

TEST REPORT

APPLICANT : Sharp Corporation, Communication Systems Group
ADDRESS : 2-13-1, Iida Hachihonmatsu, Higashi-Hiroshima City, Hiroshima,
739-0192, JAPAN
PRODUCTS : Cellular Phone
MODEL NO. : 102SH
SERIAL NO. : 004401/11/359853/2
004401/11/359810/2
FCC ID : APYHRO00157
TEST STANDARD : CFR 47 FCC Rules and Regulations Part 15
TESTING LOCATION : Japan Quality Assurance Organization
KITA-KANSAI Testing Center
1-7-7, Ishimaru, Minoh-shi, Osaka 562-0027, Japan
TEST RESULTS : **Passed**
DATE OF TEST : September 30, 2011 ~ October 18, 2011



A handwritten signature in black ink, appearing to read 'K. Shibata', positioned above a horizontal line.

Kousei Shibata
Manager
Japan Quality Assurance Organization
KITA-KANSAI Testing Center
Testing Dept. SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

- The measurement values stated in Test Report was made with traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.
- The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
- The test results presented in this report relate only to the offered test sample.
- The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
- This test report shall not be reproduced except in full without the written approval of JQA.
- VLAC does not approve, certify or warrant the product by this test report.

TABLE OF CONTENTS**Page**

Documentation	3
1 Test Regulation.....	3
2 Test Location.....	3
3 Recognition of Test Laboratory.....	3
4 Description of the Equipment Under Test.....	4
5 Test Condition.....	5
6 Preliminary Test and Test Setup	7
7 Equipment Under Test Modification.....	13
8 Responsible Party	13
9 Deviation from Standard.....	13
10 Test Results.....	14
11 Summary	17
12 Operating Condition.....	18
13 Test Configuration.....	18
14 Equipment Under Test Arrangement (Drawings)	19
Appendix A: Test Data	20
Appendix B: Test Arrangement (Photographs)	86
Appendix C: Test Instruments.....	88

DEFINITIONS FOR ABBREVIATION AND SYMBOLS USED IN THIS TEST REPORT

EUT : Equipment Under Test	EMC : Electromagnetic Compatibility
AE : Associated Equipment	EMI : Electromagnetic Interference
N/A : Not Applicable	EMS : Electromagnetic Susceptibility
N/T : Not Tested	

- ☒ - indicates that the listed condition, standard or equipment is applicable for this report.
☐ - indicates that the listed condition, standard or equipment is not applicable for this report.

Documentation

1 Test Regulation

Applied Standard : CFR 47 FCC Rules and Regulations Part 15
Subpart C – Intentional Radiators

Test Requirements : §15.247, §15.207 and §15.209

Test Procedure : ANSI C63.4–2003

The tests were performed with reference to the FCC Public Notice DA 00-705, released March 30, 2000.
The test set-up was made in accordance to the general provisions of ANSI C63.4-2003.

2 Test Location

Japan Quality Assurance Organization (JQA)
KITA-KANSAI Testing Center Testing Department SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan
MINOH Test Site (KITA-KANSAI Testing Center)
7-7, Ishimaru, 1-chome, Minoh-shi, Osaka, 562-0027, Japan
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-cho, Kameoka-shi, Kyoto, 621-0126, Japan

3 Recognition of Test Laboratory

JQA KITA-KANSAI Testing Center Testing Dept. SAITO EMC Branch is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility of Testing Division is registered by the following bodies.

VLAC Code : VLAC-001-2 (Effective through : March 30, 2012)
BSMI Recognition No. : SL2-IS-E-6006, SL2-IN-E-6006, SL2-AI-E-6006
(Effective through : September 14, 2013)
IC Registration No. : 2079E-2 (Effective through : January 25, 2014)
2079E-3, 2079E-4 (Effective through : July 20, 2014)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI.
(Effective through : February 22, 2012)

4 Description of the Equipment Under Test

4.1 General Information

1. Manufacturer : Sharp Corporation, Communication Systems Group
2-13-1, Iida Hachihonmatsu, Higashi-Hiroshima City, Hiroshima,
739-0192, JAPAN
2. Products : Cellular Phone
3. Model No. : 102SH
4. Serial No. : 004401/11/359853/2
: 004401/11/359810/2
5. Product Type : Pre-production
6. Date of Manufacture : August, 2011
7. Transmitting Frequency : 2412.0 MHz(01CH) –2462.0MHz(11CH)
8. Receiving Frequency : 2412.0 MHz(01CH) –2462.0MHz(11CH)
9. Max. RF Output Power : 16.60dBm(Measure Value of IEEE802.11b)
: 20.95dBm(Measure Value of IEEE802.11g)
: 21.19dBm(Measure Value of IEEE802.11n)
10. Power Rating : 4.0VDC (Lithium-ion Battery Pack SHBED1 1520mAh)
11. EUT Grounding : None
12. EUT Authorization : Certification
13. Receive Date of EUT : September 30, 2011

4.2 Channel Plan

The carrier spacing is 5 MHz.

The carrier frequency is designated by the absolute frequency channel number (ARFCN).

The carrier frequency is expressed in the equation shown as follows:

Transmitting Frequency (in MHz) = $2407.0 + 5 \cdot n$

Receiving Frequency (in MHz) = $2407.0 + 5 \cdot n$

where, n : channel number ($1 \leq n \leq 11$)

5 Test Condition

5.1 Channel Separation

The requirements are ☐ - Applicable ☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

Test site :	SAITO	☐ - Shielded room (S1)	☐ - Shielded room (S2)
		☐ - Shielded room (S3)	☐ - Shielded room (S4)
	MINOH	☐ - Shielded room	
	KAMEOKA	☐ - Shielded room	☐ - Conducted emission facility

Test instruments : Refer to Appendix C.

5.2 Minimum Hopping Channel

The requirements are ☐ - Applicable ☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

Test site :	SAITO	☐ - Shielded room (S1)	☐ - Shielded room (S2)
		☐ - Shielded room (S3)	☐ - Shielded room (S4)
	MINOH	☐ - Shielded room	
	KAMEOKA	☐ - Shielded room	☐ - Conducted emission facility

Test instruments : Refer to Appendix C.

5.3 Occupied Bandwidth

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site :	SAITO	☐ - Shielded room (S1)	☐ - Shielded room (S2)
		☐ - Shielded room (S3)	☒ - Shielded room (S4)
	MINOH	☐ - Shielded room	
	KAMEOKA	☐ - Shielded room	☐ - Conducted emission facility

Test instruments : Refer to Appendix C.

5.4 Dwell Time

The requirements are ☐ - Applicable ☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

Test site :	SAITO	☐ - Shielded room (S1)	☐ - Shielded room (S2)
		☐ - Shielded room (S3)	☐ - Shielded room (S4)
	MINOH	☐ - Shielded room	
	KAMEOKA	☐ - Shielded room	☐ - Conducted emission facility

Test instruments : Refer to Appendix C.

5.5 Peak Output Power and Density (Conduction)

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site :	SAITO	☐ - Shielded room (S1)	☐ - Shielded room (S2)
		☐ - Shielded room (S3)	☒ - Shielded room (S4)
	MINOH	☐ - Shielded room	
	KAMEOKA	☐ - Shielded room	☐ - Conducted emission facility

Test instruments : Refer to Appendix C.

5.6 Spurious Emission (Conduction)

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site :	SAITO	☐ - Shielded room (S1)	☐ - Shielded room (S2)
		☐ - Shielded room (S3)	☒ - Shielded room (S4)
	MINOH	☐ - Shielded room	
	KAMEOKA	☐ - Shielded room	☐ - Conducted emission facility

Test instruments : Refer to Appendix C.

5.7 AC Powerline Conducted Emission

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site :	SAITO	☐ - Anechoic chamber (A1)	☐ - Measurement room (M1)
		☐ - Measurement room (M2)	☐ - Measurement room (M3)
		☐ - Shielded room (S1)	☒ - Shielded room (S2)
	MINOH	☐ - Shielded room	
		☐ - Anechoic chamber	
	KAMEOKA	☐ - Shielded room	☐ - Conducted emission facility
		☐ - 1st open site	

Test instruments : Refer to Appendix C.

5.8 Field Strength of Spurious Radiation

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site :	SAITO	☐ - Anechoic chamber (A1)	☒ - Anechoic chamber (A2)
	KAMEOKA	☐ - 1st open site	

Test instruments : Refer to Appendix C.

6 Preliminary Test and Test Setup

6.1 Channel Separation

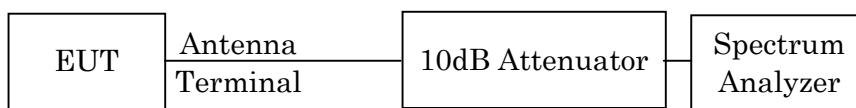
Not Applicable

6.2 Minimum Hopping Channel

Not Applicable

6.3 Occupied Bandwidth

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

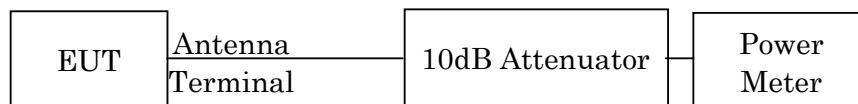
Res. Bandwidth	100 kHz
Video Bandwidth	300 kHz
Span	30 MHz
Sweep Time	AUTO
Trace	Maxhold

6.4 Dwell Time

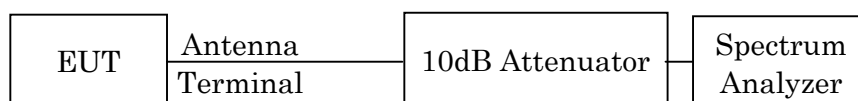
Not Applicable

6.5 Peak Output Power and Peak Power Density

The Conducted RF Power Output was measured with a power meter, one 10dB attenuator and a short, low loss cable.

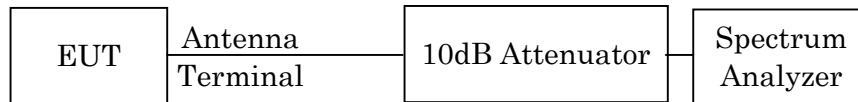


The Peak Power Density was measured with a spectrum analyzer, one 10dB attenuator and a short, low loss cable.



6.6 Spurious Emission(Conduction)

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

Frequency Range	30 MHz - 25 GHz	Band-Edge
Res. Bandwidth	100 kHz	100 kHz
Video Bandwidth	300 kHz	300 kHz
Sweep Time	AUTO	AUTO
Trace	Maxhold	Maxhold

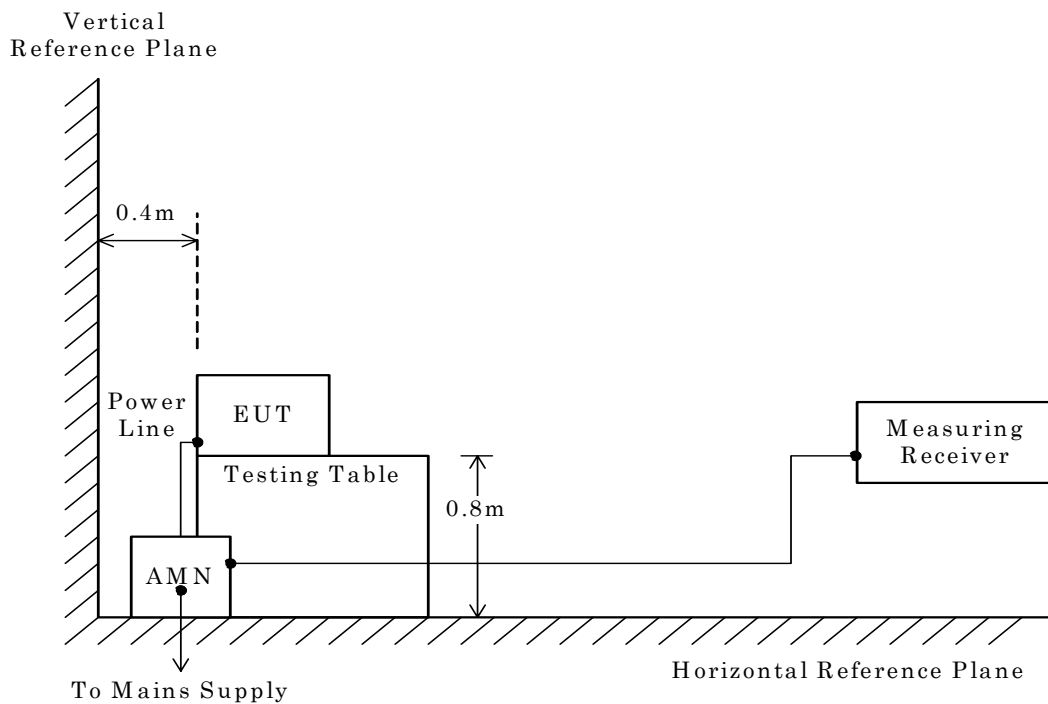
6.7 AC Powerline Conducted Emission

The preliminary tests were performed using the scan mode of test receiver or spectrum analyzer to observe the emissions characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for final tests.

– Side View –



NOTE

AMN : Artificial Mains Network

6.8 Field Strength of Spurious Emission

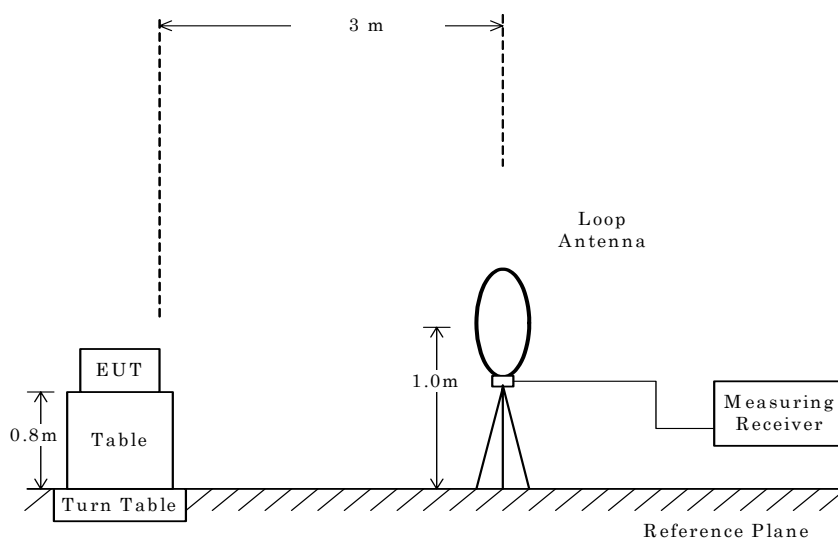
6.8.1 Field Strength of Spurious Emission 9 kHz – 30 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration(in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

– Side View –



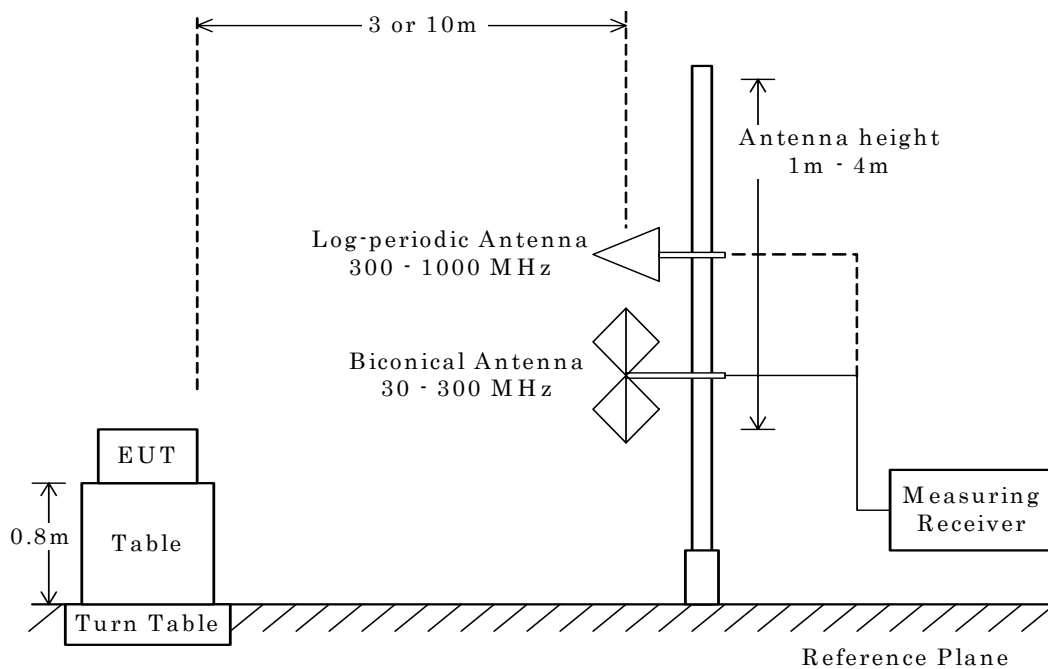
6.8.2 Field Strength of Spurious Emission 30 MHz – 1000 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration(in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

– Side View –



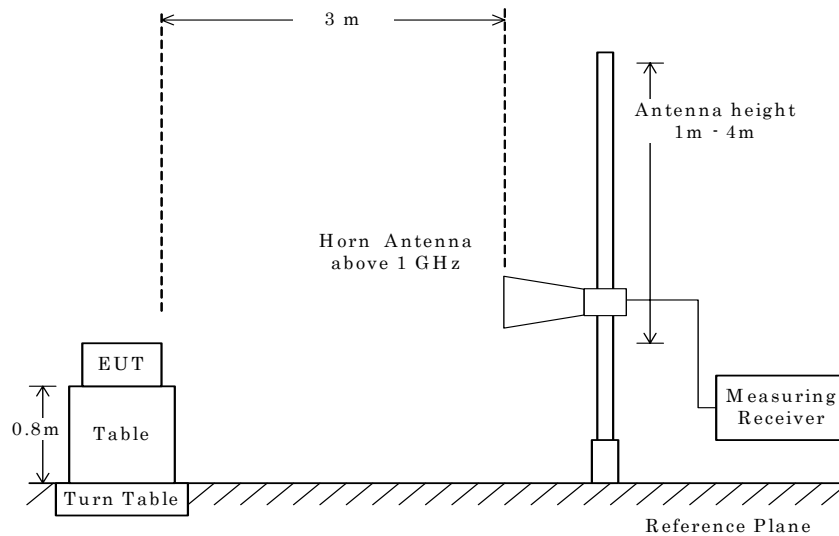
6.8.3 Field Strength of Spurious Emission above 1 GHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration(in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

– Side View –



NOTE

The antenna height is scanned depending on the EUT's size and mounting height.

7 Equipment Under Test Modification

- ☒ - No modifications were conducted by JQA to achieve compliance to the limitations.
☐ - To achieve compliance to the limitations, the following changes were made by JQA during the compliance test.

The modifications will be implemented in all production models of this equipment.

Applicant : Not Applicable

Date : Not Applicable

Typed Name : Not Applicable

Position : Not Applicable

Signatory : Not Applicable

8 Responsible PartyResponsible Party of Test Item (Product)

Responsible Party :

Contact Person :

Signatory

9 Deviation from Standard

- ☒ - No deviations from the standard described in clause 1.
☐ - The following deviations were employed from the standard described in clause 1.

10 Test Results**10.1 RF Power Output (§2.1046)****10.1.1 Channel Separation**

The requirements are ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

☐ - Passed ☐ - Failed ☐ - Not judged

Channel Separation is _____ MHz
Channel Separation(Inquiry) is _____ MHz

Uncertainty of Measurement Results +/-0.9 %(2 σ)

Remarks : _____

10.1.2 Minimum Hopping Channel

The requirements are ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

Number of Channel is _____
Number of Channel (Inquiry) is _____

Remarks : _____

10.1.3 Occupied Bandwidth

The requirements are ☒ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

☒ - Passed ☐ - Failed ☐ - Not judged

The 99% Bandwidth of IEEE802.11b is	<u>14.356</u>	MHz	at	<u>2462.0</u>	MHz
The 99% Bandwidth of IEEE802.11g is	<u>16.464</u>	MHz	at	<u>2437.0</u>	MHz
The 99% Bandwidth of IEEE802.11n is	<u>17.675</u>	MHz	at	<u>2437.0</u>	MHz

The 6dB Bandwidth of IEEE802.11b is	<u>10.796</u>	MHz	at	<u>2462.0</u>	MHz
The 6dB Bandwidth of IEEE802.11g is	<u>16.513</u>	MHz	at	<u>2437.0</u>	MHz
The 6dB Bandwidth of IEEE802.11n is	<u>17.725</u>	MHz	at	<u>2462.0</u>	MHz

Uncertainty of Measurement Results +/-0.9 %(2 σ)

Remarks : _____

10.1.4 Dwell Time

The requirements are ☐ - Applicable ☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

☐ - Passed ☐ - Failed ☐ - Not judged

Dwell Time is _____ msec

Dwell Time (Inquiry) is _____ msec

Uncertainty of Measurement Results +/-0.6 %(2 σ)

Remarks : _____

10.1.5 Peak Output Power(Conduction)

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Peak Output Power of IEEE802.11b is 16.60 dBm at 2437.0 MHz

Peak Output Power of IEEE802.11g is 20.95 dBm at 2462.0 MHz

Peak Output Power of IEEE802.11n is 21.19 dBm at 2462.0 MHz

Uncertainty of Measurement Results at Amplitude +/-1.2 dB(2 σ)

Remarks : _____

10.1.6 Peak Power Density(Conduction)

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Peak Power Density of IEEE802.11b is -7.25 dBm at 2462.0 MHz

Peak Power Density of IEEE802.11g is -13.88 dBm at 2462.0 MHz

Peak Power Density of IEEE802.11n is -14.56 dBm at 2462.0 MHz

Uncertainty of Measurement Results at Amplitude +/-0.8 dB(2 σ)

Remarks : _____

10.2 Spurious Emissions(Conduction)

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

☒ - Passed ☐ - Failed ☐ - Not judged

Uncertainty of Measurement Results	9 kHz – 1GHz	<u>+/-1.0</u>	dB(2σ)
	1GHz – 18GHz	<u>+/-1.2</u>	dB(2σ)
	18GHz – 40GHz	<u>+/-1.6</u>	dB(2σ)

Remarks : _____

10.3 AC Powerline Conducted Emission

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

☒ - Passed ☐ - Failed ☐ - Not judged

Min. Limit Margin (Quasi-Peak) 15.1 dB at 1.89 MHz

Max. Limit Exceeding (Quasi-Peak) _____ dB at _____ MHz

Uncertainty of Measurement Results +/-2.5 dB(2σ)

Remarks : _____

10.4 Field Strength of Spurious Emission

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

☒ - Passed ☐ - Failed ☐ - Not judged

Min. Limit Margin (Average) >4.3 dB at 22158.0 MHz

Max. Limit Exceeding (Average) _____ dB at _____ MHz

Uncertainty of Measurement Results	9 kHz – 30 MHz	<u>+/-1.7</u>	dB(2σ)
	30 MHz – 300 MHz	<u>+/-4.3</u>	dB(2σ)
	300 MHz – 1000 MHz	<u>+/-4.5</u>	dB(2σ)
	1 GHz – 18 GHz	<u>+/-4.0</u>	dB(2σ)
	18 GHz – 40 GHz	<u>+/-4.7</u>	dB(2σ)

Remarks : _____

11 Summary**General Remarks :**

The EUT was tested according to the requirements of the following standard.

CFR 47 FCC Rules and Regulations Part 15

The test configuration is shown in clause 12 to 14.

The conclusion for the test items of which are required by the applied regulation is indicated under the test results.

Determining compliance with the limits in this report was based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

Test Results :

The “as received” sample;

- ☒ - fulfill the test requirements of the regulation mentioned on clause 1.
- ☒ - doesn't fulfill the test requirements of the regulation mentioned on clause 1.

Reviewed by:

Tested by:



Shigeru Kinoshita
Deputy Manager
JQA KITA-KANSAI Testing Center
Testing Dept. SAITO EMC Branch



Shigeru Osawa
Deputy Manager
JQA KITA-KANSAI Testing Center
Testing Dept. SAITO EMC Branch

12 Operating Condition

Transmitting/Receiving

Transmitting frequency : 2412.0 MHz(1CH) – 2462.0 MHz(11CH)

Receiver frequency : 2412.0 MHz(1CH) – 2462.0 MHz(11CH)

Modulation Type

1. 802.11b : DSSS

2. 802.11g : OFDM

3. 802.11n : OFDM

Other Clock Frequency

32.768 kHz, 26.0 MHz, 27.12 MHz, 38.4 MHz

13 Test Configuration

The equipment under test (EUT) consists of :

	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	Cellular Phone	Sharp	102SH	004401/11/3 59853/2*1) 004401/11/3 59810/2*2)	APYHRO00157
B	Lithium-ion Battery	Sharp	SHBED1	--	N/A
C	AC Charger	KYUSHU MITSUMI	ZTDAA1	--	N/A
D	USB conversion cable	Sharp	SHCDL1	--	N/A
E	Handsfree	Sharp	SHLDL1	--	N/A

*1) Used for AC Powerline Conducted Emission and Field Strength of Spurious Emission

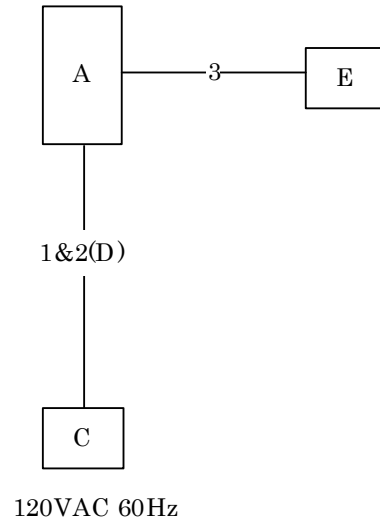
*2) Used for Antenna Conducted Emission

The auxiliary equipment used for testing :

None

Type of Cable:

No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	DC Power Cord	--	NO	--	NO	1.5
2	USB conversion cable	--	--	NO	NO	0.1
3	Handsfree	--	NO	--	NO	1.5

14 Equipment Under Test Arrangement (Drawings)

Appendix A: Test Data**A.1 Channel Separation**

Not Applicable

A.2 Minimum Hopping Channel

Not Applicable

A.3 Occupied Bandwidth

Test Date : October 12, 2011

Temp.:24°C, Humi:58%

The resolution bandwidth was set to about 1% of emission bandwidth, -6dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

A) IEEE 802.11b

1)Data Rate : 1Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	13.972	9.078
06	2437.0	13.948	9.102
11	2462.0	13.916	9.084

2)Data Rate : 2Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	13.954	9.500
06	2437.0	13.912	9.260
11	2462.0	13.878	9.858

3)Data Rate : 5.5Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	14.270	10.158
06	2437.0	14.291	10.286
11	2462.0	14.356	10.796

4)Data Rate : 11Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	14.330	9.787
06	2437.0	14.291	9.272
11	2462.0	14.291	9.734

B) IEEE 802.11g

1) Data Rate : 6Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	16.321	15.111
06	2437.0	16.316	15.829
11	2462.0	16.341	16.344

2) Data Rate : 54Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	16.448	16.511
06	2437.0	16.464	16.513
11	2462.0	16.442	16.488

C) IEEE 802.11n

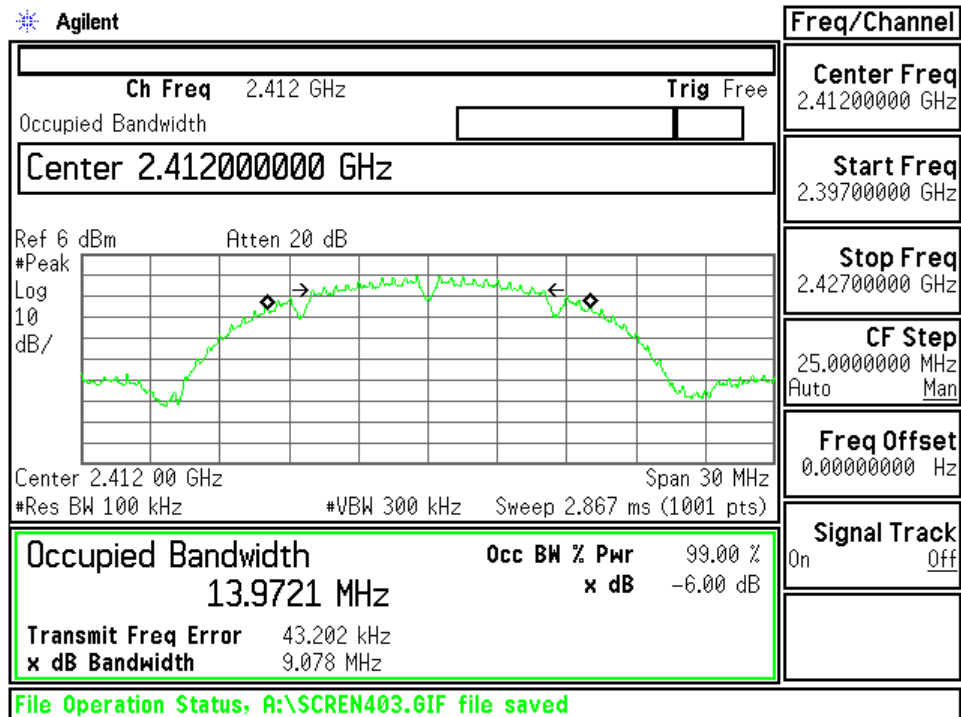
1) Data Rate : 6.5Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	17.557	13.590
06	2437.0	17.553	15.686
11	2462.0	17.563	15.054

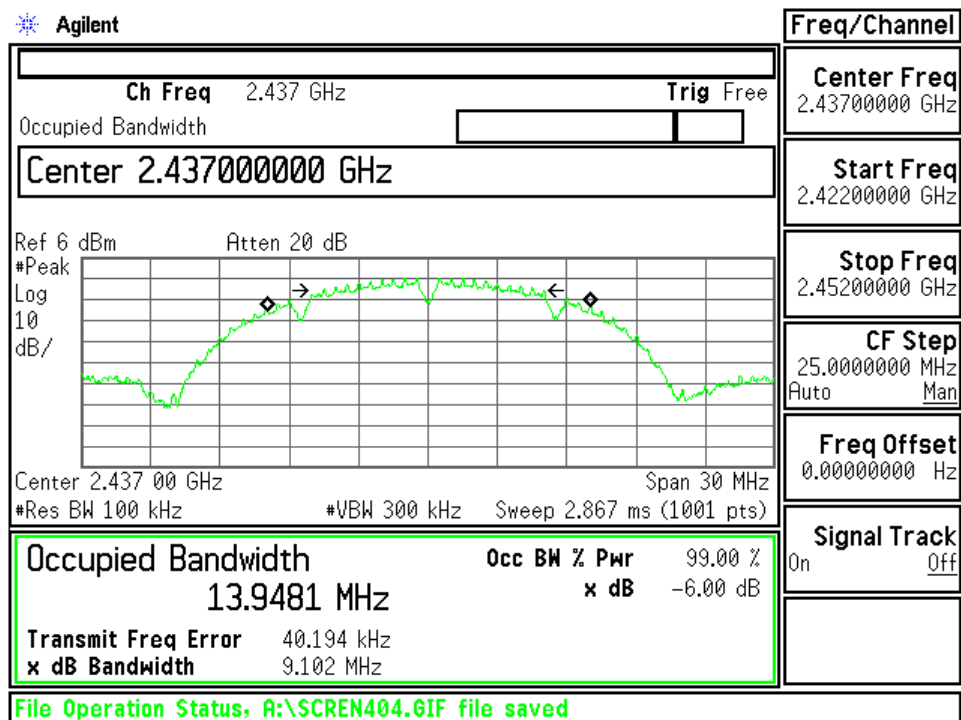
2) Data Rate : 65Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	17.672	17.722
06	2437.0	17.675	17.714
11	2462.0	17.668	17.725

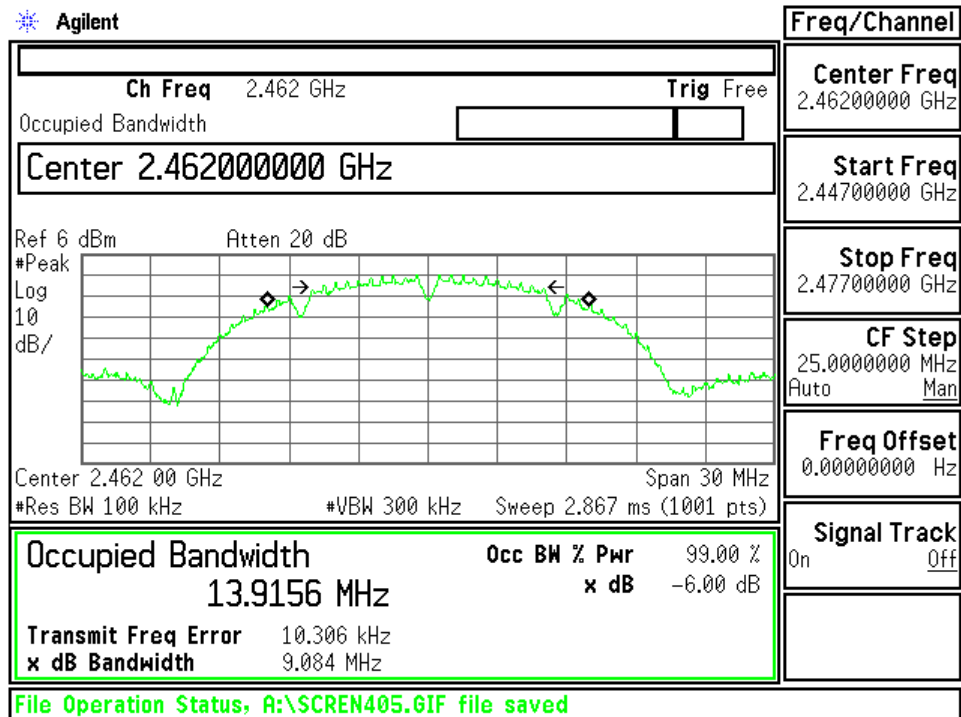
1)Data Rate : 1Mbps(IEEE 802.11b) Low Channel



Middle Channel

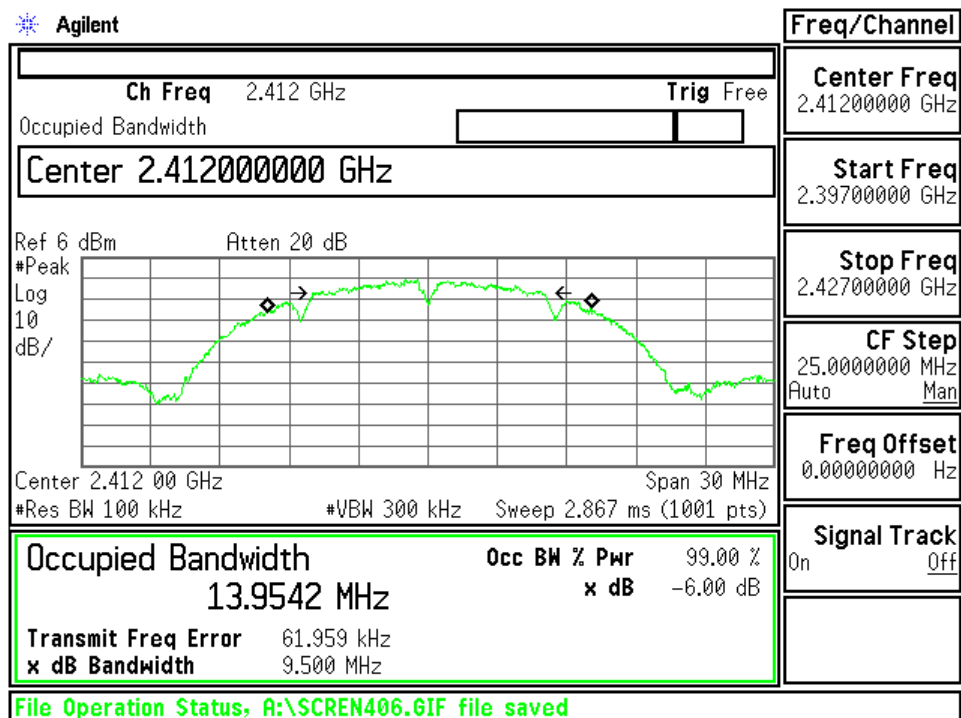


High Channel

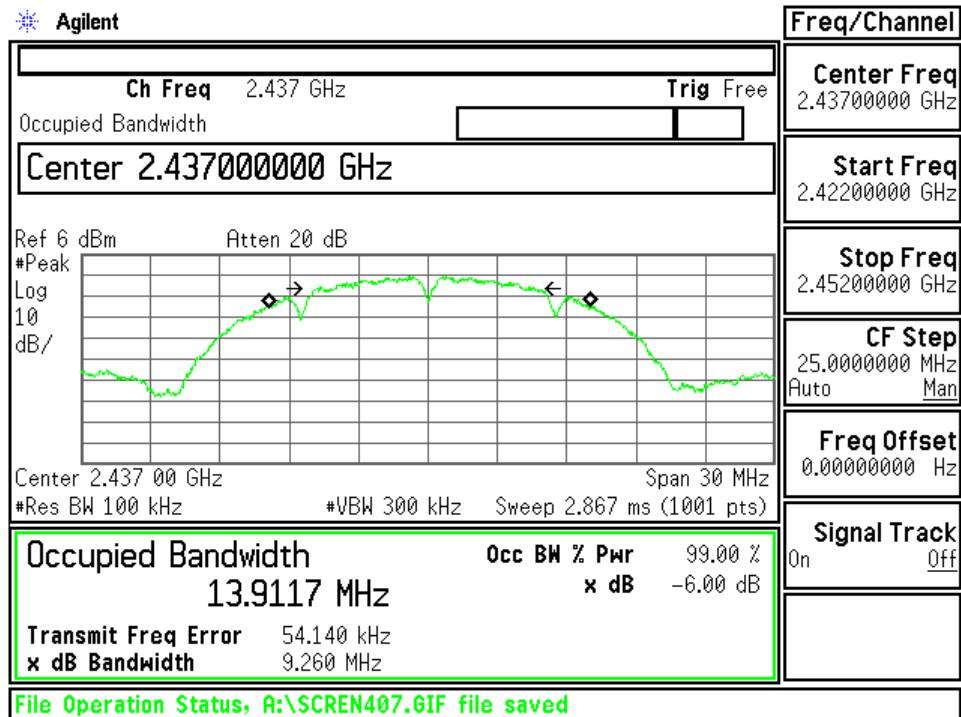


2)Data Rate : 2Mbps(IEEE 802.11b)

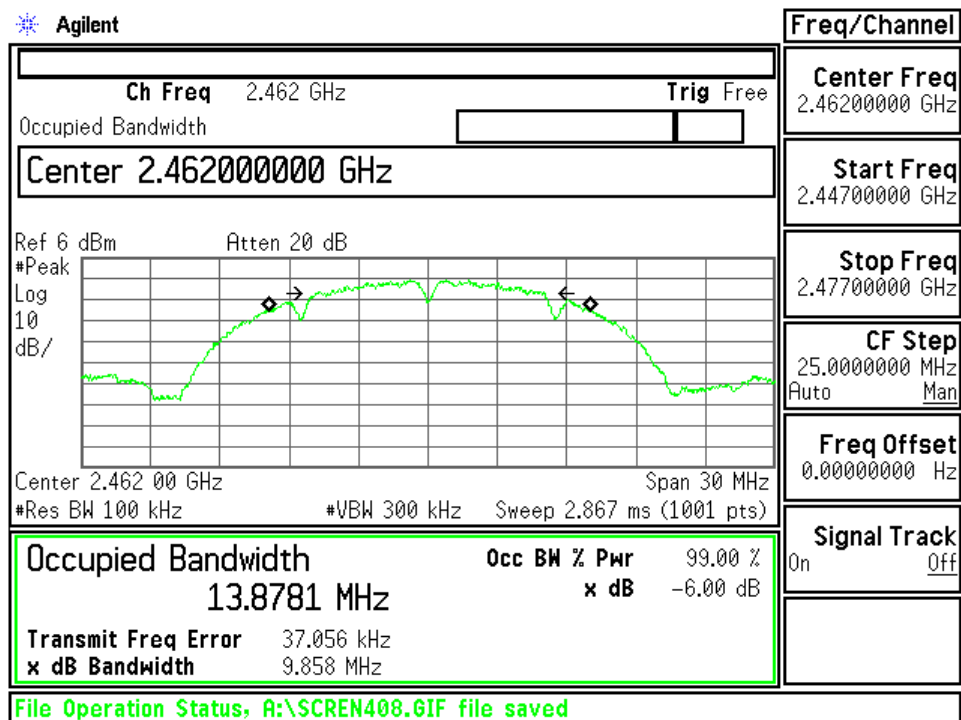
Low Channel



Middle Channel

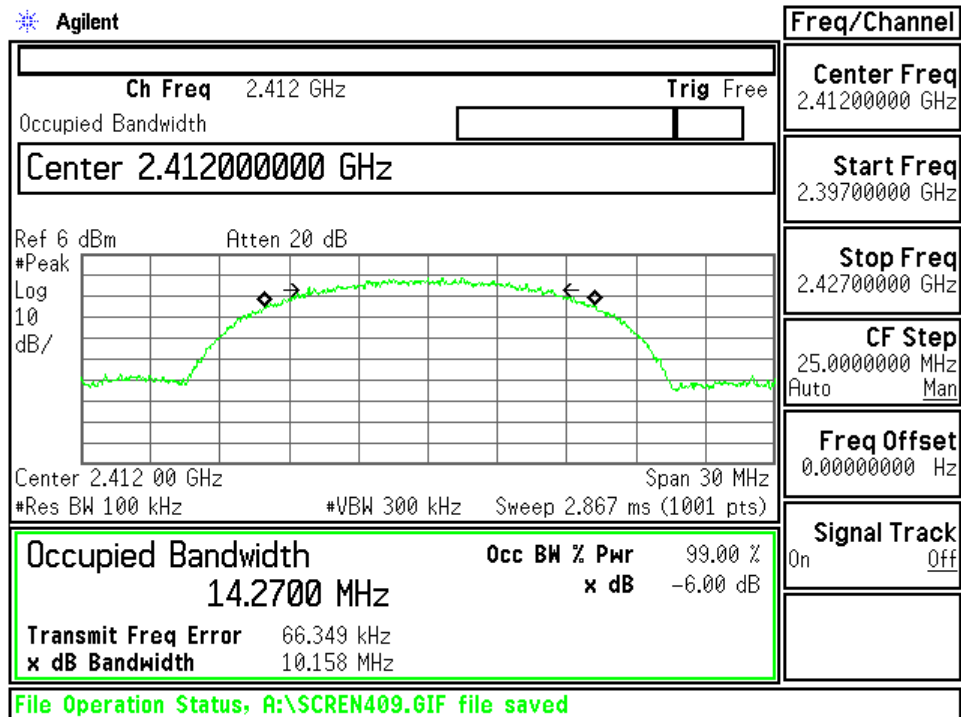


High Channel

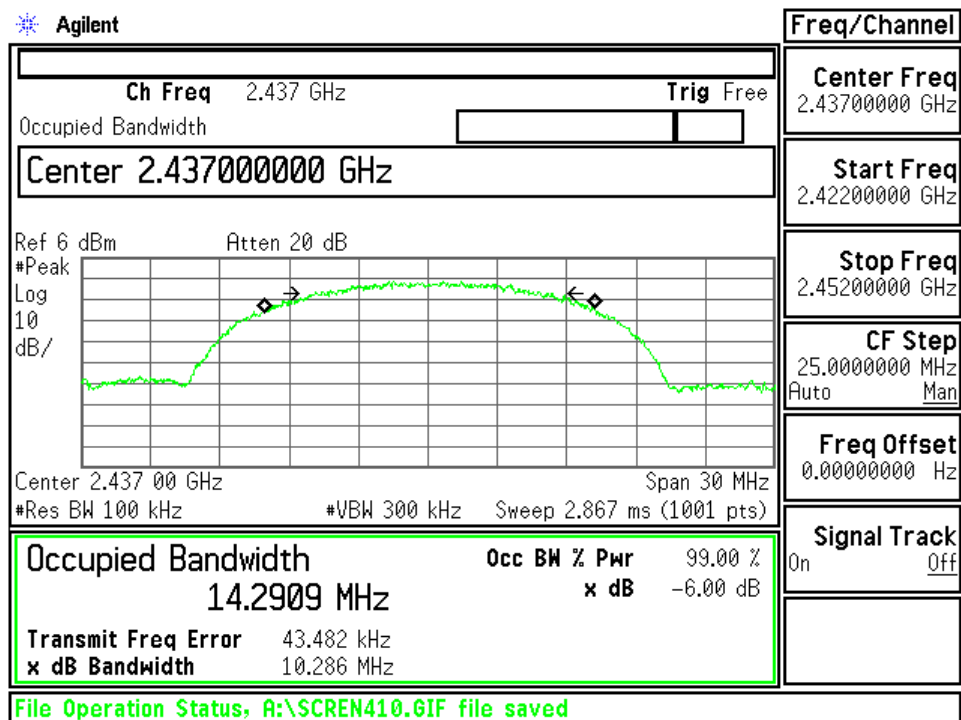


3)Data Rate : 5.5Mbps(IEEE 802.11b)

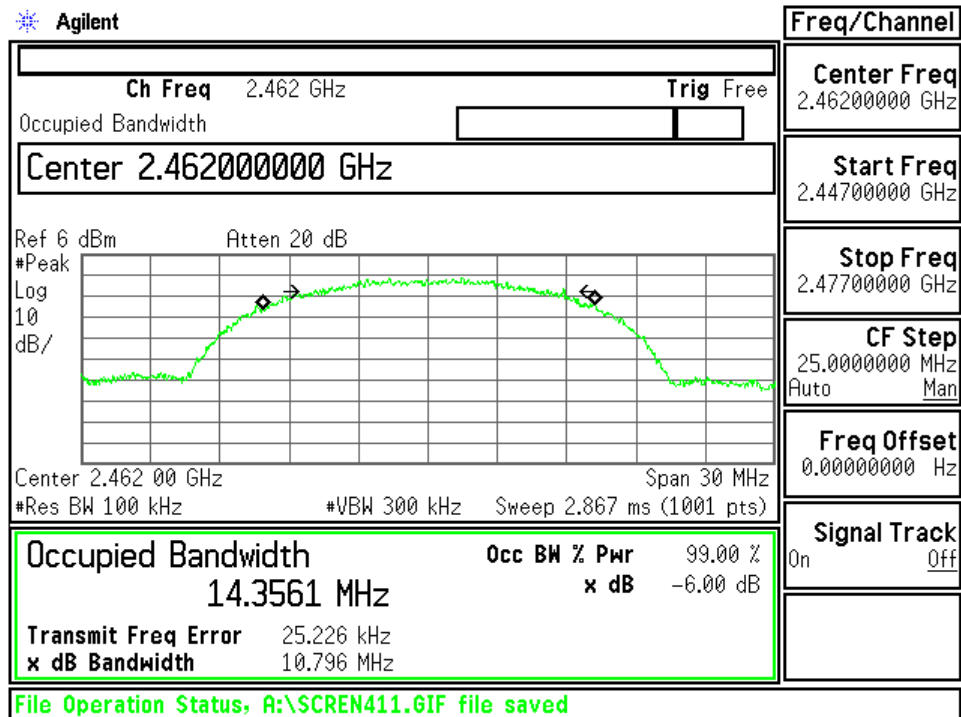
Low Channel



Middle Channel

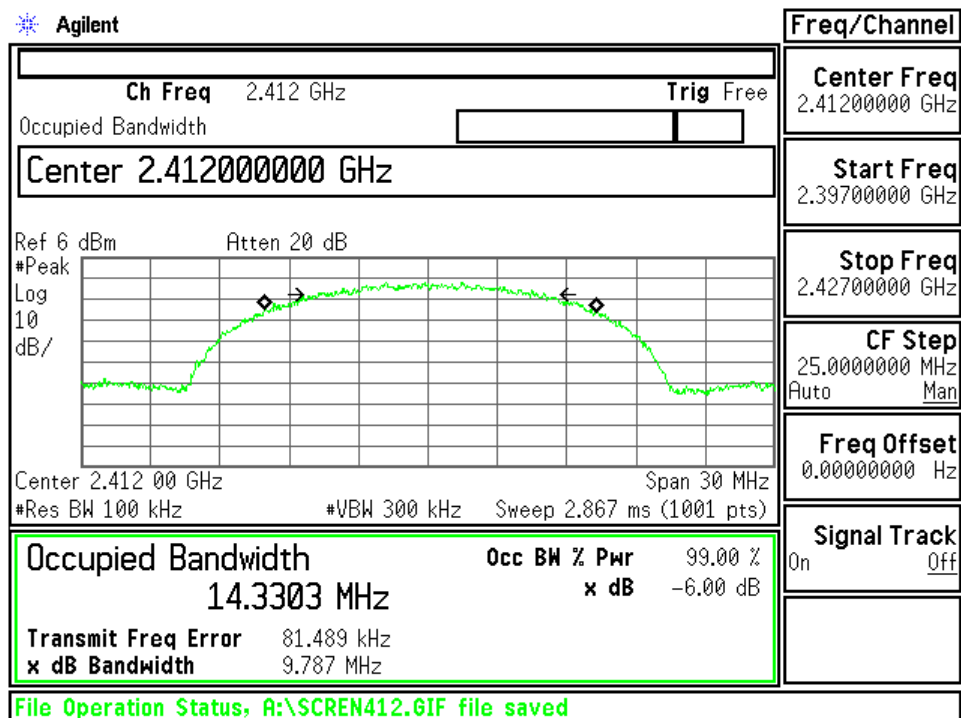


High Channel

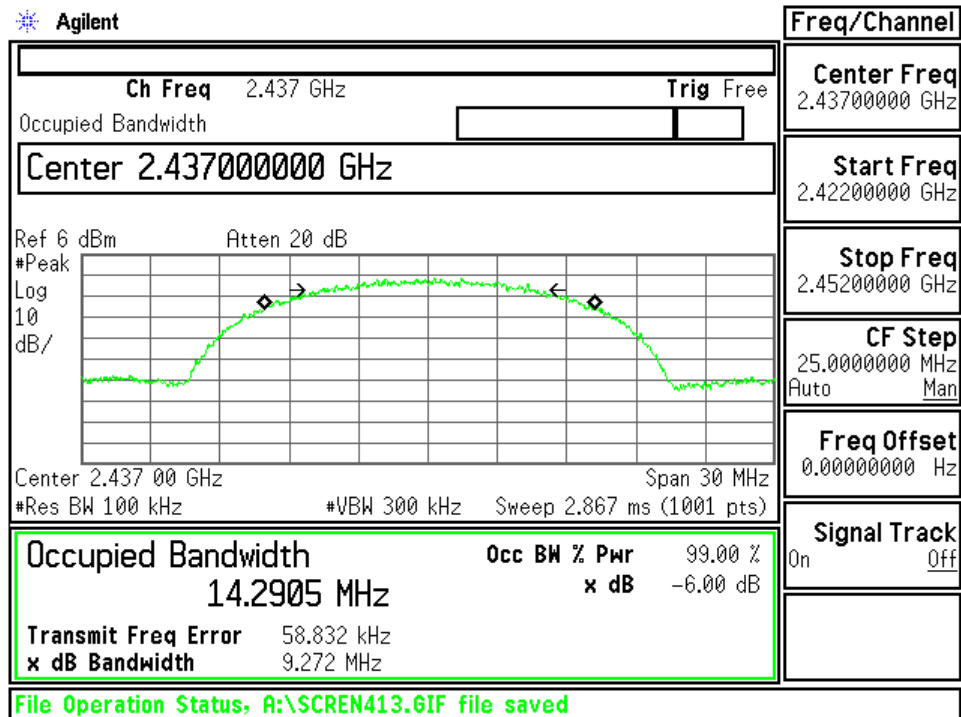


4)Data Rate : 11Mbps(IEEE 802.11b)

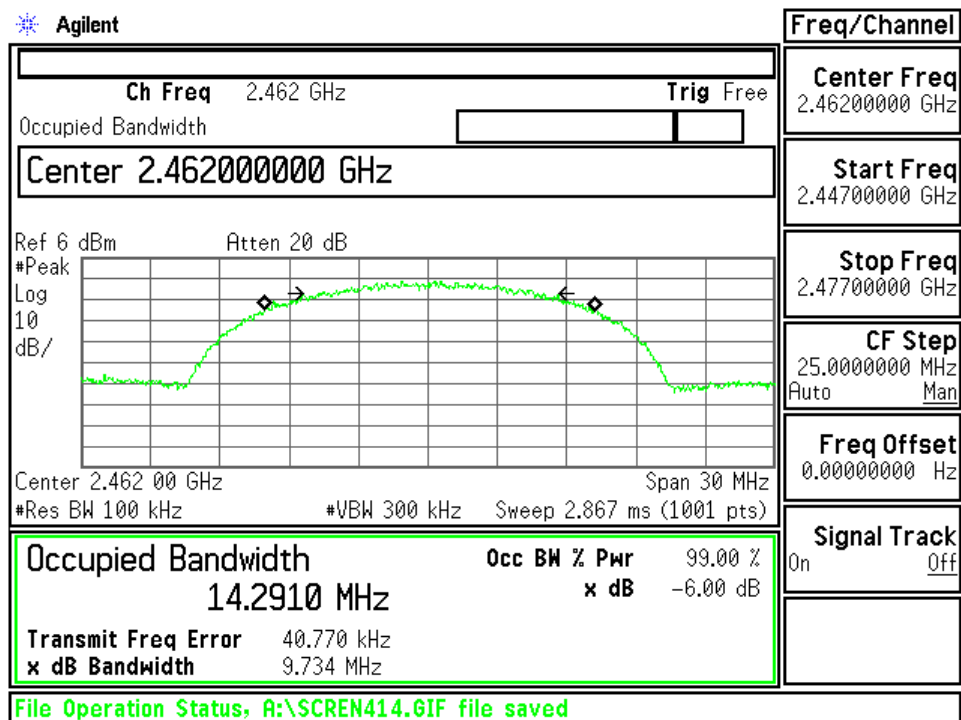
Low Channel



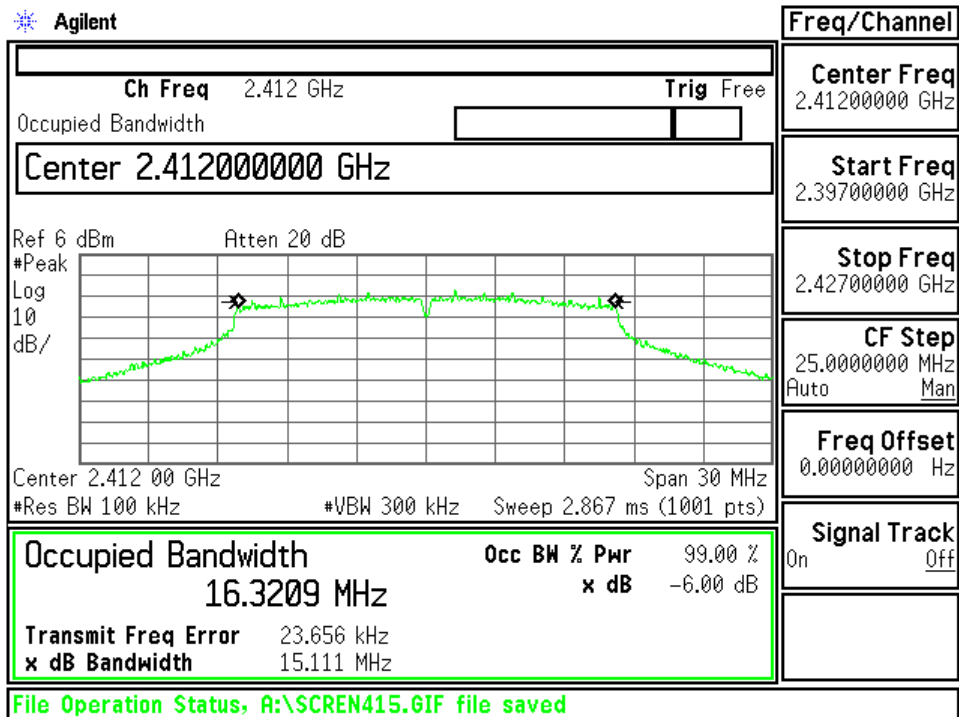
Middle Channel



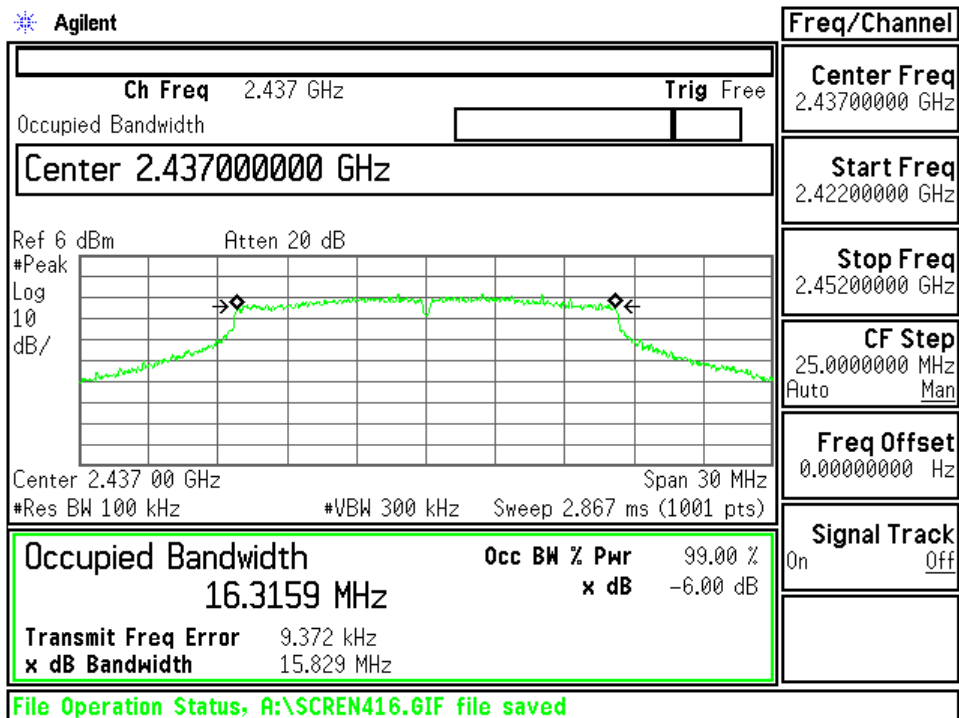
High Channel



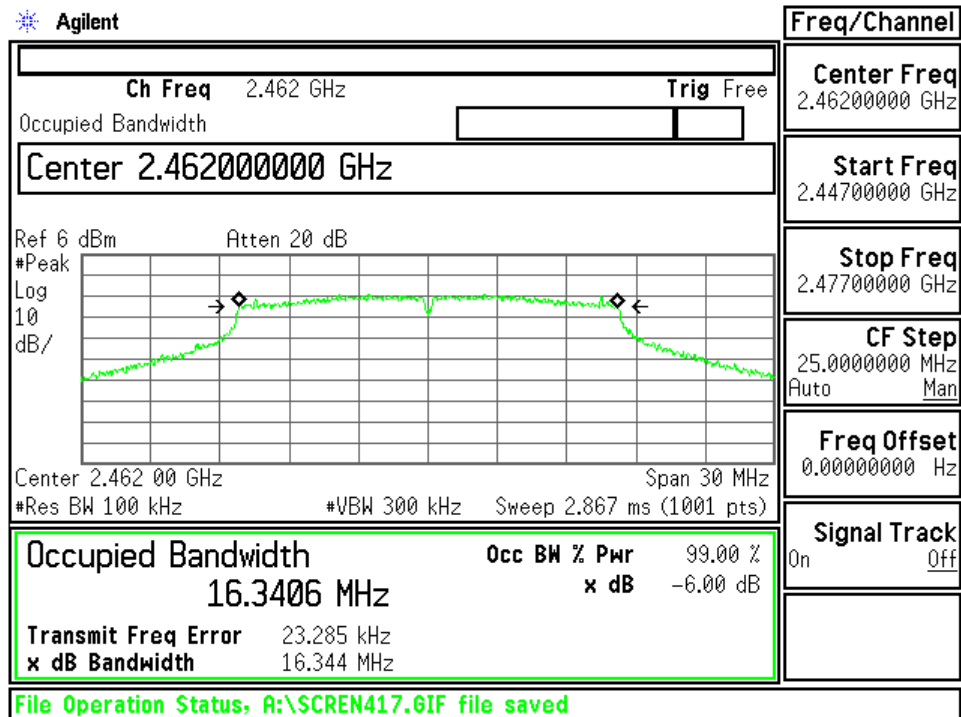
5)Data Rate : 6Mbps(IEEE 802.11g)
Low Channel



Middle Channel

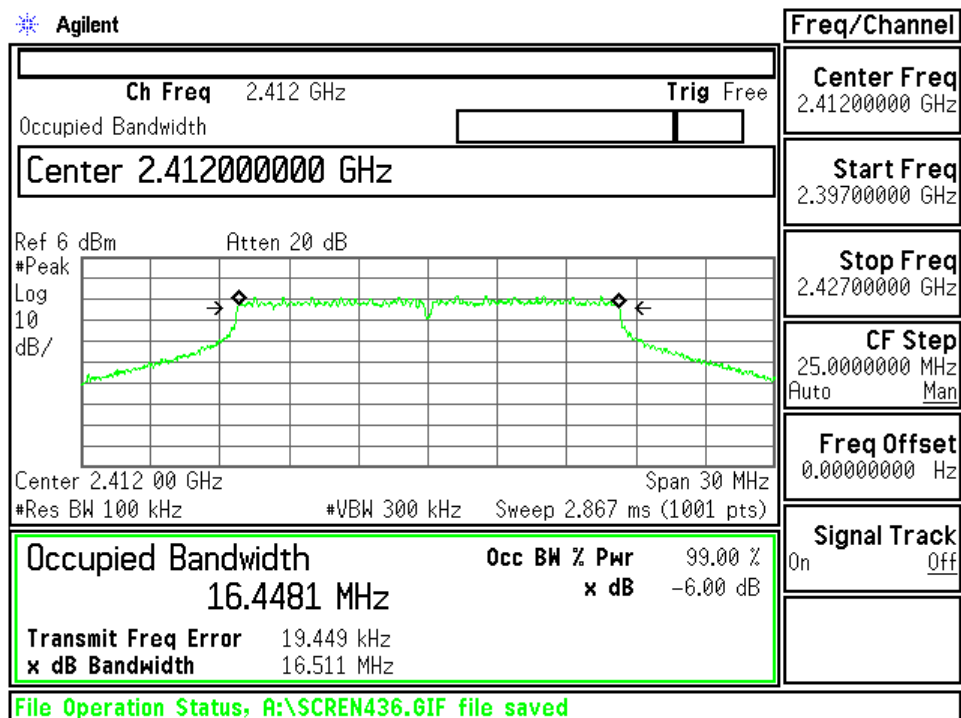


High Channel

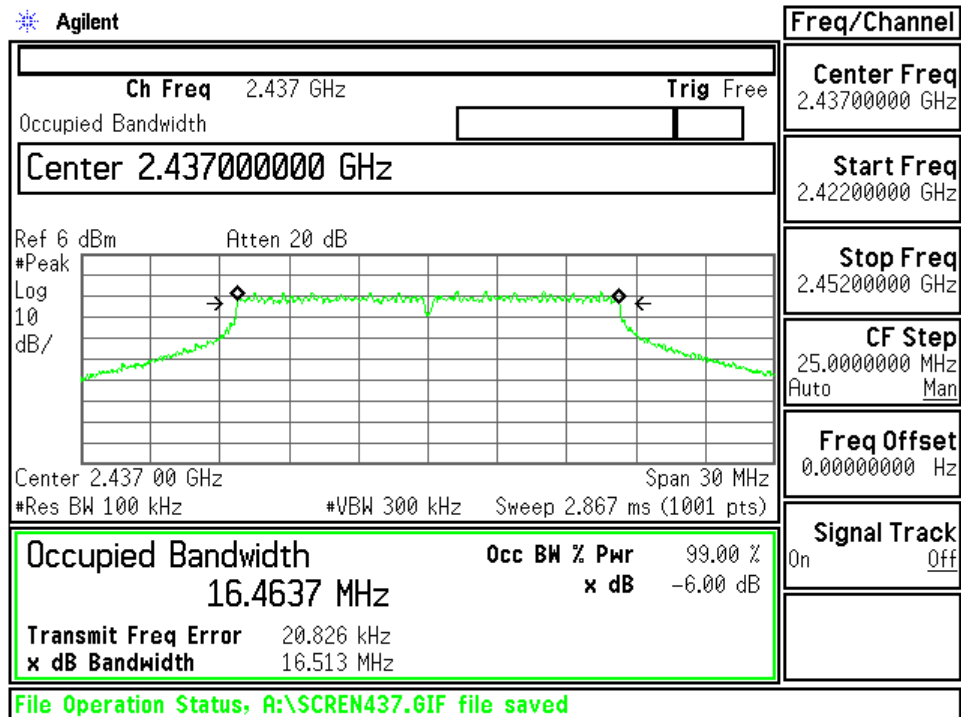


6)Data Rate : 54Mbps(IEEE 802.11g)

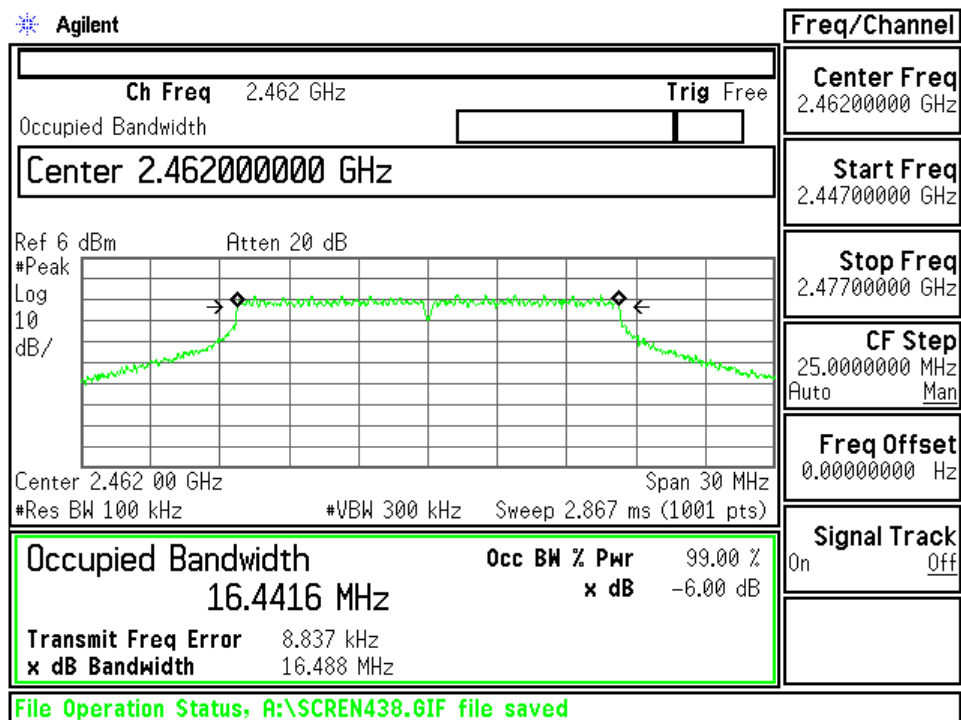
Low Channel



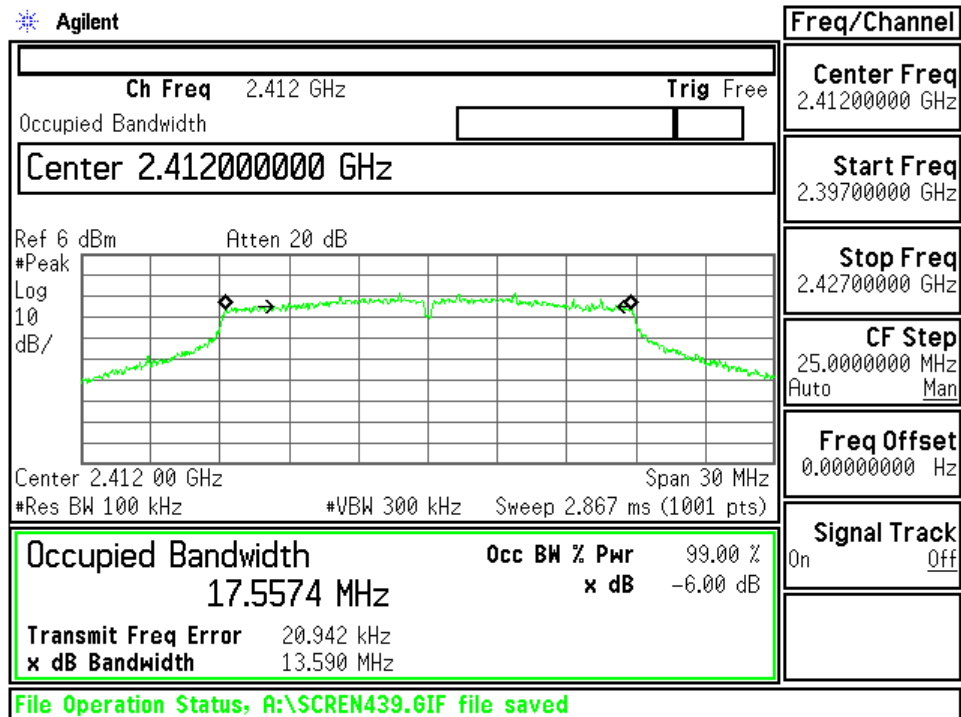
Middle Channel



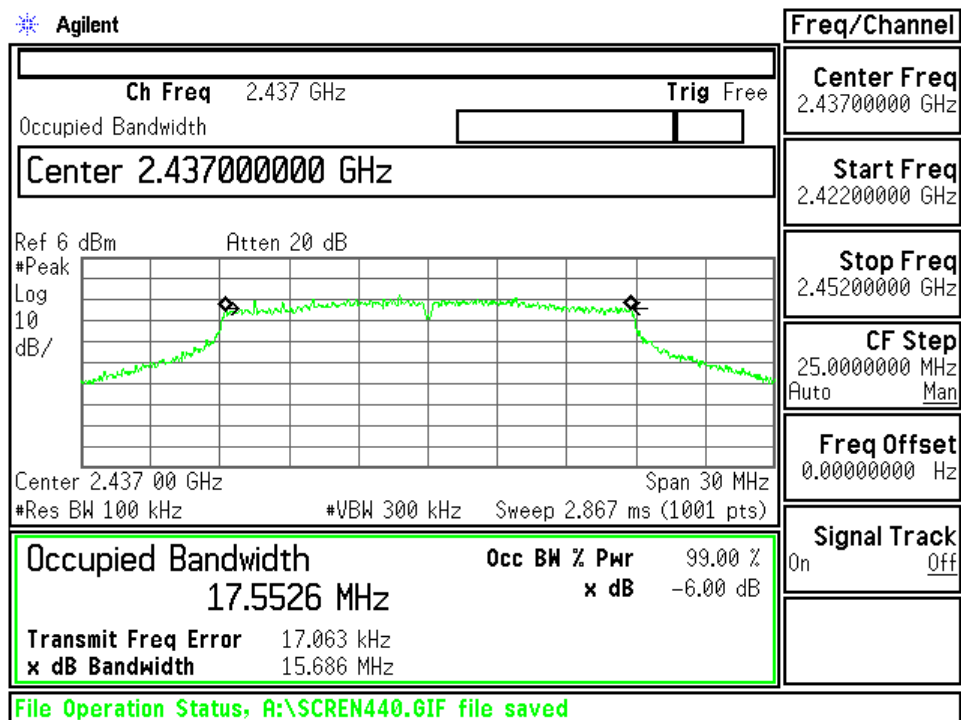
High Channel



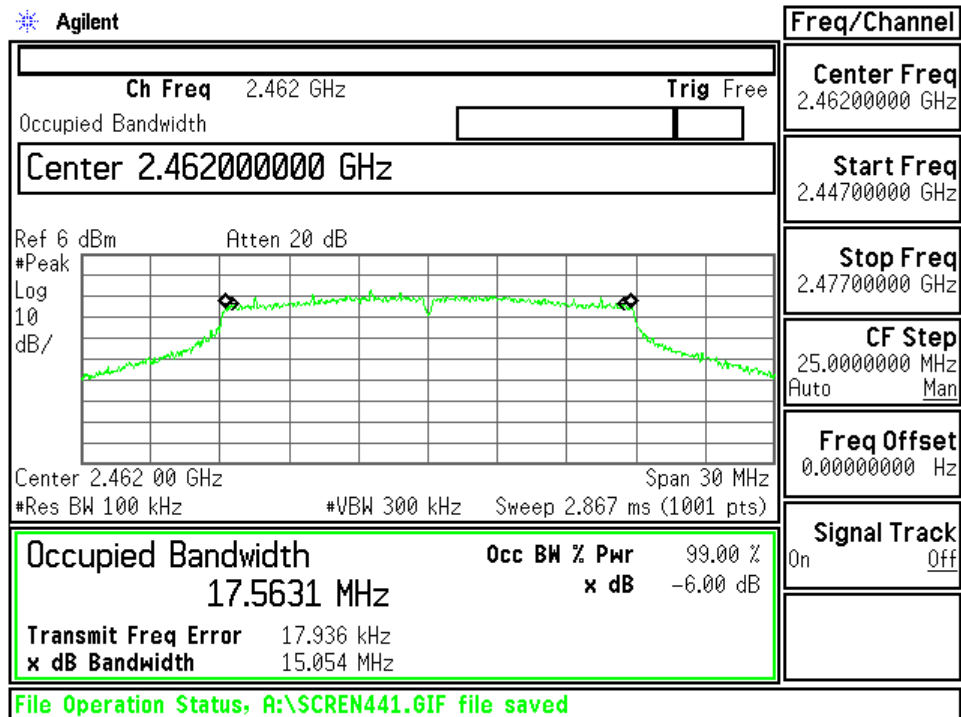
7)Data Rate : 6.5Mbps(IEEE 802.11n)
Low Channel



Middle Channel

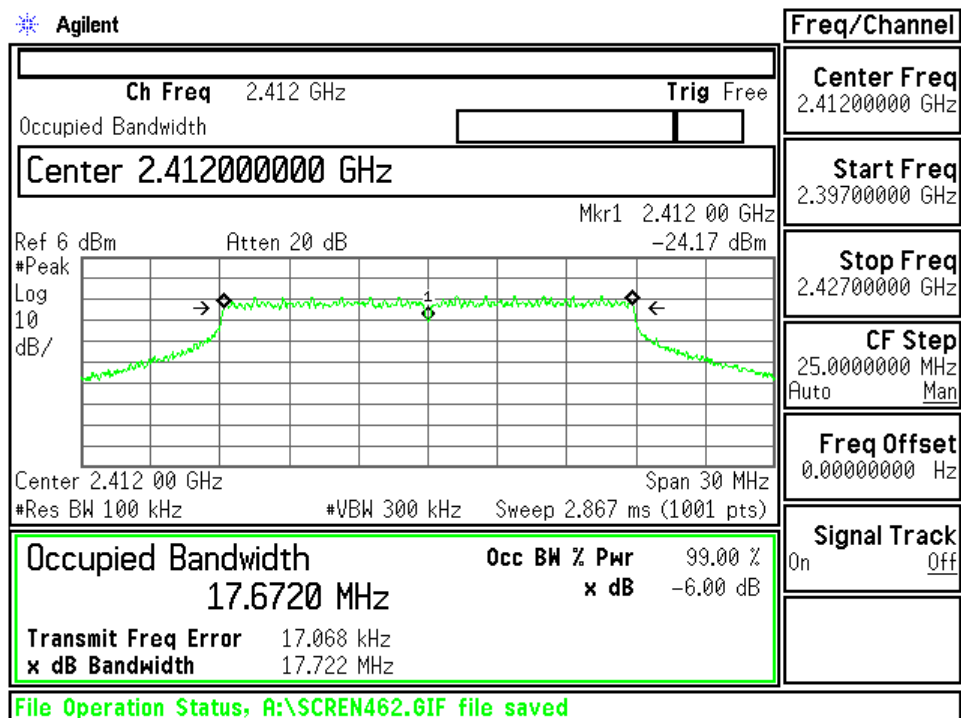


High Channel

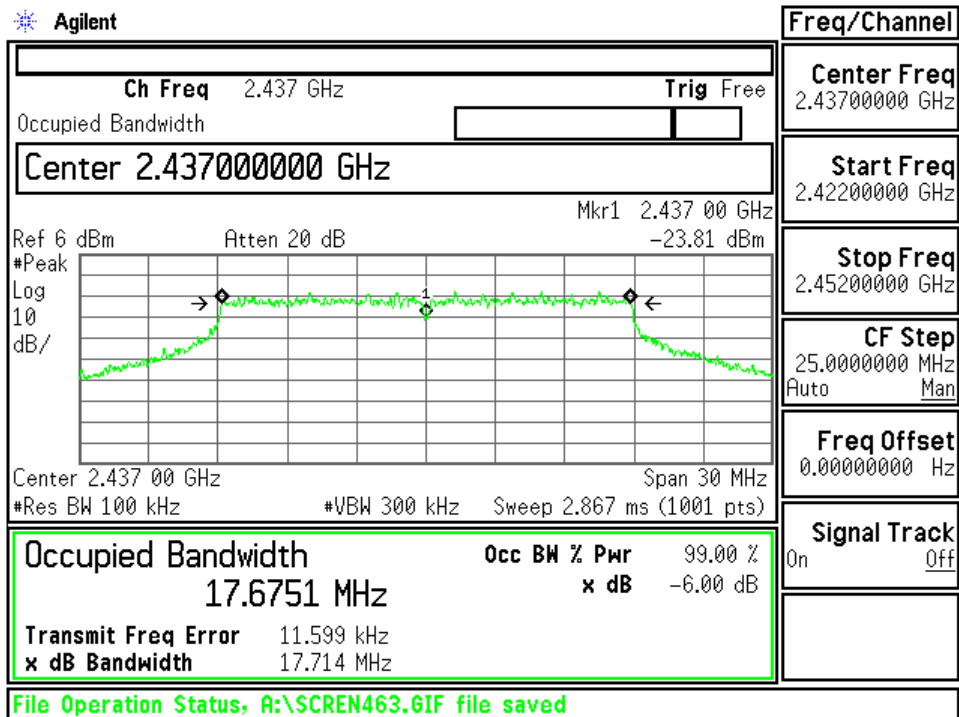


8)Data Rate : 65Mbps(IEEE 802.11n)

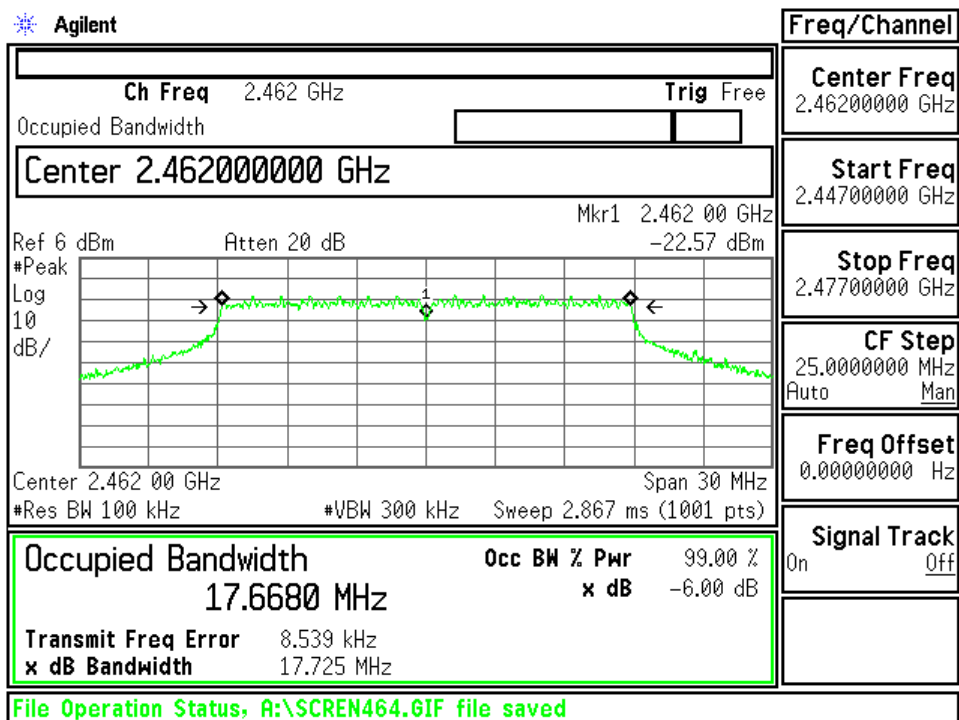
Low Channel



Middle Channel



High Channel



A.4 Dwell Time

Not Applicable

A.5 Peak Output Power(Conduction)

1)Data Rate : 1Mbps(IEEE 802.11b)

Data Rate : 1Mbps						Test Date: September 30, 2011 Temp.: 26 °C, Humi: 68 %	
Transmitting Frequency	Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin	
CH [MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]	
01 2412	10.03	6.16	16.19	41.59	30.00	+13.81	
06 2437	10.03	6.57	16.60	45.71	30.00	+13.40	
11 2462	10.03	6.48	16.51	44.77	30.00	+13.49	

Calculated result at 2437.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	6.57 dBm
Result	=	16.60 dBm = 45.71 mW

Minimum Margin: 30.00 - 16.60 = 13.40 (dB)

NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

2)Data Rate : 2Mbps(IEEE 802.11b)

Data Rate : 2Mbps						Test Date: September 30, 2011 Temp.: 26 °C, Humi: 68 %	
Transmitting Frequency	Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin	
CH [MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]	
01 2412	10.03	5.99	16.02	39.99	30.00	+13.98	
06 2437	10.03	6.42	16.45	44.16	30.00	+13.55	
11 2462	10.03	6.45	16.48	44.46	30.00	+13.52	

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	6.45 dBm
Result	=	16.48 dBm = 44.46 mW

Minimum Margin: 30.00 - 16.48 = 13.52 (dB)

NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

3)Data Rate : 5.5Mbps(IEEE 802.11b)

Data Rate : 5.5Mbps

Test Date: September 30, 2011

Temp.: 26 °C, Humi: 68 %

Transmitting Frequency		Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
01	2412	10.03	5.32	15.35	34.28	30.00	+14.65
06	2437	10.03	5.45	15.48	35.32	30.00	+14.52
11	2462	10.03	5.62	15.65	36.73	30.00	+14.35

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	5.62 dBm
Result	=	15.65 dBm = 36.73 mW

Minimum Margin: 30.00 - 15.65 = 14.35 (dB)

NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

4)Data Rate : 11Mbps(IEEE 802.11b)

Data Rate : 11Mbps

Test Date: September 30, 2011

Temp.: 26 °C, Humi: 68 %

Transmitting Frequency		Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
01	2412	10.03	5.13	15.16	32.81	30.00	+14.84
06	2437	10.03	5.36	15.39	34.59	30.00	+14.61
11	2462	10.03	5.73	15.76	37.67	30.00	+14.24

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	5.73 dBm
Result	=	15.76 dBm = 37.67 mW

Minimum Margin: 30.00 - 15.76 = 14.24 (dB)

NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

5)Data Rate : 6Mbps(IEEE 802.11g)

Test Date: September 30, 2011
Temp.: 26 °C, Humi: 68 %

Data Rate : 6Mbps

Transmitting Frequency		Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
01	2412	10.03	10.12	20.15	103.51	30.00	+ 9.85
06	2437	10.03	10.16	20.19	104.47	30.00	+ 9.81
11	2462	10.03	10.92	20.95	124.45	30.00	+ 9.05

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	10.92 dBm
Result	=	20.95 dBm = 124.45 mW

Minimum Margin: 30.00 - 20.95 = 9.05 (dB)

NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

6)Data Rate : 54Mbps(IEEE 802.11g)

Test Date: September 30, 2011
Temp.: 26 °C, Humi: 68 %

Data Rate : 54Mbps

Transmitting Frequency		Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
01	2412	10.03	9.48	19.51	89.33	30.00	+10.49
06	2437	10.03	9.96	19.99	99.77	30.00	+10.01
11	2462	10.03	10.37	20.40	109.65	30.00	+ 9.60

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	10.37 dBm
Result	=	20.40 dBm = 109.65 mW

Minimum Margin: 30.00 - 20.40 = 9.60 (dB)

NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

7)Data Rate : 6.5Mbps(IEEE 802.11n)

Data Rate : 6.5Mbps

Test Date: September 30, 2011

Temp.: 26 °C, Humi: 68 %

Transmitting Frequency		Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
01	2412	10.03	10.25	20.28	106.66	30.00	+ 9.72
06	2437	10.03	10.86	20.89	122.74	30.00	+ 9.11
11	2462	10.03	11.16	21.19	131.52	30.00	+ 8.81

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	11.16 dBm
Result	=	21.19 dBm = 131.52 mW

Minimum Margin: 30.00 - 21.19 = 8.81 (dB)

NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

8)Data Rate : 65Mbps(IEEE 802.11n)

Data Rate : 65Mbps

Test Date: September 30, 2011

Temp.: 26 °C, Humi: 68 %

Transmitting Frequency		Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
01	2412	10.03	9.39	19.42	87.50	30.00	+10.58
06	2437	10.03	9.97	20.00	100.00	30.00	+10.00
11	2462	10.03	10.22	20.25	105.93	30.00	+ 9.75

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	10.22 dBm
Result	=	20.25 dBm = 105.93 mW

Minimum Margin: 30.00 - 20.25 = 9.75 (dB)

NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

A.6 Peak Power Density(Conduction)

1)Data Rate : 1Mbps(IEEE 802.11b)

Data Rate : 1Mbps

Test Date: October 12, 2011

Temp.: 24 °C, Humi: 58 %

Transmitting Frequency		Correction Factor [dB]	Meter Reading [dBm]	Conducted Peak Output Power		Limits [dBm]	Margin [dB]
CH	[MHz]			[dBm]	[mW]		
01	2412	10.03	-18.35	-8.32	0.15	8.00	+16.32
06	2437	10.03	-18.15	-8.12	0.15	8.00	+16.12
11	2462	10.03	-17.55	-7.52	0.18	8.00	+15.52

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	-17.55 dBm
Result	=	-7.52 dBm = 0.18 mW

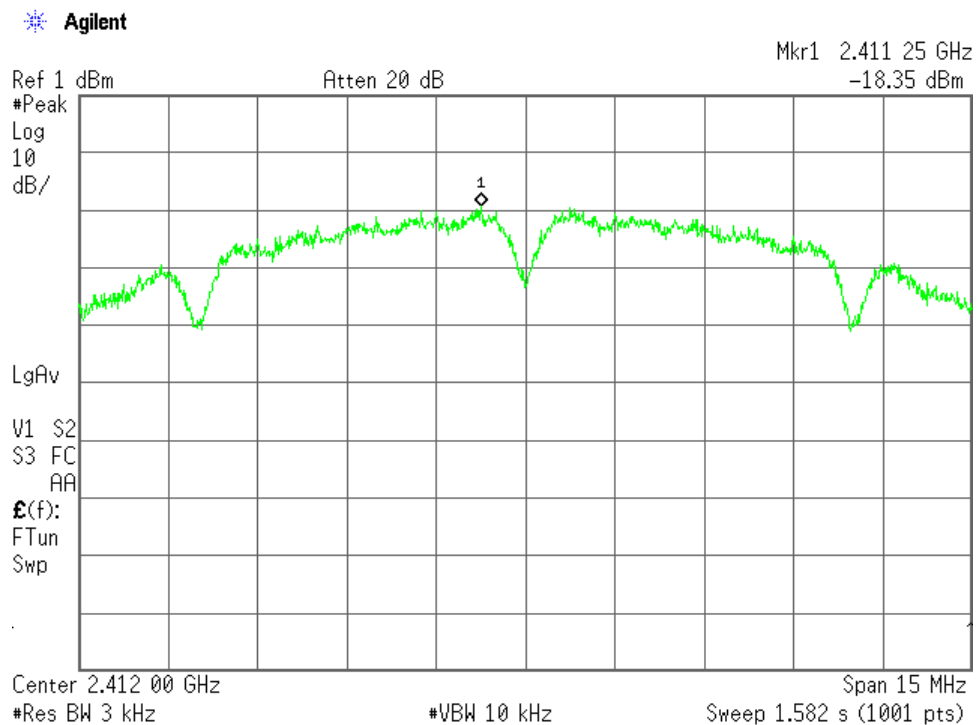
Minimum Margin: 8.00 - -7.52 = 15.52 (dB)

NOTES

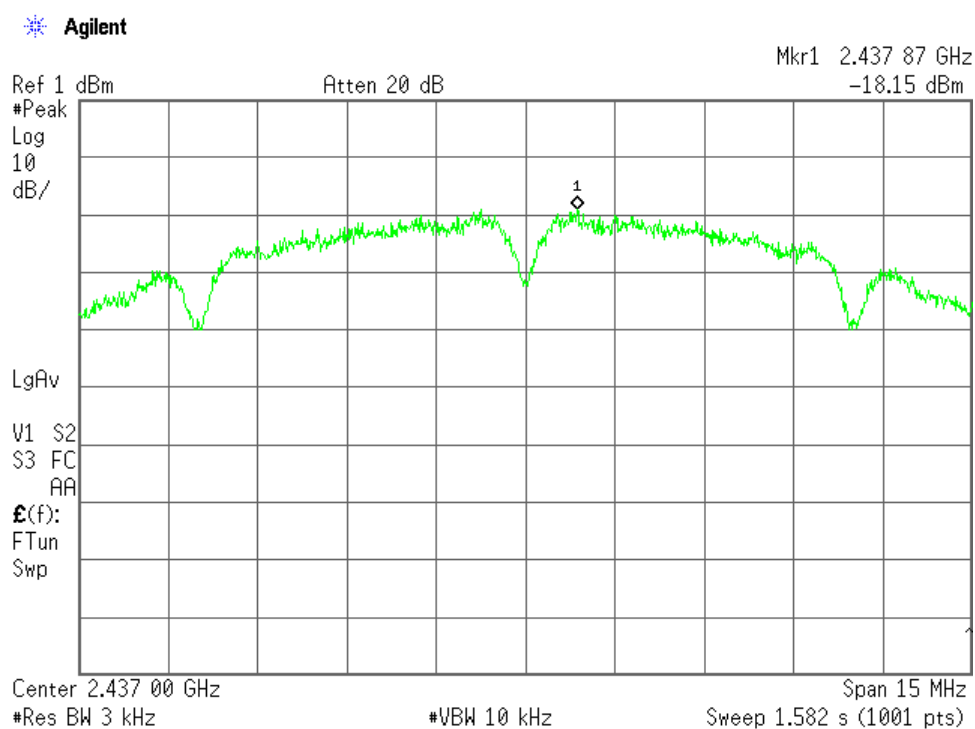
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	3kHz	10kHz

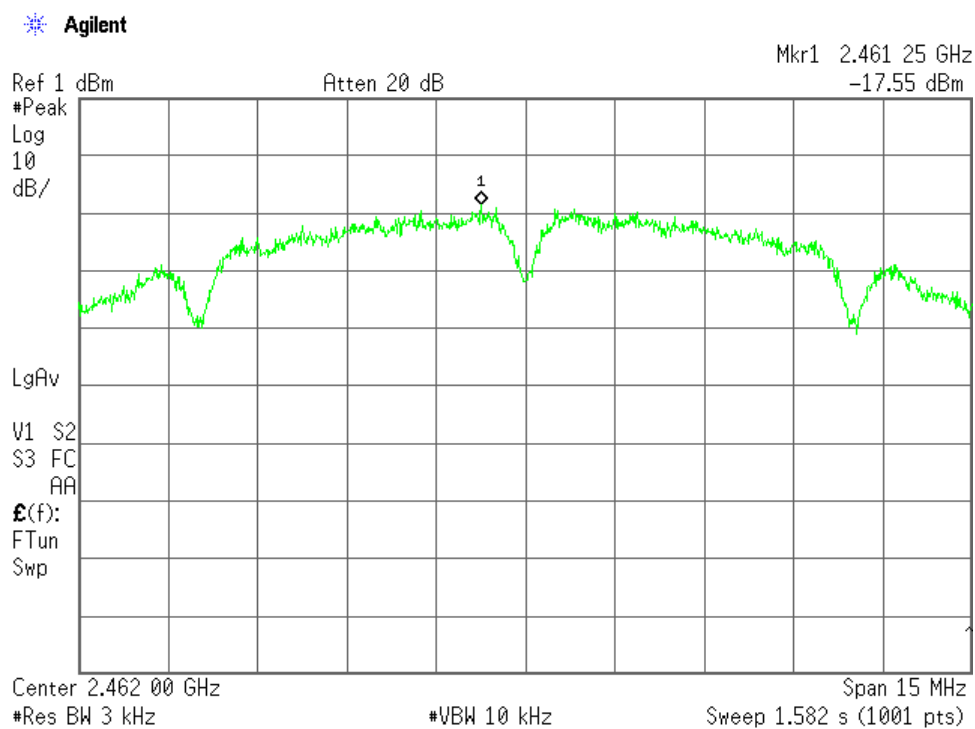
Low Channel



Middle Channel



High Channel



2)Data Rate : 2Mbps(IEEE 802.11b)

Test Date: October 12, 2011

Temp.: 24 °C, Humi: 58 %

Data Rate : 2Mbps

Transmitting Frequency		Correction Factor [dB]	Meter Reading [dBm]	Conducted Peak Output Power		Limits [dBm]	Margin [dB]
CH	[MHz]			[dBm]	[mW]		
01	2412	10.03	-18.36	-8.33	0.15	8.00	+16.33
06	2437	10.03	-17.71	-7.68	0.17	8.00	+15.68
11	2462	10.03	-17.28	-7.25	0.19	8.00	+15.25

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor = 10.03 dB

+) Meter Reading = -17.28 dBm

Result = -7.25 dBm = 0.19 mW

Minimum Margin: 8.00 - -7.25 = 15.25 (dB)

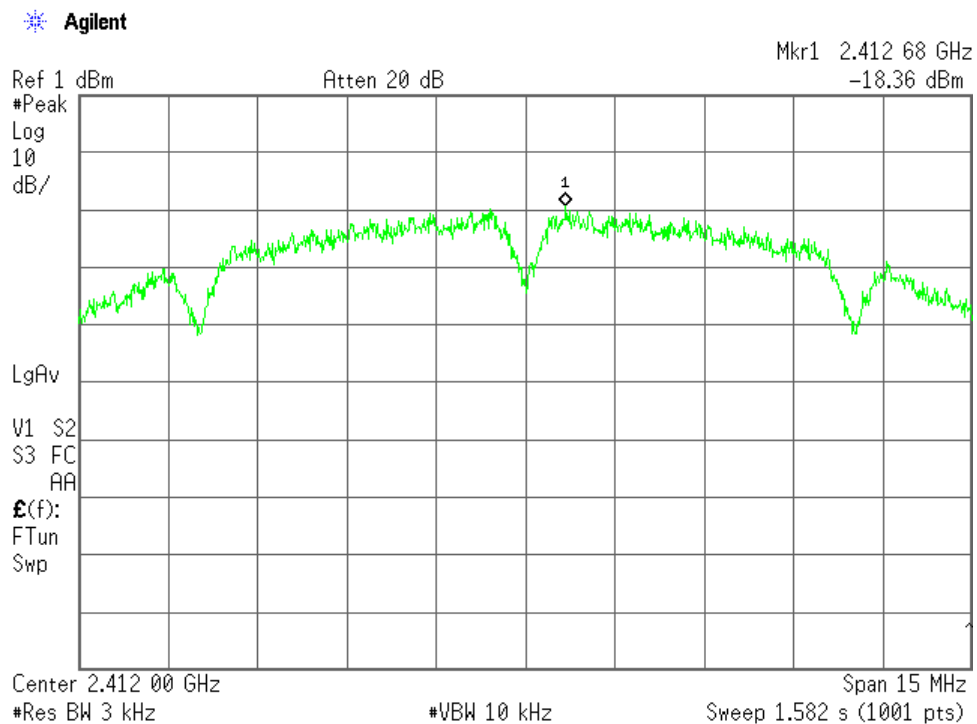
NOTES

1. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

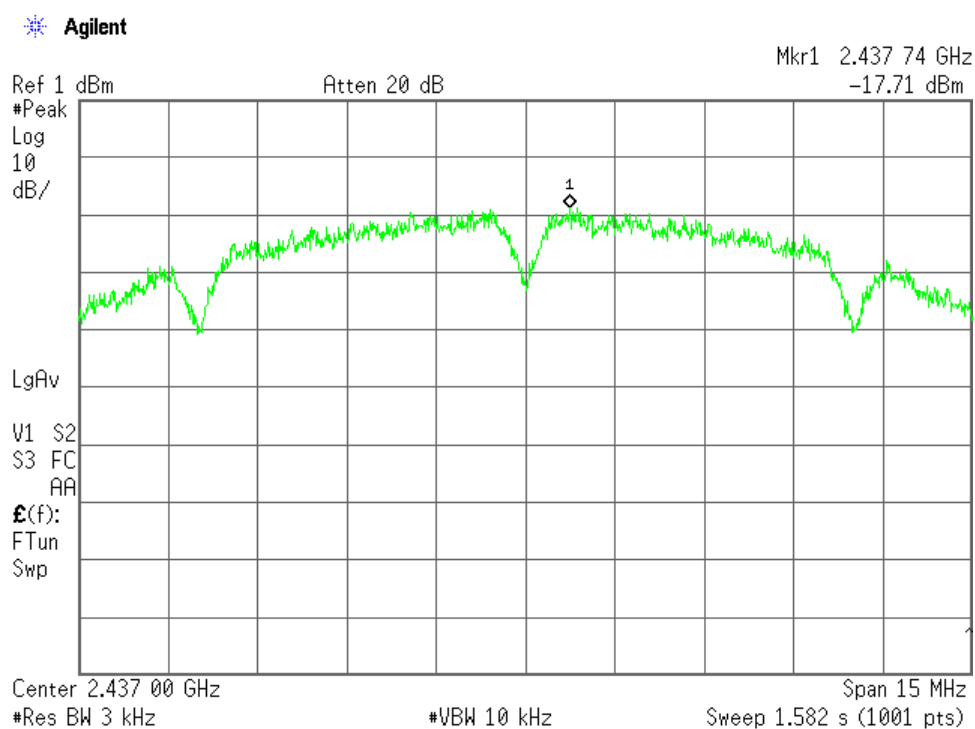
2. Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	3kHz	10kHz

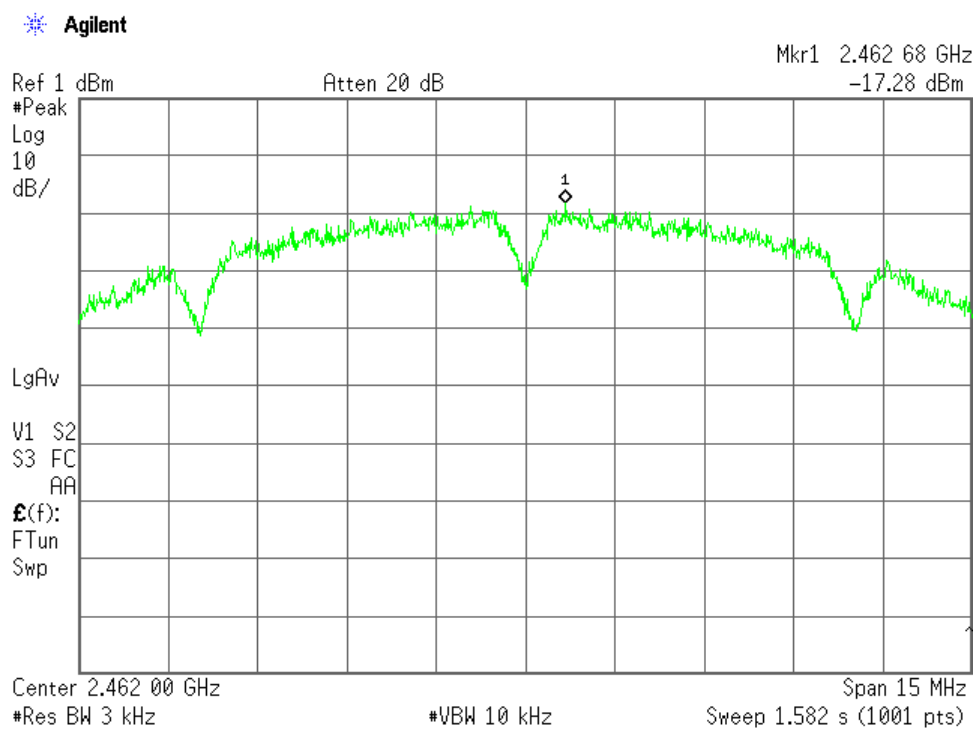
Low Channel



Middle Channel



High Channel



3)Data Rate : 5.5Mbps(IEEE 802.11b)

Data Rate : 5.5Mbps

Test Date: October 12, 2011

Temp.: 24 °C, Humi: 58 %

Transmitting Frequency	Correction Factor	Meter Reading	Conducted Peak Output Power	Limits	Margin
CH [MHz]	[dB]	[dBm]	[dBm] [mW]	[dBm]	[dB]
01 2412	10.03	-19.85	-9.82 0.10	8.00	+17.82
06 2437	10.03	-19.67	-9.64 0.11	8.00	+17.64
11 2462	10.03	-19.33	-9.30 0.12	8.00	+17.30

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	-19.33 dBm
Result	=	-9.30 dBm = 0.12 mW

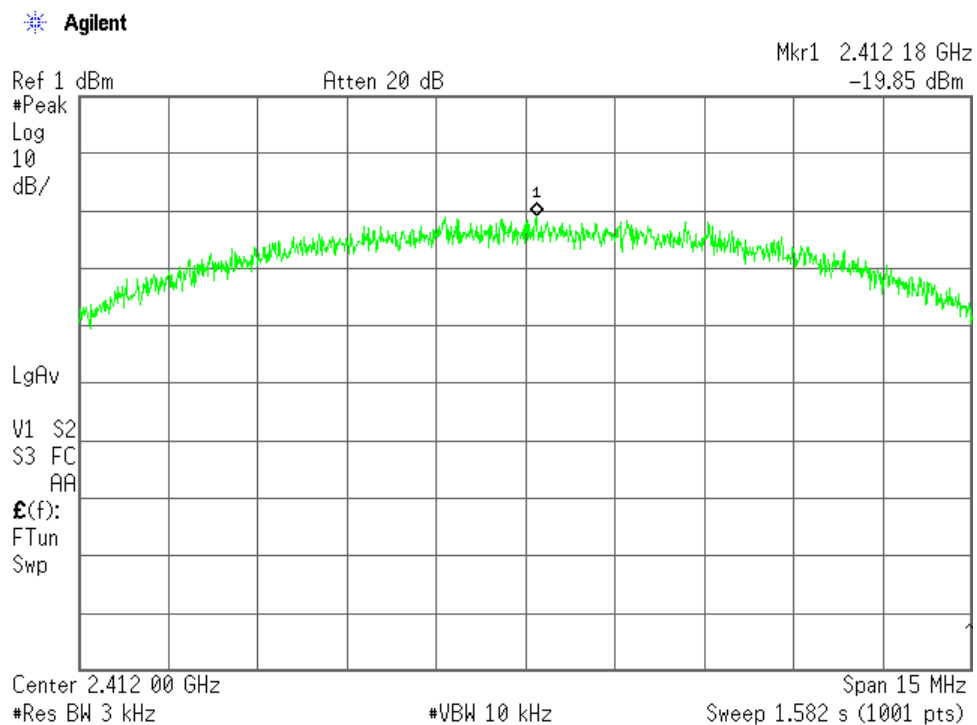
Minimum Margin: 8.00 - -9.30 = 17.30 (dB)

NOTES

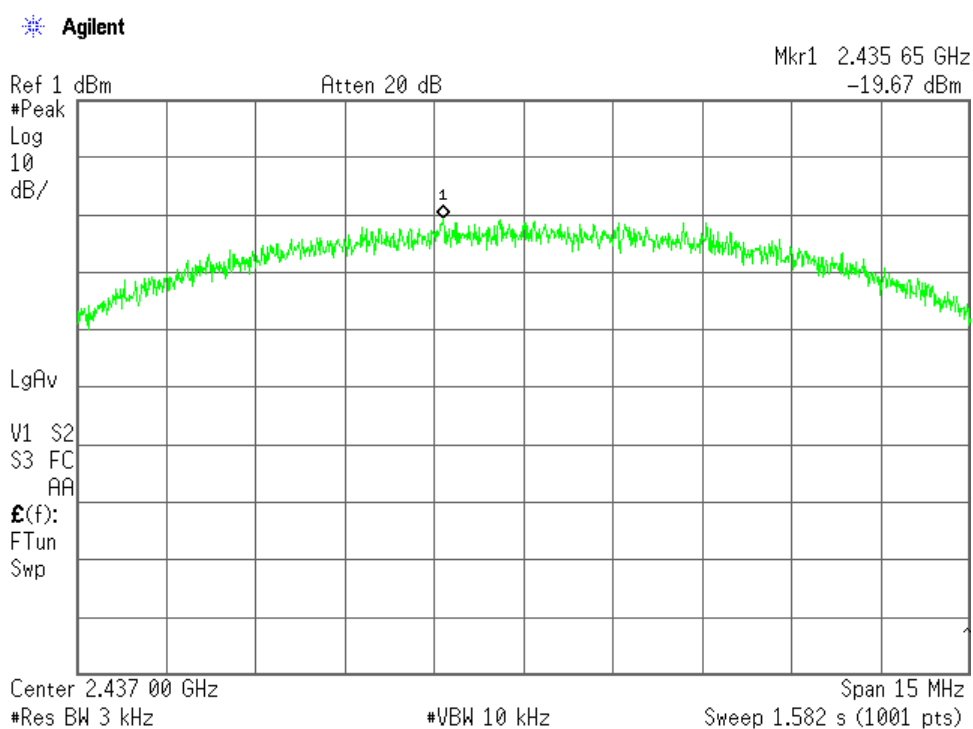
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	3kHz	10kHz

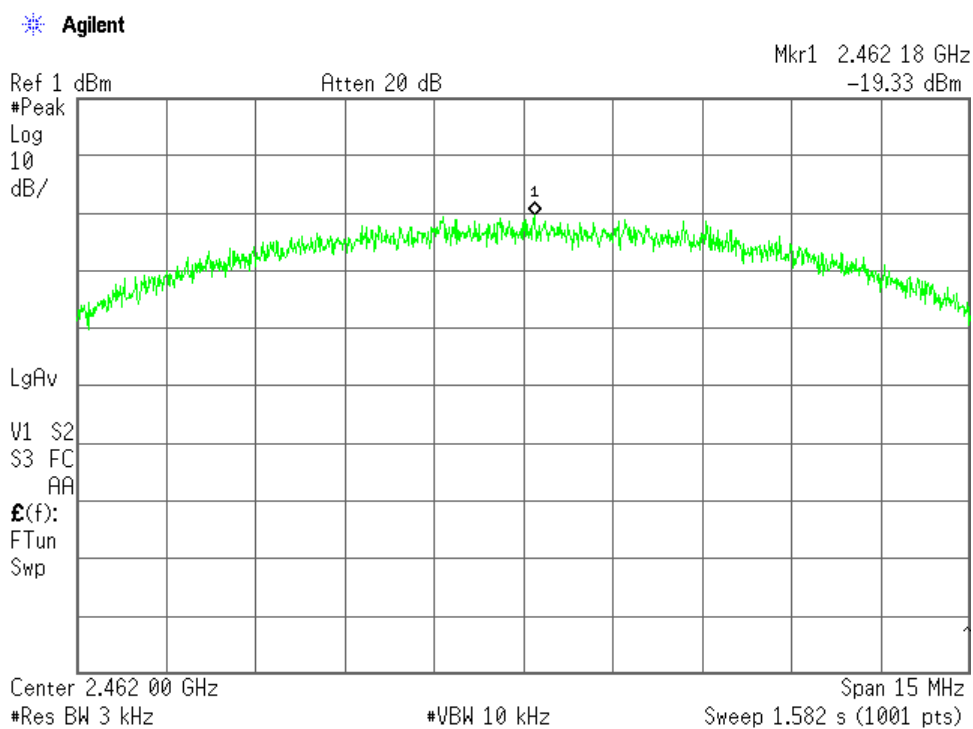
Low Channel



Middle Channel



High Channel



4)Data Rate : 11Mbps(IEEE 802.11b)

Data Rate : 11Mbps

Test Date: October 12, 2011

Temp.: 24 °C, Humi: 58 %

Transmitting Frequency	Correction Factor	Meter Reading	Conducted Peak Output Power	Limits	Margin
CH [MHz]	[dB]	[dBm]	[dBm] [mW]	[dBm]	[dB]
01 2412	10.03	-20.26	-10.23 0.09	8.00	+18.23
06 2437	10.03	-20.01	-9.98 0.10	8.00	+17.98
11 2462	10.03	-19.90	-9.87 0.10	8.00	+17.87

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	-19.90 dBm
Result	=	-9.87 dBm = 0.10 mW

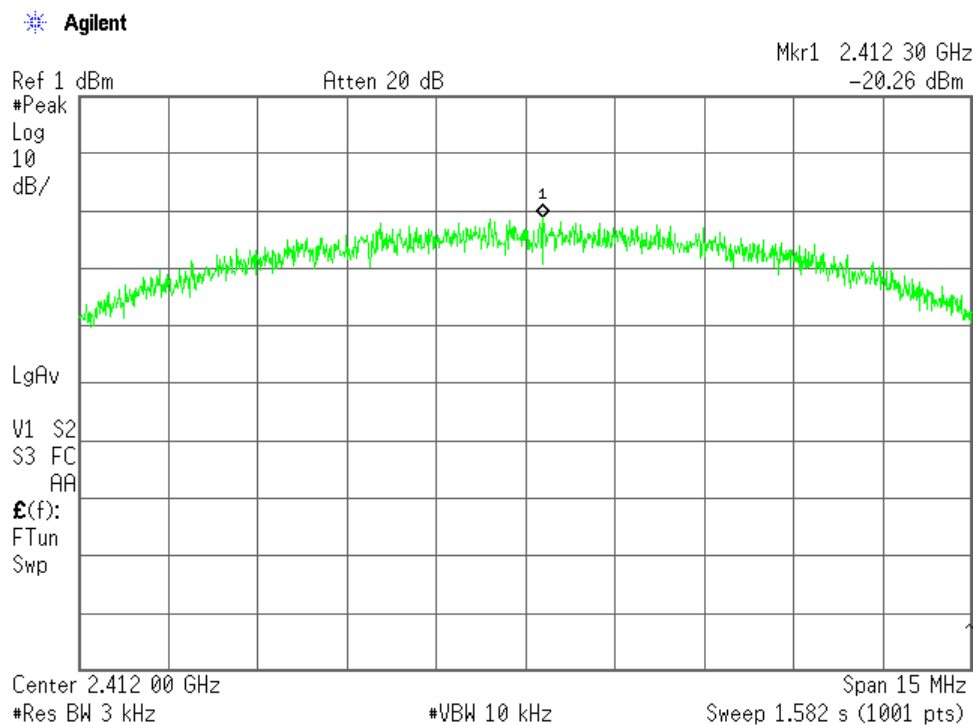
Minimum Margin: 8.00 - -9.87 = 17.87 (dB)

NOTES

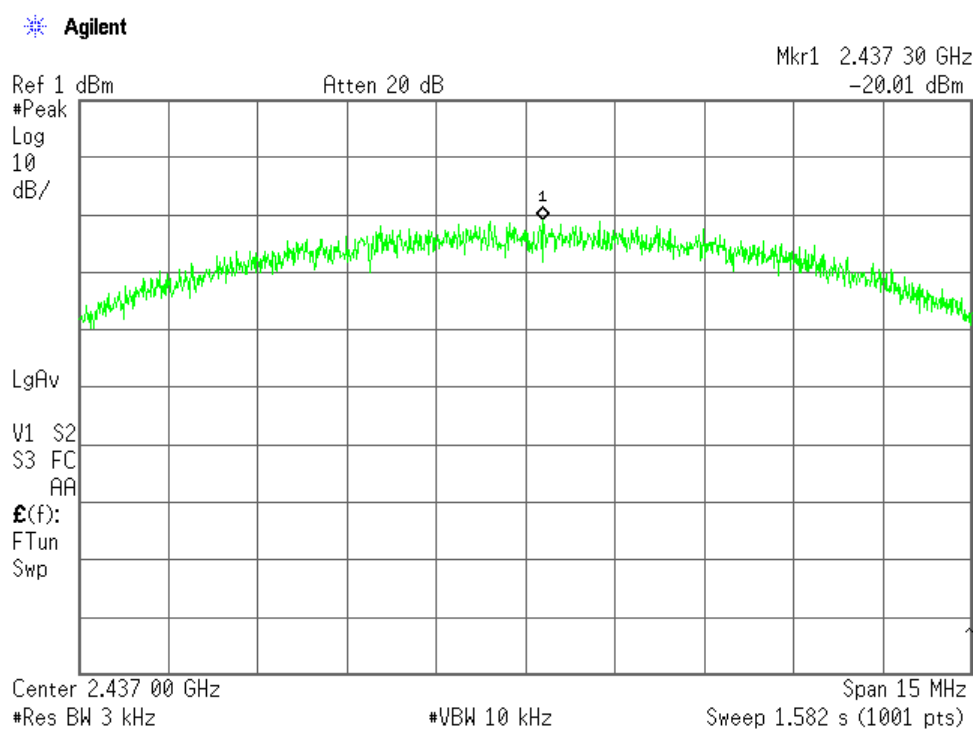
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	3kHz	10kHz

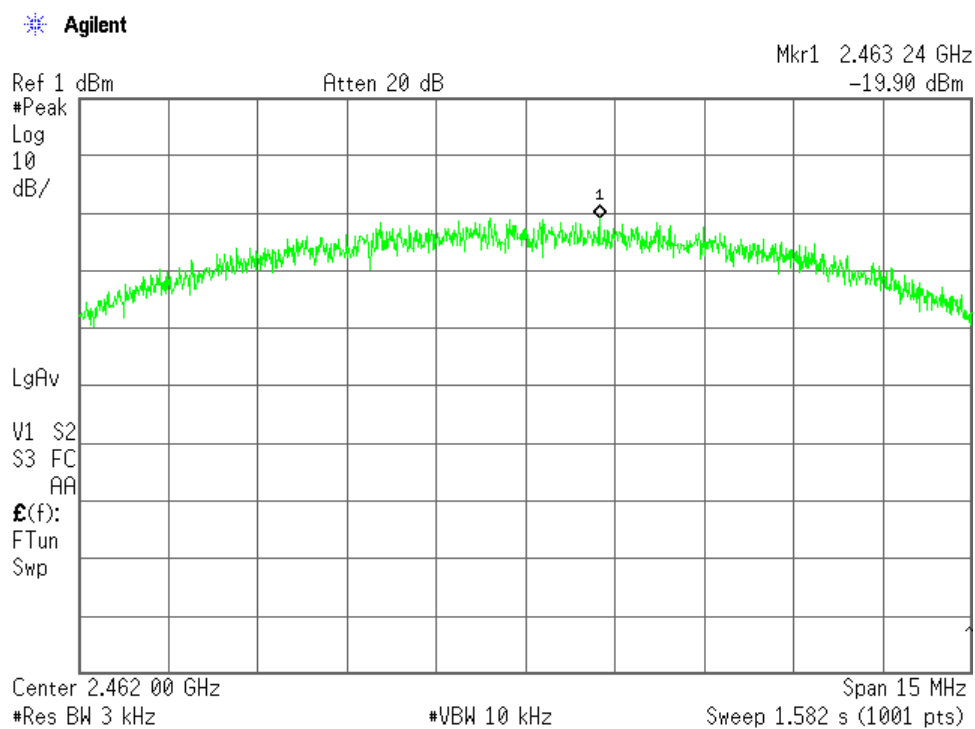
Low Channel



Middle Channel



High Channel



5)Data Rate : 6Mbps(IEEE 802.11g)

Test Date: October 12, 2011

Temp.: 24 °C, Humi: 58 %

Data Rate : 6Mbps

Transmitting Frequency		Correction Factor [dB]	Meter Reading [dBm]	Conducted Peak Output Power		Limits [dBm]	Margin [dB]
CH	[MHz]			[dBm]	[mW]		
01	2412	10.03	-25.21	-15.18	0.03	8.00	+23.18
06	2437	10.03	-24.57	-14.54	0.04	8.00	+22.54
11	2462	10.03	-23.91	-13.88	0.04	8.00	+21.88

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	-23.91 dBm
Result	=	-13.88 dBm = 0.04 mW

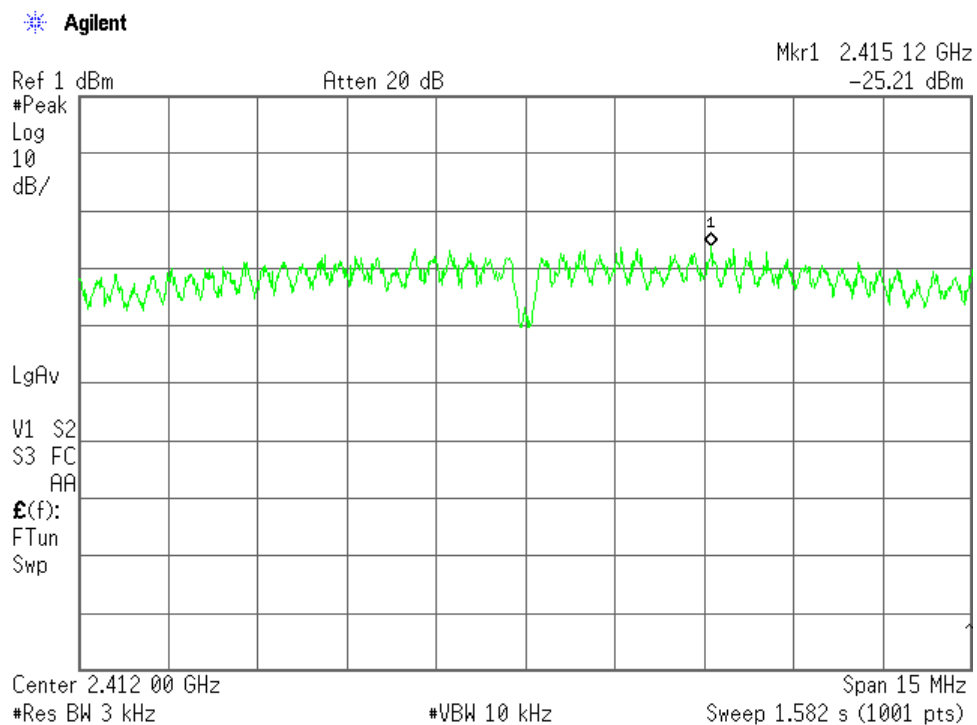
Minimum Margin: 8.00 - -13.88 = 21.88 (dB)

NOTES

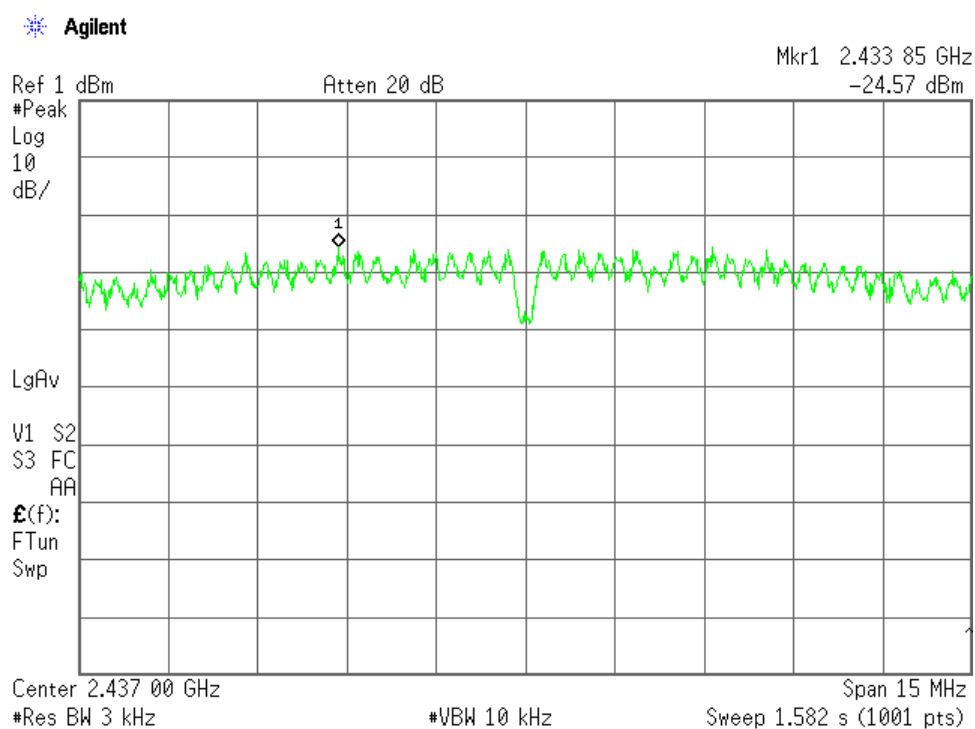
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	3kHz	10kHz

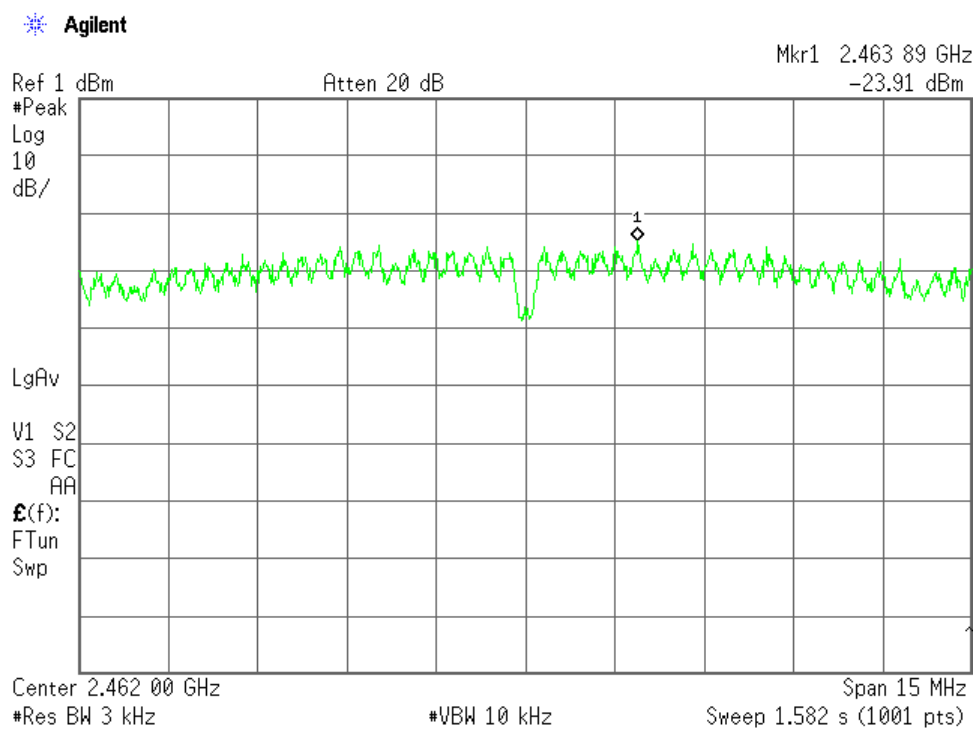
Low Channel



Middle Channel



High Channel



6)Data Rate : 54Mbps(IEEE 802.11g)

Test Date: October 12, 2011

Temp.: 24 °C, Humi: 58 %

Data Rate : 54Mbps

Transmitting Frequency		Correction Factor [dB]	Meter Reading [dBm]	Conducted Peak Output Power		Limits [dBm]	Margin [dB]
CH	[MHz]			[dBm]	[mW]		
01	2412	10.03	-26.08	-16.05	0.02	8.00	+24.05
06	2437	10.03	-25.27	-15.24	0.03	8.00	+23.24
11	2462	10.03	-26.01	-15.98	0.03	8.00	+23.98

Calculated result at 2437.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	-25.27 dBm
Result	=	-15.24 dBm = 0.03 mW

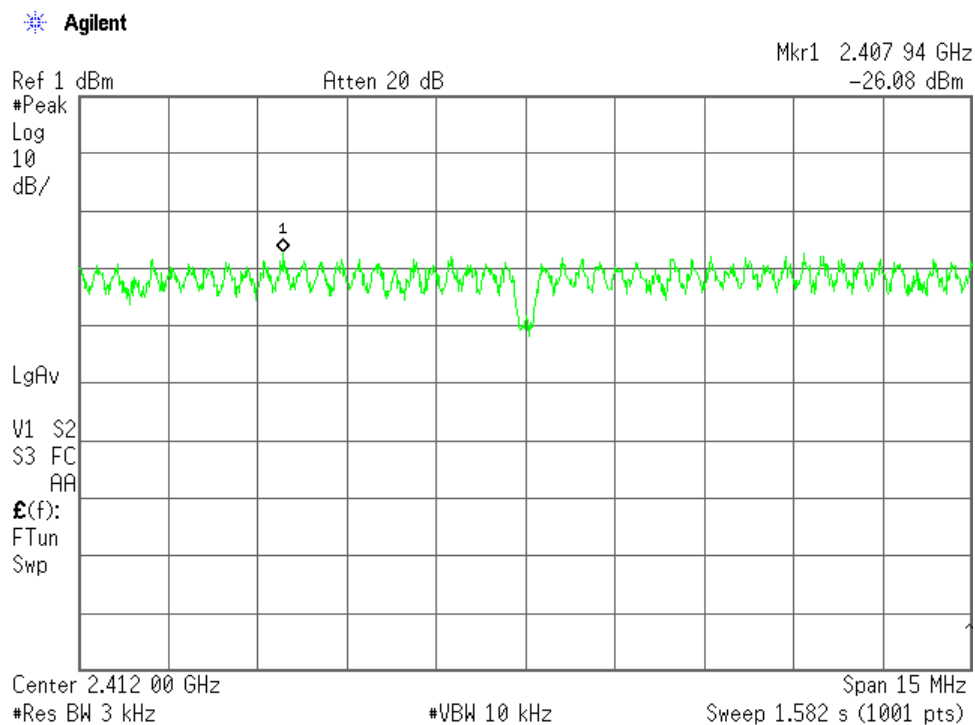
Minimum Margin: 8.00 - -15.24 = 23.24 (dB)

NOTES

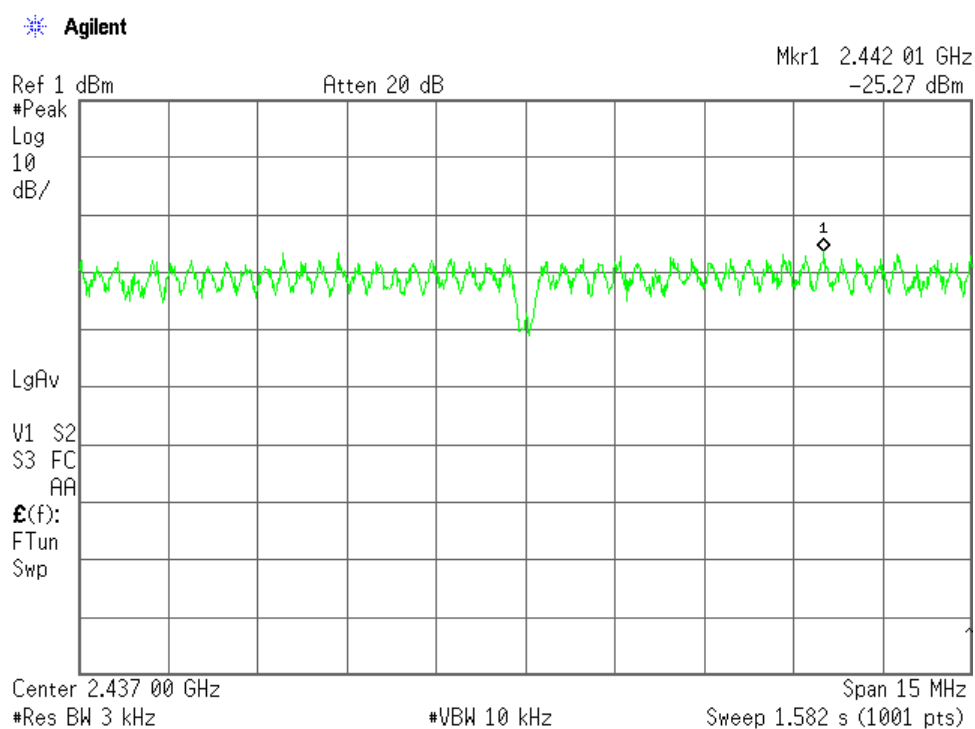
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	3kHz	10kHz

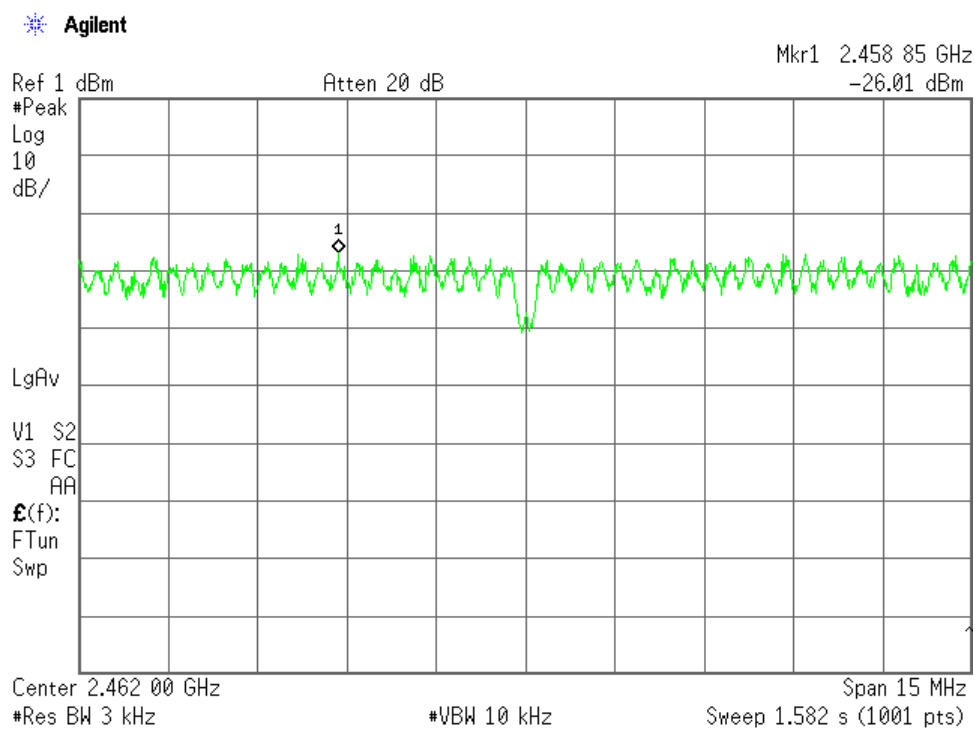
Low Channel



Middle Channel



High Channel



7)Data Rate : 6.5Mbps(IEEE 802.11n)

Data Rate : 6.5Mbps

Test Date: October 12, 2011

Temp.: 24 °C, Humi: 58 %

Transmitting Frequency	Correction Factor	Meter Reading	Conducted Peak Output Power	Limits	Margin
CH [MHz]	[dB]	[dBm]	[dBm] [mW]	[dBm]	[dB]
01 2412	10.03	-24.80	-14.77 0.03	8.00	+22.77
06 2437	10.03	-24.60	-14.57 0.03	8.00	+22.57
11 2462	10.03	-24.59	-14.56 0.03	8.00	+22.56

Calculated result at 2462.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	-24.59 dBm
Result	=	-14.56 dBm = 0.03 mW

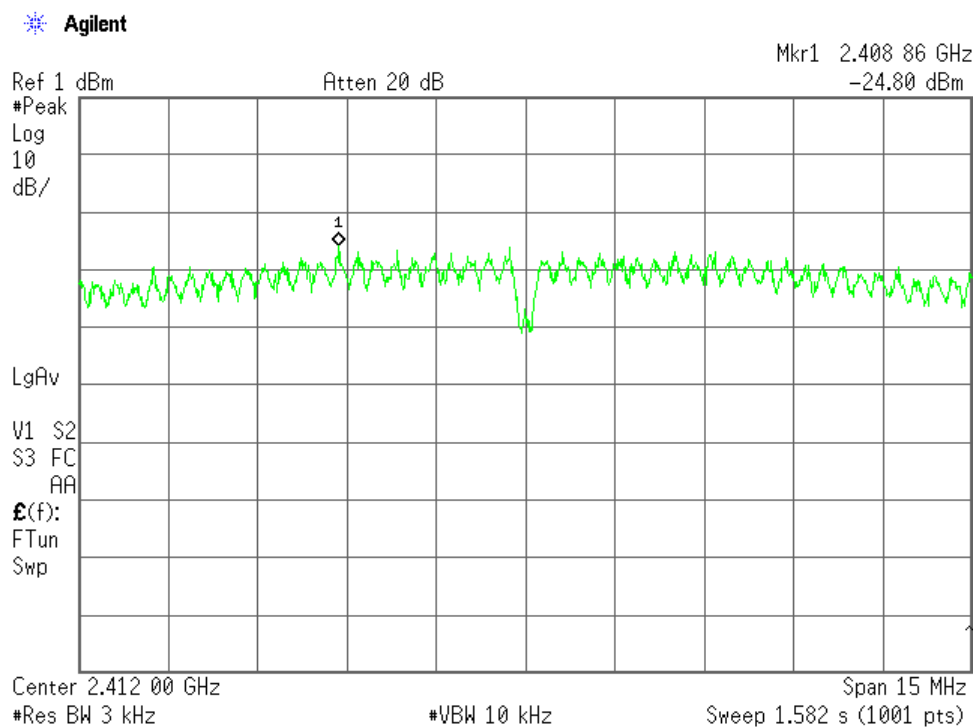
Minimum Margin: 8.00 - -14.56 = 22.56 (dB)

NOTES

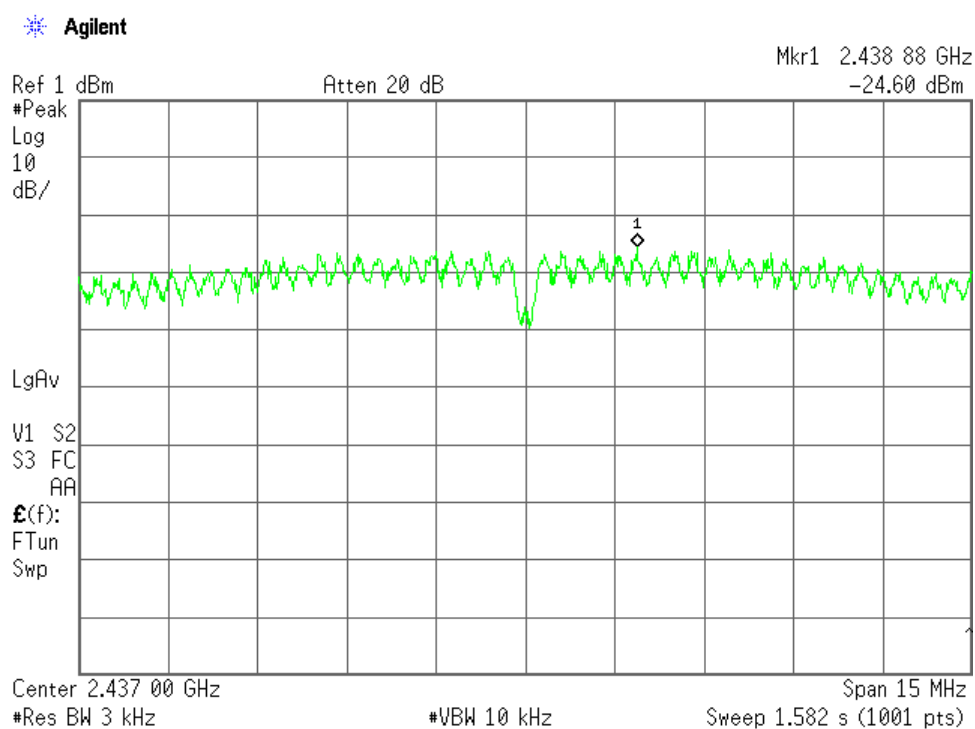
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	3kHz	10kHz

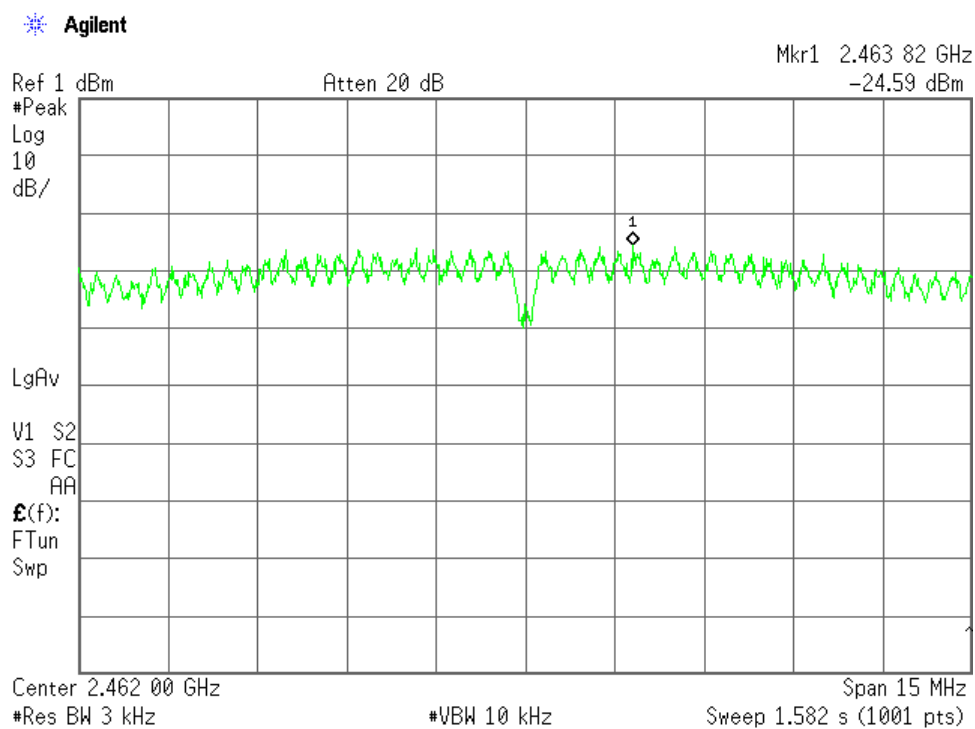
Low Channel



Middle Channel



High Channel



8)Data Rate : 65Mbps(IEEE 802.11n)

Test Date: October 12, 2011

Temp.: 24 °C, Humi: 58 %

Data Rate : 65Mbps

Transmitting Frequency		Correction Factor [dB]	Meter Reading [dBm]	Conducted Peak Output Power		Limits [dBm]	Margin [dB]
CH	[MHz]			[dBm]	[mW]		
01	2412	10.03	-26.00	-15.97	0.03	8.00	+23.97
06	2437	10.03	-25.77	-15.74	0.03	8.00	+23.74
11	2462	10.03	-25.93	-15.90	0.03	8.00	+23.90

Calculated result at 2437.000 MHz, as the worst point shown on underline:

Correction Factor	=	10.03 dB
+) Meter Reading	=	-25.77 dBm
Result	=	-15.74 dBm = 0.03 mW

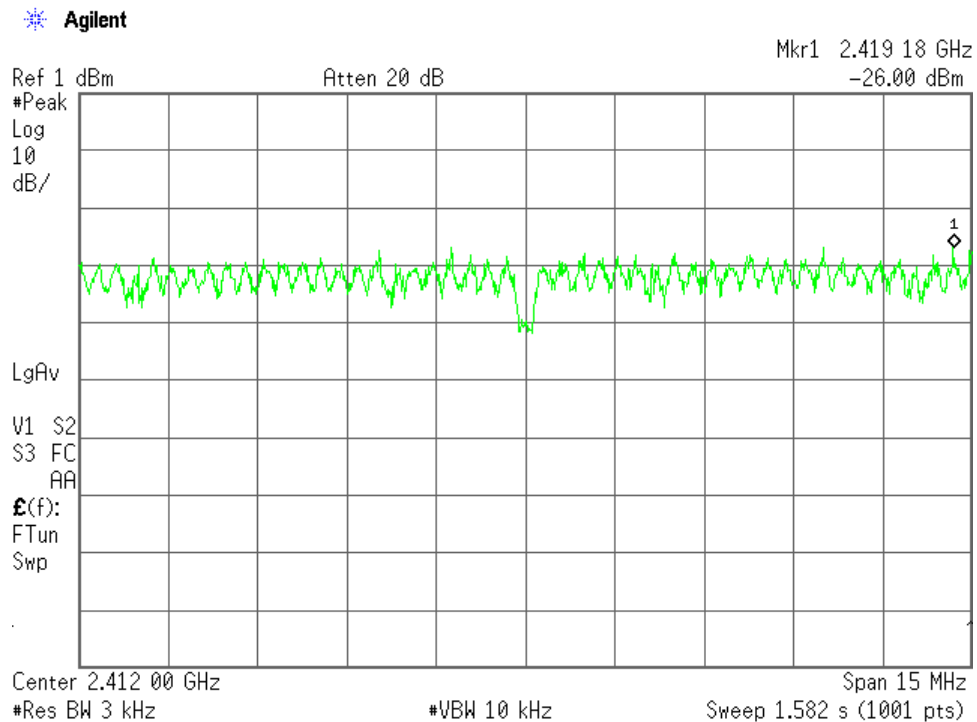
Minimum Margin: 8.00 - -15.74 = 23.74 (dB)

NOTES

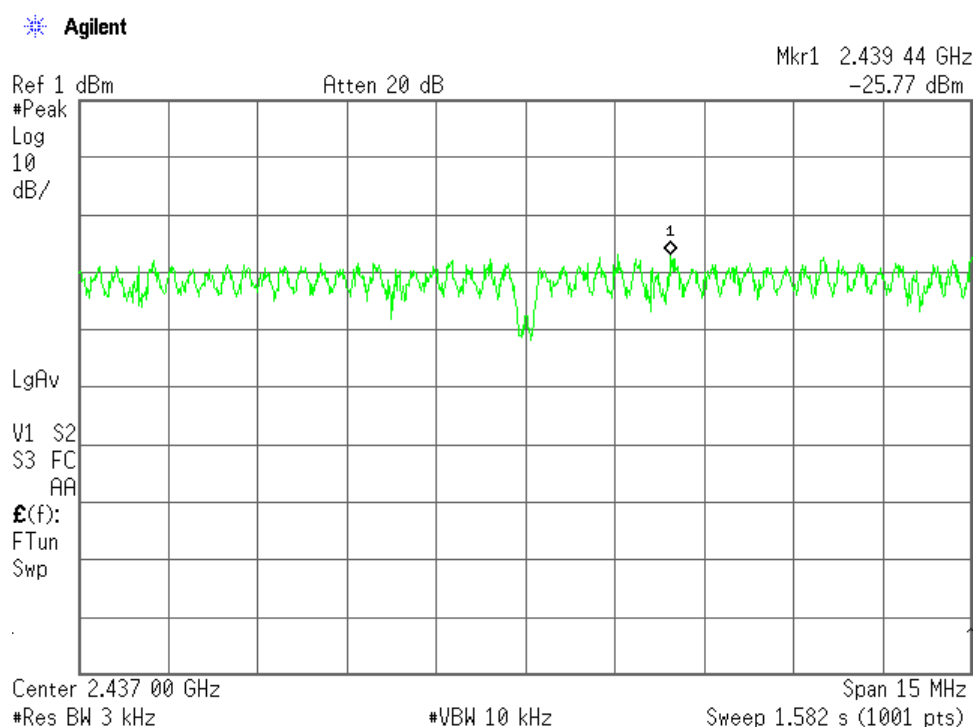
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	3kHz	10kHz

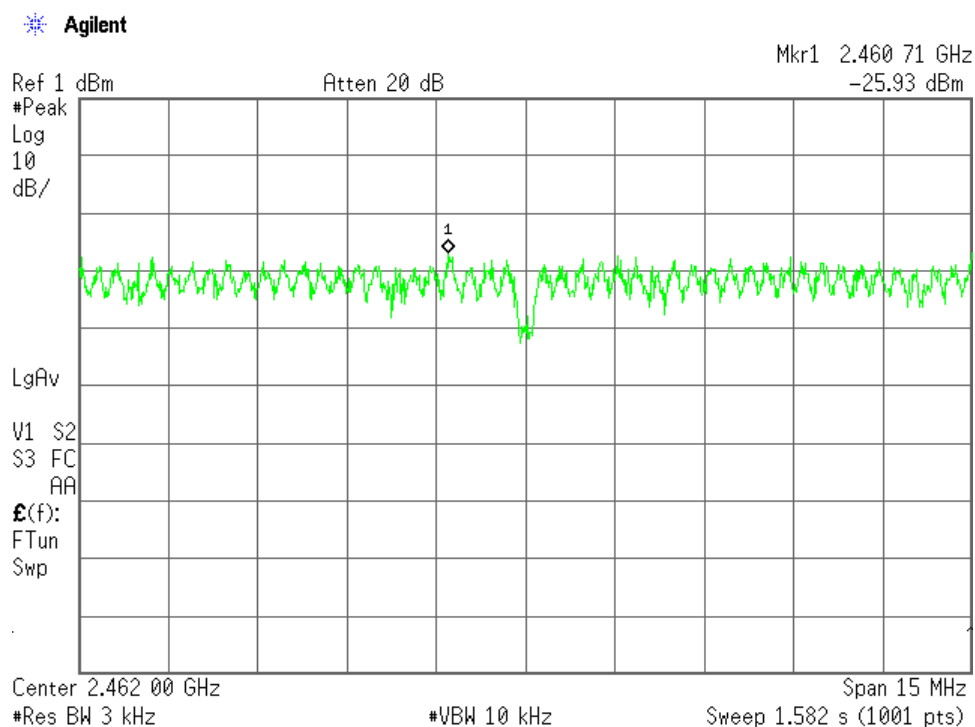
Low Channel



Middle Channel



High Channel



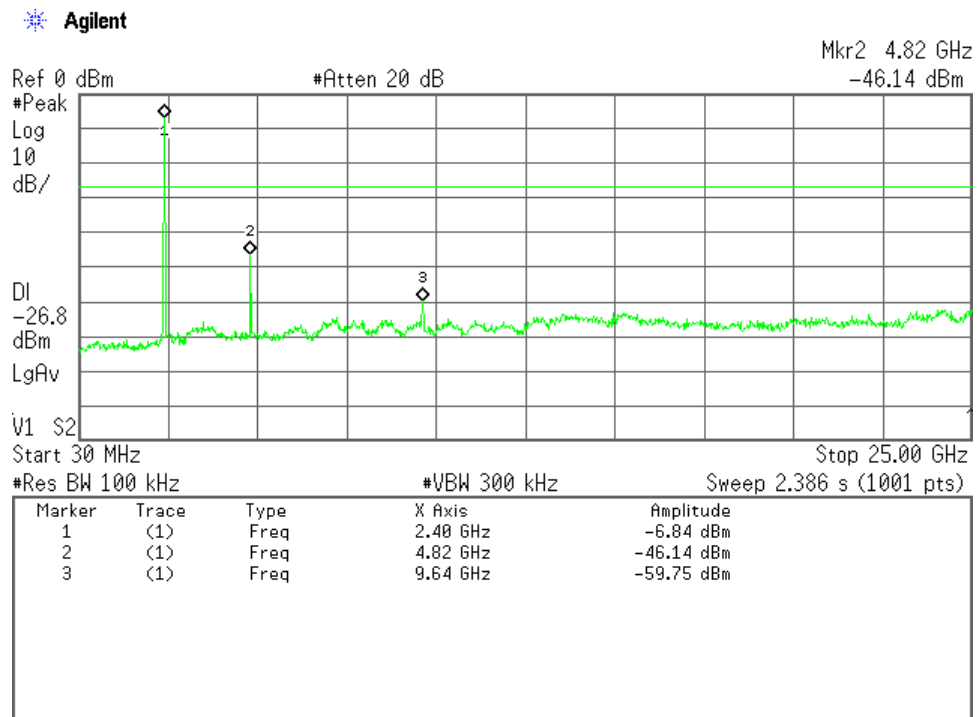
A.7 Spurious Emission(Conduction)

Test Date : October 18, 2011

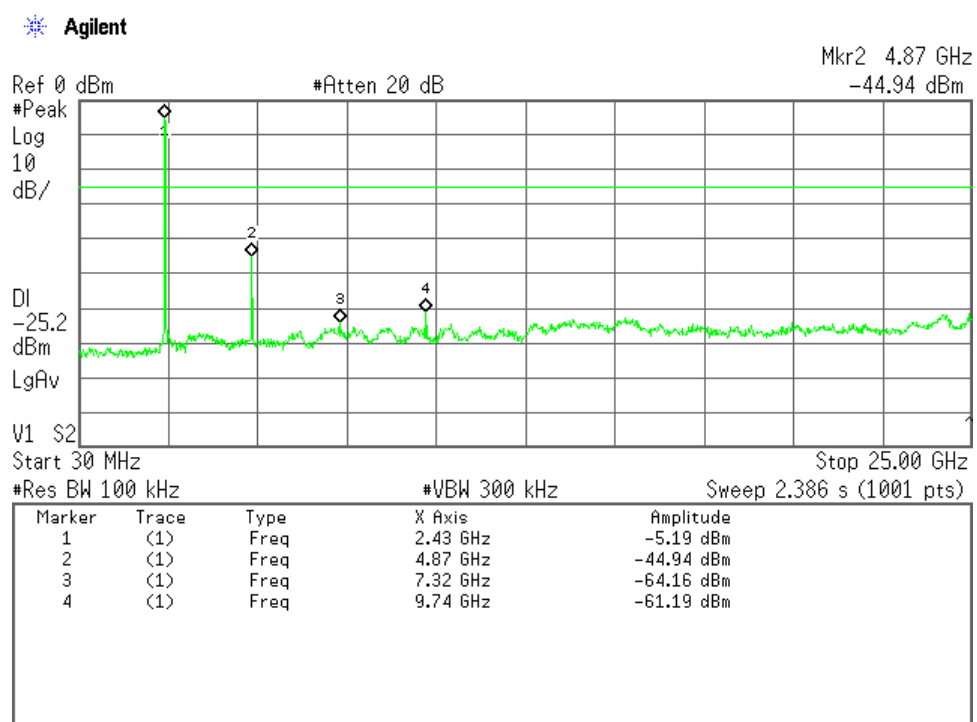
Temp.:24°C, Humi:45%

1)Data Rate : 1Mbps(IEEE 802.11b)

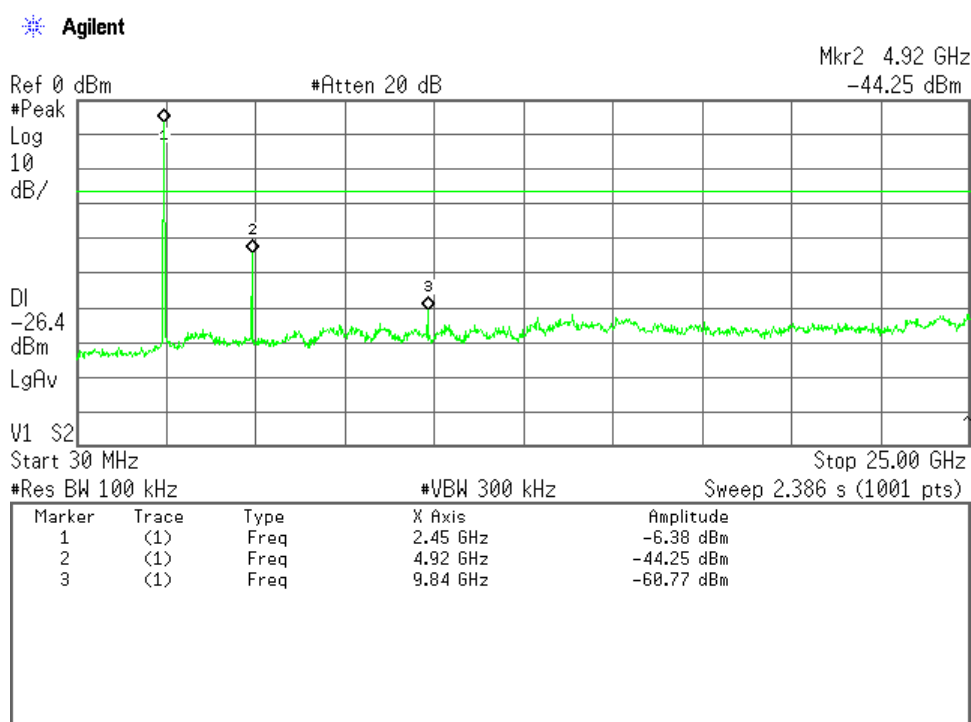
Low Channel



Middle Channel

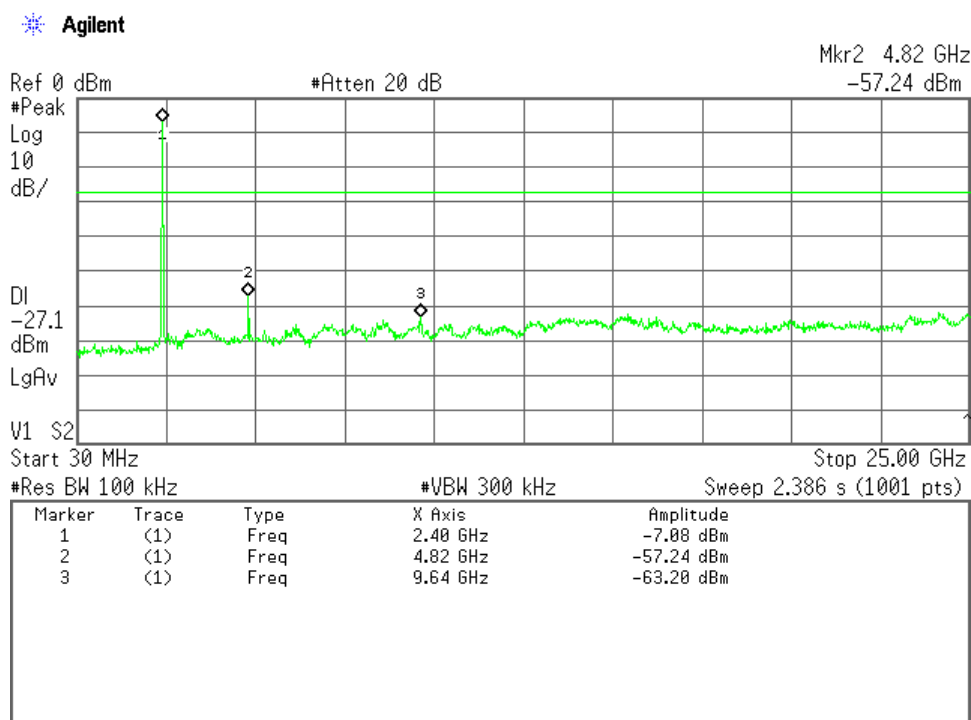


High Channel

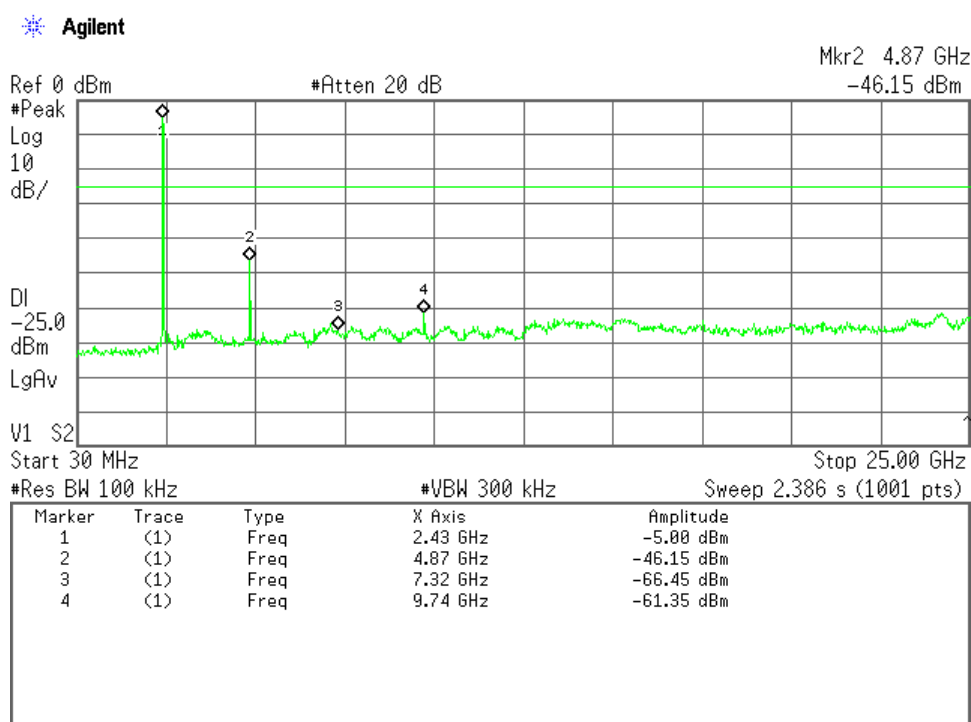


2)Data Rate : 11Mbps(IEEE 802.11b)

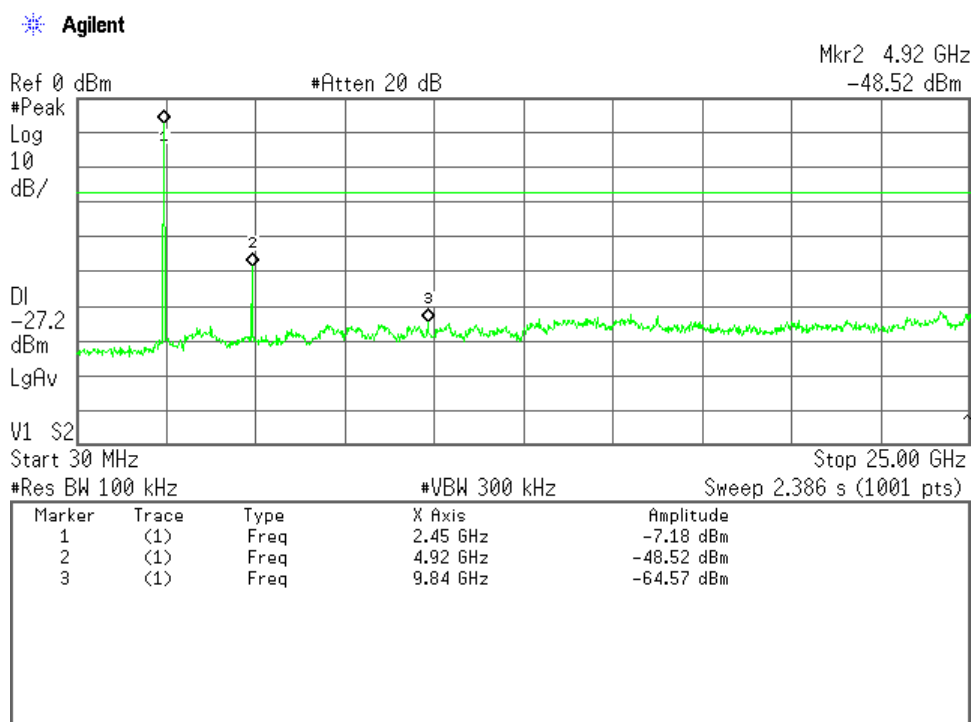
Low Channel



Middle Channel

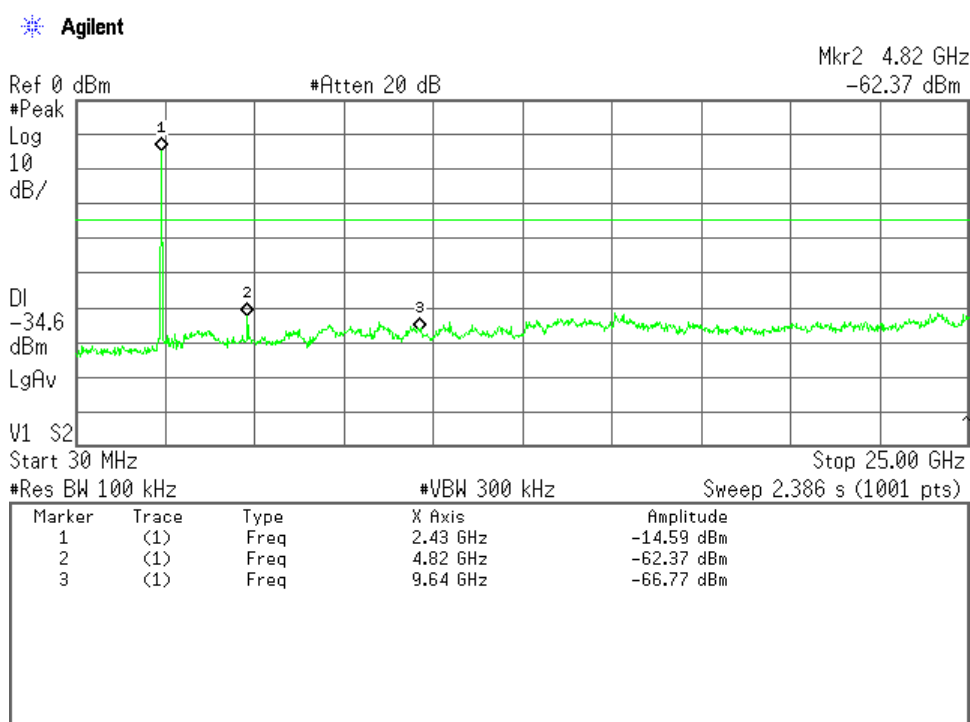


High Channel

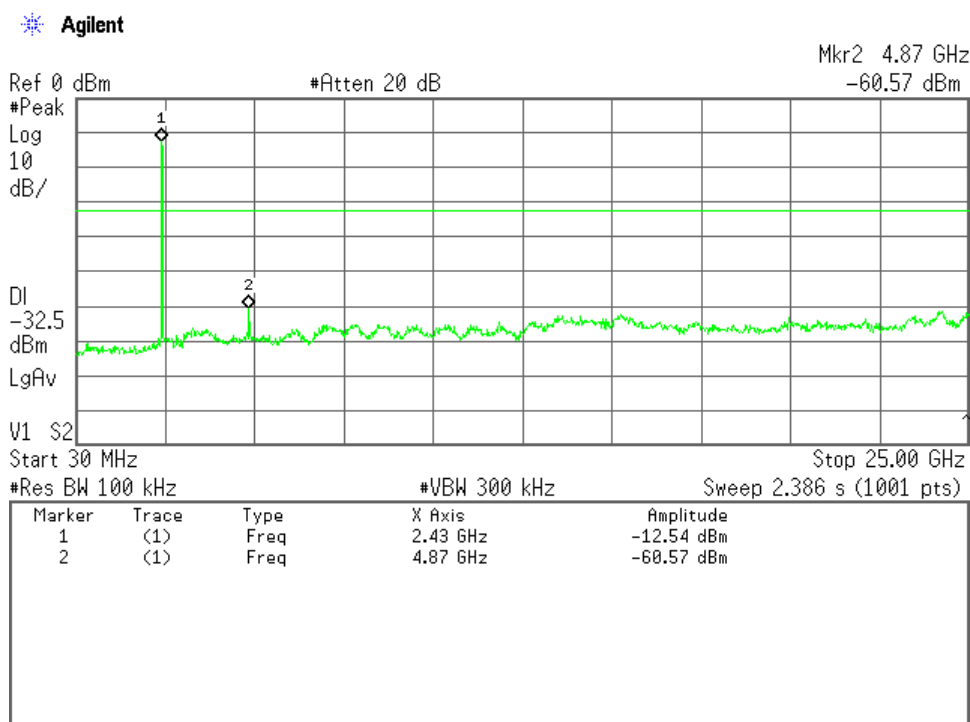


3)Data Rate : 6Mbps(IEEE 802.11g)

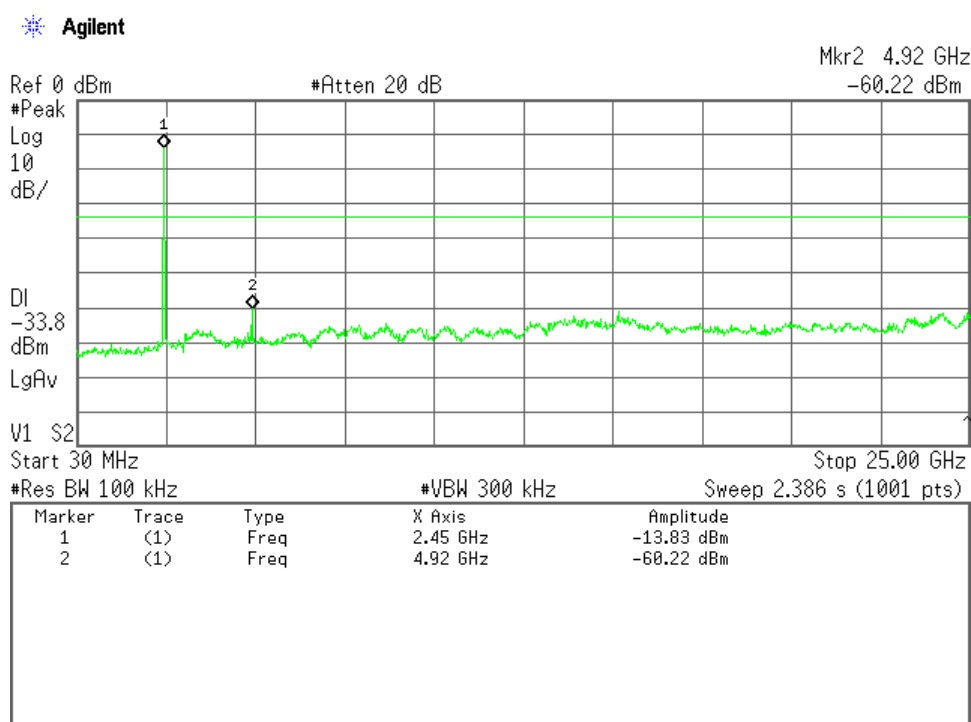
Low Channel



Middle Channel

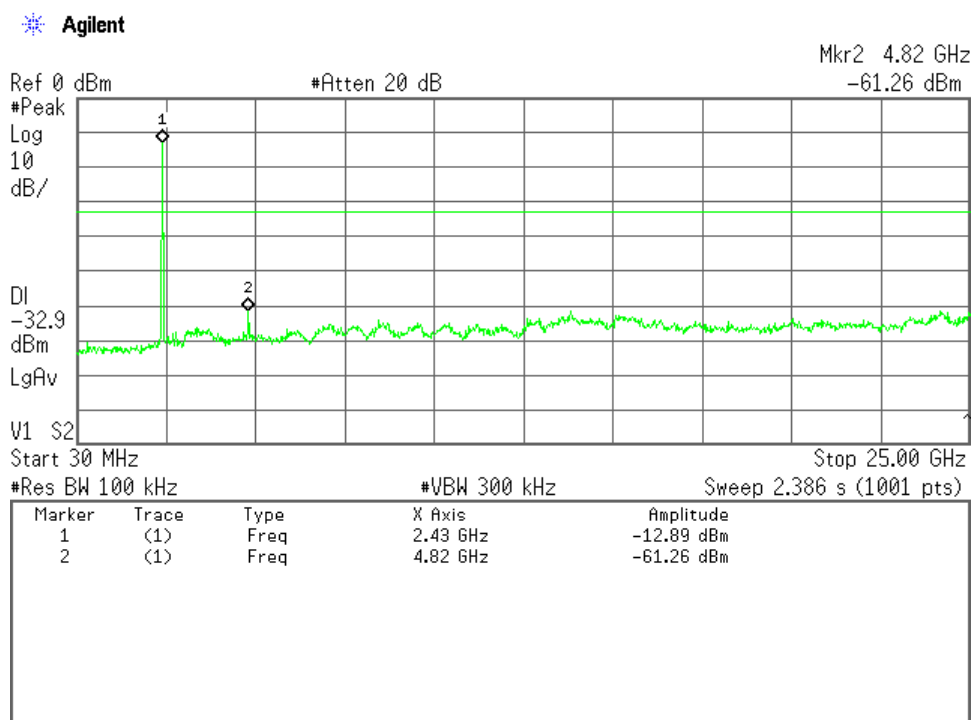


High Channel

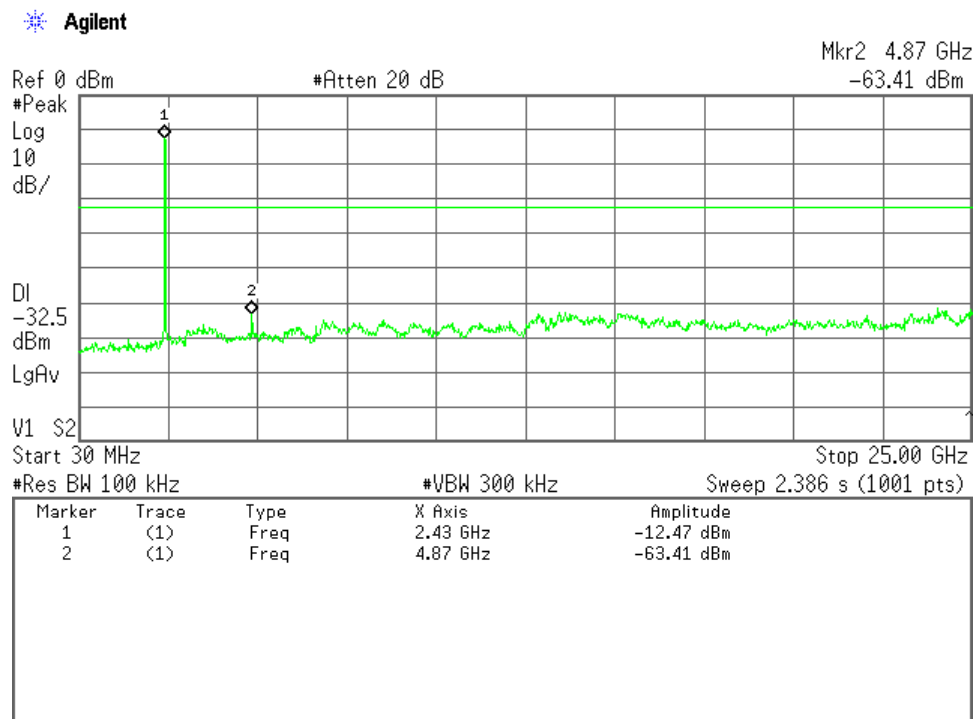


4)Data Rate : 54Mbps(IEEE 802.11g)

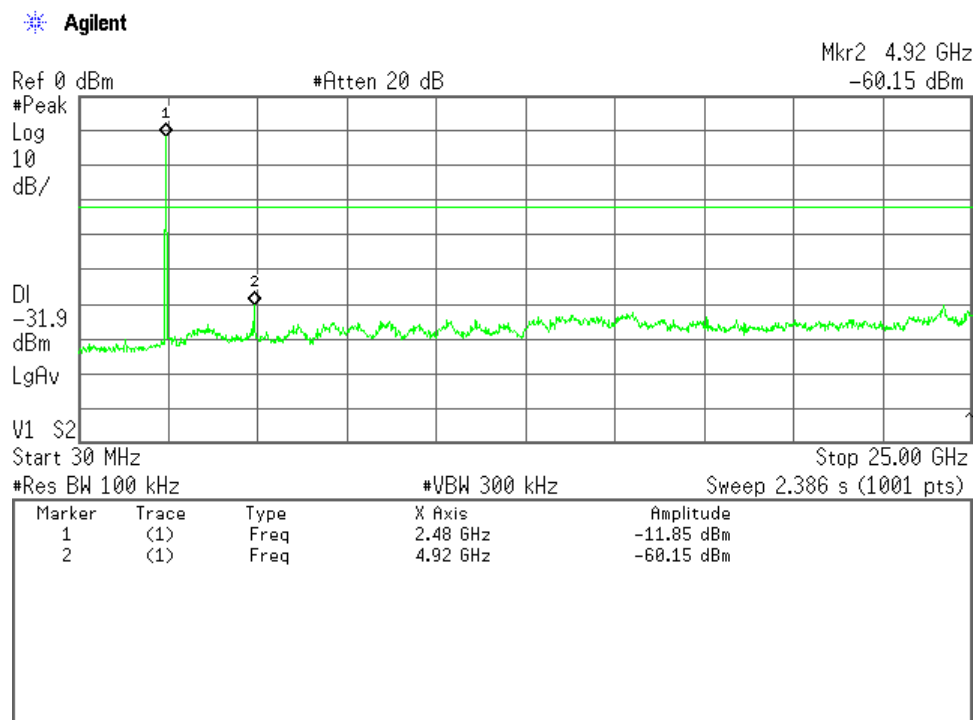
Low Channel



Middle Channel

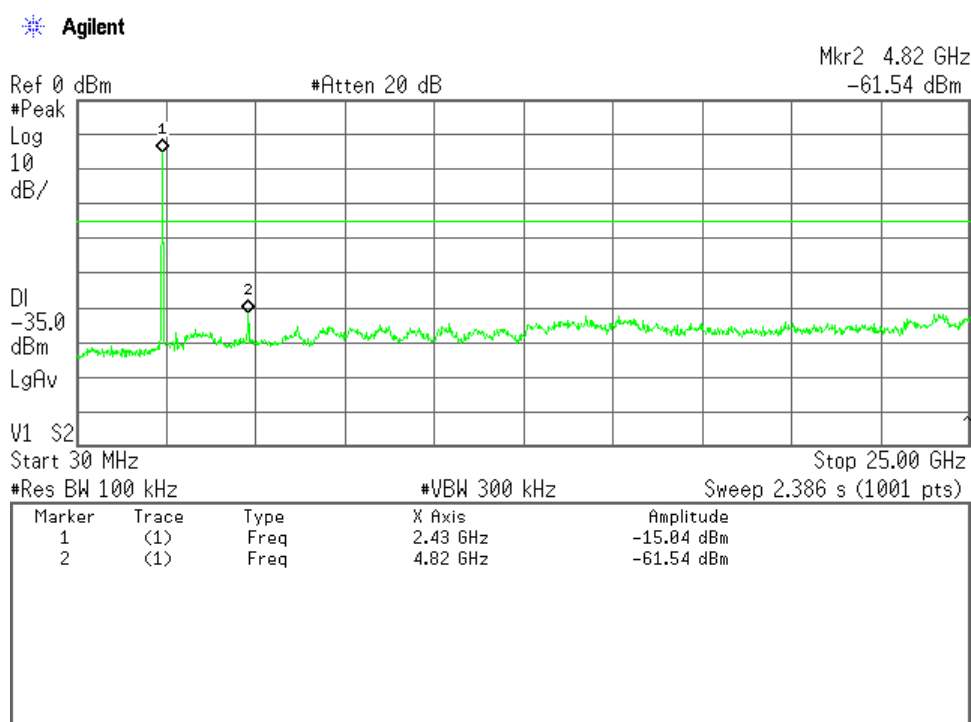


High Channel

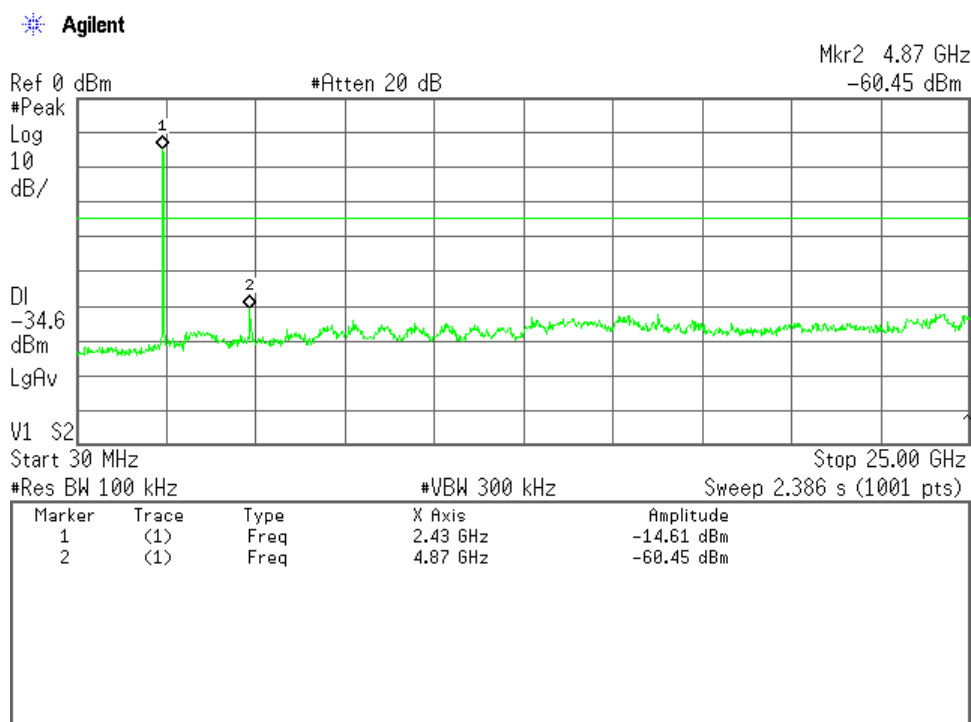


5)Data Rate : 6.5Mbps(IEEE 802.11n)

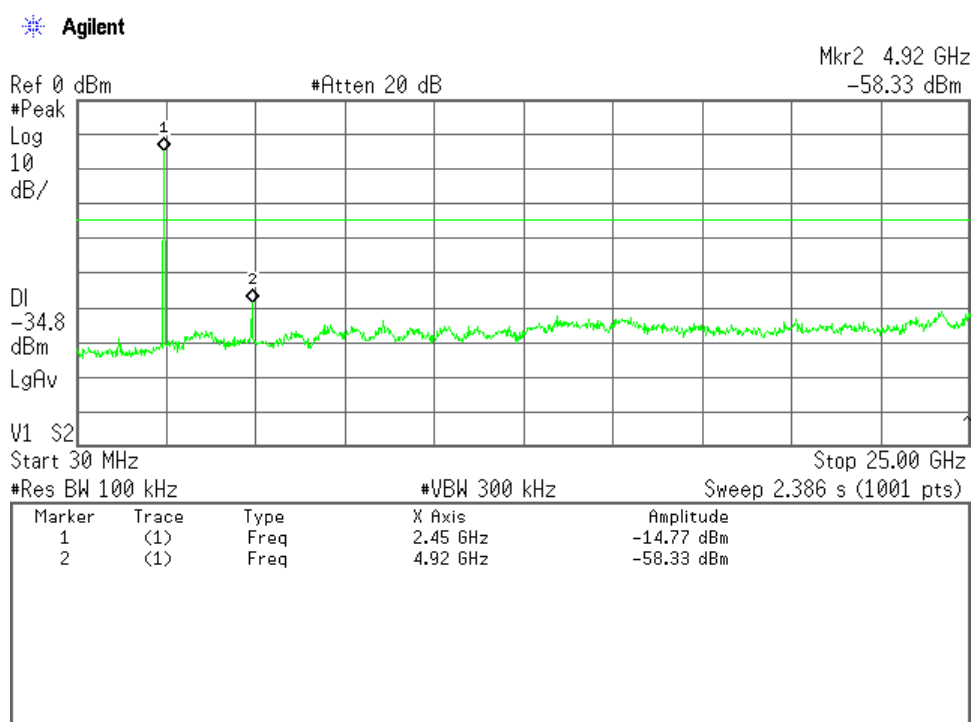
Low Channel



Middle Channel

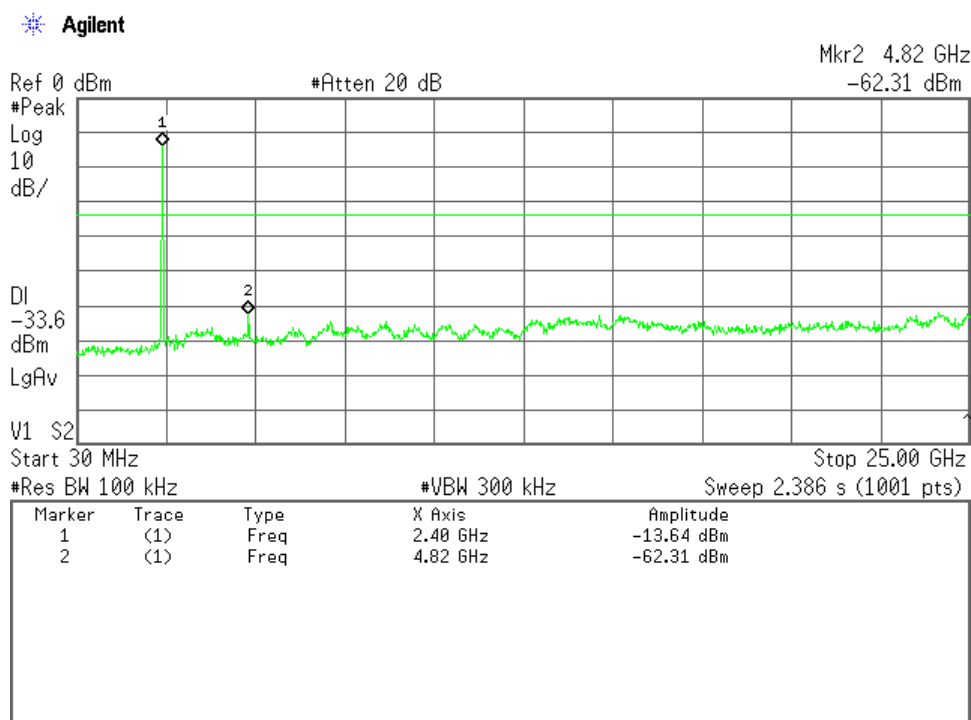


High Channel

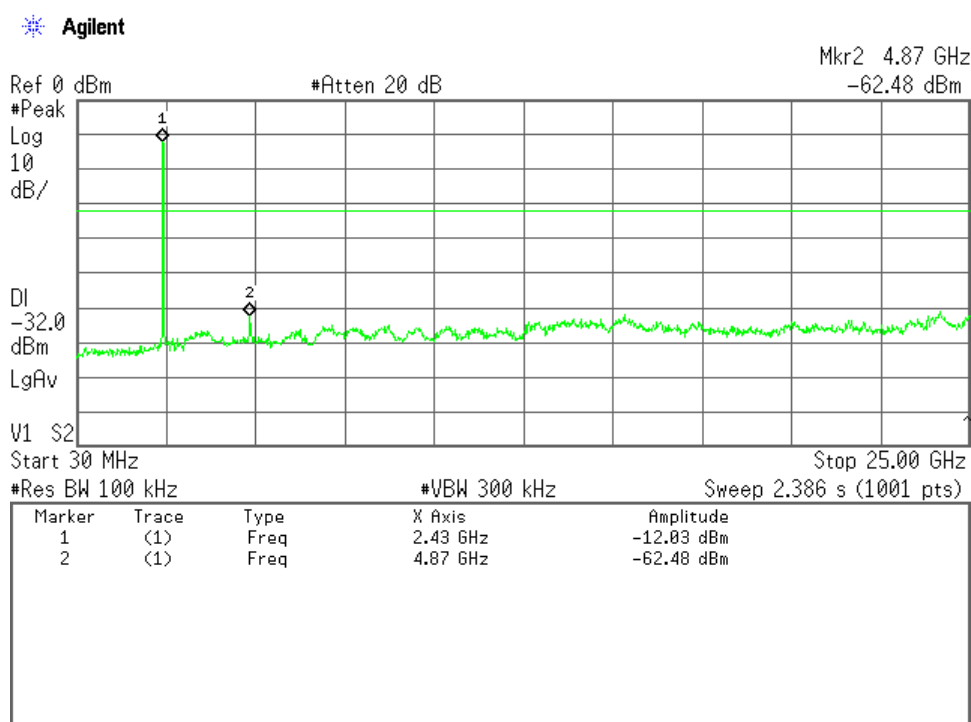


6)Data Rate : 65Mbps(IEEE 802.11n)

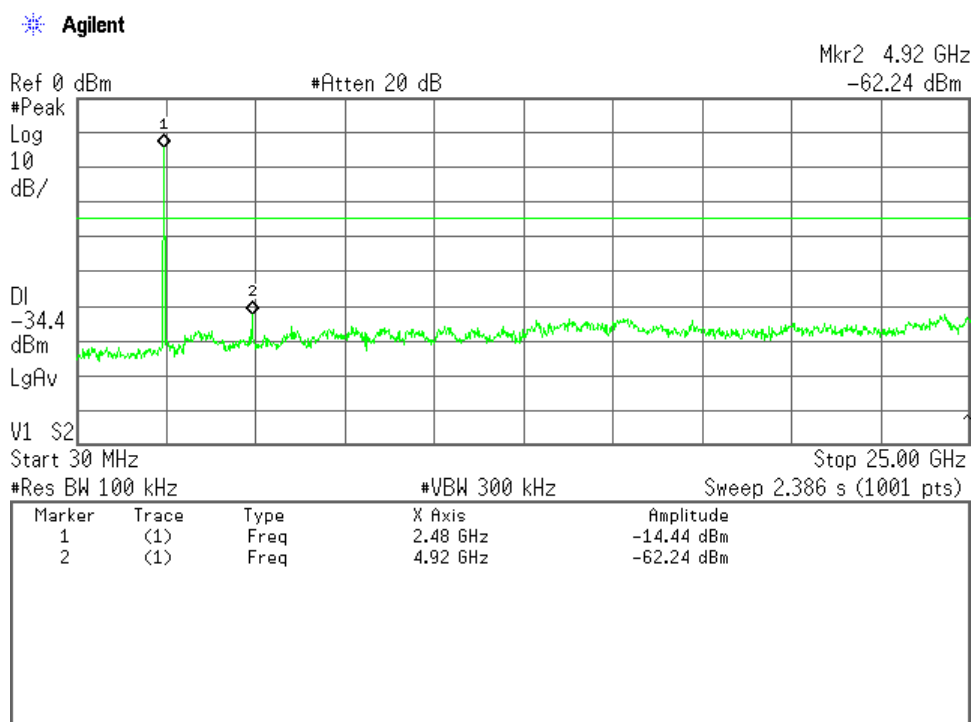
Low Channel



Middle Channel



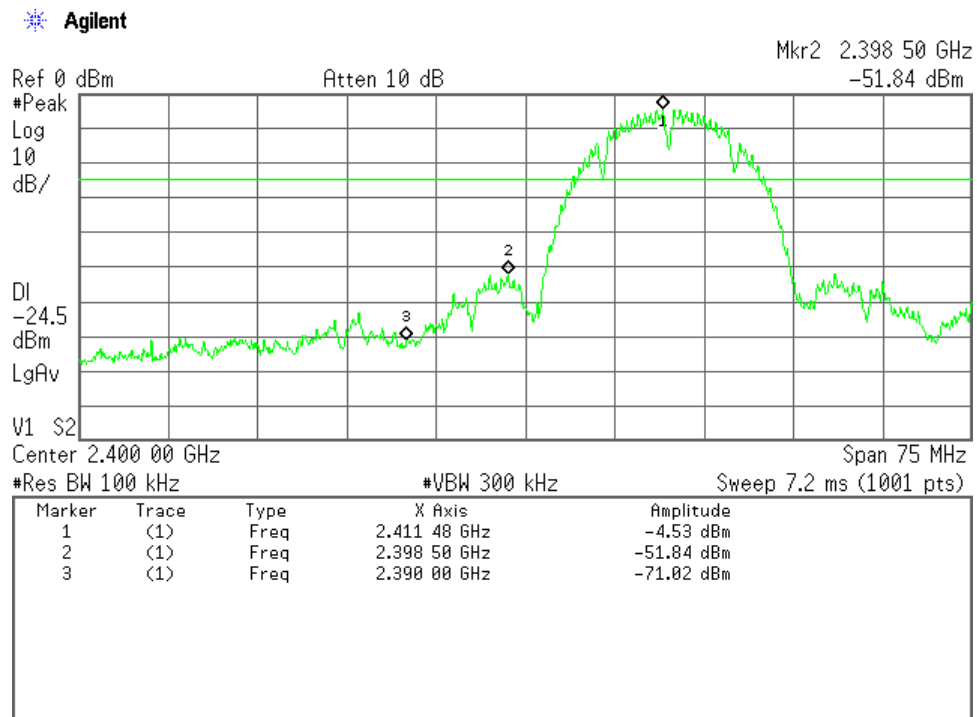
High Channel



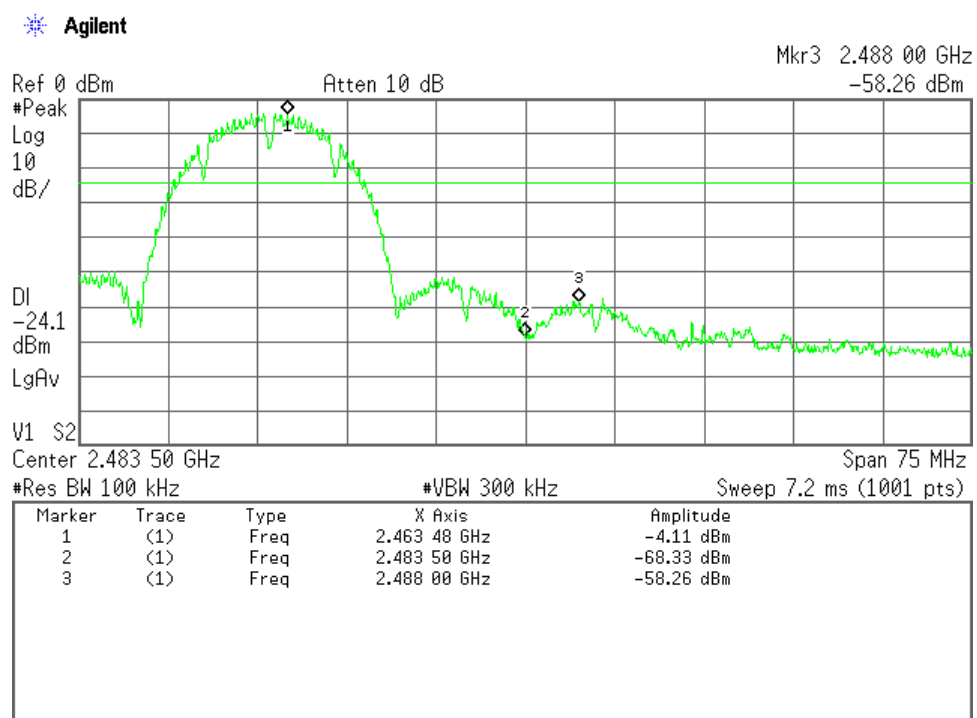
Band-Edge Emission

1)Data Rate : 1Mbps(IEEE 802.11b)

Low Channel

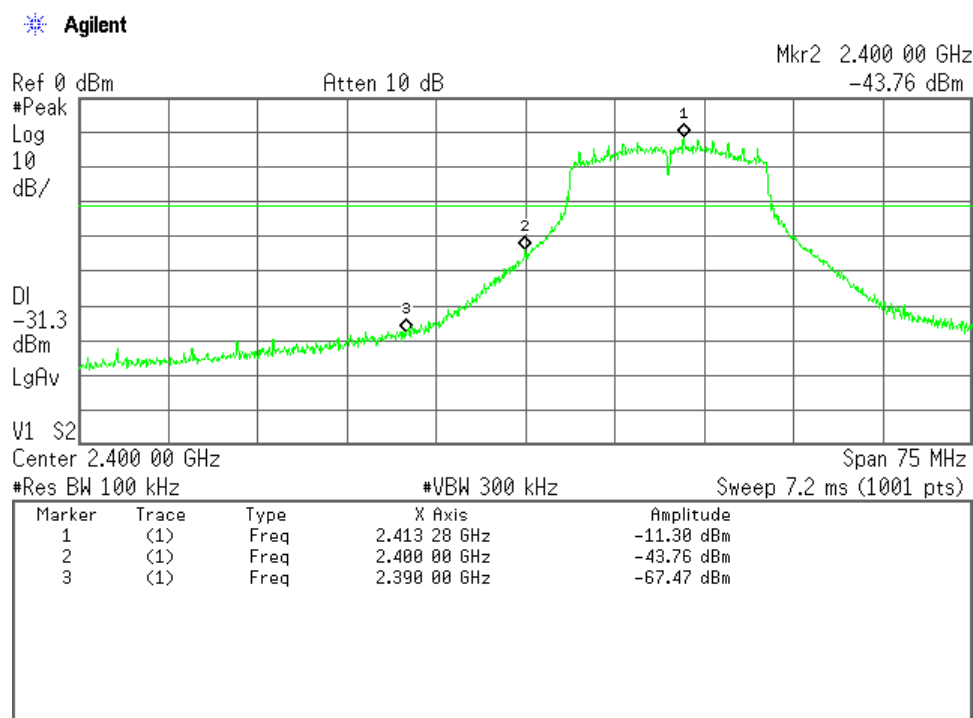


High Channel

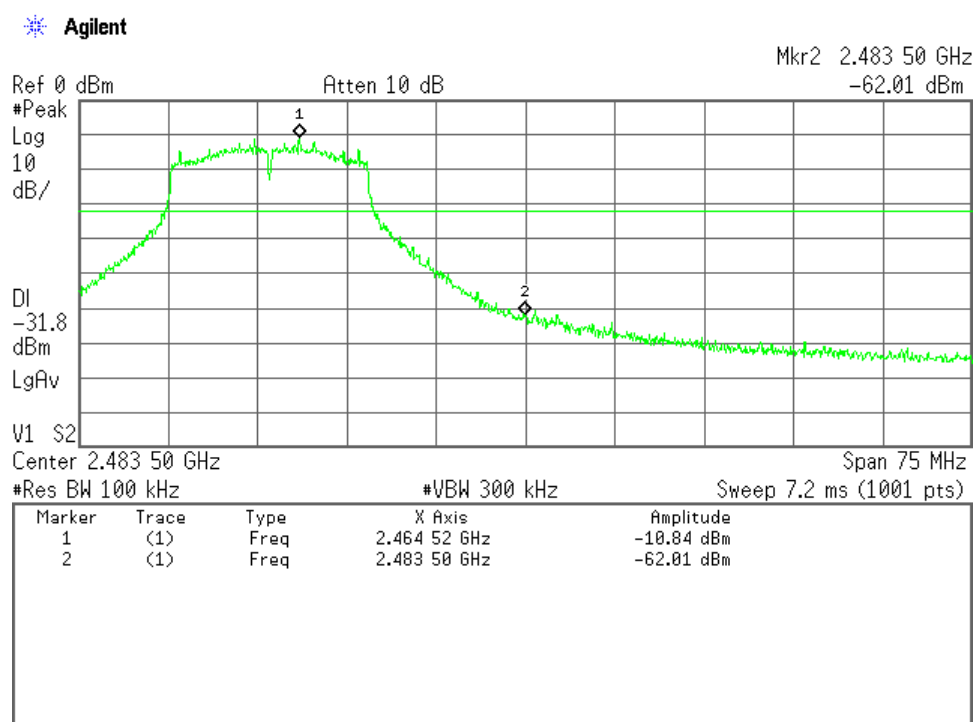


2)Data Rate : 6Mbps(IEEE 802.11g)

Low Channel

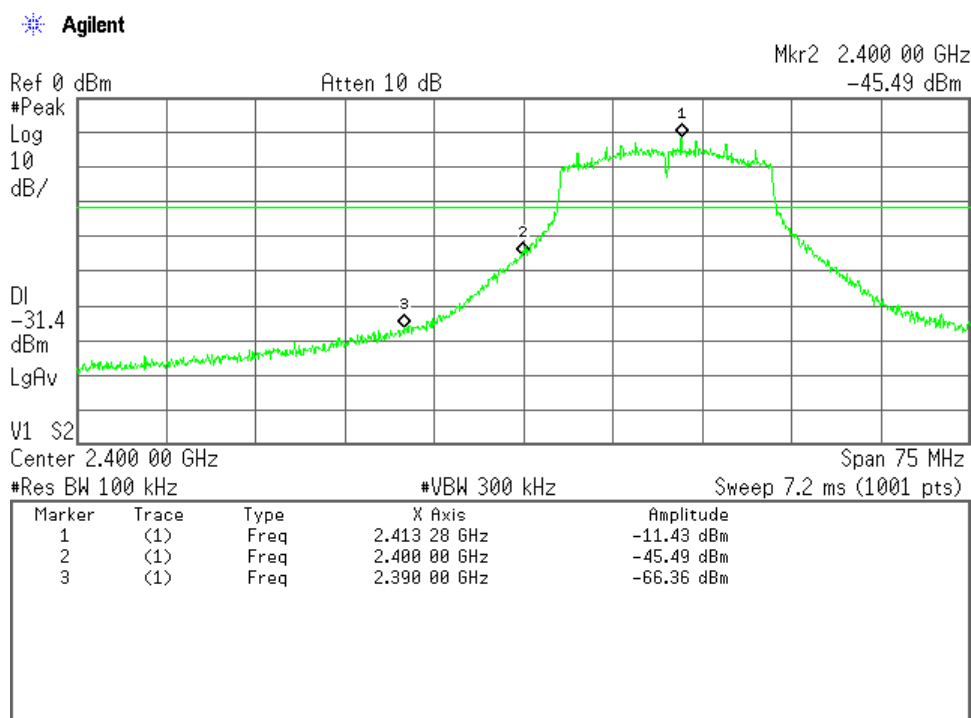


High Channel

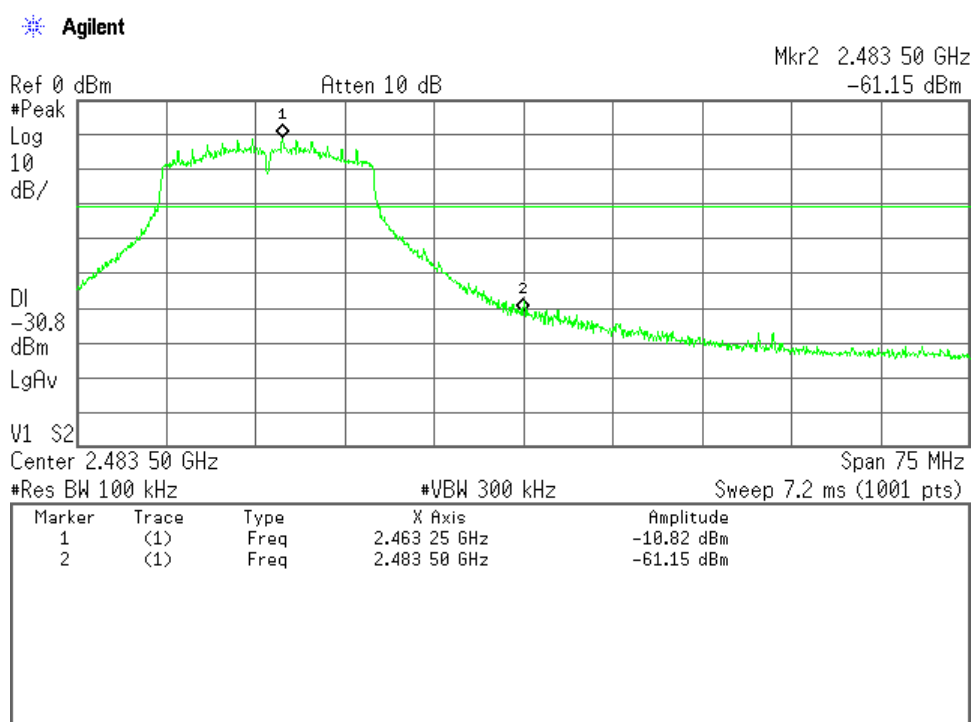


2)Data Rate : 6.5Mbps(IEEE 802.11n)

Low Channel



High Channel

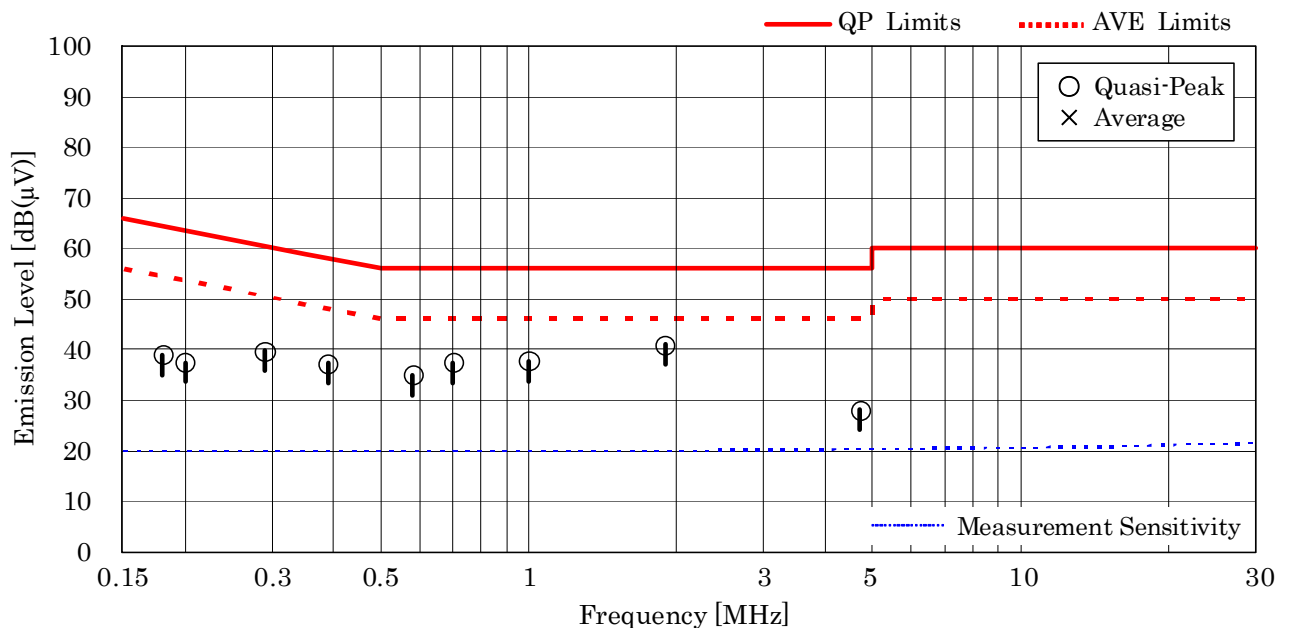


A.8 AC Powerline Conducted Emission

Mode of EUT : All modes have been investigated and the worst case mode for channel (06ch: 2437MHz / IEEE 802.11b, IEEE 802.11g and IEEE 802.11n) has been listed.

Test Date: October 7, 2011
Temp.: 22 °C, Humi.: 45 %

Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dB(μV)]				Limits [dB(μV)]		Results [dB(μV)]		Margin [dB]	Remarks
		VA		VB		QP	AVE	QP	AVE		
		QP	AVE	QP	AVE	QP	AVE	QP	AVE		
0.18	10.1	28.8	--	28.6	--	64.5	54.5	38.9	--	+25.6	-
0.20	10.0	27.5	--	24.5	--	63.6	53.6	37.5	--	+26.1	-
0.29	10.0	29.7	--	26.6	--	60.5	50.5	39.7	--	+20.8	-
0.39	10.0	27.3	--	21.4	--	58.1	48.1	37.3	--	+20.8	-
0.58	10.0	25.0	--	19.3	--	56.0	46.0	35.0	--	+21.0	-
0.70	10.0	27.4	--	21.8	--	56.0	46.0	37.4	--	+18.6	-
1.00	10.1	27.7	--	23.9	--	56.0	46.0	37.8	--	+18.2	-
1.89	10.1	26.0	--	30.8	--	56.0	46.0	40.9	--	+15.1	-
4.72	10.2	17.9	--	17.6	--	56.0	46.0	28.1	--	+27.9	-



NOTES

1. The spectrum was checked from 0.15 MHz to 30 MHz.
2. The correction factor includes the AMN insertion loss and the cable loss.
3. The symbol of "<" means "or less".
4. The symbol of ">" means "more than".
5. The symbol of "--" means "not applicable".
6. Calculated result at 1.89 MHz, as the worst point shown on underline:
Correction Factor + Meter Reading = 10.1 + 30.8 = 40.9 dB(μV)
7. QP : Quasi-Peak Detector / AVE : Average Detector
8. Test receiver setting(s) : CISPR QP 9 kHz / Average 9 kHz

A.9 Field Strength of Spurious Radiation

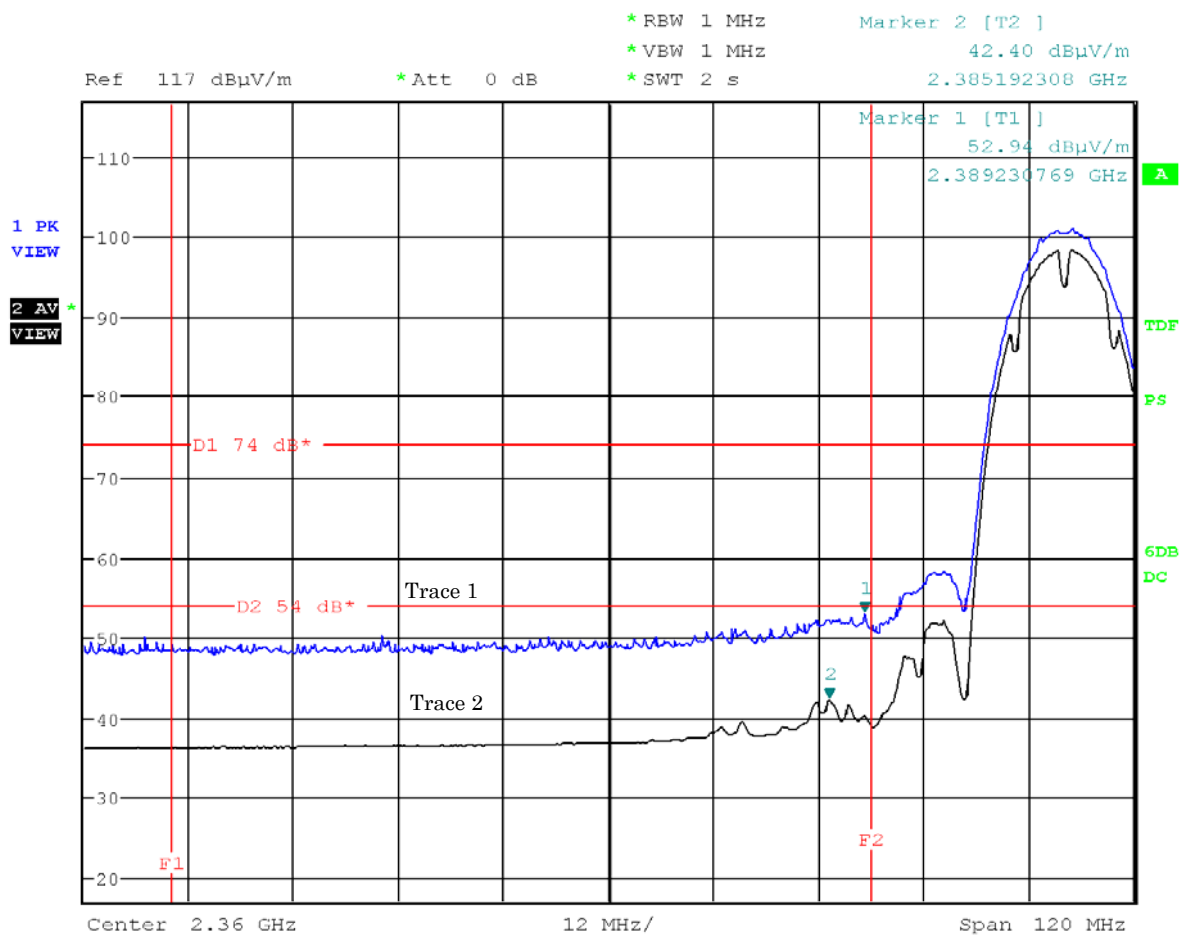
A.9.1 Band-edge Compliance

Test Date : October 4, 2011

Temp.:24°C, Humi:30%

Mode of EUT : TX(1ch: 2412 MHz, data rate : 1Mbps(IEEE 802.11b))

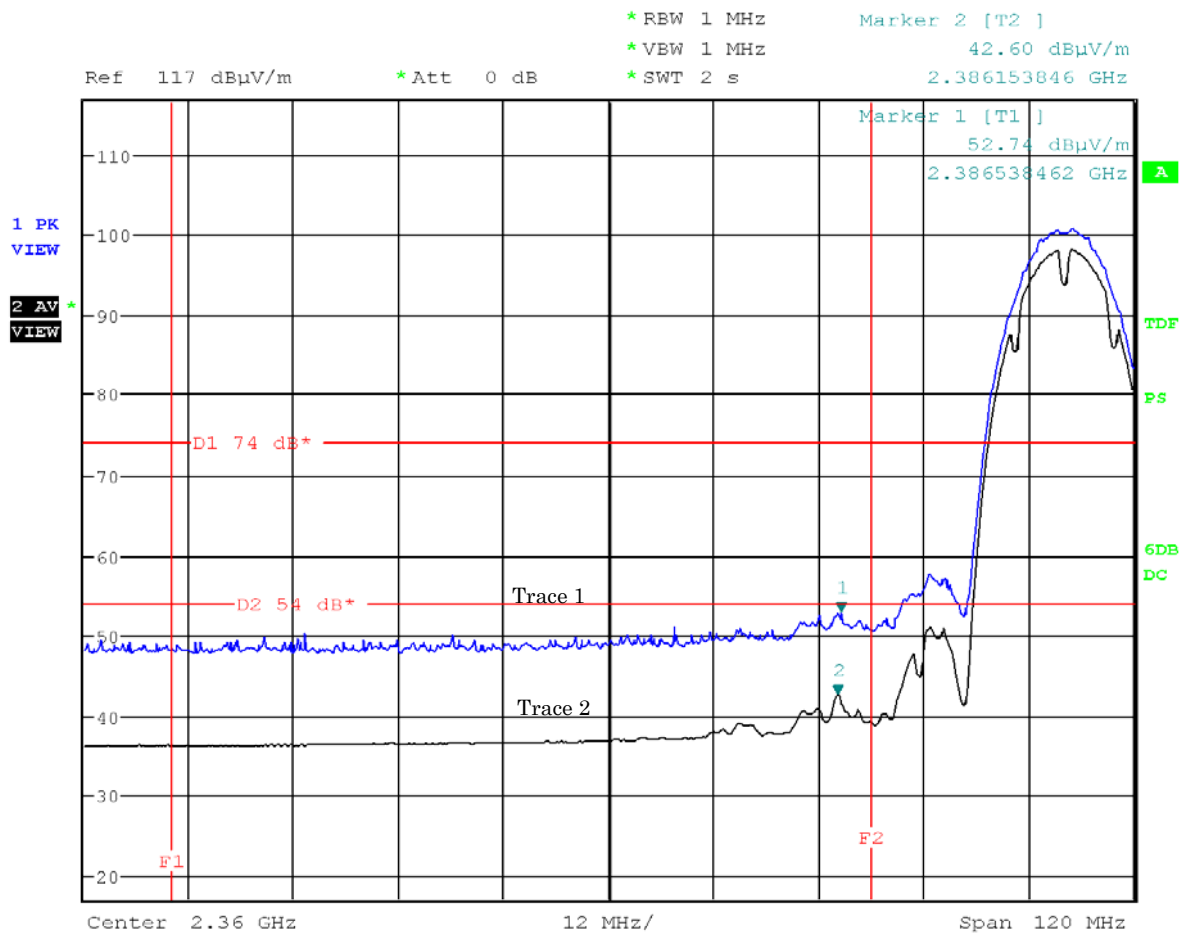
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX(1ch: 2412 MHz, data rate : 1Mbps(IEEE 802.11b))

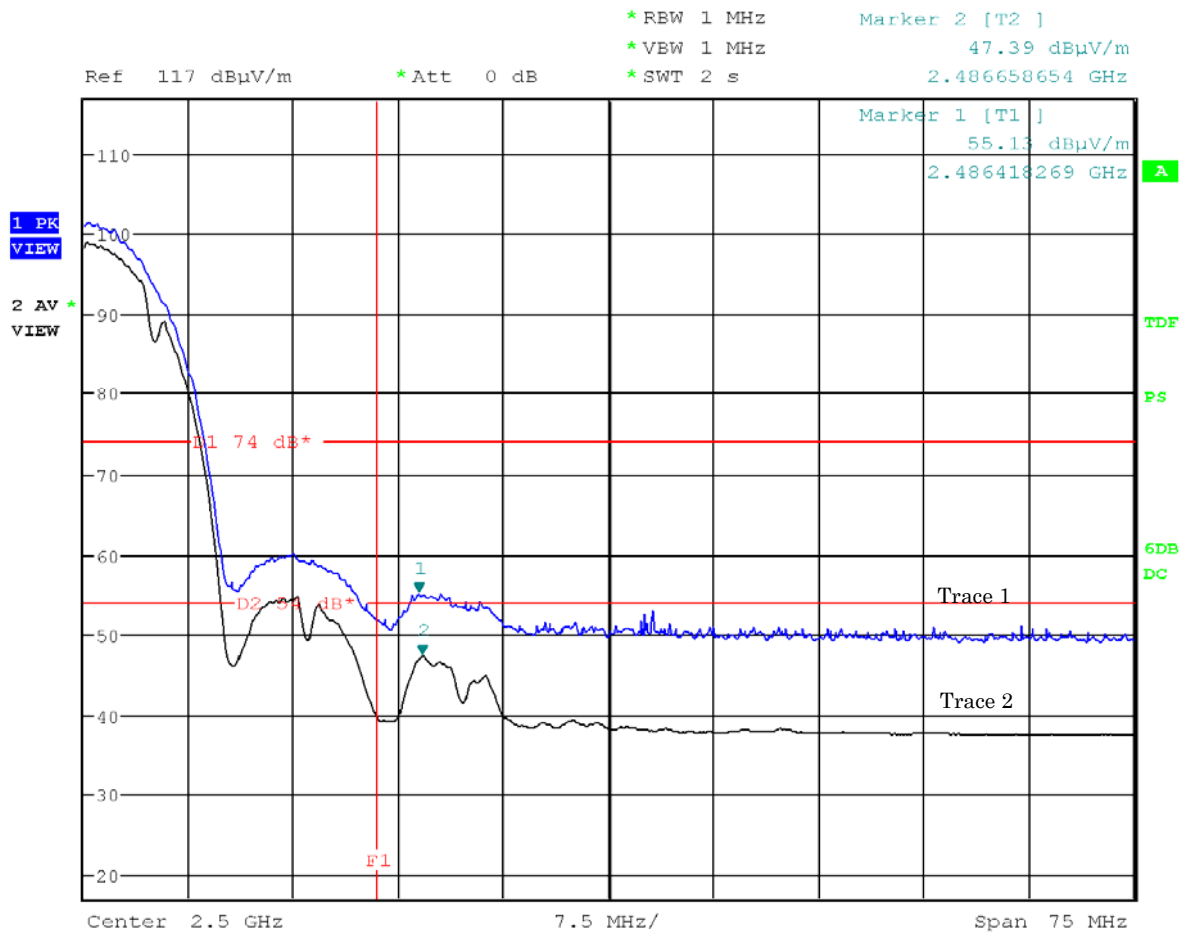
Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX(11ch: 2462 MHz, data rate : 1Mbps(IEEE 802.11b))

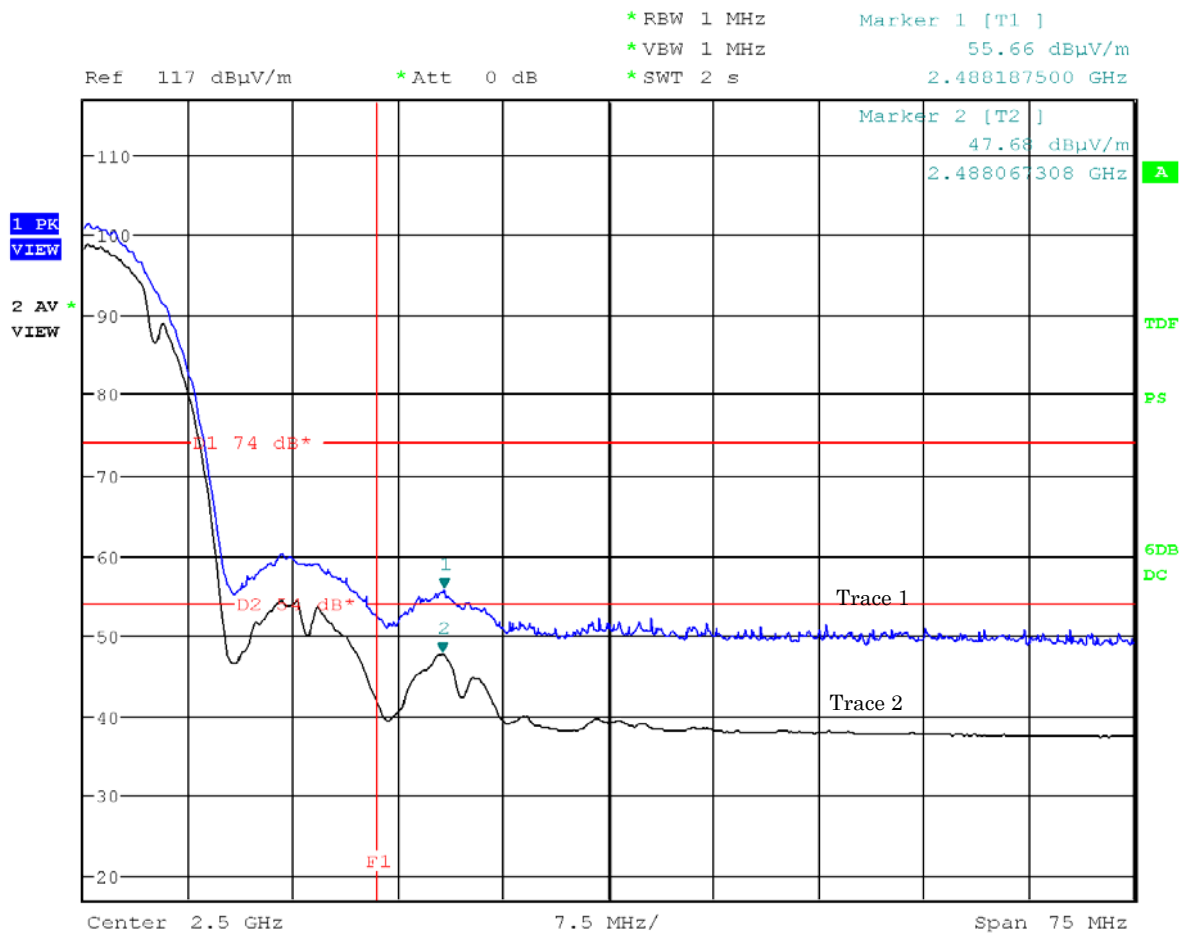
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX(11ch: 2462 MHz, data rate : 1Mbps(IEEE 802.11b))

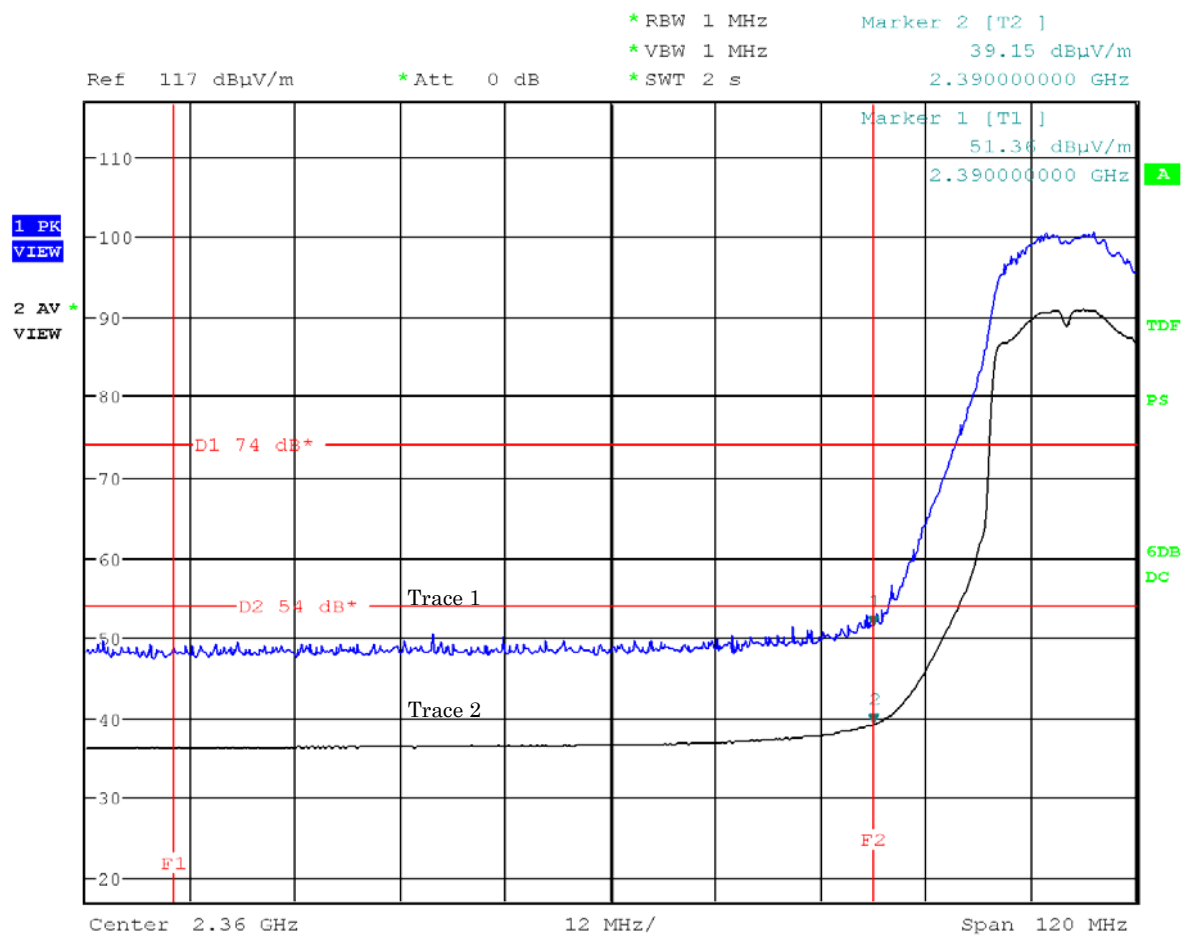
Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX(1ch: 2412 MHz, data rate : 6Mbps(IEEE 802.11g))

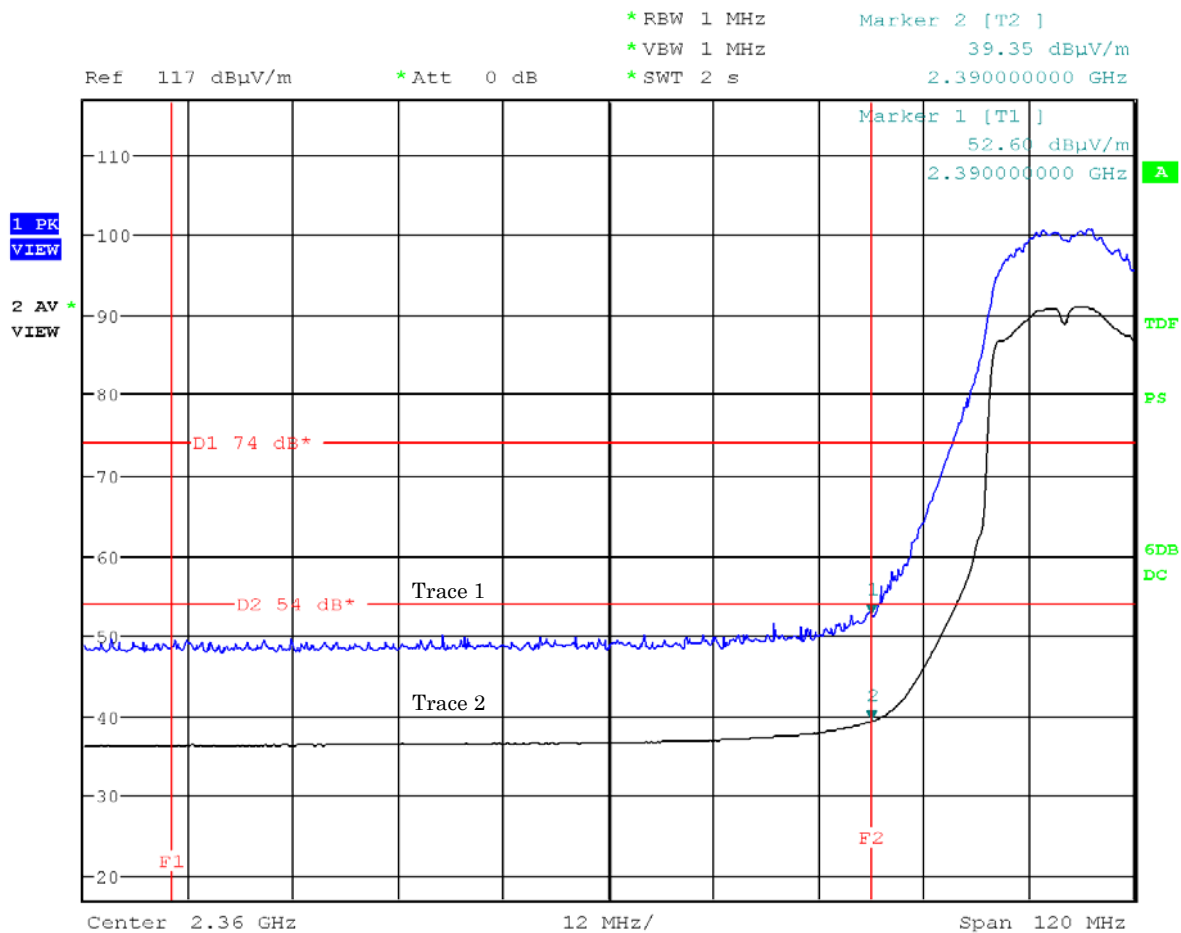
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX(1ch: 2412 MHz, data rate : 6Mbps(IEEE 802.11g))

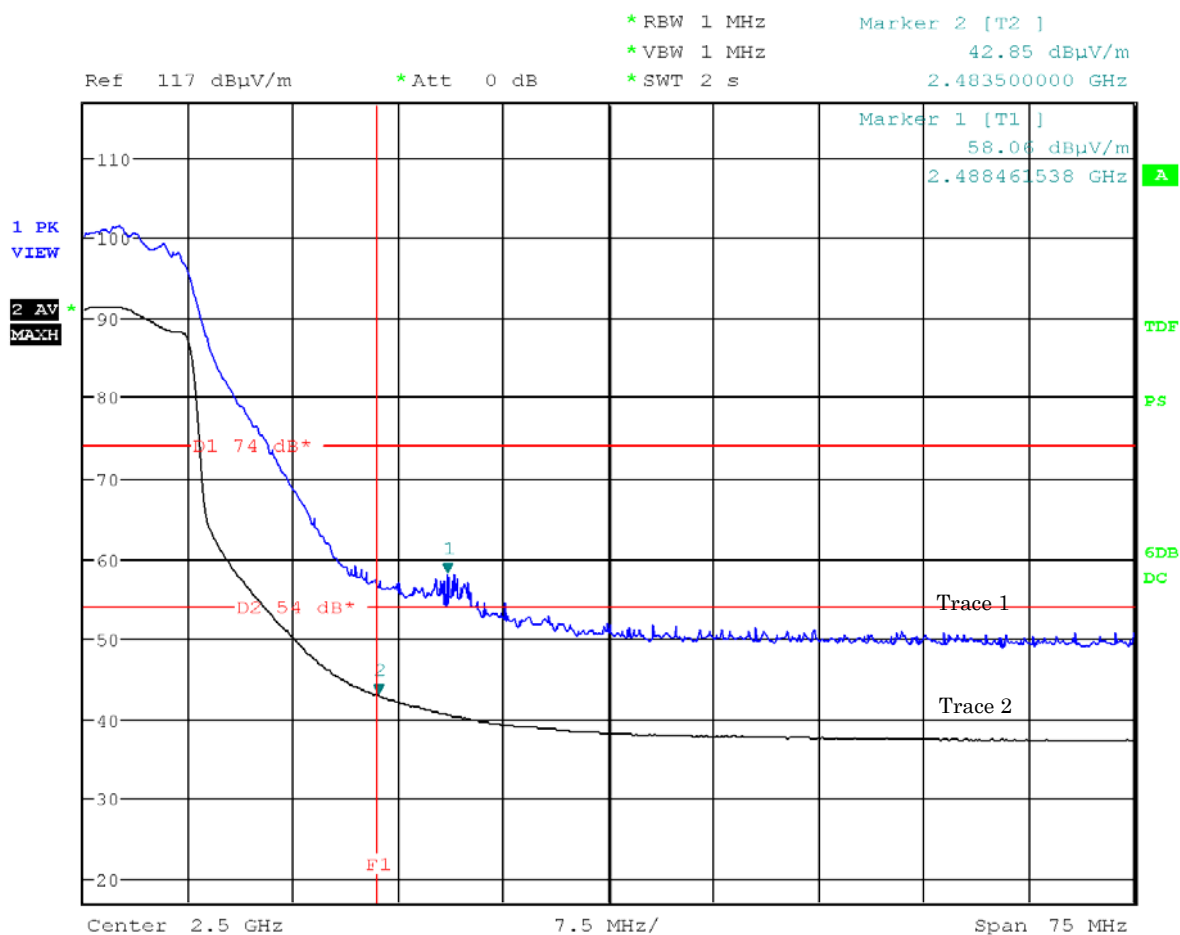
Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX(11ch: 2462 MHz, data rate : 6Mbps(IEEE 802.11g))

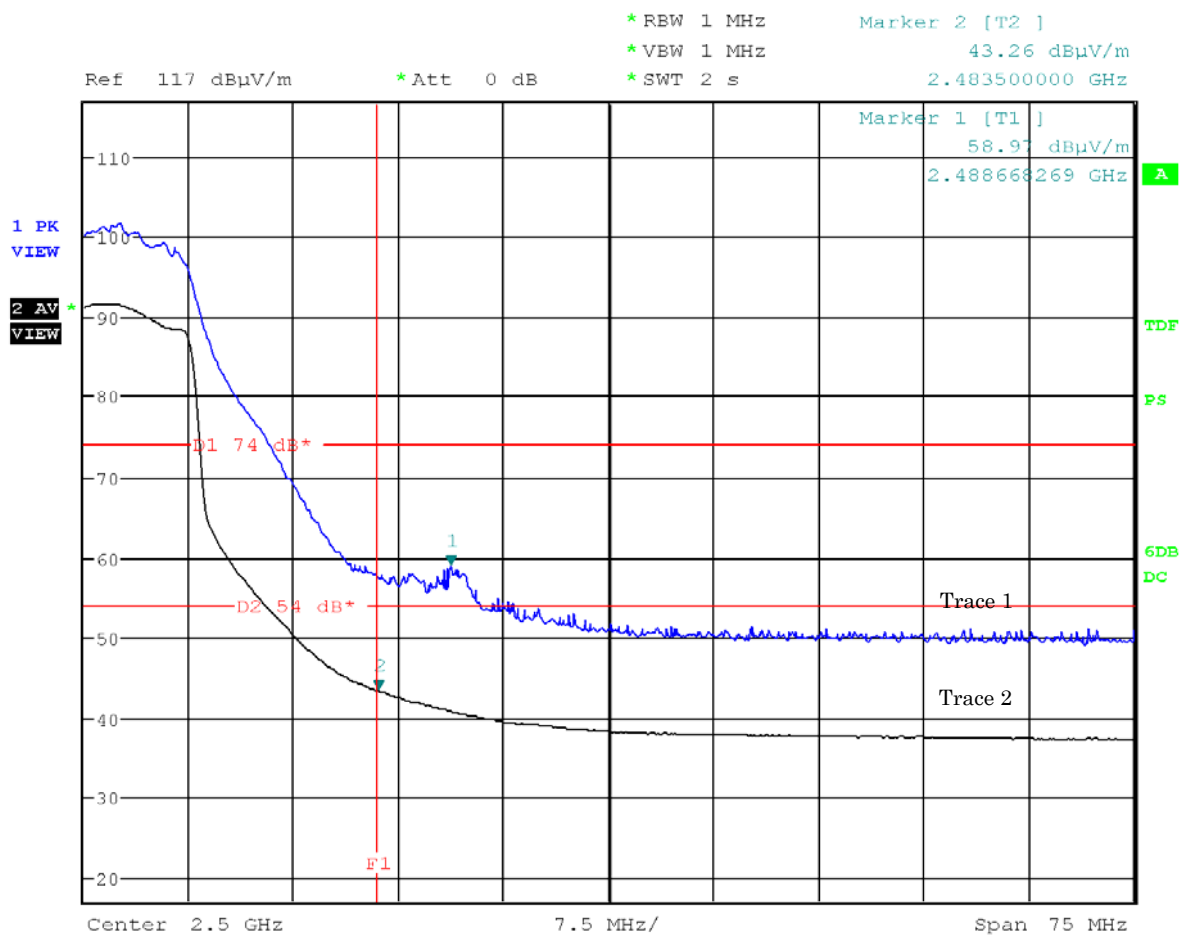
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX(11ch: 2462 MHz, data rate : 6Mbps(IEEE 802.11g))

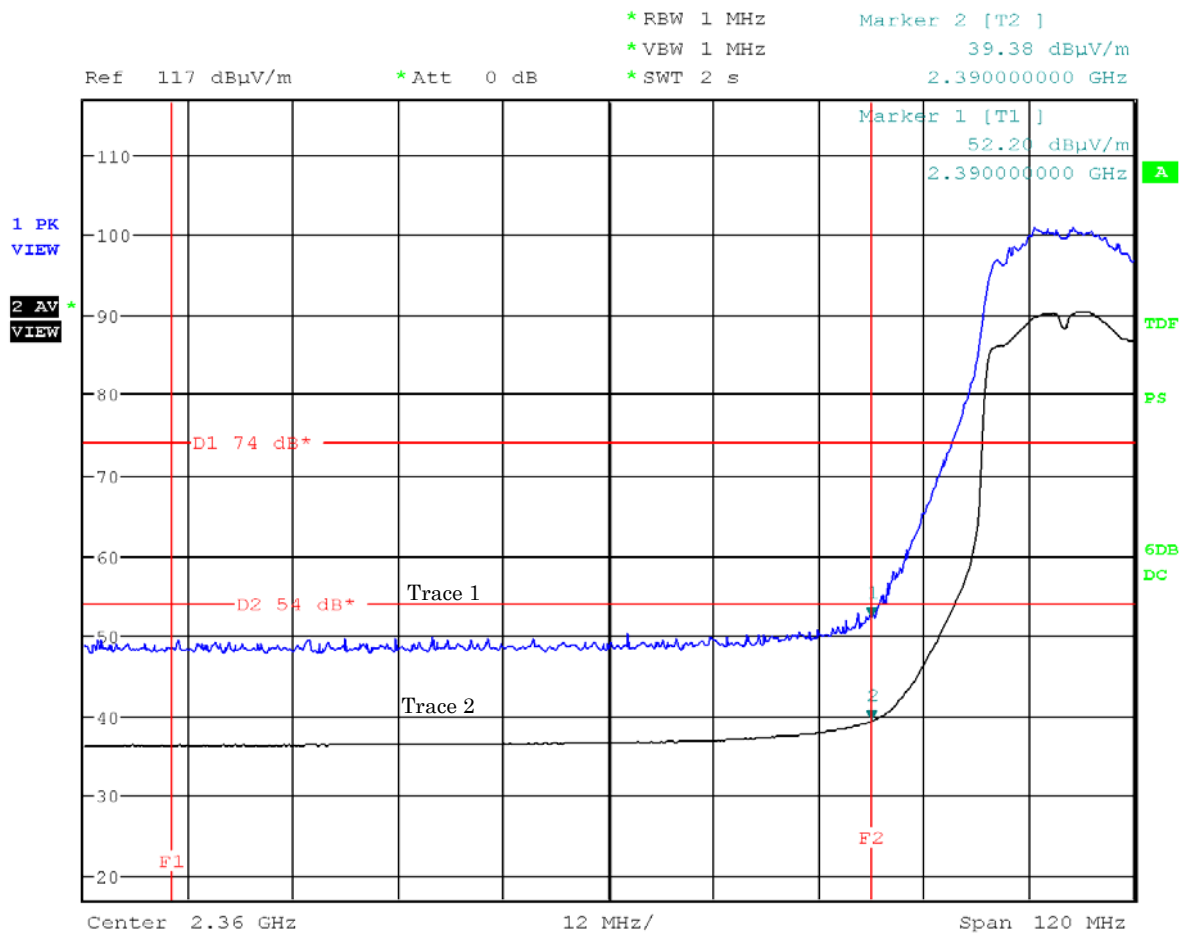
Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX(1ch: 2412 MHz, data rate : 6.5Mbps(IEEE 802.11n))

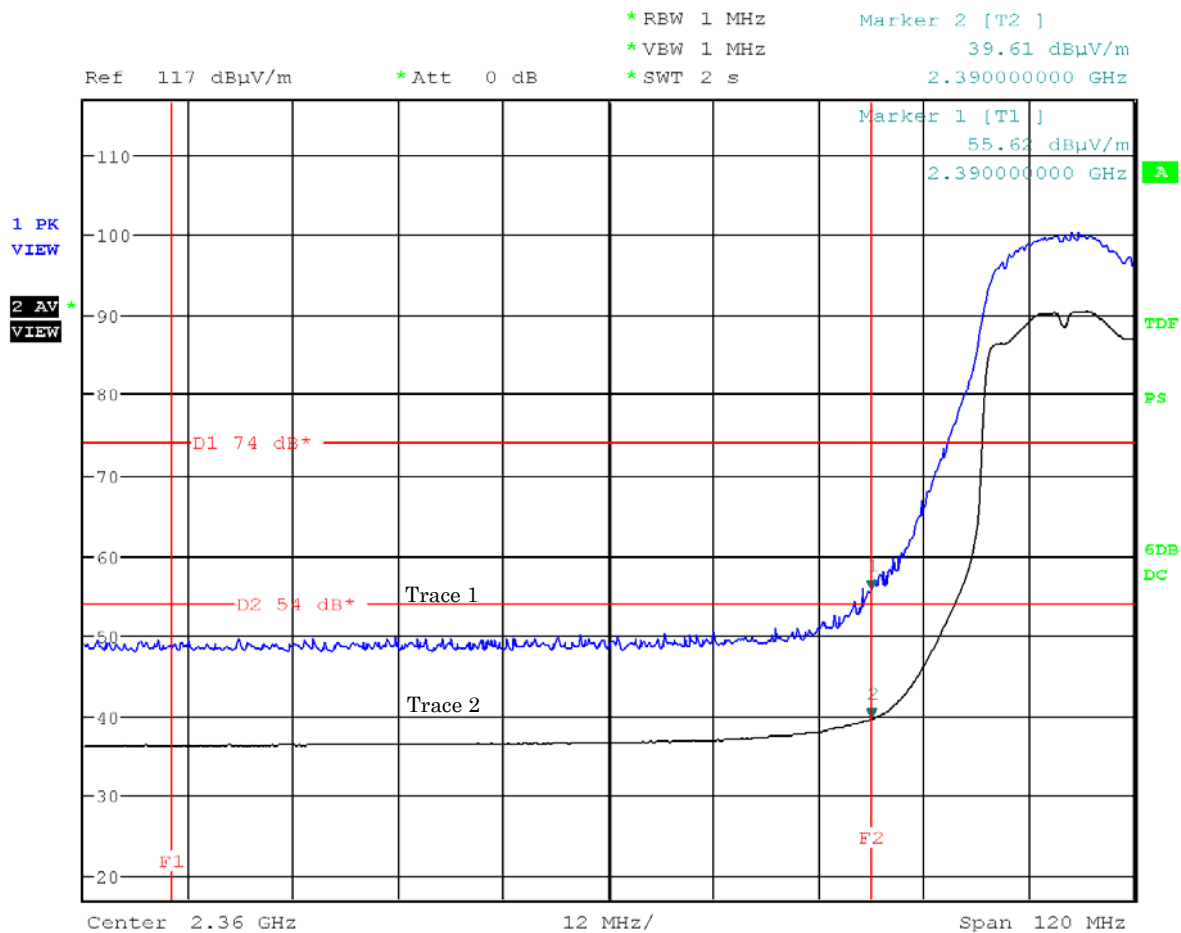
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX(1ch: 2412 MHz, data rate : 6.5Mbps(IEEE 802.11n))

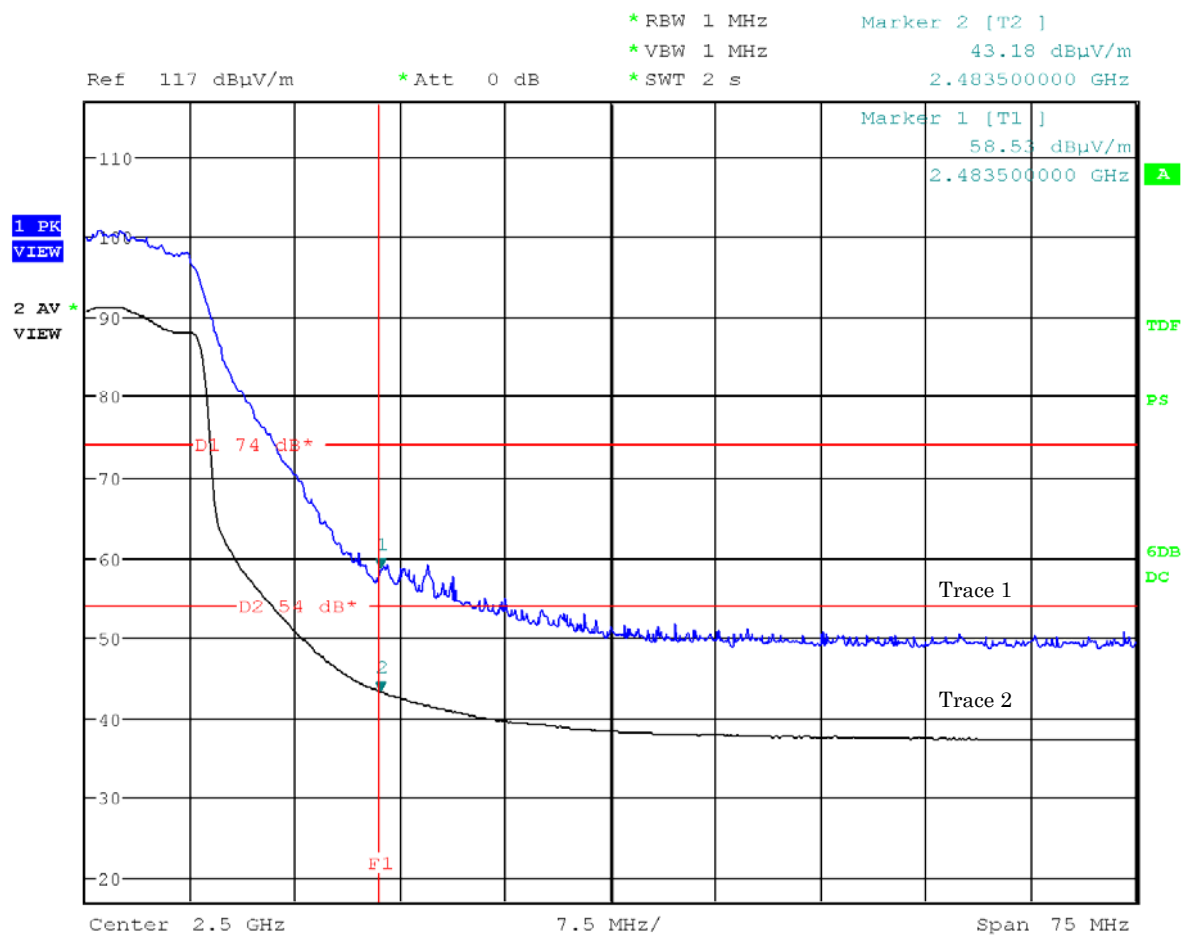
Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX(11ch: 2462 MHz, data rate : 6.5Mbps(IEEE 802.11n))

Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

A.9.2 Other Spurious Emission

A.9.2.1 Other Spurious Emission(9kHz – 30MHz)

Test Date : October 4, 2011

Temp.:25°C, Humi:65%

Mode of EUT : All modes have been investigated and the worst case mode for channel (06ch: 2437MHz / IEEE802.11b, IEEE802.11g and IEEE802.11n) has been listed.

Results : No spurious emissions in the range 20dB below the limit.

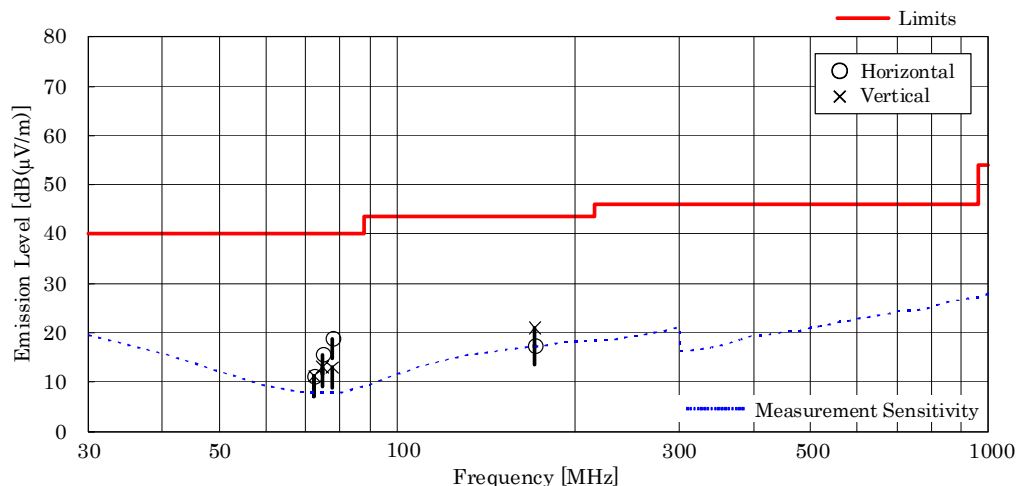
A.9.2.2 Other Spurious Emission(30MHz – 1000MHz)

Mode of EUT : All modes have been investigated and the worst case mode for channel (06ch: 2437MHz / IEEE802.11b, IEEE802.11g and IEEE802.11n) has been listed.

Test Date: October 4, 2011

Temp.: 25 °C, Humi: 65 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Cable Loss [dB]	Meter Readings [dB(μV)]		Limits [dB(μV/m)]	Results [dB(μV/m)]		Margin [dB]	Remarks
			Hori.	Vert.		Hori.	Vert.		
72.3	6.6	1.2	3.4	3.4	40.0	11.2	11.2	+28.8	-
74.7	6.6	1.2	7.8	5.2	40.0	15.6	13.0	+24.4	-
77.6	6.5	1.2	11.1	5.2	40.0	18.8	12.9	+21.2	-
170.9	15.5	1.7	0.2	3.7	43.5	17.4	20.9	+22.6	-



NOTES

1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 1000 MHz.
3. The symbol of "<" means "or less".
4. The symbol of ">" means "more than".
5. Calculated result at 77.6 MHz, as the worst point shown on underline:
Antenna Factor + Cable Loss + Meter Reading = 6.5 + 1.2 + 11.1 = 18.8 dB(μV/m)
6. Test receiver setting(s) : CISPR QP 120 kHz (QP : Quasi-Peak)

A.9.2.3 Other Spurious Emission(Above 1000MHz)

A.9.2.3.1 Mode of TX

A.9.2.3.1.1 IEEE802.11b

Test Date: October 4, 2011

Temp.: 24 °C, Humi: 30 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings [dB(μV)]				Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
			Horizontal		Vertical		PK	AVE	PK	AVE		
Test condition : Tx Low Ch												
4824.0	27.3	-21.1	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.2	< 36.2	> +17.8	A/B
12060.0	33.6	-25.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 47.7	< 37.7	> +16.3	A/B
19296.0	40.3	-21.6	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.7	< 48.7	> + 5.3	A/B
Test condition : TX Middle Ch												
4874.0	27.3	-21.1	41.3	30.9	40.8	30.6	74.0	54.0	47.5	37.1	+16.9	A/B
7311.0	29.9	-19.4	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.5	< 40.5	> +13.5	A/B
12185.0	33.5	-25.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 47.7	< 37.7	> +16.3	A/B
19496.0	40.2	-21.6	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.6	< 48.6	> + 5.4	A/B
Test condition : TX High Ch												
4924.0	27.3	-21.2	42.3	32.6	42.0	32.2	74.0	54.0	48.4	38.7	+15.3	A/B
7386.0	29.9	-19.4	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.5	< 40.5	> +13.5	A/B
12310.0	33.5	-25.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 47.7	< 37.7	> +16.3	A/B
19696.0	40.3	-21.4	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.9	< 48.9	> + 5.1	A/B
22158.0	40.3	-20.6	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 59.7	< 49.7	> + 4.3	A/B

Calculated result at 22158.0 MHz, as the worst point shown on underline:

Antenna Factor = 40.3 dB(1/m)
 Corr. Factor = -20.6 dB
 +) Meter Reading = <30.0 dB(μV)
 Result = <49.7 dB(μV/m)

Minimum Margin: 54.0 - <49.7 = >4.3 (dB)

NOTES

- Test Distance : 3 m
- The spectrum was checked from 1 GHz to 25 GHz (10th harmonic of the highest fundamental frequency).
- The correction factor is shown as follows:
 Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
 Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
 Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (over 18 GHz)
- The symbol of "<" means "or less".
- The symbol of ">" means "more than".
- PK : Peak Detector / AVE : Average Detector
- Setting of measuring instrument(s) :

	Detector Function	Resolution B.W.	Video B.W.	Sweep Time
A	Peak	1 MHz	1 MHz	AUTO
B	Peak	1 MHz	10 Hz	AUTO

A.9.2.3.1.2 IEEE802.11g

Test Date: October 4, 2011

Temp.: 24 °C, Humi: 30 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings [dB(μV)]				Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
			Horizontal		Vertical		PK	AVE	PK	AVE		
Test condition : Tx Low Ch												
4824.0	27.3	-20.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.5	< 36.5	> +17.5	A/B
12060.0	33.6	-25.6	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 48.0	< 38.0	> +16.0	A/B
19296.0	40.3	-21.6	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.7	< 48.7	> + 5.3	A/B
Test condition : TX Middle Ch												
4874.0	27.3	-20.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.5	< 36.5	> +17.5	A/B
7311.0	29.9	-19.0	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.9	< 40.9	> +13.1	A/B
12185.0	33.5	-25.4	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 48.1	< 38.1	> +15.9	A/B
19496.0	40.2	-21.6	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.6	< 48.6	> + 5.4	A/B
Test condition : TX High Ch												
4924.0	27.3	-20.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.4	< 36.4	> +17.6	A/B
7386.0	29.9	-19.0	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.9	< 40.9	> +13.1	A/B
12310.0	33.5	-25.4	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 48.1	< 38.1	> +15.9	A/B
19696.0	40.3	-21.4	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.9	< 48.9	> + 5.1	A/B
22158.0	40.3	-20.6	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 59.7	< 49.7	> + 4.3	A/B

Calculated result at 19696.0 MHz, as the worst point shown on underline:

Antenna Factor	=	40.3 dB(1/m)
Corr. Factor	=	-21.4 dB
+) Meter Reading	=	<30.0 dB(μV)
Result	=	<48.9 dB(μV/m)

Minimum Margin: 54.0 - <48.9 => +4.3 (dB)

NOTES

- Test Distance : 3 m
- The spectrum was checked from 1 GHz to 25 GHz (10th harmonic of the highest fundamental frequency).
- The correction factor is shown as follows:
Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (over 18 GHz)
- The symbol of "<" means "or less".
- The symbol of ">" means "more than".
- PK : Peak Detector / AVE : Average Detector
- Setting of measuring instrument(s) :

	Detector Function	Resolution B.W.	Video B.W.	Sweep Time
A	Peak	1 MHz	1 MHz	AUTO
B	Peak	1 MHz	10 Hz	AUTO

A.9.2.3.1.3 IEEE802.11n

Test Date: October 4, 2011

Temp.: 24 °C, Humi: 30 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings [dB(μV)]				Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
			Horizontal		Vertical		PK	AVE	PK	AVE		
Test condition : Tx Low Ch												
4824.0	27.3	-20.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.5	< 36.5	> +17.5	A/B
12060.0	33.6	-25.6	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 48.0	< 38.0	> +16.0	A/B
19296.0	40.3	-21.6	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.7	< 48.7	> + 5.3	A/B
Test condition : TX Middle Ch												
4874.0	27.3	-20.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.5	< 36.5	> +17.5	A/B
7311.0	29.9	-19.0	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.9	< 40.9	> +13.1	A/B
12185.0	33.5	-25.4	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 48.1	< 38.1	> +15.9	A/B
19496.0	40.2	-21.6	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.6	< 48.6	> + 5.4	A/B
Test condition : TX High Ch												
4924.0	27.3	-20.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.4	< 36.4	> +17.6	A/B
7386.0	29.9	-19.0	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.9	< 40.9	> +13.1	A/B
12310.0	33.5	-25.4	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 48.1	< 38.1	> +15.9	A/B
19696.0	40.3	-21.4	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.9	< 48.9	> + 5.1	A/B
22158.0	40.3	-20.6	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 59.7	< 49.7	> + 4.3	A/B

Calculated result at 19696.0 MHz, as the worst point shown on underline:

Antenna Factor	=	40.3 dB(1/m)
Corr. Factor	=	-21.4 dB
+) Meter Reading	=	<30.0 dB(μV)
Result	=	<48.9 dB(μV/m)

Minimum Margin: 54.0 - <48.9 => +4.3 (dB)

NOTES

- Test Distance : 3 m
- The spectrum was checked from 1 GHz to 25 GHz (10th harmonic of the highest fundamental frequency).
- The correction factor is shown as follows:
Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (over 18 GHz)
- The symbol of "<" means "or less".
- The symbol of ">" means "more than".
- PK : Peak Detector / AVE : Average Detector
- Setting of measuring instrument(s) :

	Detector Function	Resolution B.W.	Video B.W.	Sweep Time
A	Peak	1 MHz	1 MHz	AUTO
B	Peak	1 MHz	10 Hz	AUTO

A.9.2.3.2 Mode of RX

Test Date: October 4, 2011

Temp.: 24 °C, Humi: 30 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings [dB(μV)]				Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
			Horizontal		Vertical		PK	AVE	PK	AVE		
			PK	AVE	PK	AVE						
Test condition : RX Middle Ch												
2437.0	21.4	-22.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 39.2	< 29.2	> +24.8	A/B
4874.0	27.3	-21.4	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 45.9	< 35.9	> +18.1	A/B
7311.0	29.9	-19.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.2	< 40.2	> +13.8	A/B

Calculated result at 4874.0 MHz, as the worst point shown on underline:

Antenna Factor = 27.3 dB(1/m)

Corr. Factor = -21.4 dB

+) Meter Reading = <30.0 dB(μV)

Result = <35.9 dB(μV/m)

Minimum Margin: 54.0 - <35.9 = >13.8 (dB)

NOTES

- Test Distance : 3 m
- The spectrum was checked from 1 GHz to 25 GHz (10th harmonic of the highest fundamental frequency).
- The correction factor is shown as follows:
Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
- The symbol of "<" means "or less".
- The symbol of ">" means "more than".
- PK : Peak Detector / AVE : Average Detector
- Setting of measuring instrument(s) :

	Detector Function	Resolution B.W.	Video B.W.	Sweep Time
A	Peak	1 MHz	1 MHz	AUTO
B	Peak	1 MHz	10 Hz	AUTO

Appendix B: Test Arrangement (Photographs)**B.1 AC Powerline Conducted Emission**

This page is CONFIDENTIAL.

B.2 Radiated Emission

This page is CONFIDENTIAL.

Appendix C: Test Instruments

C.1 Channel Separation

Not Applicable

C.2 Minimum Hopping Channel

Not Applicable

C.3 Occupied Bandwidth

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2011/9	1 Year
Attenuator	54A-10	Weinschel	D-29	2011/9	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2011/6	1 Year

C.4 Dwell Time

Not Applicable

C.5.1 Peak Output Power (Conduction)

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Power Meter	N1911A	Agilent	B-63	2011/7	1 Year
Power Sensor	N1921A	Agilent	B-64	2011/7	1 Year
Attenuator	54A-10	Weinschel	D-29	2011/9	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2011/6	1 Year

C.5.2 Peak Output Power Density (Conduction)

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2011/9	1 Year
Attenuator	54A-10	Weinschel	D-29	2011/9	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2011/6	1 Year

C.6 Spurious Emission (Conduction)

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2011/9	1 Year
Attenuator	54A-10	Weinschel	D-29	2011/9	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2011/6	1 Year

C.7 AC Power Conducted Emission

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Test Receiver	ESCI 7	Rohde & Schwarz	A-8	2011/1	1 Year
AMN (main)	KNW-407FR	Kyoritsu	D-103	2010/10	1 Year
RF Cable	RG223/U	SUHNER	H-35	2011/6	1 Year

C.8 Radiated Emission

C.8.1 Radiated Emission 9 kHz – 30 MHz

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Test Receiver	ESCI 7	Rohde & Schwarz	A-8	2011/1	1 Year
Loop Antenna	HFH2-Z2	Rohde & Schwarz	C-2	2011/8	1 Year
RF Cable	RG213/U	SUHNER	H-28	2011/8	1 Year

C.8.2 Radiated Emission 30MHz – 1000 MHz

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Test Receiver	ESCI 7	Rohde & Schwarz	A-8	2011/1	1 Year
Biconical Antenna	VHA9103/BBA9106	Schwarzbeck	C-30	2011/5	1 Year
Log-periodic Antenna	UHALP9108-A1	Schwarzbeck	C-31	2011/5	1 Year
RF Cable	S 10162 B-11 etc.	SUHNER	H-4	2011/3	1 Year
Site Attenuation	--	----	H-15	2011/2	1 Year

C.8.3 Radiated Emission Above 1000 MHz

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Test Receiver	ESU 26	Rohde & Schwarz	A-6	2011/5	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-40-11	2010/12	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-40-14	2010/12	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-54	2010/12	1 Year
RF Cable	SUCOFLEX102EA	SUHNER	C-69	2010/12	1 Year
Attenuator	2-10	Weinschel	D-79	2010/10	1 Year
Attenuator	54-10	Weinschel	D-28	2011/9	1 Year
Pre-Amplifier	WJ-6611-513	Watkins Johnson	A-23	2010/12	1 Year
Pre-Amplifier	WJ-6882-824	Watkins Johnson	A-21	2010/12	1 Year
Pre-Amplifier	DBL-0618N515	DBS Microwave	A-33	2010/12	1 Year
Pre-Amplifier	BZ1804LD1	B&T Technologies	A-29	2010/12	1 Year
Band Rejection Filter	BRM50701	MICRO-TRONICS	D-93	2011/2	1 Year
Horn Antenna	91888-2	EATON	C-41-1	2011/6	1 Year
Horn Antenna	91889-2	EATON	C-41-2	2011/6	1 Year
Horn Antenna	3160-05	EMCO	C-55	2011/6	2 Years
Horn Antenna	3160-06	EMCO	C-57	2011/6	2 Years
Horn Antenna	3160-07	EMCO	C-58	2011/6	2 Years
Horn Antenna	3160-08	EMCO	C-59	2011/6	2 Years
Horn Antenna	3160-09	EMCO	C-48	2011/6	2 Years