

## 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.** : SH-04E  
**SERIAL NO.** : 004401114445154  
004401114445170

**FCC ID** : APYHRO00184

**Test Standard** : CFR 47 FCC Rules and Regulations Part 15

**Test Results** : **Passed**

**Date of Test** : November 28 ~ December 5, 2012



A handwritten signature in black ink, appearing to read 'K. Shibata', is written over a horizontal line.

Kousei Shibata  
Manager  
Japan Quality Assurance Organization  
KITA-KANSAI Testing Center  
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.

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**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.

## 1 Description of the Equipment Under Test

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. : SH-04E
4. Serial No. : 004401114445154  
: 004401114445170
5. Product Type : Pre-production
6. Date of Manufacture : November, 2012
7. Power Rating : 4.0VDC (Internal Lithium-ion BatterySH40 2000mAh)
8. EUT Grounding : None
9. Transmitting Frequency : 2412.0 MHz(01CH) –2462.0MHz(11CH)
10. Receiving Frequency : 2412.0 MHz(01CH) –2462.0MHz(11CH)
11. Max. RF Output Power : 16.22dBm(Measure Value of IEEE802.11b)  
: 19.46dBm(Measure Value of IEEE802.11g)  
: 19.13dBm(Measure Value of IEEE802.11n)
12. Category : DTS
13. EUT Authorization : Certification
14. Received Date of EUT : November 28, 2012

### 15. 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) =  $2407.0 + 5*n$

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

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

## 2 Summary of Test Results

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

The EUT described in clause 1 was tested according to the applied standard shown above.  
Details of the test configuration is shown in clause 6.

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

- The test result was **passed** for the test requirements of the applied standard.
- The test result was **failed** for the test requirements of the applied standard.
- The test result was **not judged** the test requirements of the applied standard.

In the approval of 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.
- No deviations were employed from the applied standard.
- No modifications were conducted by JQA to achieve compliance to the limitations.

Reviewed by:

Tested by:



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



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

### 3 Test Procedure

Test Requirements : §15.247, §15.207 and §15.209

Test Procedure : ANSI C63.4-2003

The tests were performed with reference to FCC KDB 558074 D01 DTS Meas Guidance v02, released October 4, 2012. The test set-up was made in accordance to the general provisions of ANSI C63.4-2003.

### 4 Test Location

Japan Quality Assurance Organization (JQA)  
KITA-KANSAI Testing Center  
7-7, Ishimaru, 1-chome, Minoh-shi, Osaka, 562-0027, Japan  
SAITO EMC Branch  
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

### 5 Recognition of Test Laboratory

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

VLAC Accreditation No. : VLAC-001-2 (Expiry date : March 30, 2014)  
VCCI Registration No. : A-0002 (Expiry date : March 30, 2014)  
BSMI Registration No. : SL2-IN-E-6006, SL2-A1-E-6006 (Expiry date : September 14, 2013)  
IC Registration No. : 2079E-3, 2079E-4 (Expiry date : July 20, 2014)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI.  
(Expiry date : February 22, 2013)

## 6 Details of the Equipment Under Test

### 6.1 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, 19.2 MHz, 27 MHz, 27.12 MHz, 37.4 MHz

The EUT was rotated through three orthogonal axis (X, Y and Z axis) in radiated measurement.

The EUT with temporary antenna port was used in conducted measurement.

## 6.2 Test Configuration

The equipment under test (EUT) consists of :

	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	Cellular Phone	Sharp	SH-04E	0044011144 45154*1) 0044011144 45170*2)	APYHRO00184
B	Lithium-ion Battery	Sharp	SH40	--	N/A
C	AC Adapter	Panasonic Mobile	03	--	N/A
D	Stereo Handsfree	Sharp	HBH0210-010010	--	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 :

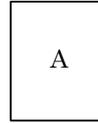
	Item	Manufacturer	Model No.	Serial No.	FCC ID
E	Wireless Charger	Sharp	SH03	--	N/A
F	AC Adapter (Wireless Charger)	Sharp	SH03	--	N/A

Type of Cable:

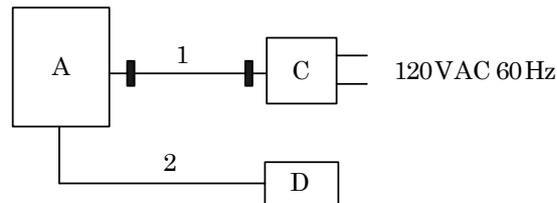
No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	USB conversion cable (For AC Adapter)	--	--	NO	YES	1.2
2	Handsfree Cable	--	--	NO	NO	1.3
3	DC Power Cable (For Wireless Charger)	--	--	NO	YES	1.8

**6.3 Test Arrangement (Drawings)**

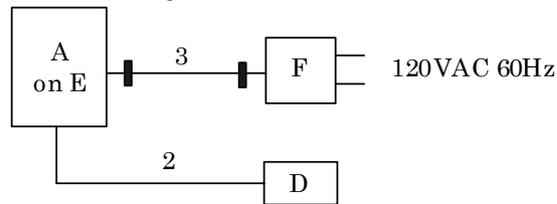
a) Single Unit



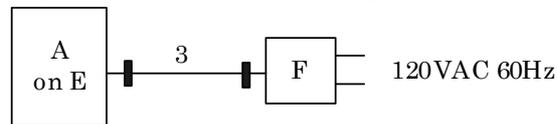
b) AC Adapter used



c) Wireless Charger used



d) Single Unit with Wireless Charger



■ : Ferrite Core

**7 Details of the Test Item**

**7.1 Channel Separation**

For the requirements,  - Applicable [ - Tested.  - Not tested by applicant request.]  
 - Not Applicable

For the limits,  - **Passed**  - **Failed**  - **Not judged**

**7.2 Minimum Hopping Channel**

For the requirements,  - Applicable [ - Tested.  - Not tested by applicant request.]  
 - Not Applicable

For the limits,  - **Passed**  - **Failed**  - **Not judged**

**7.3 Occupied Bandwidth**

For the requirements,  - Applicable [ - Tested.  - Not tested by applicant request.]  
 - Not Applicable

For the limits,  - **Passed**  - **Failed**  - **Not judged**

**7.3.1 Worst Point and Measurement Uncertainty**

The 99% Bandwidth of IEEE802.11b is	<u>13.940</u> MHz	at	<u>2437.0</u> MHz
The 99% Bandwidth of IEEE802.11g is	<u>16.331</u> MHz	at	<u>2437.0</u> MHz
The 99% Bandwidth of IEEE802.11n is	<u>17.503</u> MHz	at	<u>2437.0</u> MHz

The 6dB Bandwidth of IEEE802.11b is	<u>9.996</u> MHz	at	<u>2412.0</u> MHz
The 6dB Bandwidth of IEEE802.11g is	<u>16.065</u> MHz	at	<u>2412.0</u> MHz
The 6dB Bandwidth of IEEE802.11n is	<u>16.663</u> MHz	at	<u>2462.0</u> MHz

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

Remarks : \_\_\_\_\_

**7.3.2 Test Site**

KITA-KANSAI Testing Center

Test site : SAITO

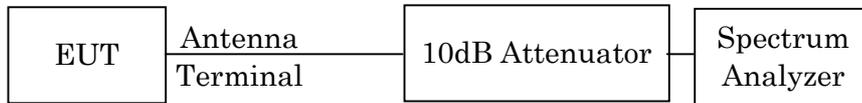
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<input type="checkbox"/> - Measurement room (M2)	<input type="checkbox"/> - Measurement room (M3)
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<input type="checkbox"/> - Shielded room (S3)	<input checked="" type="checkbox"/> - Shielded room (S4)

**7.3.3 Test Instruments**

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2012/9	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2012/7	1 Year
Attenuator	54A-10	Weinschel	D-28	2012/9	1 Year

**7.3.4 Test Method and Test Setup (Diagrammatic illustration)**

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

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

**7.3.5 Test Data**

Test Date : November 30, 2012

Temp.:23°C, Humi:35%

The resolution bandwidth was set to 1 - 5 % of emission bandwidth (Max. 100 kHz), -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	13.906	8.564
06	2437.0	13.940	8.590
11	2462.0	13.938	8.576

2)Data Rate : 2Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	13.864	8.951
06	2437.0	13.866	9.246
11	2462.0	13.909	8.033

3)Data Rate : 5.5Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	13.672	8.445
06	2437.0	13.625	8.291
11	2462.0	13.616	8.577

4)Data Rate : 11Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	13.652	9.996
06	2437.0	13.661	9.166
11	2462.0	13.684	8.484

B) IEEE 802.11g

1)Data Rate : 6Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	16.302	15.137
06	2437.0	16.294	15.136
11	2462.0	16.301	15.323

2)Data Rate : 54Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	16.321	16.065
06	2437.0	16.331	16.036
11	2462.0	16.320	16.017

C) IEEE 802.11n

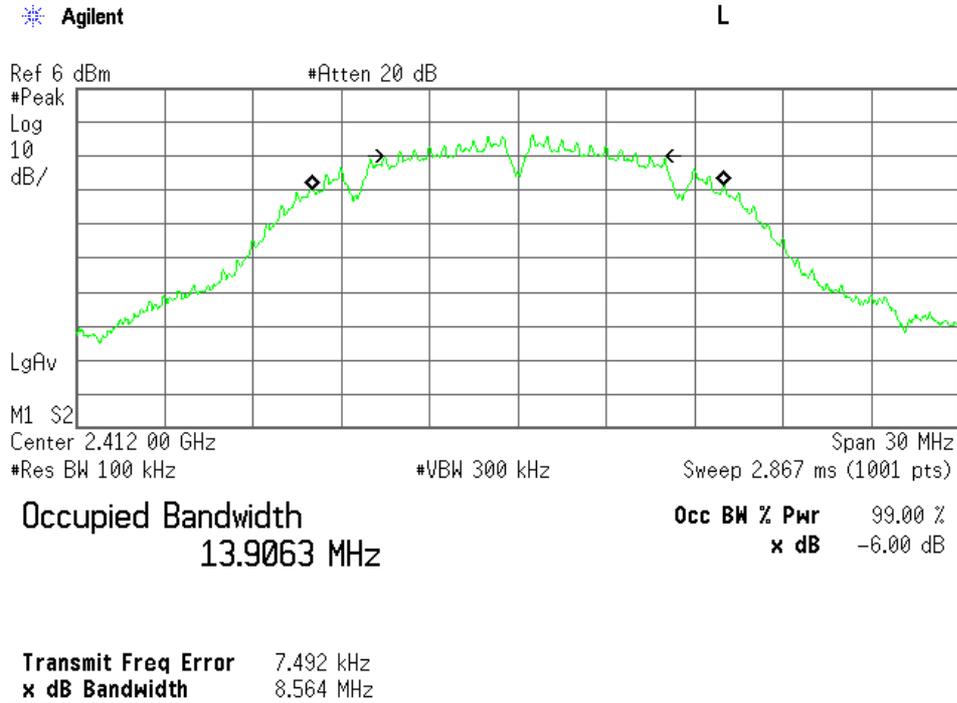
1)Data Rate : 6.5Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	17.461	15.135
06	2437.0	17.453	15.137
11	2462.0	17.467	15.130

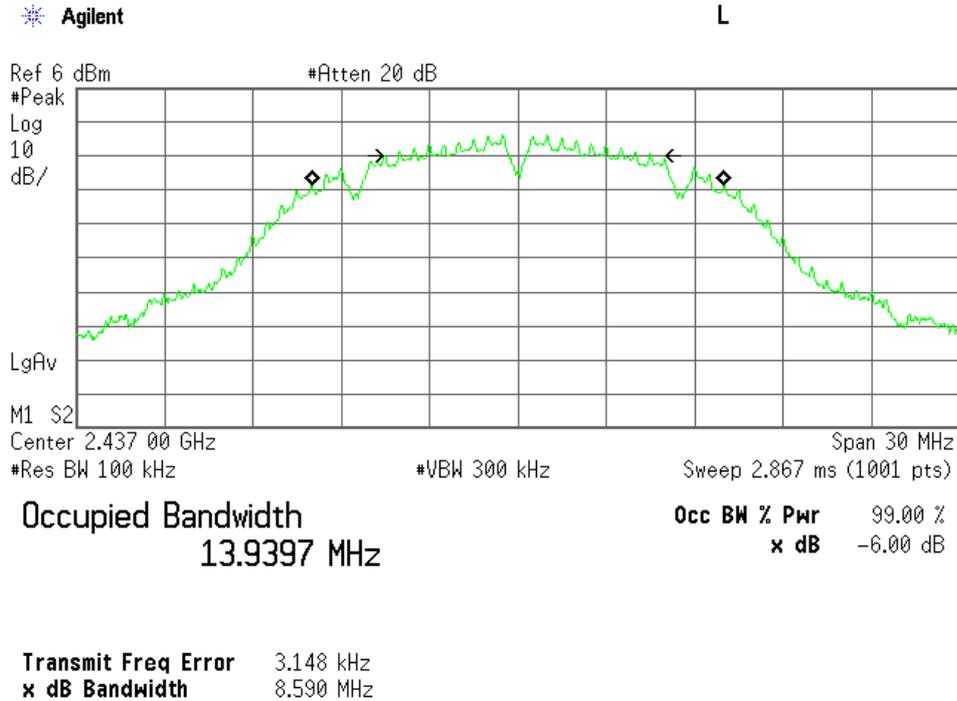
2)Data Rate :65Mbps

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-6dBc Bandwidth (MHz)
01	2412.0	17.500	16.589
06	2437.0	17.503	16.327
11	2462.0	17.500	16.663

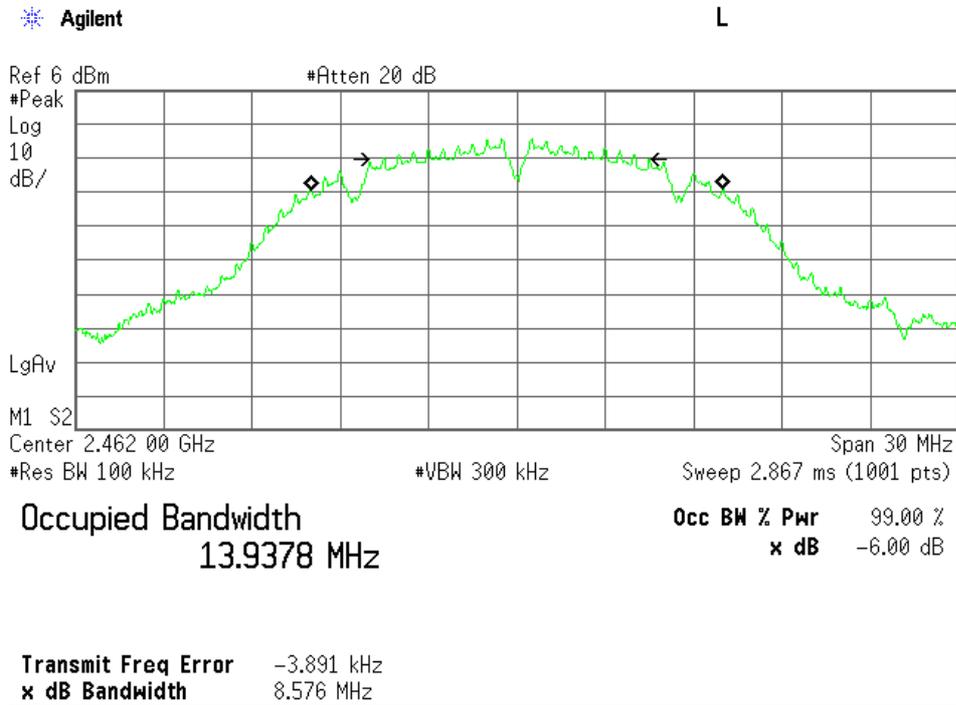
1)Data Rate : 1Mbps(IEEE 802.11b)  
Low Channel



Middle Channel

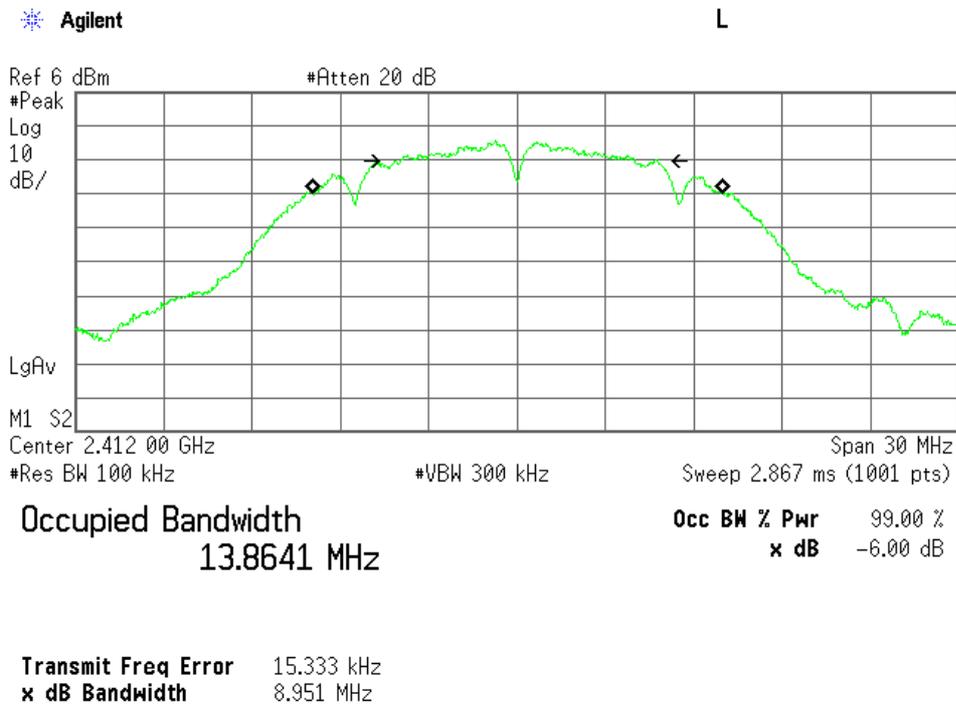


## High Channel

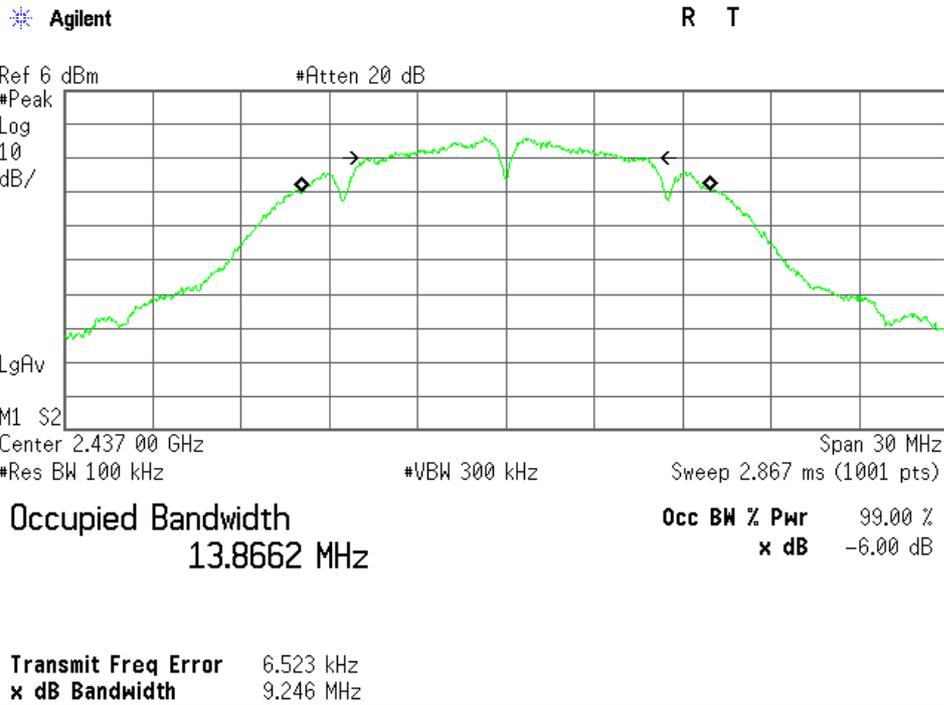


## 2)Data Rate : 2Mbps(IEEE 802.11b)

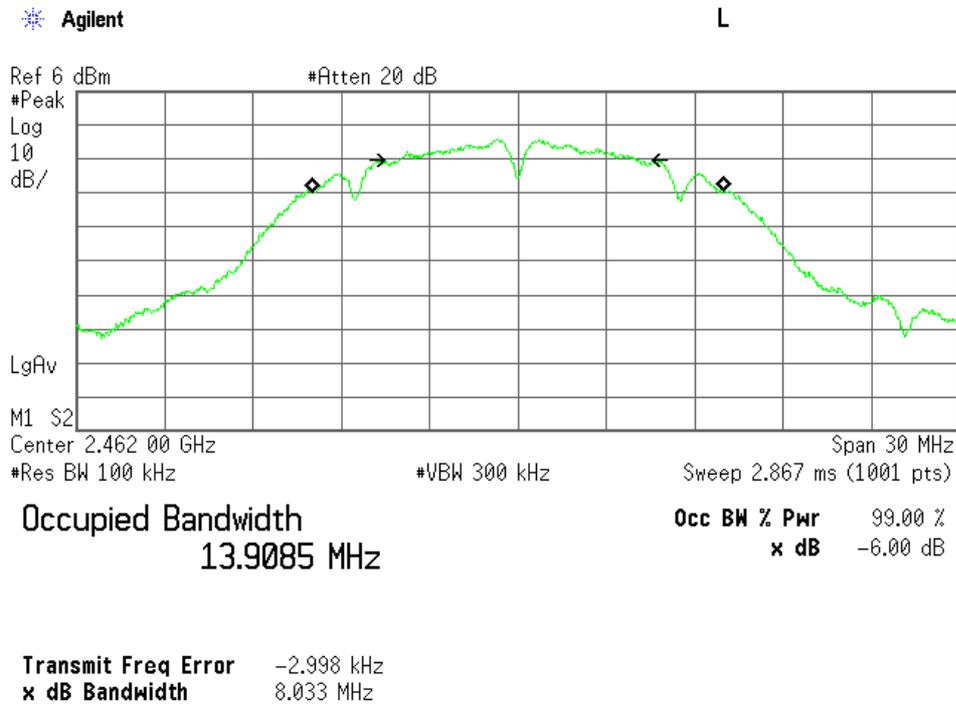
### Low Channel



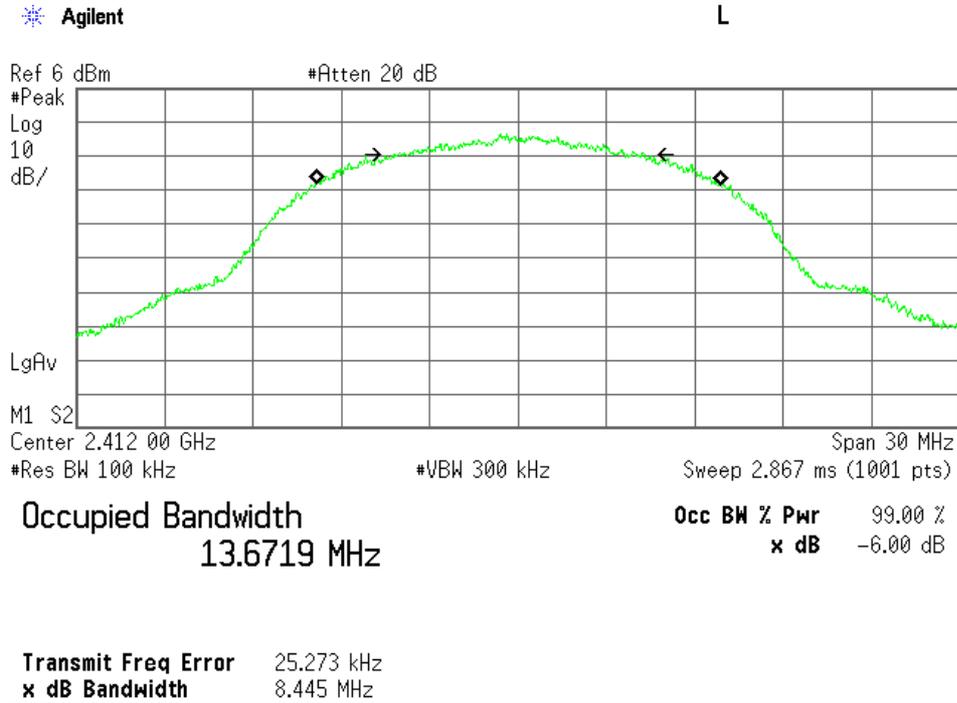
### Middle Channel



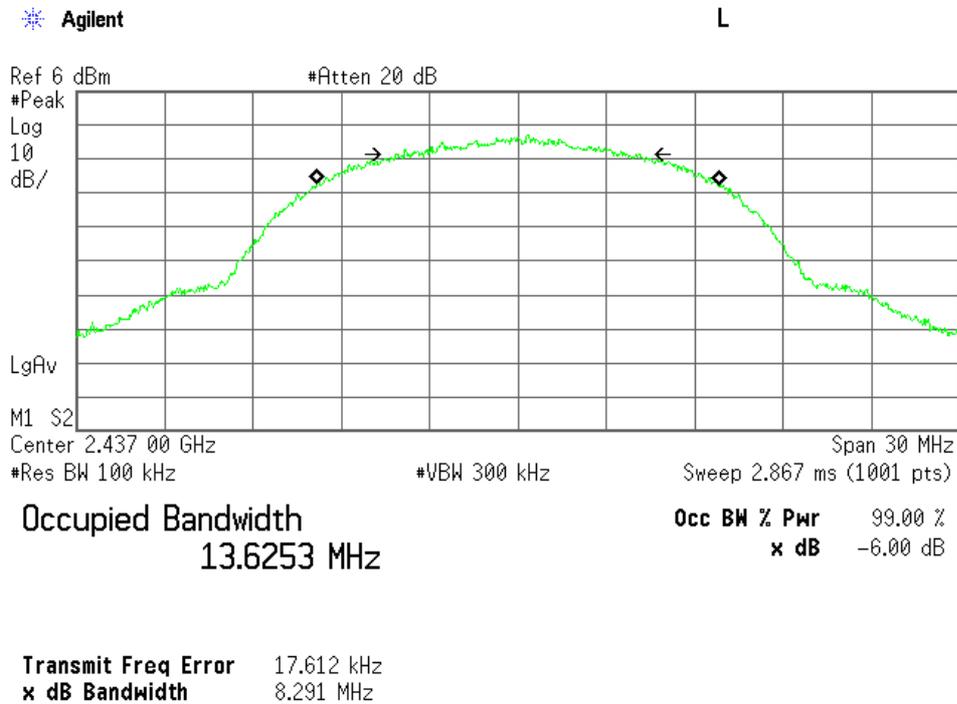
### High Channel



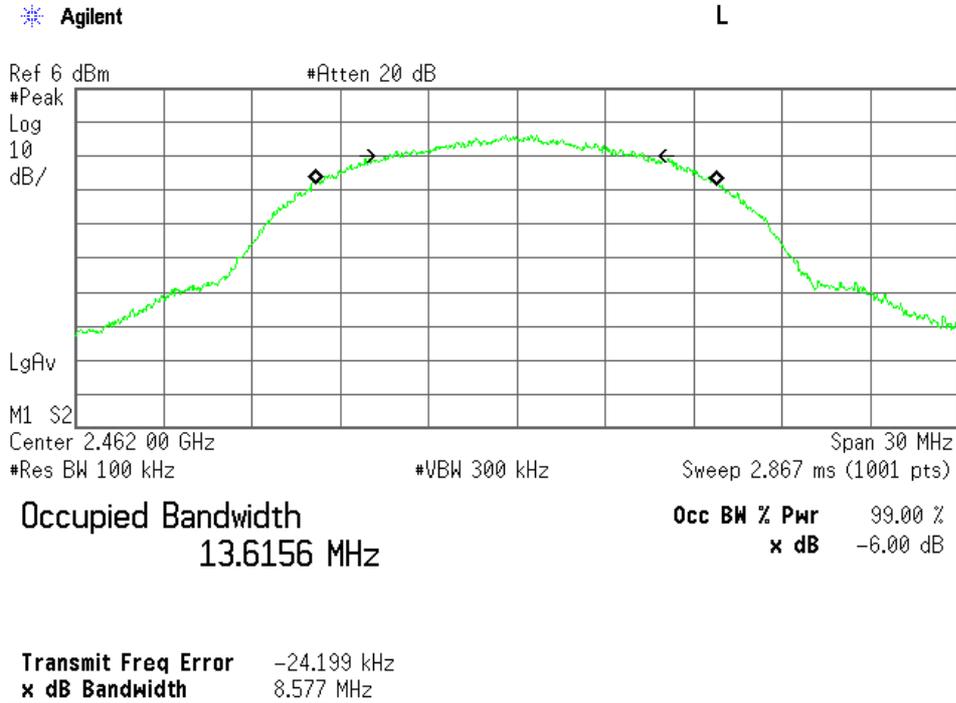
3)Data Rate : 5.5Mbps(IEEE 802.11b)  
Low Channel



Middle Channel

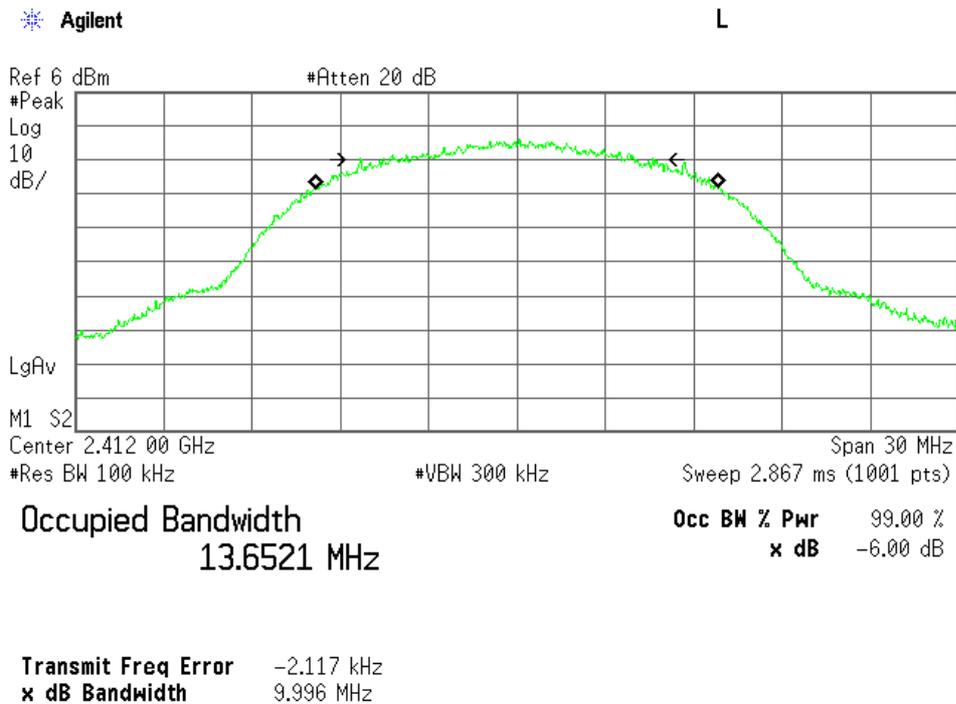


### High Channel

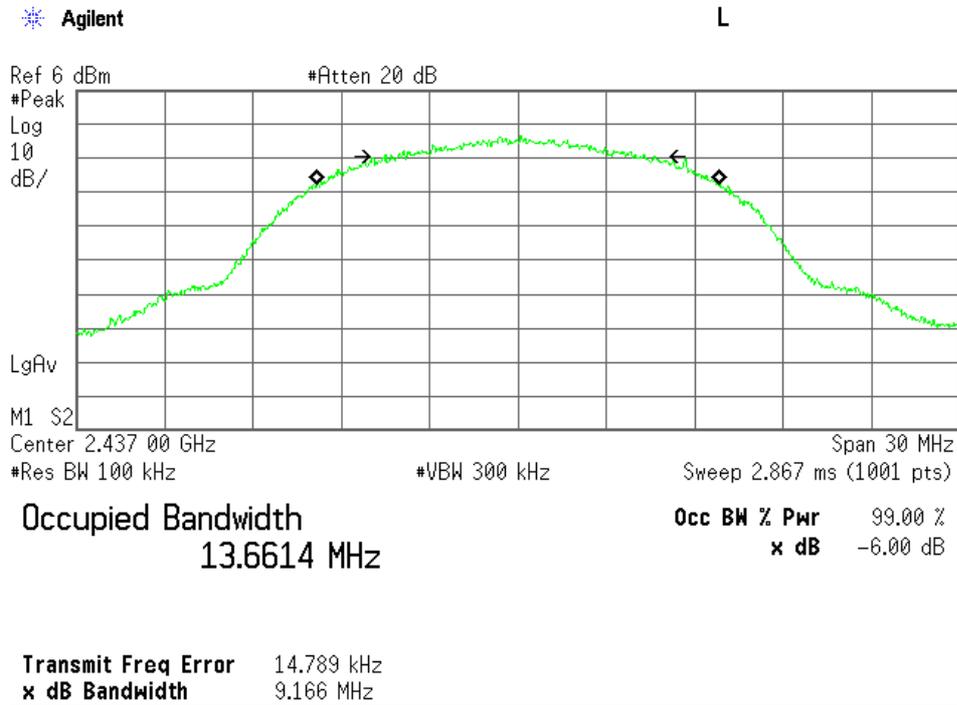


### 4)Data Rate : 11Mbps(IEEE 802.11b)

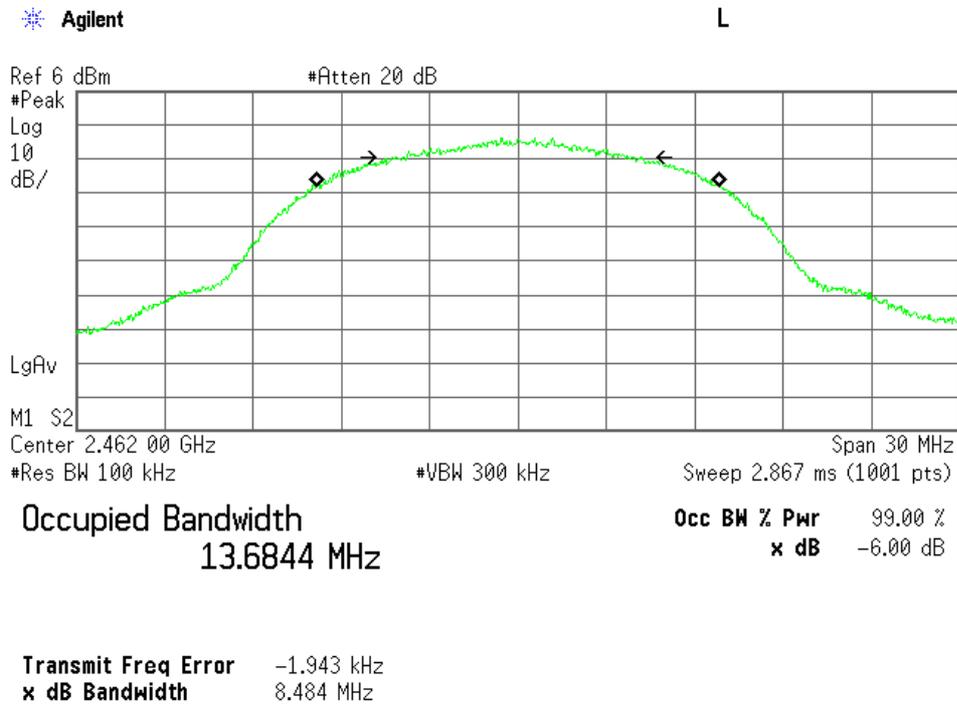
### Low Channel



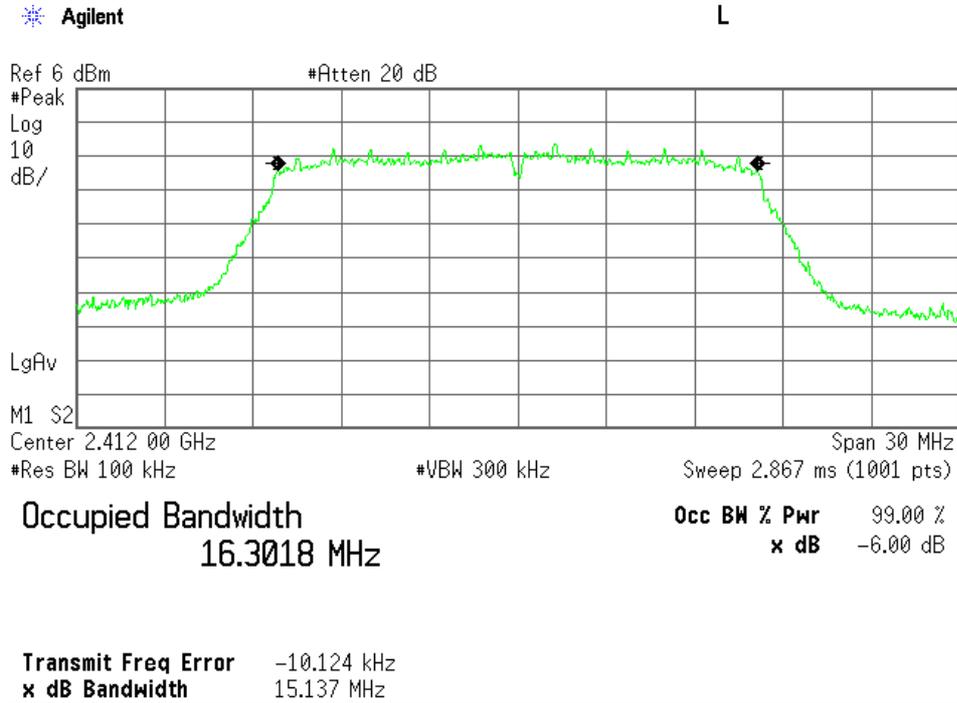
### Middle Channel



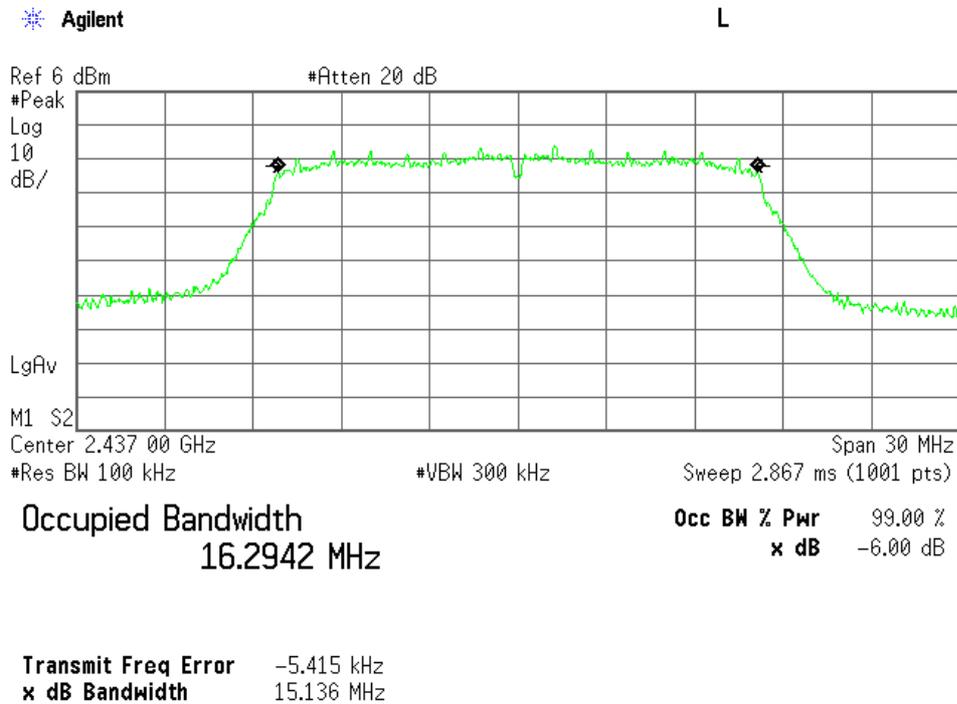
### High Channel



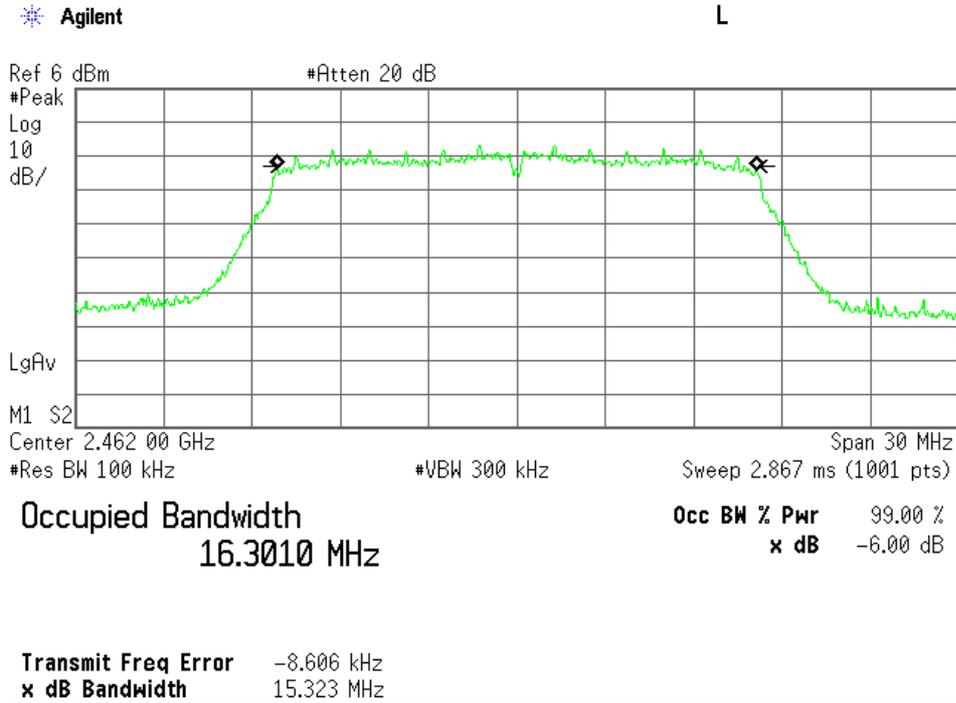
5)Data Rate : 6Mbps(IEEE 802.11g)  
Low Channel



Middle Channel

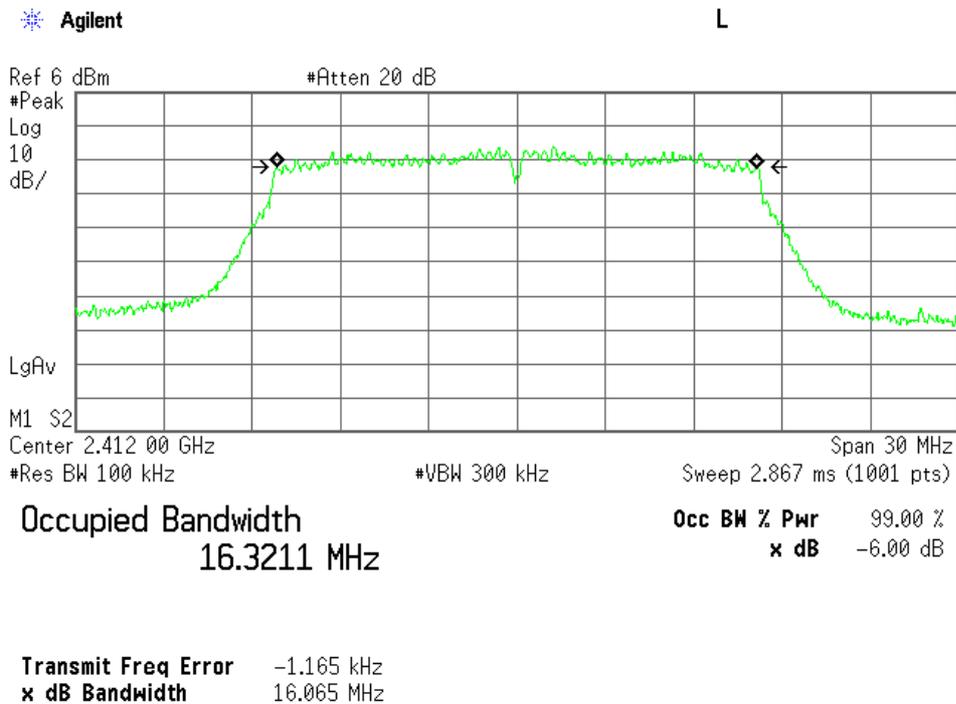


## High Channel

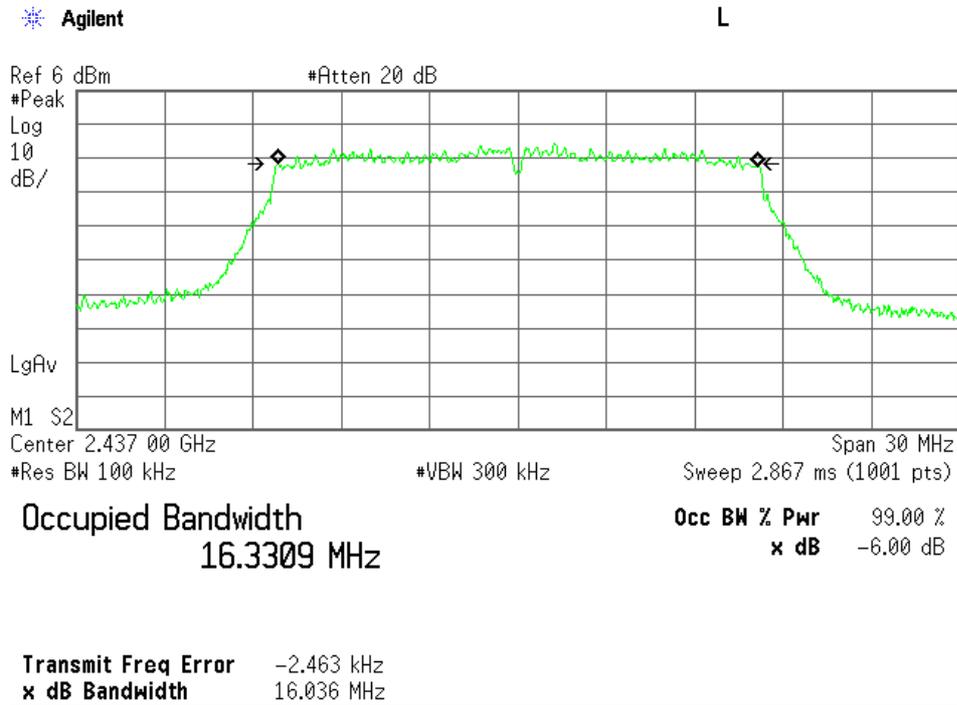


## 6)Data Rate : 54Mbps(IEEE 802.11g)

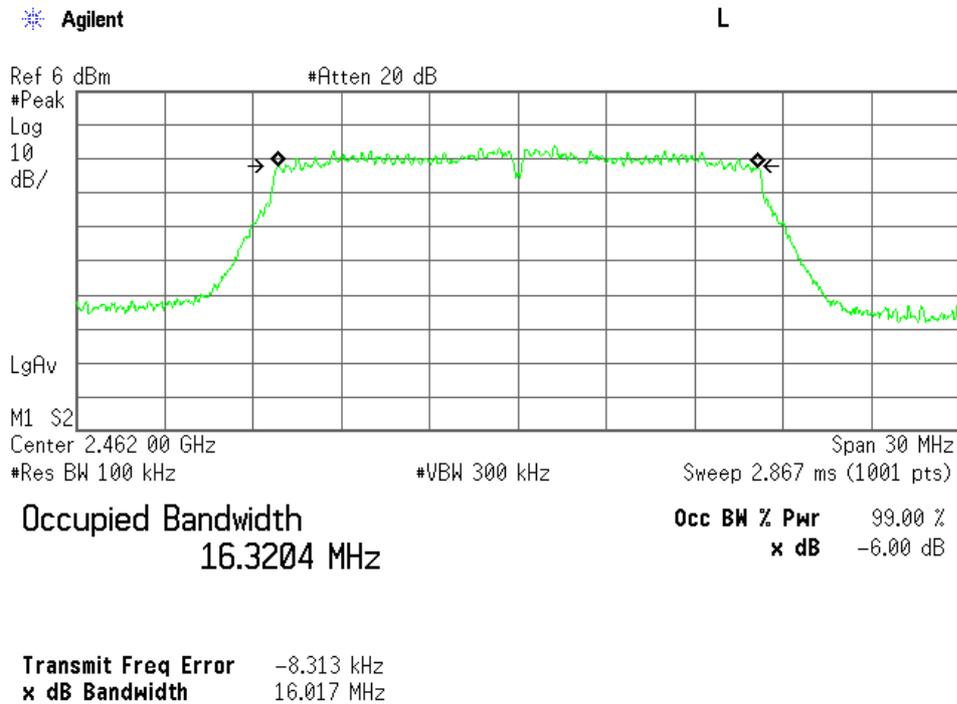
### Low Channel



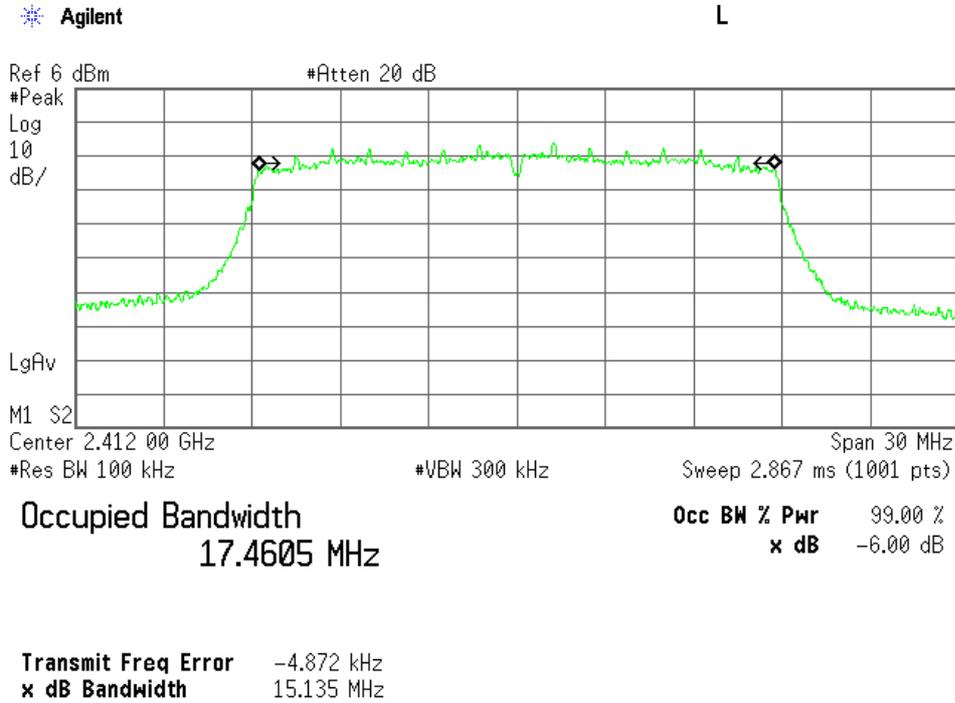
## Middle Channel



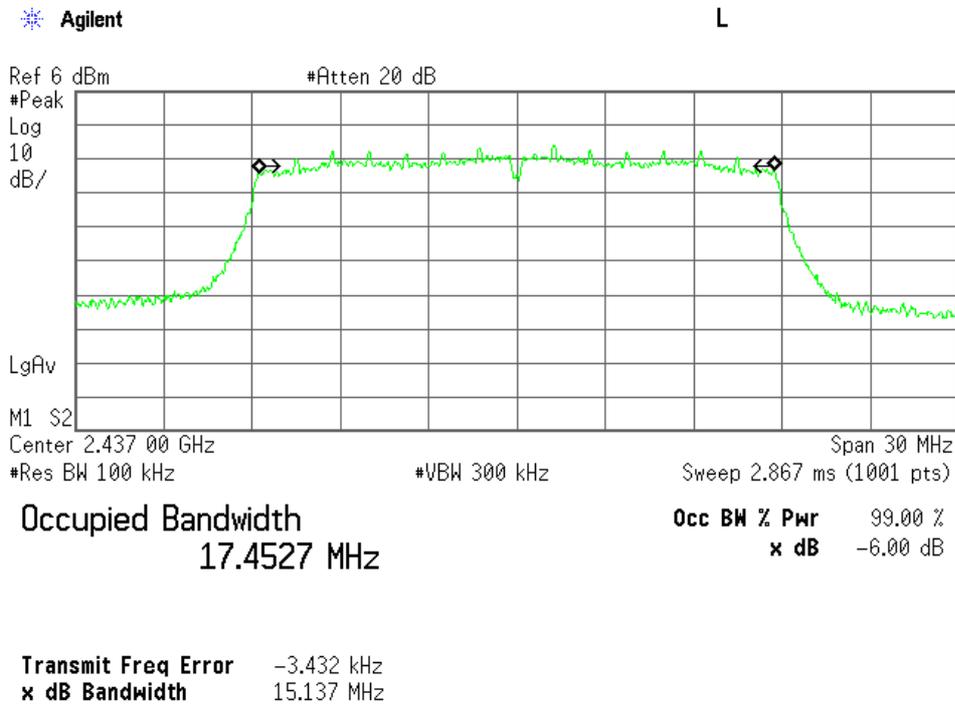
## High Channel



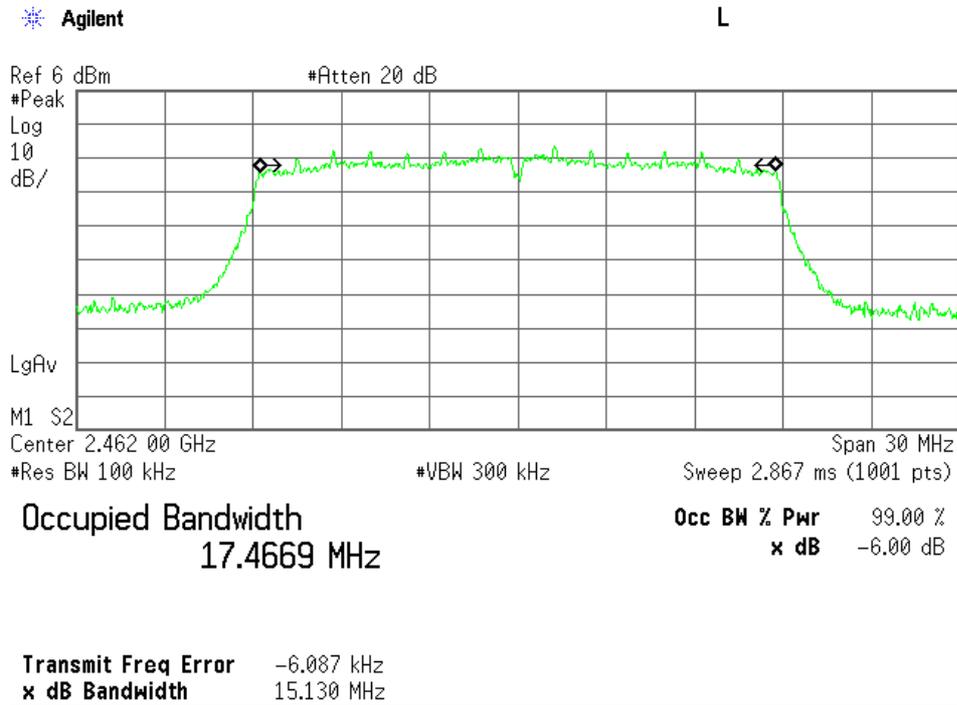
7)Data Rate : 6.5Mbps(IEEE 802.11n)  
Low Channel



Middle Channel

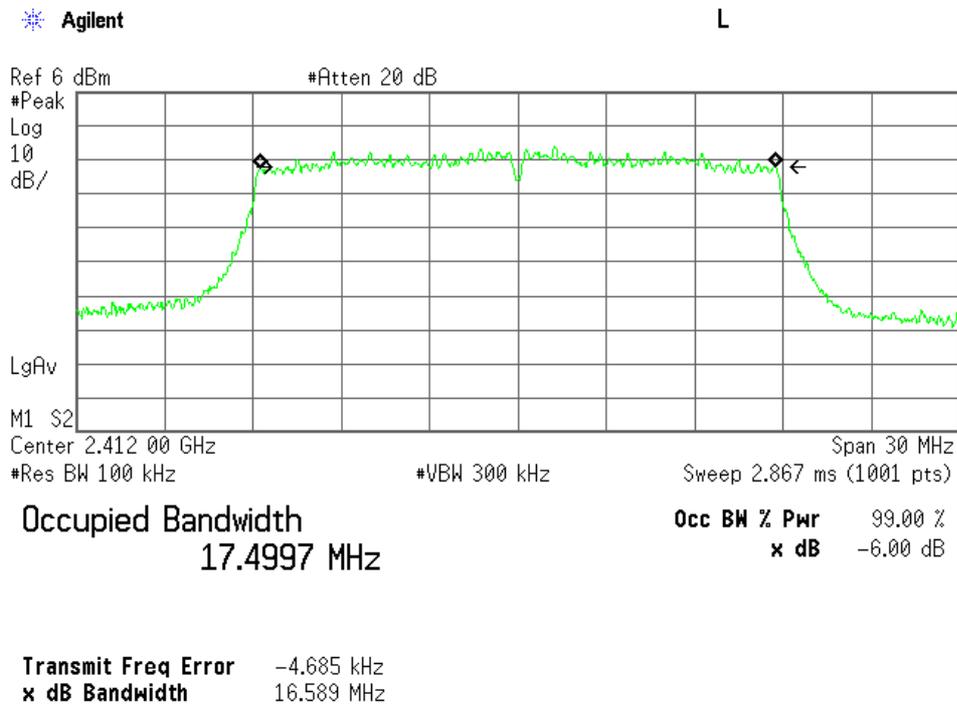


### High Channel

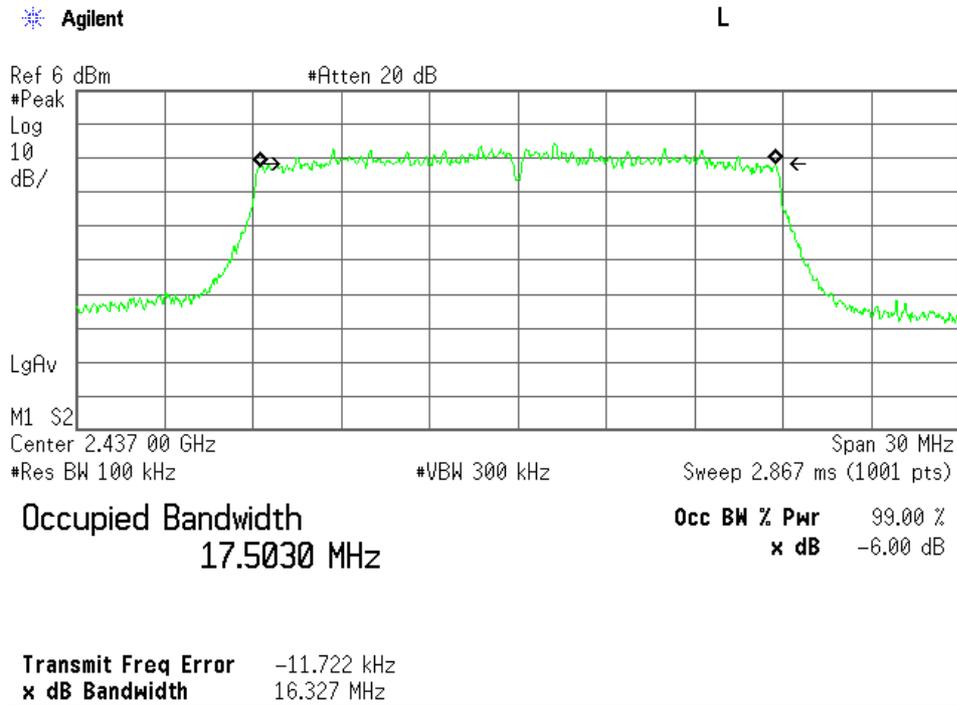


8)Data Rate : 65Mbps(IEEE 802.11n)

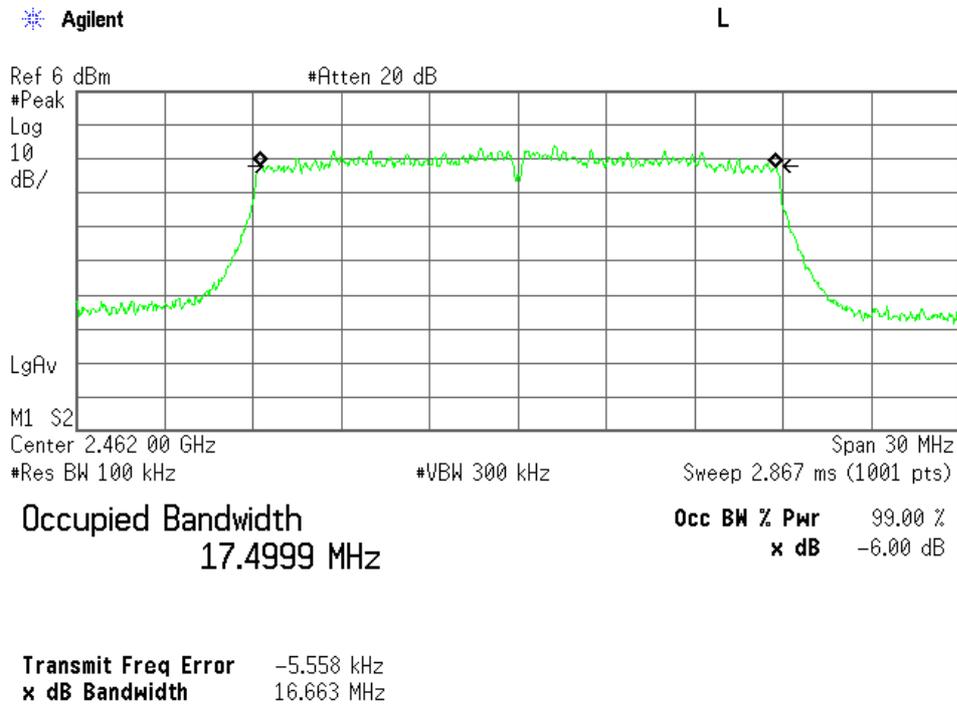
### Low Channel



### Middle Channel



### High Channel



**7.4 Dwell Time**

For the requirements,  - Applicable  - Tested.  - Not tested by applicant request.]  
 - Not Applicable

For the limits,  - Passed  - Failed  - Not judged

**7.5 Peak Output Power(Conduction)**

For the requirements,  - Applicable  - Tested.  - Not tested by applicant request.]  
 - Not Applicable

For the limits,  - Passed  - Failed  - Not judged

**7.5.1 Worst Point and Measurement Uncertainty**

Peak Output Power of IEEE802.11b is	<u>16.22</u>	dBm	at	<u>2437.0</u>	MHz
Peak Output Power of IEEE802.11g is	<u>19.46</u>	dBm	at	<u>2437.0</u>	MHz
Peak Output Power of IEEE802.11n is	<u>19.13</u>	dBm	at	<u>2437.0</u>	MHz

Uncertainty of Measurement Results at Amplitude +/-1.2 dB(2 $\sigma$ )

Remarks : \_\_\_\_\_

**7.5.2 Test Site**

KITA-KANSAI Testing Center

Test site : SAITO

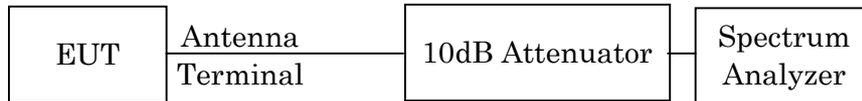
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<input type="checkbox"/> - Measurement room (M2)	<input type="checkbox"/> - Measurement room (M3)
<input type="checkbox"/> - Shielded room (S1)	<input type="checkbox"/> - Shielded room (S2)
<input type="checkbox"/> - Shielded room (S3)	<input checked="" type="checkbox"/> - Shielded room (S4)

**7.5.3 Test Instruments**

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2012/9	1 Year
Attenuator	54A-10	Weinschel	D-28	2012/9	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2012/7	1 Year

**7.5.4 Test Method and Test Setup (Diagrammatic illustration)**

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



### 7.5.5 Test Data

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

Test Date: November 28, 2012  
 Temp.: 22 °C, Humi: 31 %

Data Rate : 1Mbps

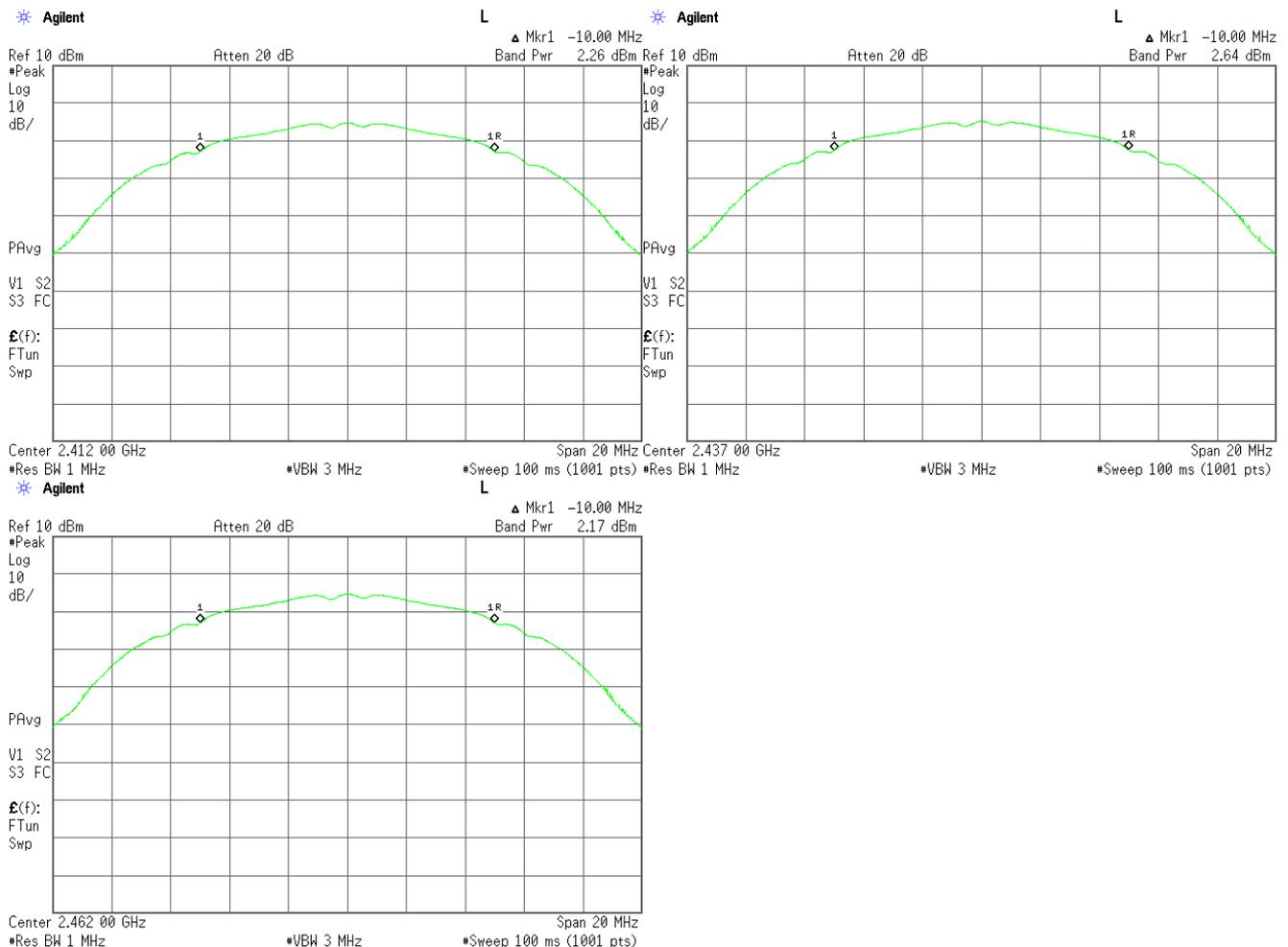
CH	Transmitting Frequency [MHz]	Correction Factor [dB]	Meter Reading [dBm]	Conducted Peak Output Power		Limits [dBm]	Margin [dB]
				[dBm]	[mW]		
01	2412	9.89	2.26	12.15	16.41	30.00	+17.85
06	2437	9.89	2.64	12.53	17.91	30.00	+17.47
11	2462	9.89	2.17	12.06	16.07	30.00	+17.94

Calculated result at 2437.000 MHz, as the worst point shown on underline:  
 Correction Factor = 9.89 dB  
 +) Meter Reading = 2.64 dBm  
 Result = 12.53 dBm = 17.91 mW  
 Minimum Margin: 30.00 - 12.53 = 17.47 (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	1MHz	3MHz

The band power function was used.



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

Test Date: November 28, 2012  
Temp: 22 °C, Humi: 31 %

Data Rate : 2Mbps

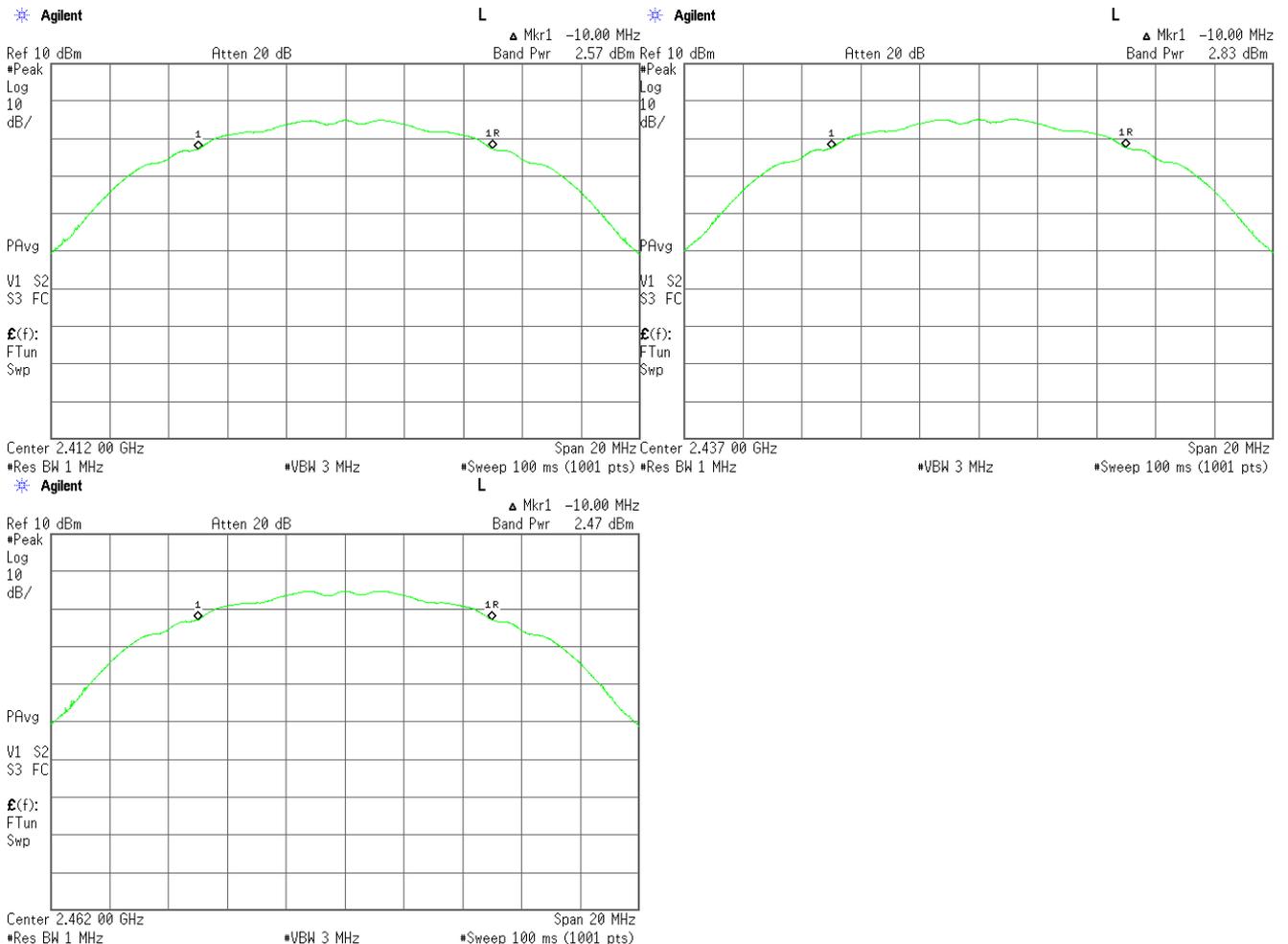
CH	Transmitting Frequency		Correction Factor [dB]	Meter Reading [dBm]	Conducted Peak Output Power		Limits [dBm]	Margin [dB]
	[MHz]	[MHz]			[dBm]	[mW]		
01	2412		9.89	2.57	12.46	17.62	30.00	+17.54
06	2437		9.89	2.83	12.72	18.71	30.00	+17.28
11	2462		9.89	2.47	12.36	17.22	30.00	+17.64

Calculated result at 2437.000 MHz, as the worst point shown on underline:  
 Correction Factor = 9.89 dB  
 +) Meter Reading = 2.83 dBm  
 Result = 12.72 dBm = 18.71 mW  
 Minimum Margin: 30.00 - 12.72 = 17.28 (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	1MHz	3MHz

The band power function was used.



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

Test Date: November 28, 2012  
Temp: 22 °C, Humi: 31 %

Data Rate : 5.5Mbps

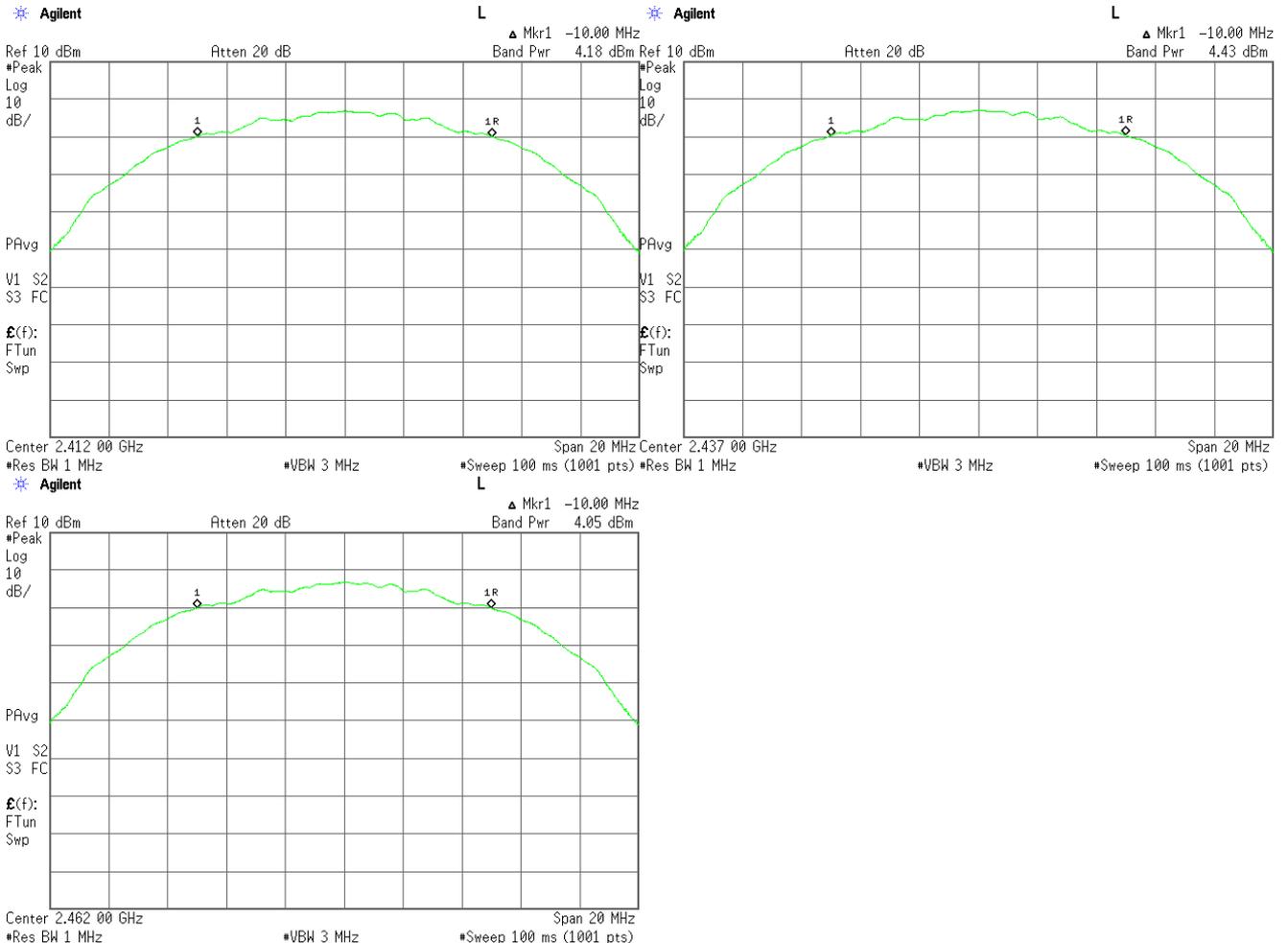
CH	Transmitting Frequency [MHz]	Correction Factor [dB]	Meter Reading [dBm]	Conducted Peak Output Power		Limits [dBm]	Margin [dB]
				[dBm]	[mW]		
01	2412	9.89	4.18	14.07	25.53	30.00	+15.93
06	2437	9.89	4.43	14.32	27.04	30.00	+15.68
11	2462	9.89	4.05	13.94	24.77	30.00	+16.06

Calculated result at 2437.000 MHz, as the worst point shown on underline:  
 Correction Factor = 9.89 dB  
 +) Meter Reading = 4.43 dBm  
 Result = 14.32 dBm = 27.04 mW  
 Minimum Margin: 30.00 - 14.32 = 15.68 (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	1MHz	3MHz

The band power function was used.



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

Test Date: November 28, 2012  
Temp: 22 °C, Humi: 31 %

Data Rate : 11Mbps

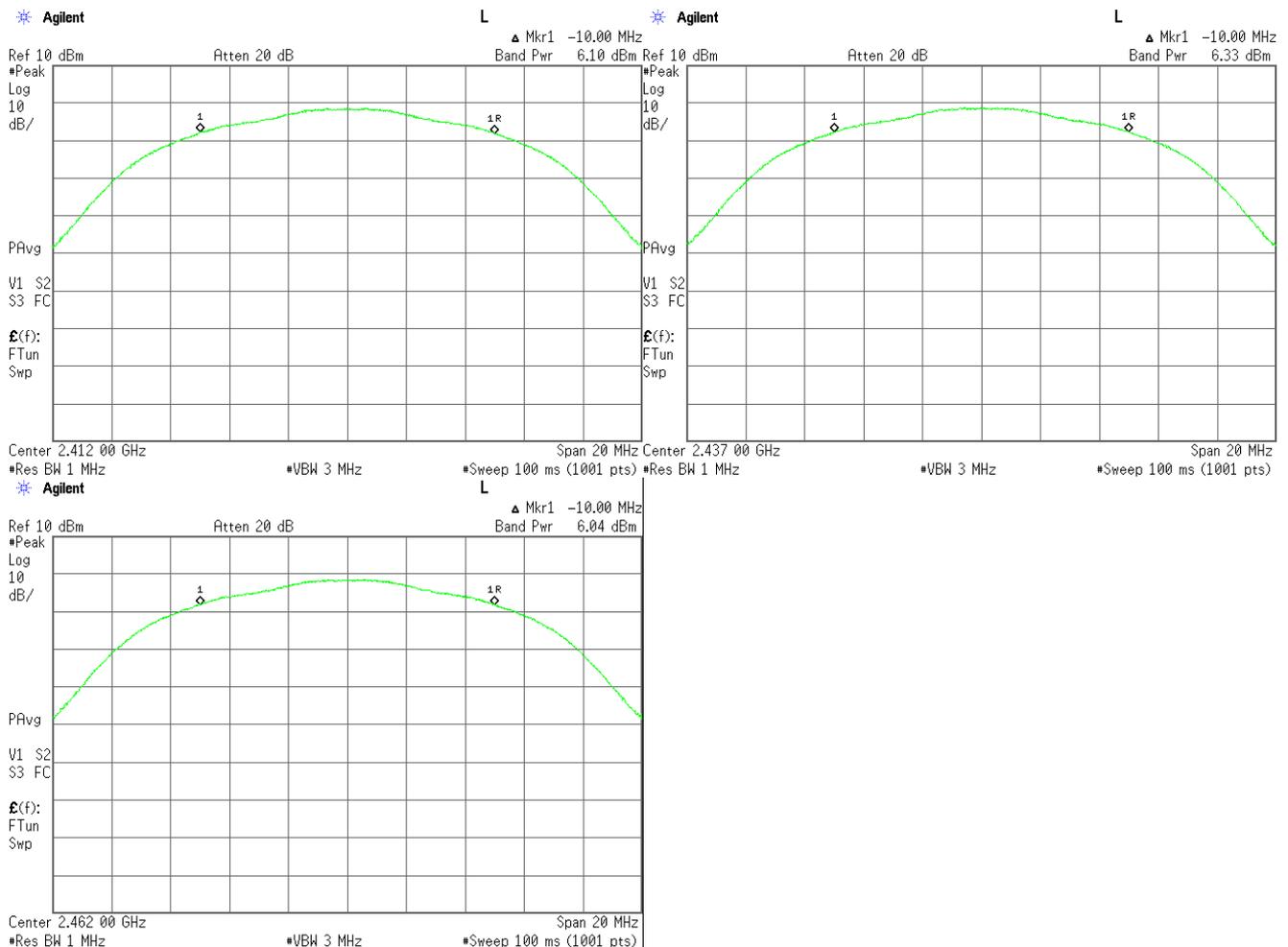
Transmitting Frequency	Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin	
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dB]	
01	2412	9.89	6.10	15.99	39.72	30.00	+14.01
06	2437	9.89	6.33	16.22	41.88	30.00	+13.78
11	2462	9.89	6.04	15.93	39.17	30.00	+14.07

Calculated result at 2437.000 MHz, as the worst point shown on underline:  
 Correction Factor = 9.89 dB  
 +) Meter Reading = 6.33 dBm  
 Result = 16.22 dBm = 41.88 mW  
 Minimum Margin: 30.00 - 16.22 = 13.78 (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	1MHz	3MHz

The band power function was used.



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

Test Date: November 28, 2012

Temp: 22 °C. Humi: 31 %

Data Rate : 6Mbps

CH	Transmitting Frequency [MHz]	Correction Factor [dB]	Meter Reading [dBm]	Conducted Peak Output Power [dBm]	Conducted Peak Output Power [mW]	Limits [dBm]	Margin [dB]
01	2412	9.89	8.12	18.01	63.24	30.00	+11.99
06	2437	9.89	8.73	18.62	72.78	30.00	+11.38
11	2462	9.89	8.25	18.14	65.16	30.00	+11.86

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

Correction Factor	=	9.89 dB
+ ) Meter Reading	=	8.73 dBm
Result	=	18.62 dBm = 72.78 mW

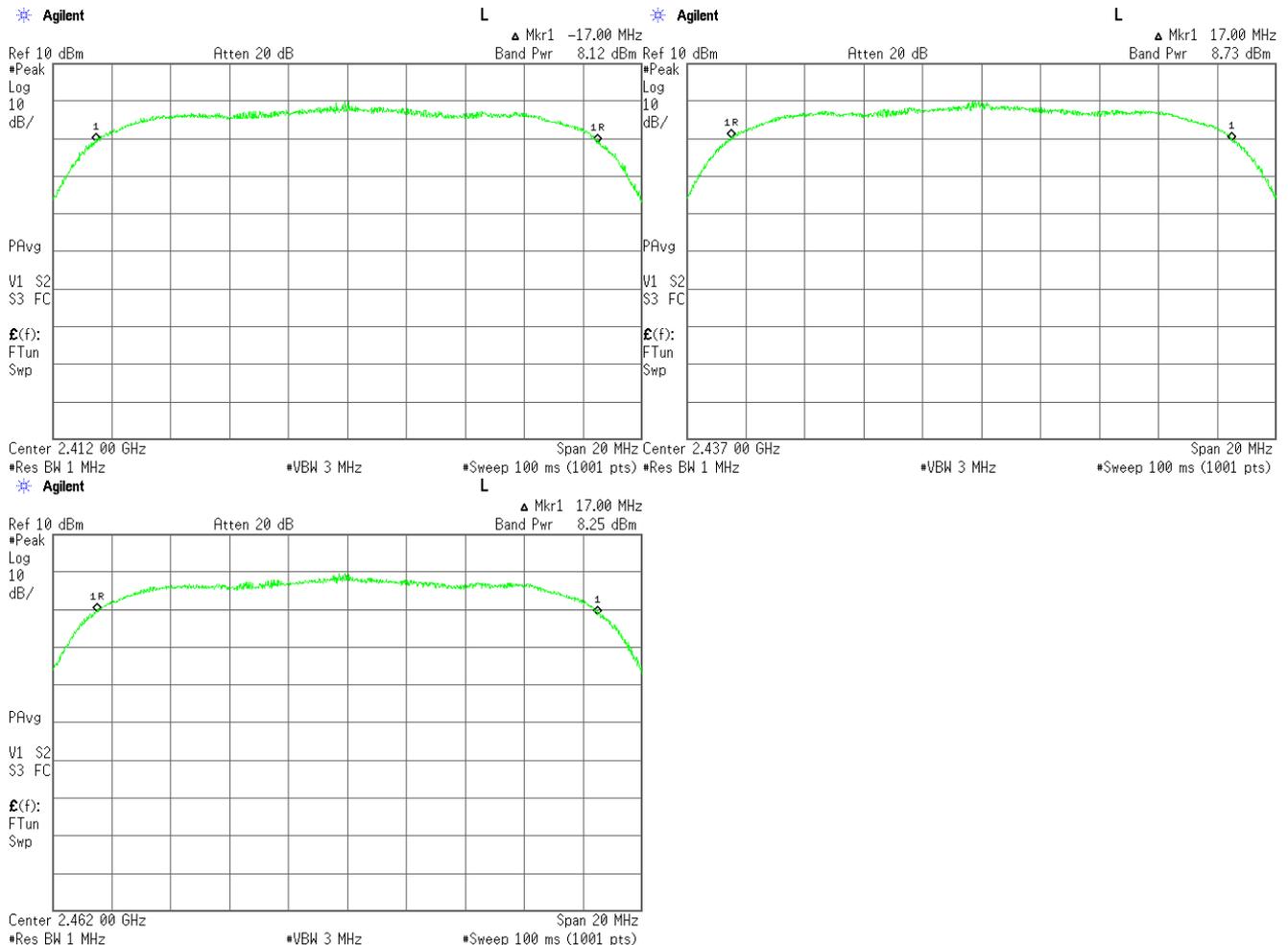
Minimum Margin: 30.00 - 18.62 = 11.38 (dB)

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	1MHz	3MHz

The band power function was used.



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

Test Date: November 28, 2012  
 Temp.: 22 °C, Humi: 31 %

Data Rate : 54Mbps

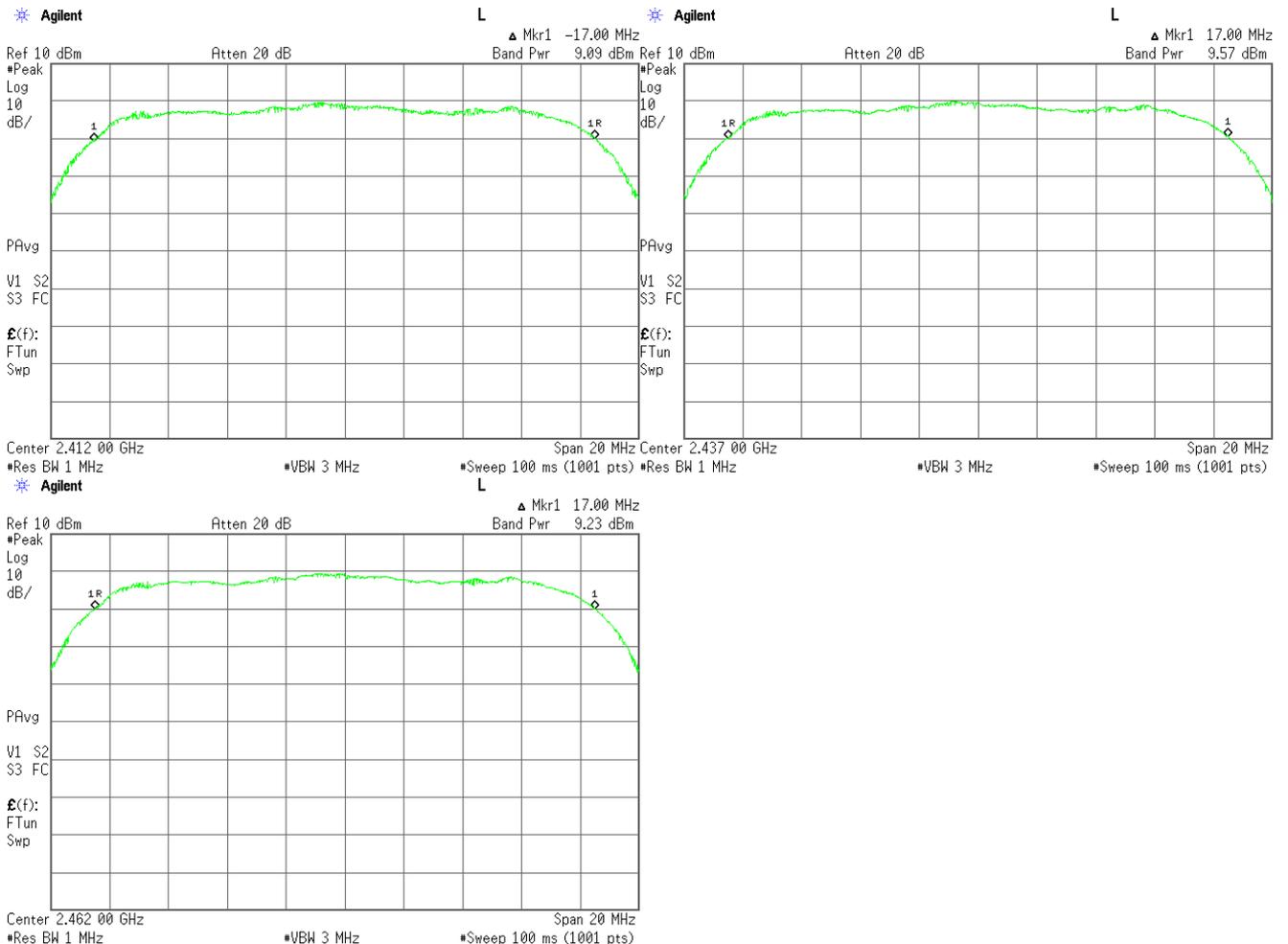
Transmitting Frequency	Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin	
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dB]	
01	2412	9.89	9.09	18.98	79.07	30.00	+11.02
06	2437	9.89	9.57	19.46	88.31	30.00	+10.54
11	2462	9.89	9.23	19.12	81.66	30.00	+10.88

Calculated result at 2437.000 MHz, as the worst point shown on underline:  
 Correction Factor = 9.89 dB  
 +) Meter Reading = 9.57 dBm  
 Result = 19.46 dBm = 88.31 mW  
 Minimum Margin: 30.00 - 19.46 = 10.54 (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	1MHz	3MHz

The band power function was used.



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

Test Date: November 28, 2012  
 Temp: 22 °C, Humi: 31 %

Data Rate : 6.5Mbps

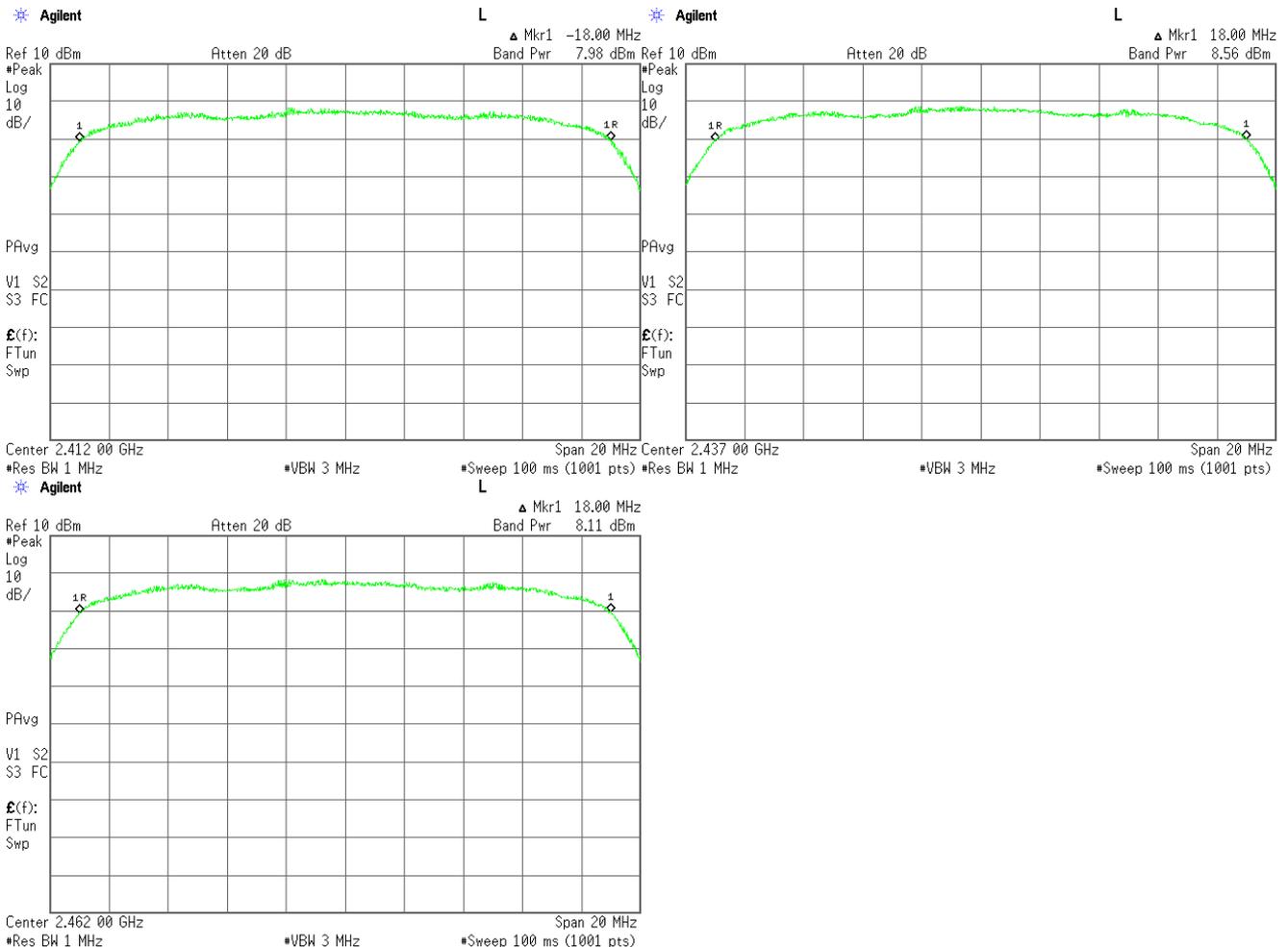
Transmitting Frequency	Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin	
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dB]	
01	2412	9.89	7.98	17.87	61.24	30.00	+12.13
06	2437	9.89	8.56	18.45	69.98	30.00	+11.55
11	2462	9.89	8.11	18.00	63.10	30.00	+12.00

Calculated result at 2437.000 MHz, as the worst point shown on underline:  
 Correction Factor = 9.89 dB  
 +) Meter Reading = 8.56 dBm  
 Result = 18.45 dBm = 69.98 mW  
 Minimum Margin: 30.00 - 18.45 = 11.55 (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	1MHz	3MHz

The band power function was used.



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

Test Date: November 28, 2012  
Temp: 22 °C, Humi: 31 %

Data Rate : 65Mbps

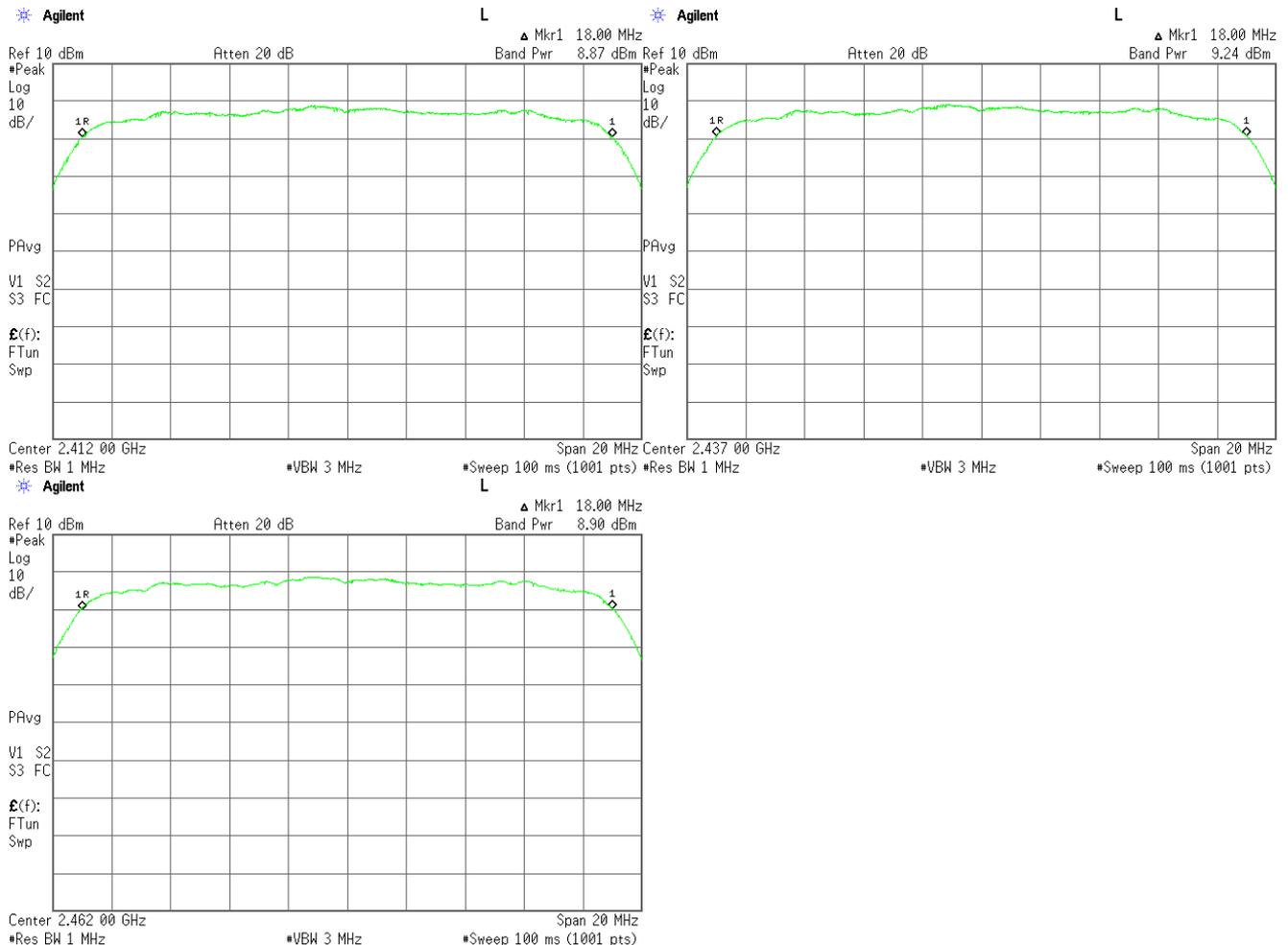
Transmitting Frequency	Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin	
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dB]	
01	2412	9.89	8.87	18.76	75.16	30.00	+11.24
06	2437	9.89	9.24	19.13	81.85	30.00	+10.87
11	2462	9.89	8.90	18.79	75.68	30.00	+11.21

Calculated result at 2437.000 MHz, as the worst point shown on underline:  
 Correction Factor = 9.89 dB  
 +) Meter Reading = 9.24 dBm  
 Result = 19.13 dBm = 81.85 mW  
 Minimum Margin: 30.00 - 19.13 = 10.87 (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	1MHz	3MHz

The band power function was used.



**7.6 Peak Power Density(Conduction)**

For the requirements,  - Applicable  - Tested.  - Not tested by applicant request.]  
 - Not Applicable

For the limits,  - Passed  - Failed  - Not judged

**7.6.1 Worst Point and Measurement Uncertainty**

Peak Power Density of IEEE802.11b is	<u>-10.80</u>	dBm	at	<u>2462.0</u>	MHz
Peak Power Density of IEEE802.11g is	<u>-14.41</u>	dBm	at	<u>2462.0</u>	MHz
Peak Power Density of IEEE802.11n is	<u>-14.58</u>	dBm	at	<u>2412.0</u>	MHz

Uncertainty of Measurement Results at Amplitude +/-1.2 dB(2 $\sigma$ )

Remarks : \_\_\_\_\_

**7.6.2 Test Site**

KITA-KANSAI Testing Center

Test site : SAITO

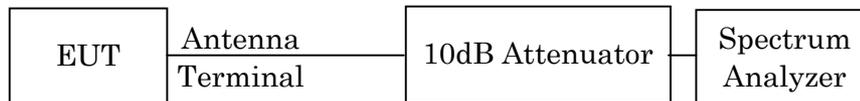
<input type="checkbox"/> - Anechoic chamber (A1)	<input type="checkbox"/> - Measurement room (M1)
<input type="checkbox"/> - Measurement room (M2)	<input type="checkbox"/> - Measurement room (M3)
<input type="checkbox"/> - Shielded room (S1)	<input type="checkbox"/> - Shielded room (S2)
<input type="checkbox"/> - Shielded room (S3)	<input checked="" type="checkbox"/> - Shielded room (S4)

### 7.6.3 Test Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2012/9	1 Year
Attenuator	54A-10	Weinschel	D-28	2012/9	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2012/7	1 Year

### 7.6.4 Test Method and Test Setup (Diagrammatic illustration)

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



## 7.6.5 Test Data

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

Test Date: November 30, 2012

Temp.: 23 °C. Humi: 35 %

Data Rate : 1Mbps

CH	Transmitting Frequency		Correction Factor [dB]	BWCF [dB]	Meter Reading [dBm]	Conducted Peak Power Density		Limits [dBm]	Margin [dB]
	[MHz]	[MHz]				[dBm]	[mW]		
01	2412		9.89	-10.00	-11.02	-11.13	0.08	8.00	+19.13
06	2437		9.89	-10.00	-11.10	-11.21	0.08	8.00	+19.21
11	2462		9.89	-10.00	-10.69	-10.80	0.08	8.00	+18.80

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

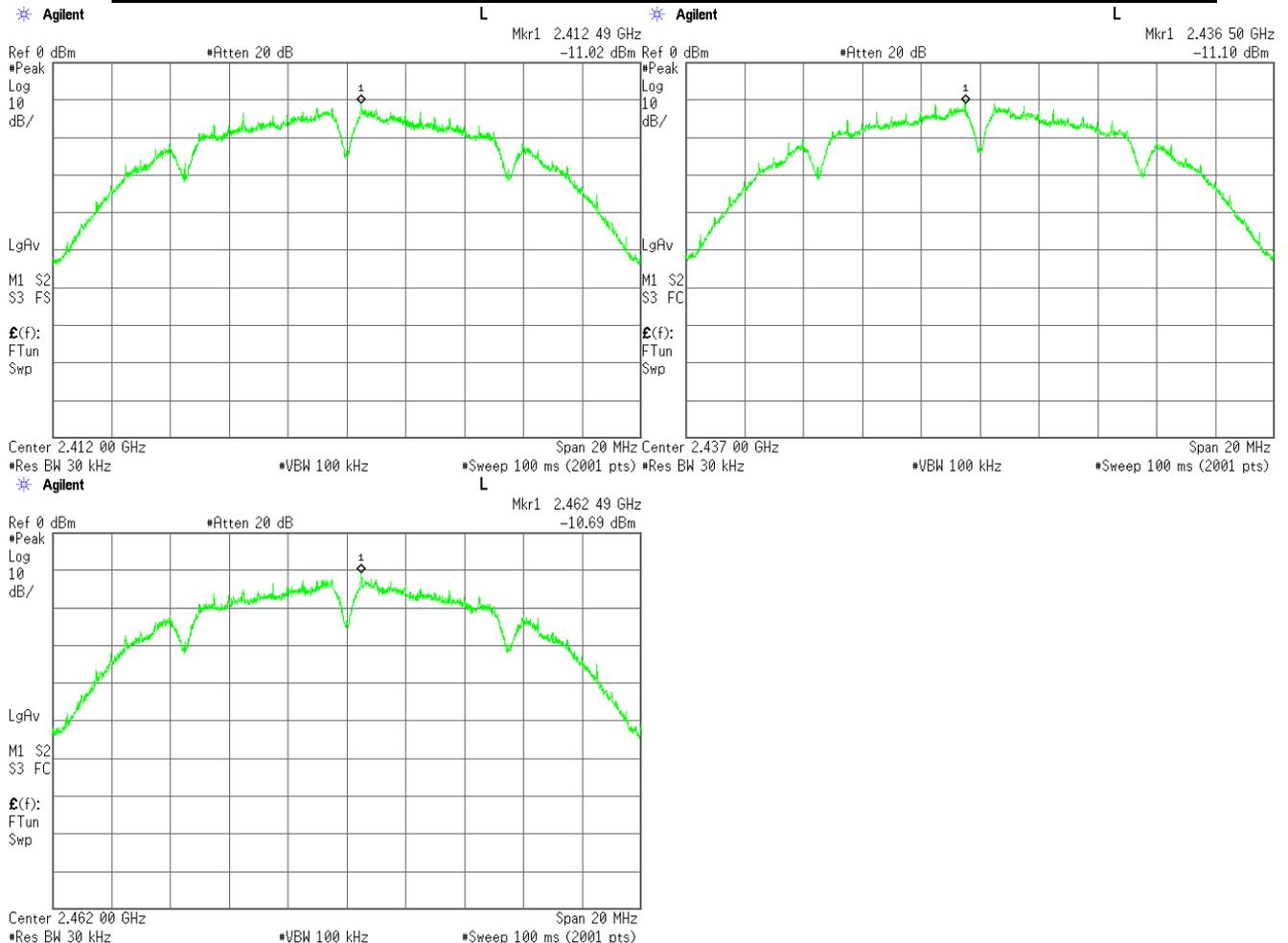
Correction Factor	=	9.89 dB
BWCF	=	-10.00 dB
+ ) Meter Reading	=	-10.69 dBm
Result	=	-10.80 dBm = 0.08 mW

Minimum Margin: 8.00 - -10.80 = 18.80 (dB)

### NOTES

1. The peak power density complied with the limit without BWCF.
2. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
3. BWCF(bandwidth correction factor) =  $10 \log(3 \text{ kHz}/30 \text{ kHz}) = -10.0 \text{ dB}$
4. Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	30kHz	100kHz



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

Test Date: November 30, 2012

Temp.: 23 °C. Humi: 35 %

Data Rate : 2Mbps

CH	Transmitting Frequency [MHz]	Correction Factor [dB]	BWCF [dB]	Meter Reading [dBm]	Conducted Peak Power Density [dBm] [mW]	Limits [dBm]	Margin [dB]
01	2412	9.89	-10.00	-10.90	-11.01 0.08	8.00	+19.01
06	2437	9.89	-10.00	-11.26	-11.37 0.07	8.00	+19.37
11	2462	9.89	-10.00	-11.01	-11.12 0.08	8.00	+19.12

Calculated result at 2412.000 MHz, as the worst point shown on underline:

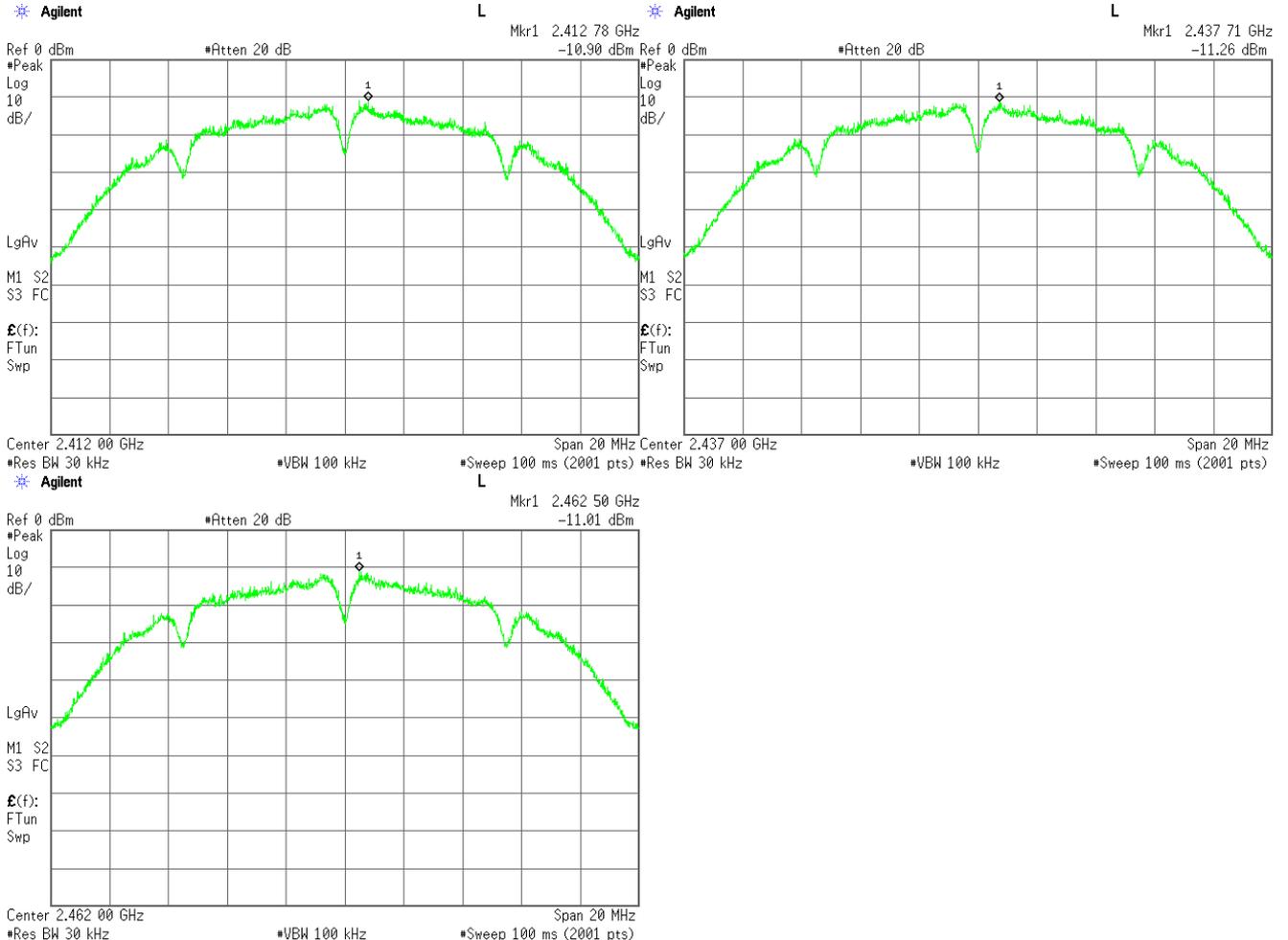
Correction Factor	=	9.89 dB
BWCF	=	-10.00 dB
+ ) Meter Reading	=	-10.90 dBm
Result	=	-11.01 dBm = 0.08 mW

Minimum Margin: 8.00 - -11.01 = 19.01 (dB)

NOTES

1. The peak power density complied with the limit without BWCF.
2. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
3. BWCF(bandwidth correction factor) =  $10 \log (3 \text{ kHz}/30 \text{ kHz}) = -10.0 \text{ dB}$
4. Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	30kHz	100kHz



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

Test Date: November 30, 2012

Temp.: 23 °C, Humi: 35 %

Data Rate : 5.5Mbps

Transmitting Frequency	Correction Factor	BWCF	Meter Reading	Conducted Peak Power Density		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
01	2412	9.89	-10.00	-12.85	-12.96	0.05	8.00 +20.96
06	2437	9.89	-10.00	-11.96	-12.07	0.06	8.00 +20.07
11	2462	9.89	-10.00	-12.52	-12.63	0.05	8.00 +20.63

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

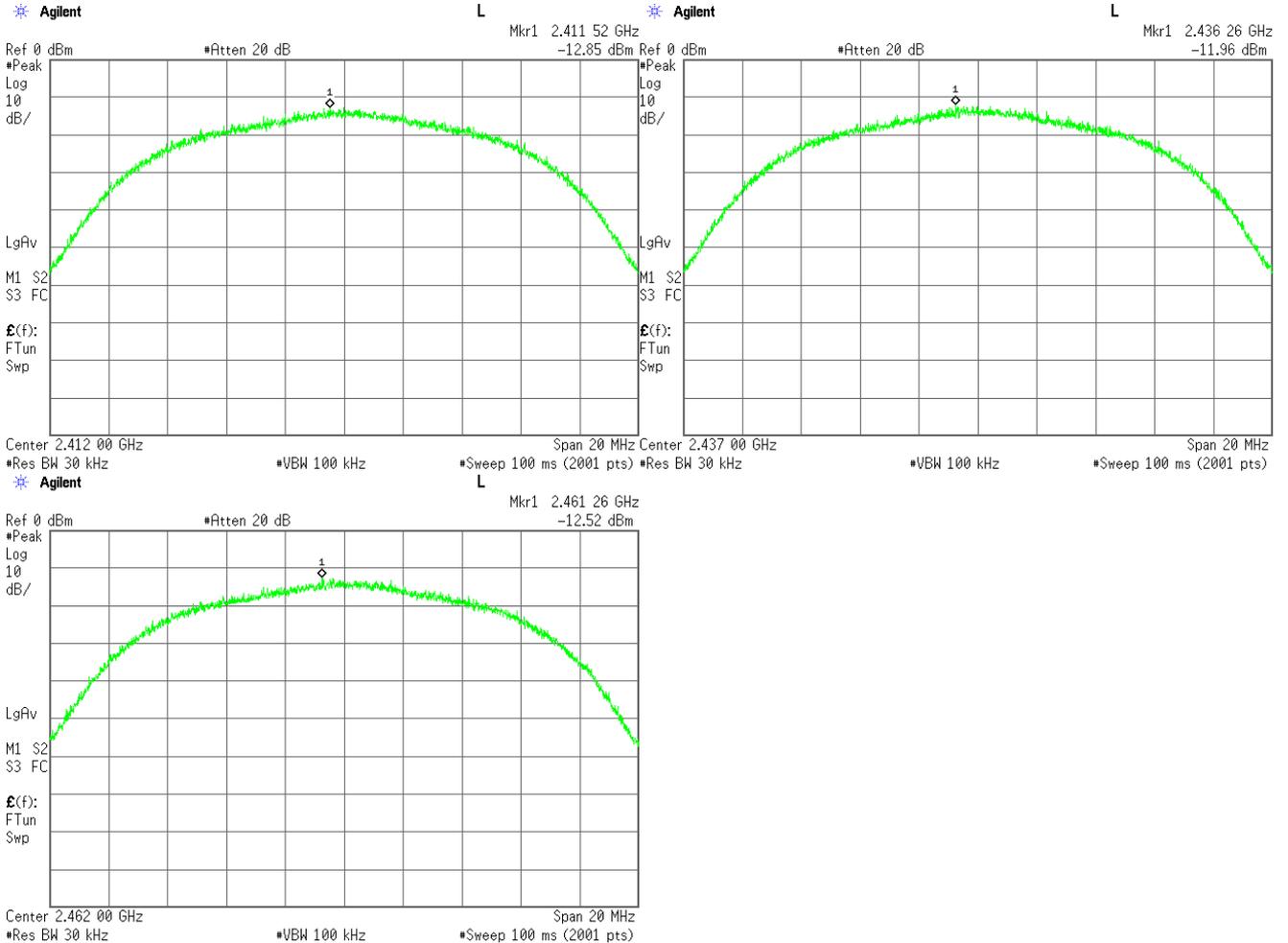
Correction Factor	=	9.89 dB
BWCF	=	-10.00 dB
+ ) Meter Reading	=	-11.96 dBm
Result	=	-12.07 dBm = 0.06 mW

Minimum Margin: 8.00 - -12.07 = 20.07 (dB)

NOTES

1. The peak power density complied with the limit without BWCF.
2. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
3. BWCF(bandwidth correction factor) =  $10 \log(3 \text{ kHz}/30 \text{ kHz}) = -10.0 \text{ dB}$
4. Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	30kHz	100kHz



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

Test Date: November 30, 2012

Temp.: 23 °C. Humi: 35 %

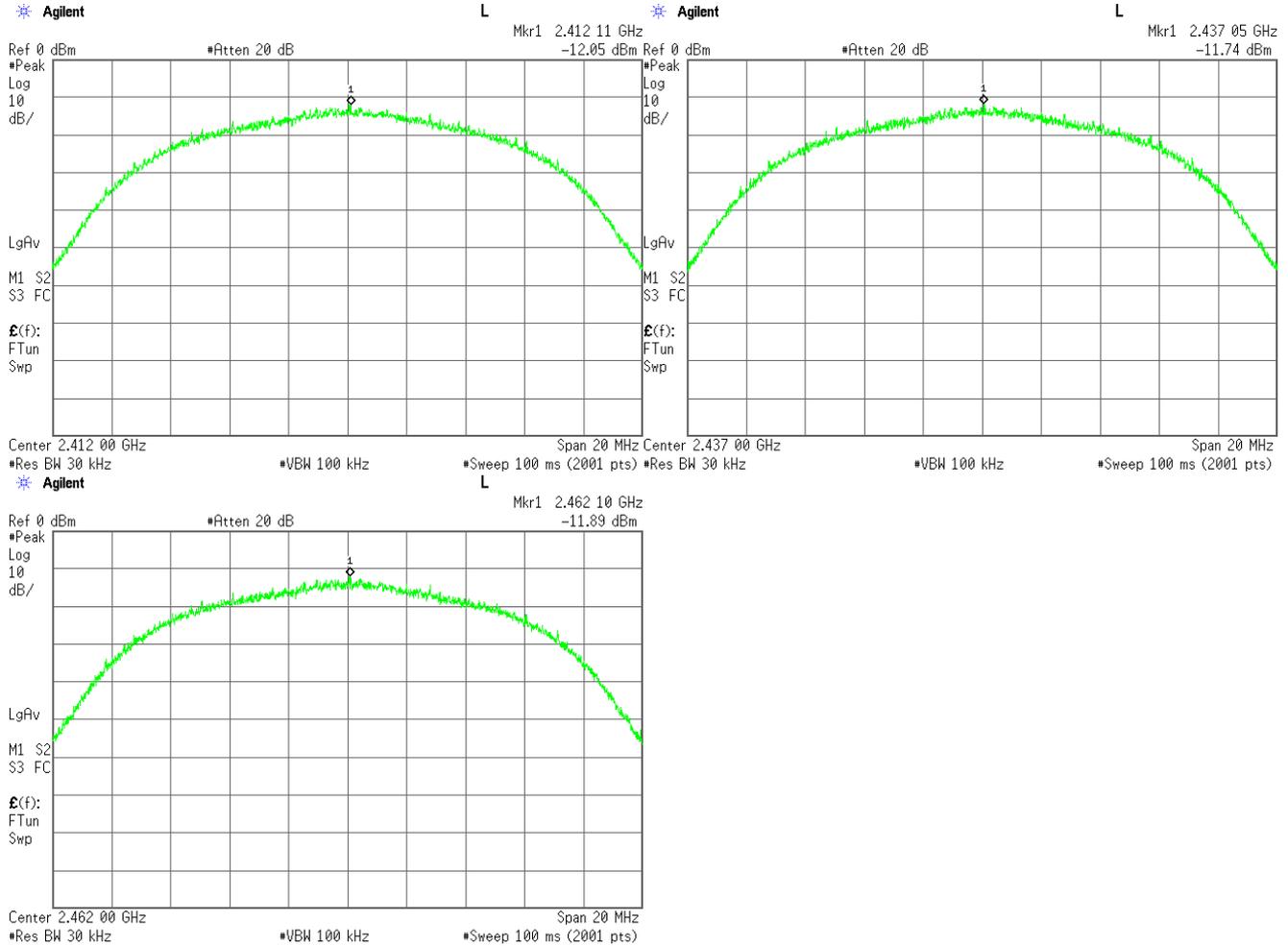
Data Rate : 11Mbps

Transmitting Frequency	Correction Factor	BWCF	Meter Reading	Conducted Peak Power Density		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
01	2412	9.89	-10.00	-12.05	0.06	8.00	+20.16
06	2437	9.89	-10.00	-11.74	0.07	8.00	+19.85
11	2462	9.89	-10.00	-11.89	0.06	8.00	+20.00

Calculated result at 2437.000 MHz, as the worst point shown on underline:  
 Correction Factor = 9.89 dB  
 BWCF = -10.00 dB  
 + ) Meter Reading = -11.74 dBm  
 Result = -11.85 dBm = 0.07 mW  
 Minimum Margin: 8.00 - -11.85 = 19.85 (dB)

NOTES  
 1. The peak power density complied with the limit without BWCF.  
 2. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.  
 3. BWCF(bandwidth correction factor) = 10 log (3 kHz/30 kHz) = -10.0 dB  
 4. Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	30kHz	100kHz



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

Test Date: November 30, 2012

Temp.: 23 °C, Humi: 35 %

Data Rate : 6Mbps

CH	Transmitting Frequency [MHz]	Correction Factor [dB]	BWCF [dB]	Meter Reading [dBm]	Conducted Peak Power Density [dBm]	Conducted Peak Power Density [mW]	Limits [dBm]	Margin [dB]
01	2412	9.89	-10.00	-14.86	-14.97	0.03	8.00	+22.97
06	2437	9.89	-10.00	-14.99	-15.10	0.03	8.00	+23.10
11	2462	9.89	-10.00	-15.02	-15.13	0.03	8.00	+23.13

Calculated result at 2412.000 MHz, as the worst point shown on underline:

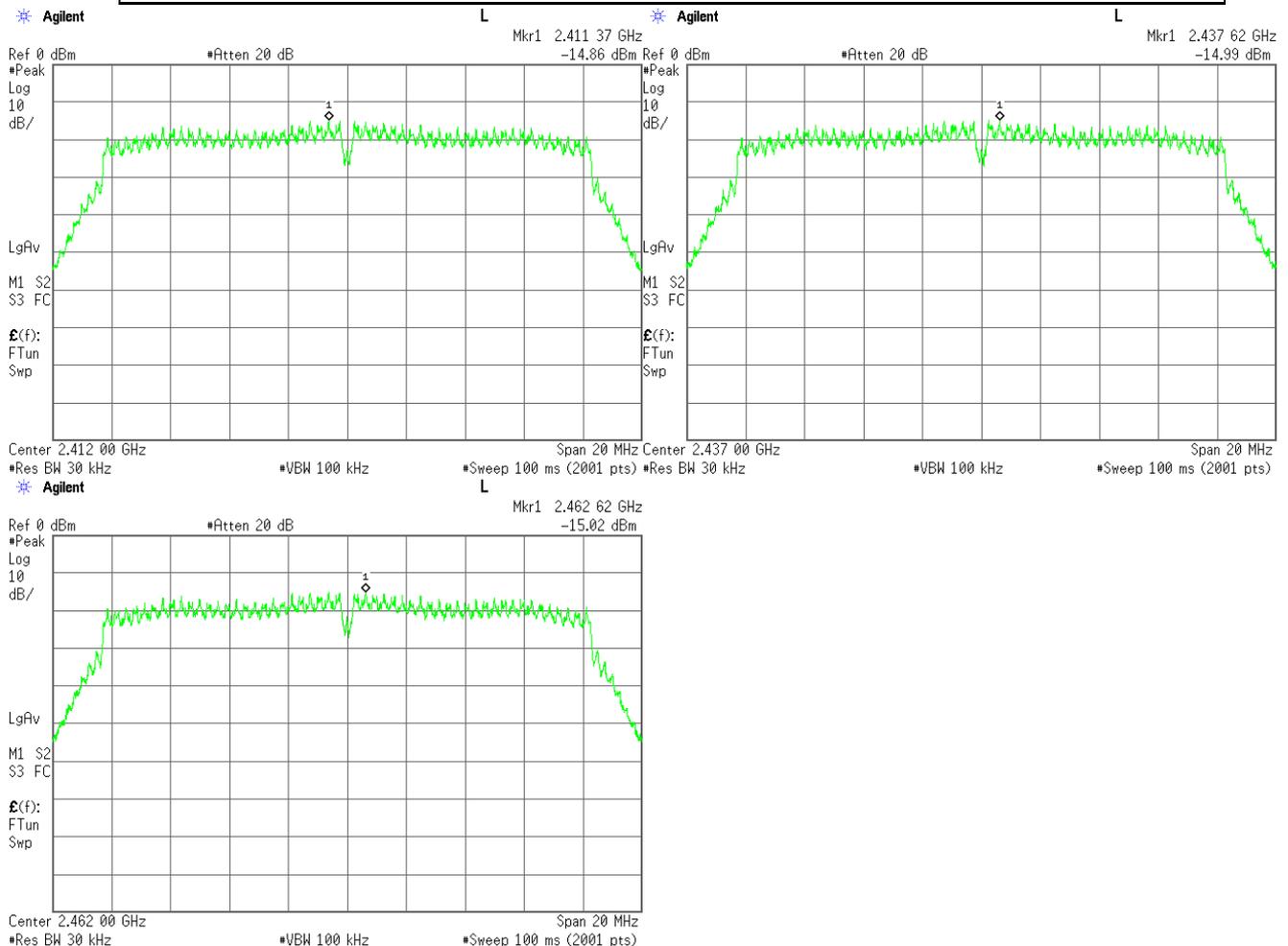
Correction Factor	=	9.89 dB
BWCF	=	-10.00 dB
+ ) Meter Reading	=	-14.86 dBm
Result	=	-14.97 dBm = 0.03 mW

Minimum Margin: 8.00 - -14.97 = 22.97 (dB)

NOTES

1. The peak power density complied with the limit without BWCF.
2. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
3. BWCF(bandwidth correction factor) =  $10 \log(3 \text{ kHz}/30 \text{ kHz}) = -10.0 \text{ dB}$
4. Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	30kHz	100kHz



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

Test Date: November 30, 2012

Temp.: 23 °C, Humi: 35 %

Data Rate : 54Mbps

CH	Transmitting Frequency [MHz]	Correction Factor [dB]	BWCF [dB]	Meter Reading [dBm]	Conducted Peak Power Density [dBm] [mW]	Limits [dBm]	Margin [dB]
01	2412	9.89	-10.00	-14.63	-14.74 0.03	8.00	+22.74
06	2437	9.89	-10.00	-14.75	-14.86 0.03	8.00	+22.86
11	2462	9.89	-10.00	-14.30	-14.41 0.04	8.00	+22.41

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

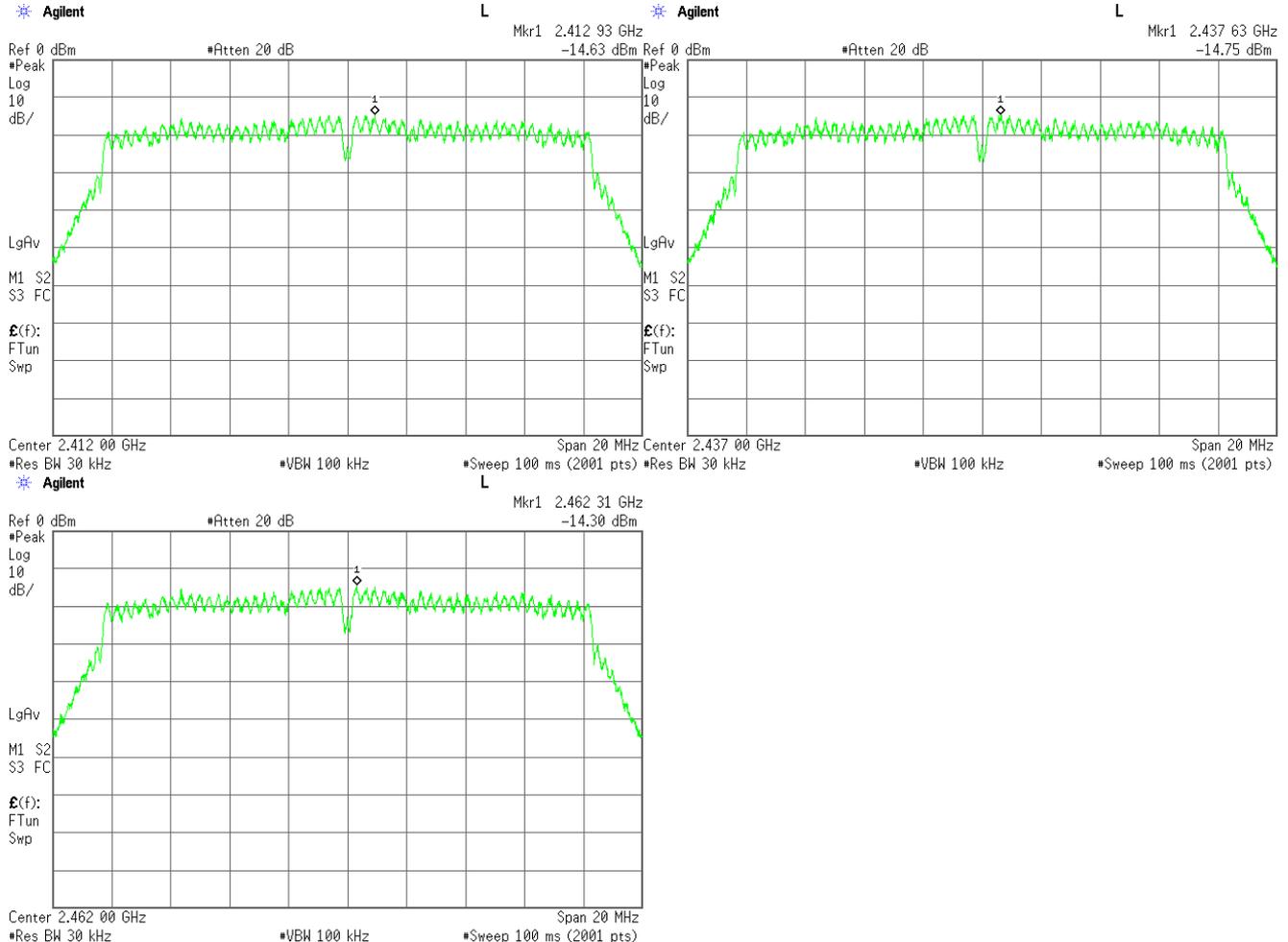
Correction Factor	=	9.89 dB
BWCF	=	-10.00 dB
+ ) Meter Reading	=	-14.30 dBm
Result	=	-14.41 dBm = 0.04 mW

Minimum Margin: 8.00 - -14.41 = 22.41 (dB)

NOTES

1. The peak power density complied with the limit without BWCF.
2. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
3. BWCF(bandwidth correction factor) =  $10 \log(3 \text{ kHz}/30 \text{ kHz}) = -10.0 \text{ dB}$
4. Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	30kHz	100kHz



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

Test Date: November 30, 2012

Temp.: 23 °C, Humi: 35 %

Data Rate : 6.5Mbps

CH	Transmitting Frequency [MHz]	Correction Factor [dB]	BWCF [dB]	Meter Reading [dBm]	Conducted Peak Power Density [dBm]	Conducted Peak Power Density [mW]	Limits [dBm]	Margin [dB]
01	2412	9.89	-10.00	-14.72	-14.83	0.03	8.00	+22.83
06	2437	9.89	-10.00	-15.16	-15.27	0.03	8.00	+23.27
11	2462	9.89	-10.00	-15.15	-15.26	0.03	8.00	+23.26

Calculated result at 2412.000 MHz, as the worst point shown on underline:

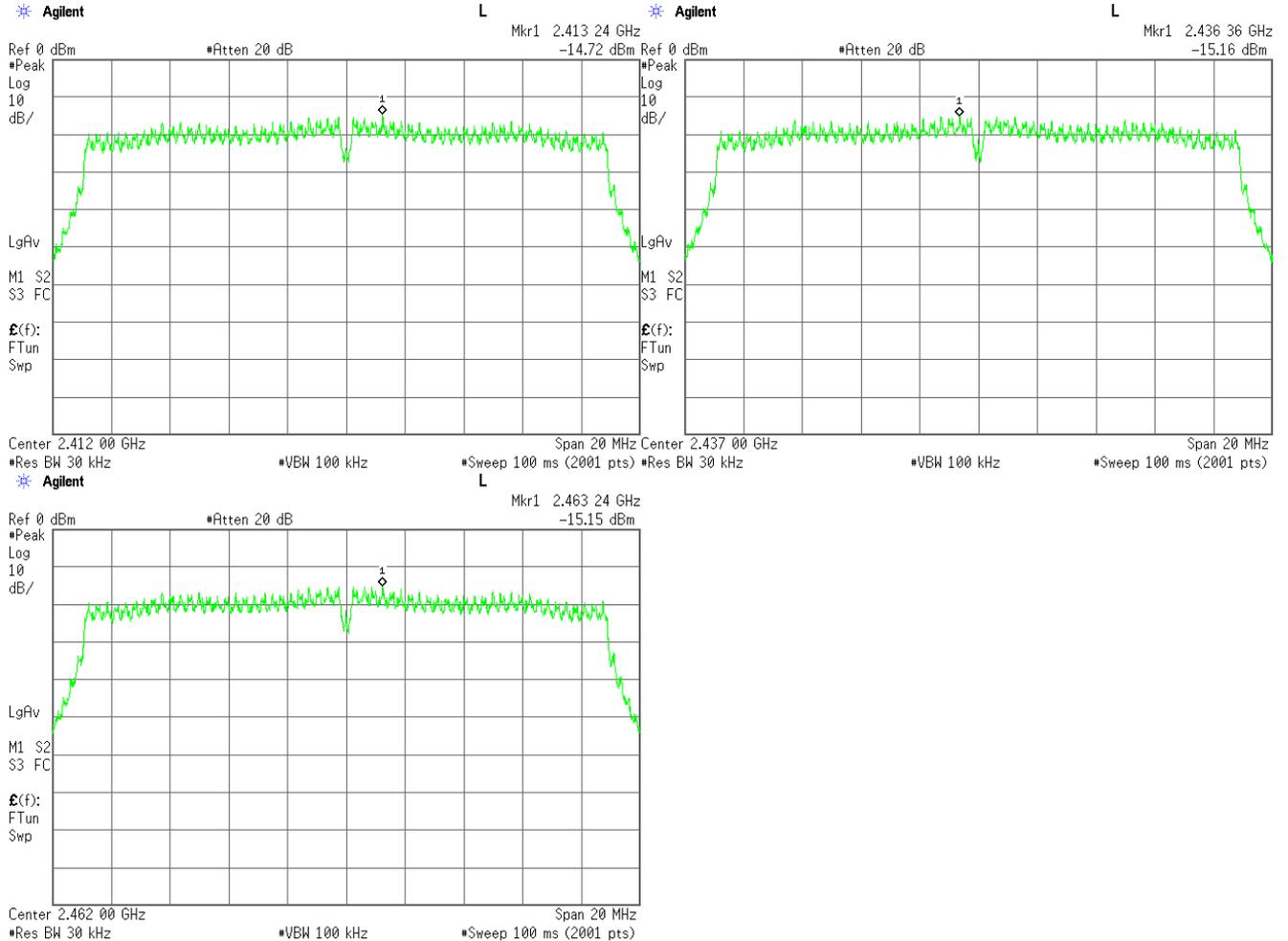
Correction Factor	=	9.89 dB
BWCF	=	-10.00 dB
+ ) Meter Reading	=	-14.72 dBm
Result	=	-14.83 dBm = 0.03 mW

Minimum Margin: 8.00 - -14.83 = 22.83 (dB)

NOTES

1. The peak power density complied with the limit without BWCF.
2. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
3. BWCF(bandwidth correction factor) =  $10 \log(3 \text{ kHz}/30 \text{ kHz}) = -10.0 \text{ dB}$
4. Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	30kHz	100kHz



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

Test Date: November 30, 2012

Temp.: 23 °C, Humi: 35 %

Data Rate : 65Mbps

CH	Transmitting Frequency [MHz]	Correction Factor [dB]	BWCF [dB]	Meter Reading [dBm]	Conducted Peak Power Density [dBm]	Conducted Peak Power Density [mW]	Limits [dBm]	Margin [dB]
01	2412	9.89	-10.00	-14.47	-14.58	0.03	8.00	+22.58
06	2437	9.89	-10.00	-14.72	-14.83	0.03	8.00	+22.83
11	2462	9.89	-10.00	-15.23	-15.34	0.03	8.00	+23.34

Calculated result at 2412.000 MHz, as the worst point shown on underline:

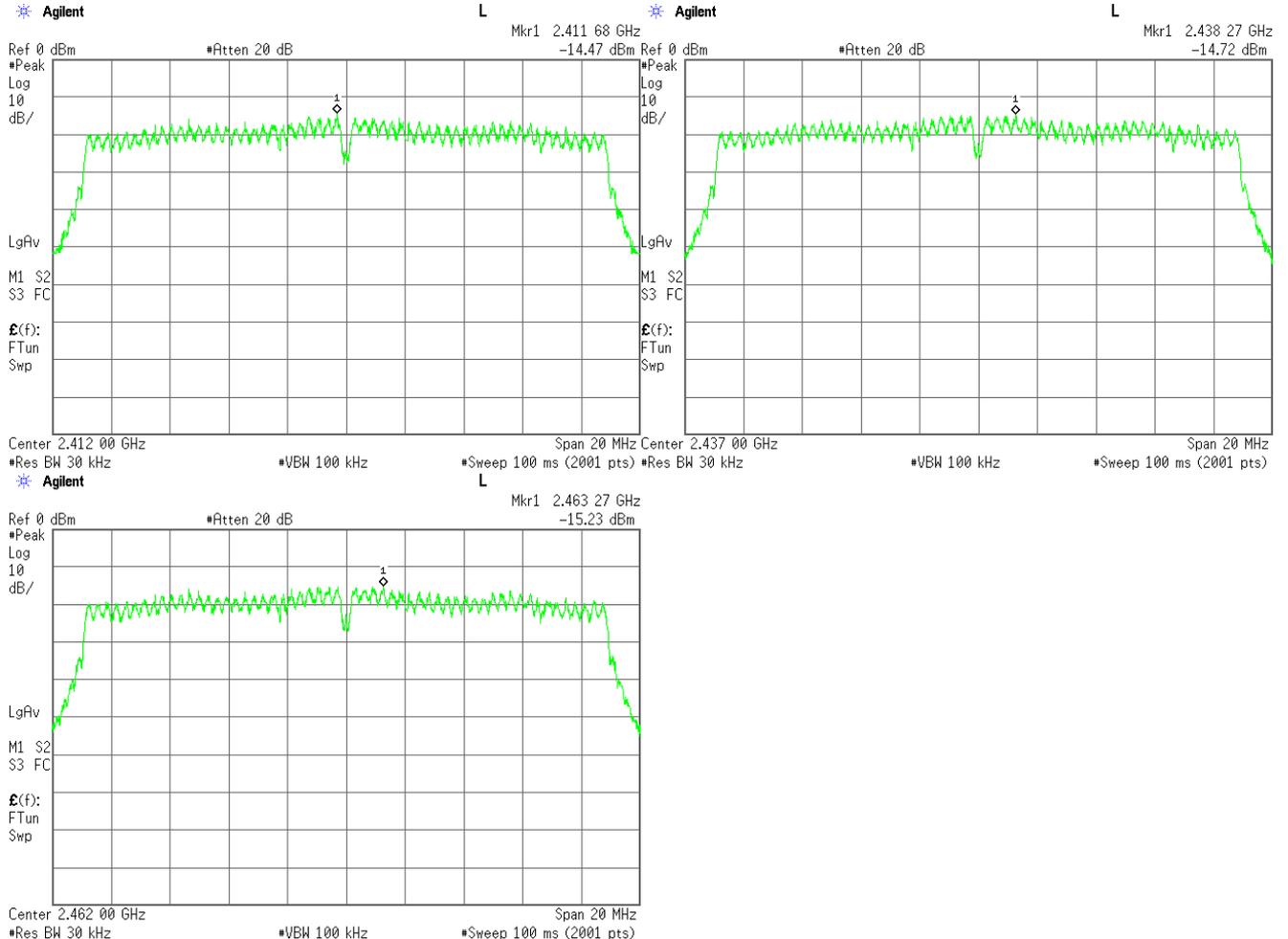
Correction Factor	=	9.89 dB
BWCF	=	-10.00 dB
+ ) Meter Reading	=	-14.47 dBm
Result	=	-14.58 dBm = 0.03 mW

Minimum Margin: 8.00 - -14.58 = 22.58 (dB)

NOTES

1. The peak power density complied with the limit without BWCF.
2. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
3. BWCF(bandwidth correction factor) = 10 log (3 kHz/30 kHz) = -10.0 dB
4. Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	30kHz	100kHz



**7.7 Spurious Emissions(Conduction)**

For the requirements,  - Applicable  - Tested.  - Not tested by applicant request.]  
 - Not Applicable

For the limits,  - Passed  - Failed  - Not judged

**7.7.1 Worst Point and Measurement Uncertainty**

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

Remarks : \_\_\_\_\_

**7.7.2 Test Site**

KITA-KANSAI Testing Center

Test site : SAITO

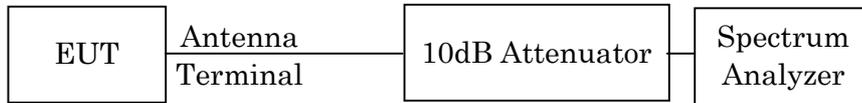
<input type="checkbox"/> - Anechoic chamber (A1)	<input type="checkbox"/> - Measurement room (M1)
<input type="checkbox"/> - Measurement room (M2)	<input type="checkbox"/> - Measurement room (M3)
<input type="checkbox"/> - Shielded room (S1)	<input type="checkbox"/> - Shielded room (S2)
<input type="checkbox"/> - Shielded room (S3)	<input checked="" type="checkbox"/> - Shielded room (S4)

**7.7.3 Test Instruments**

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2012/9	1 Year
Attenuator	54A-10	Weinschel	D-28	2012/9	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2012/7	1 Year

**7.7.4 Test Method and Test Setup (Diagrammatic illustration)**

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

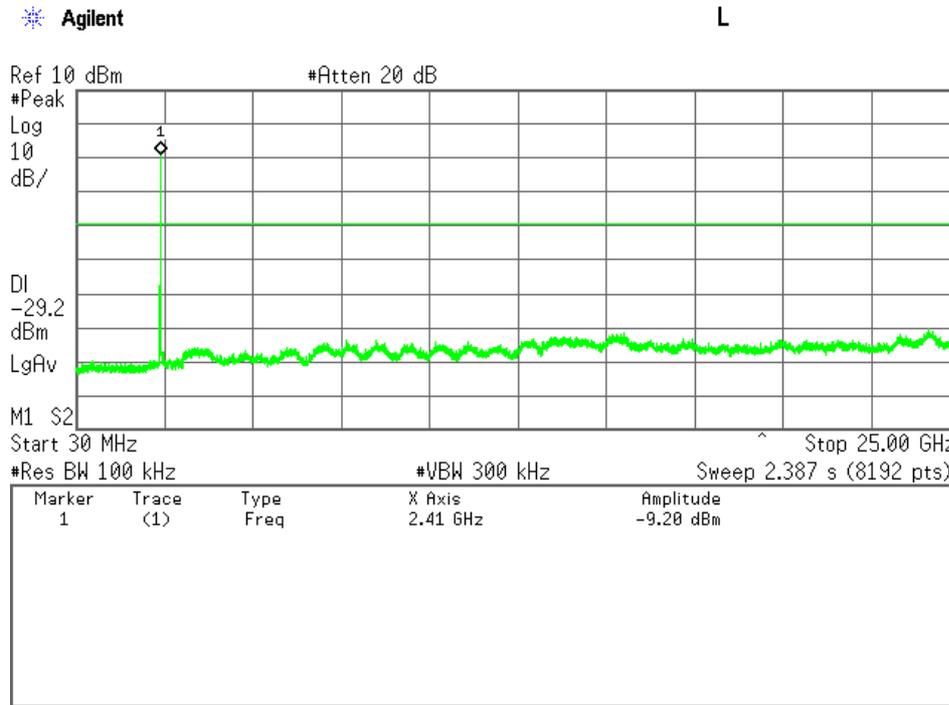
Frequency Range	30 MHz - 25 GHz	Band-Edge
Res. Bandwidth	100 kHz	100 kHz
Video Bandwidth	300 kHz	300 kHz
Sweep Time	AUTO	AUTO
Trace	Maxhold	Maxhold

**7.7.5 Test Data**

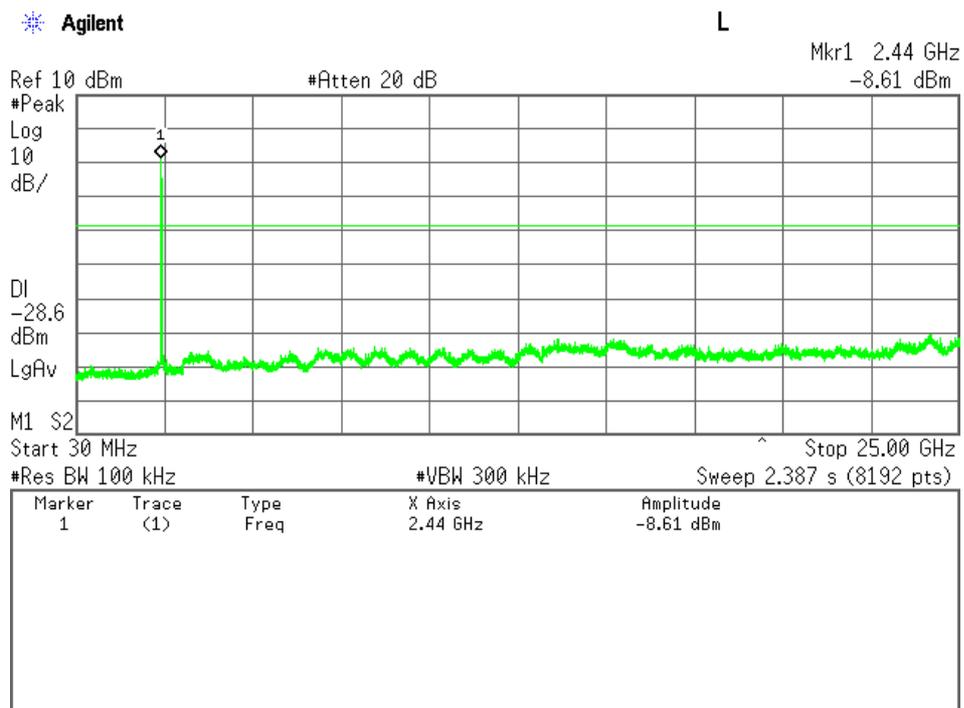
Test Date : November 30, 2012

Temp.:23°C, Humi:35%

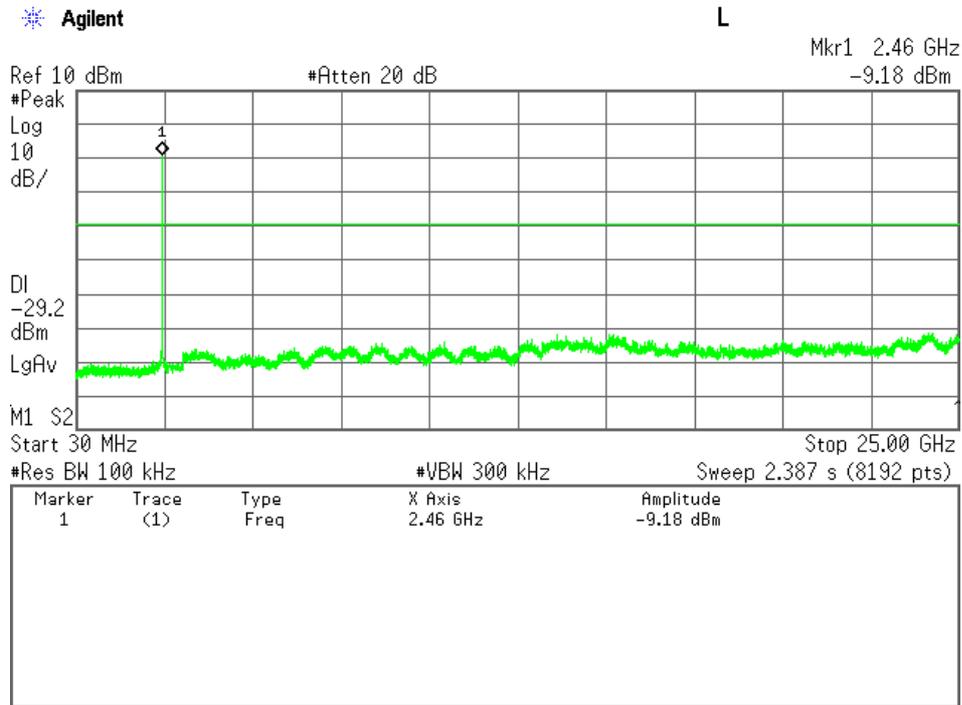
1)Data Rate : 1Mbps(IEEE 802.11b)  
Low Channel



Middle Channel

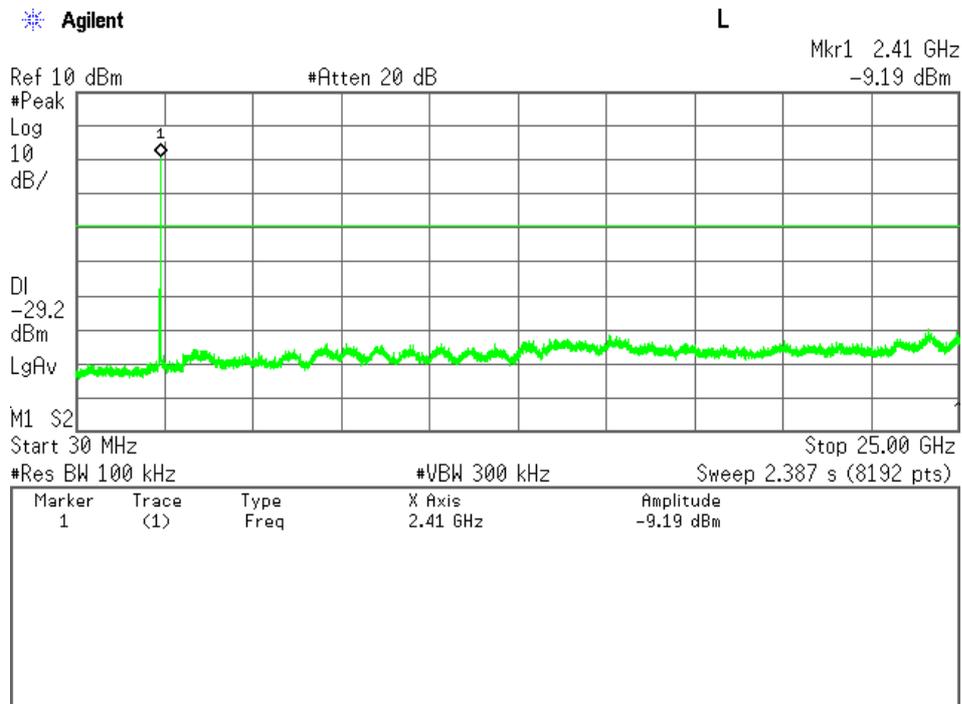


High Channel

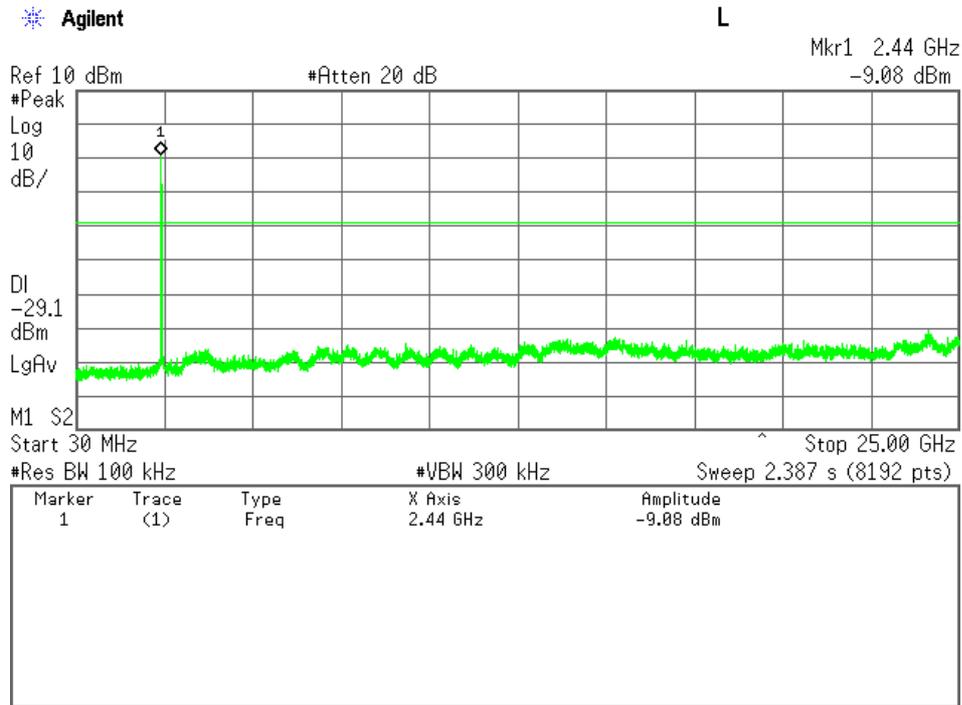


2)Data Rate : 11Mbps(IEEE 802.11b)

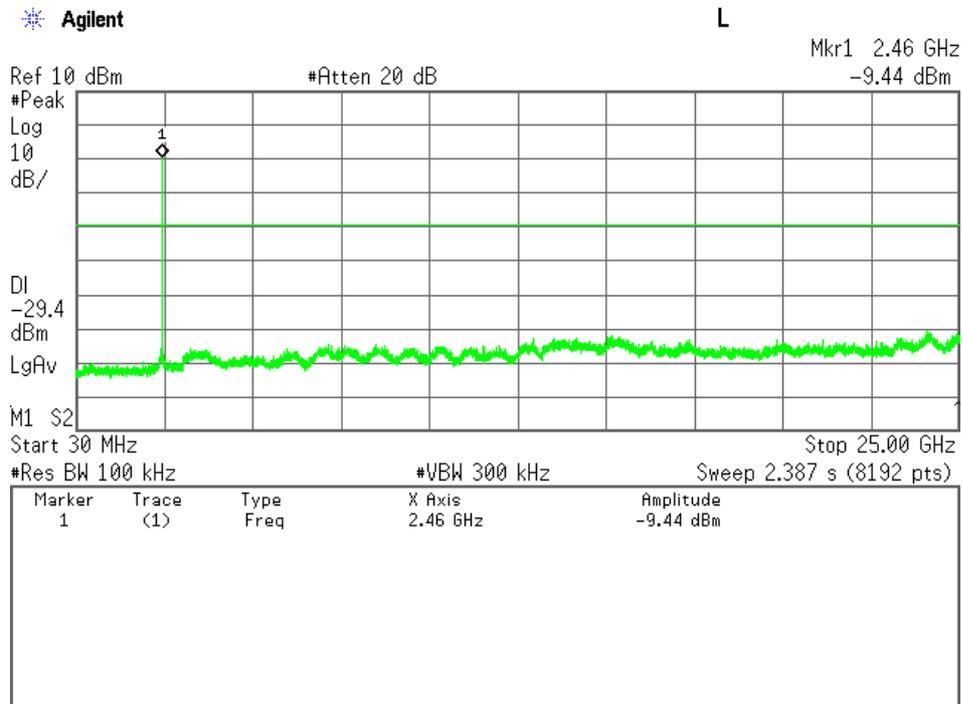
Low Channel



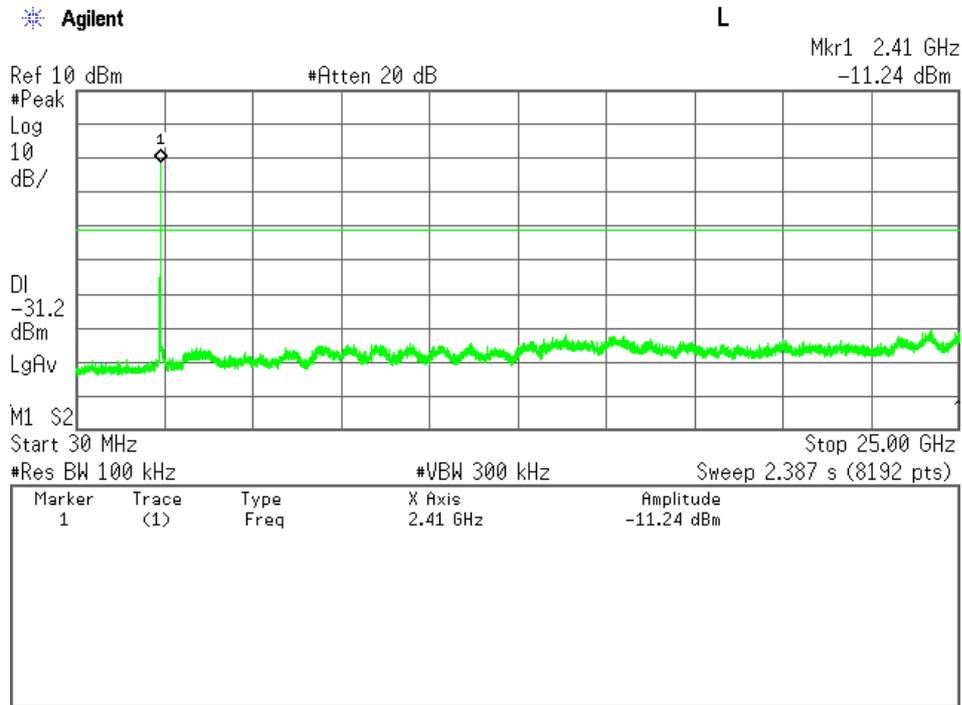
## Middle Channel



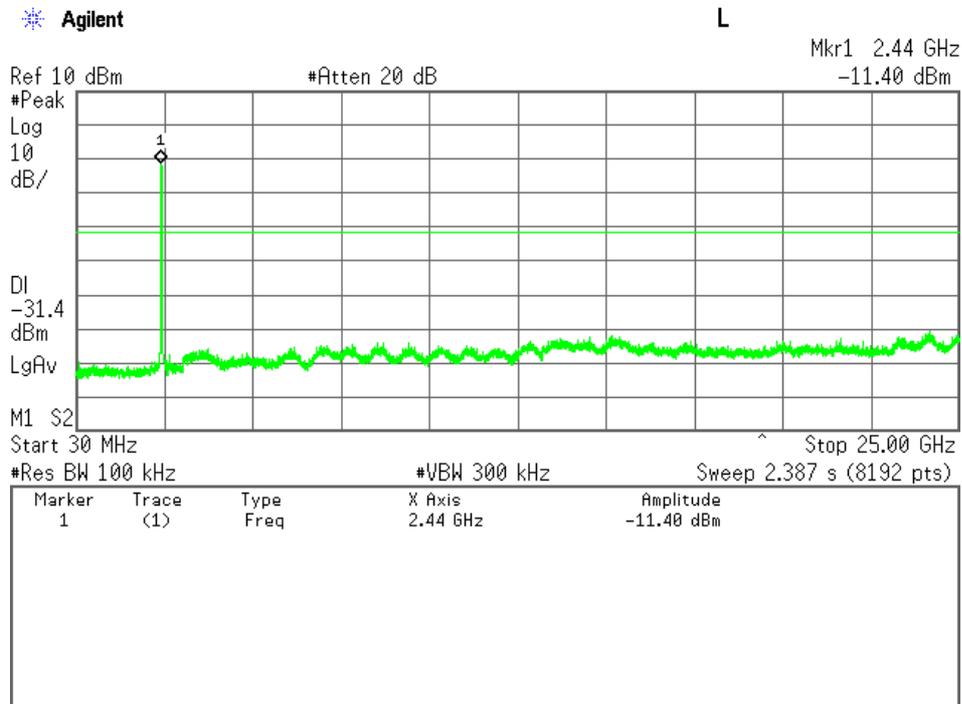
## High Channel



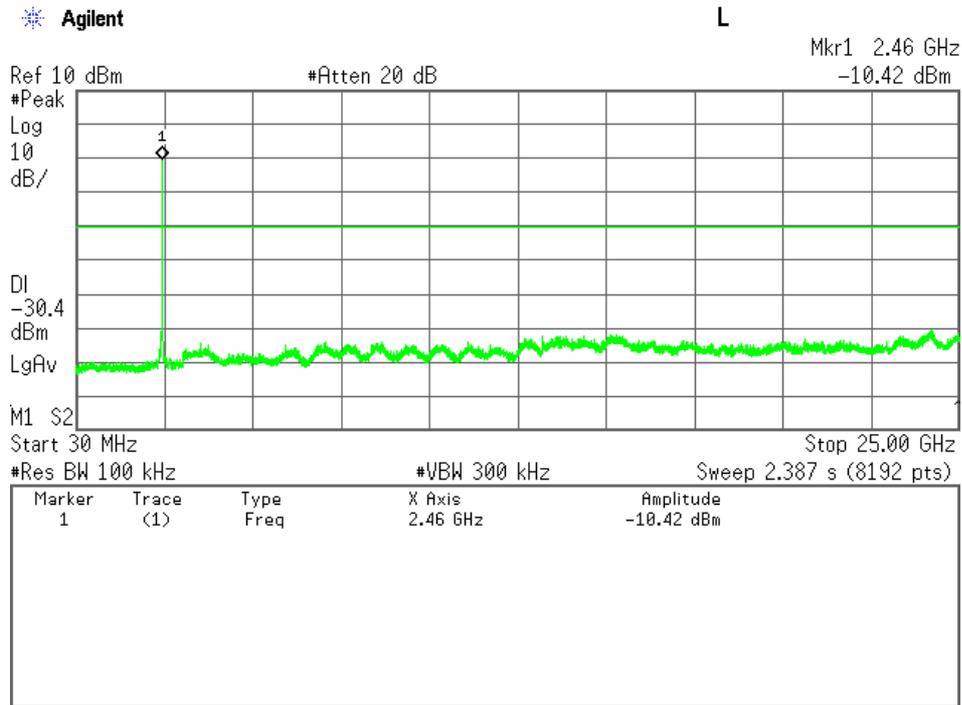
3)Data Rate : 6Mbps(IEEE 802.11g)  
Low Channel



Middle Channel

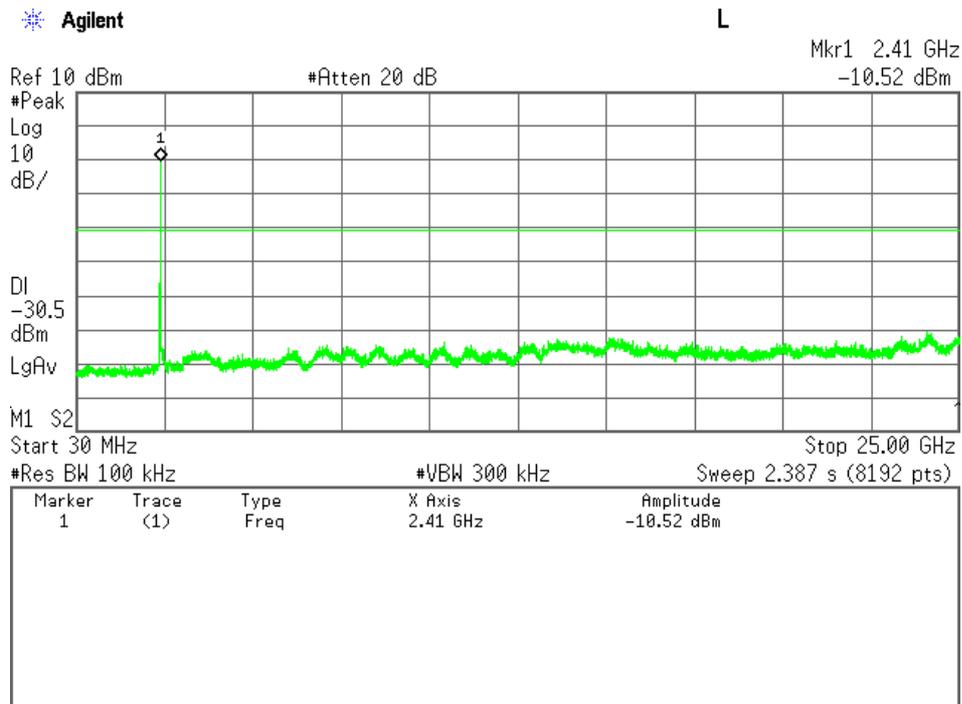


High Channel

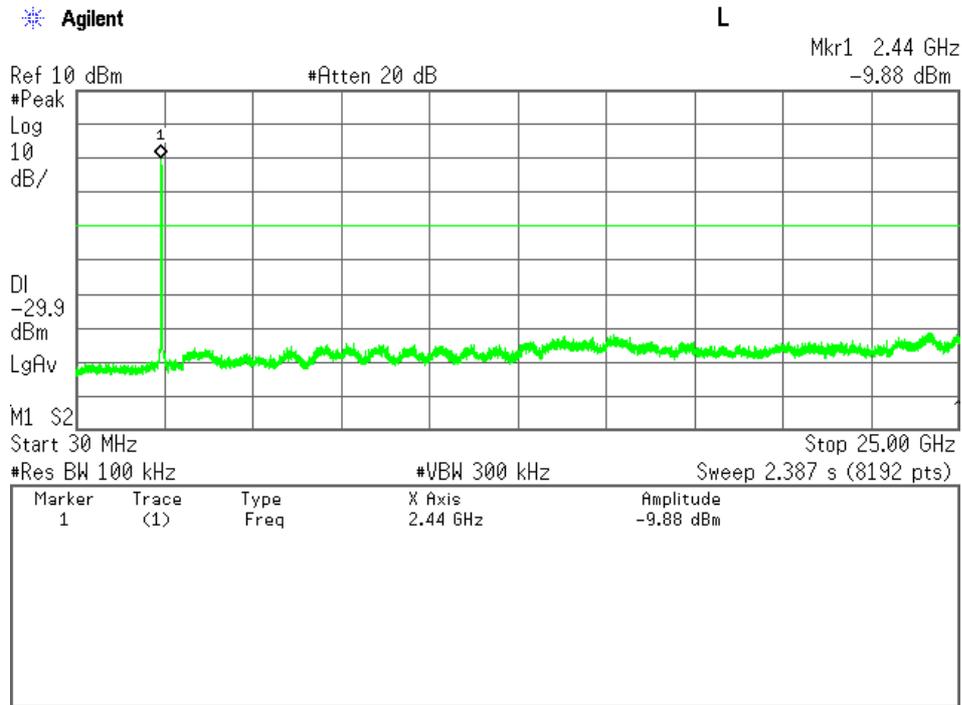


4)Data Rate : 54Mbps(IEEE 802.11g)

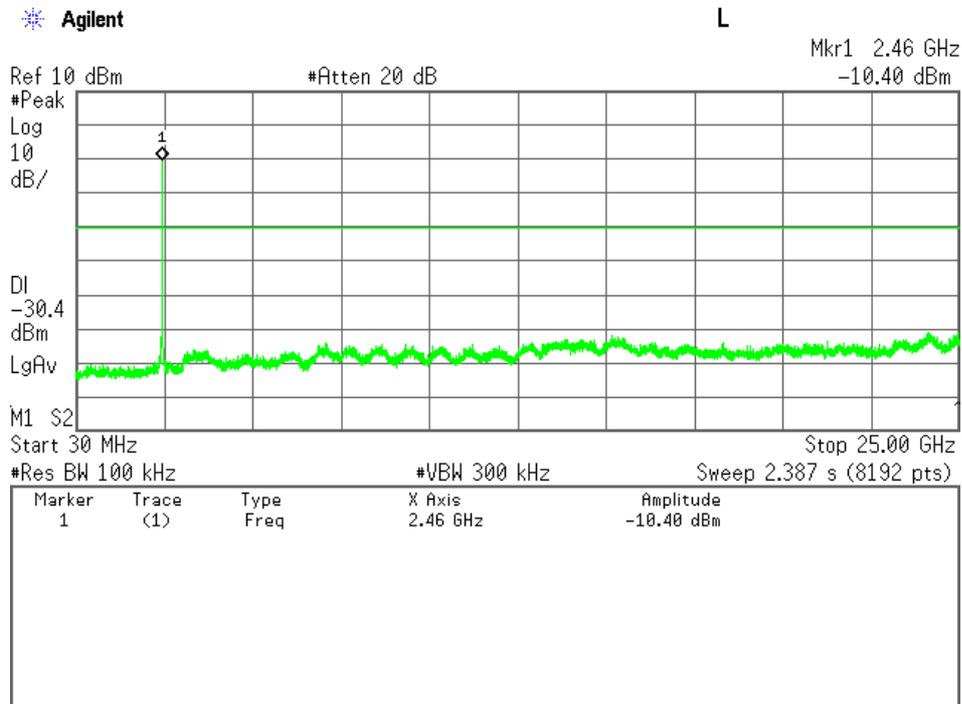
Low Channel



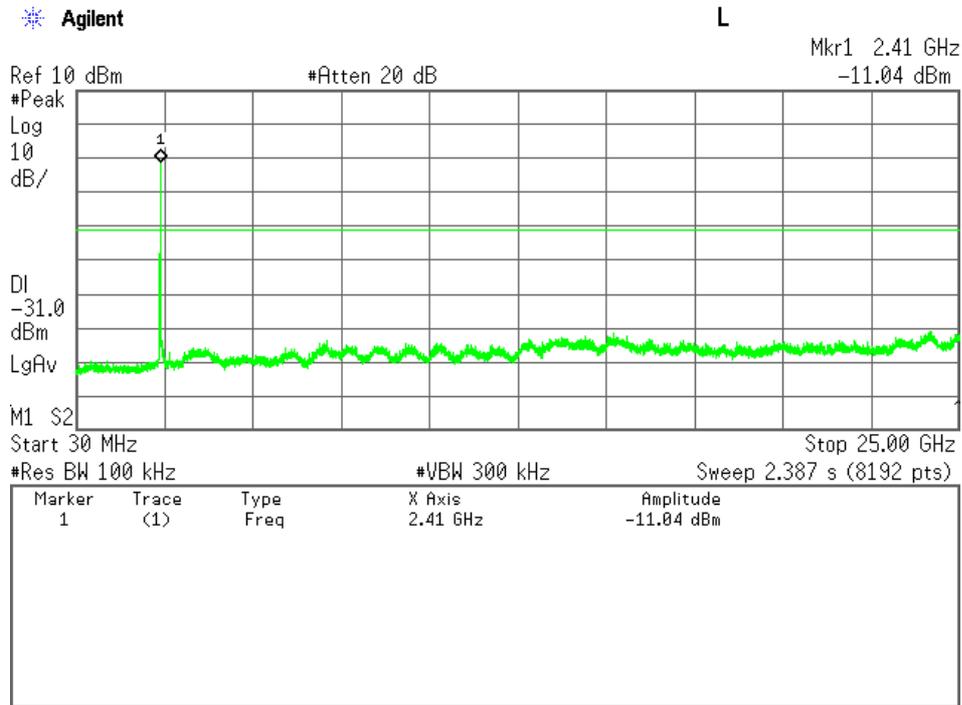
Middle Channel



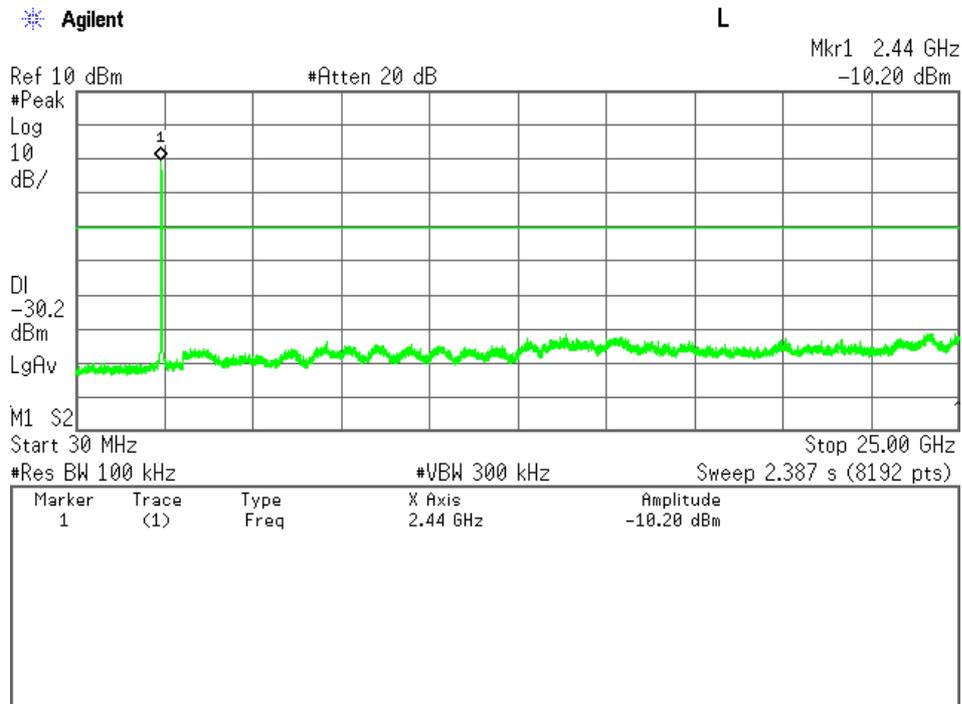
High Channel



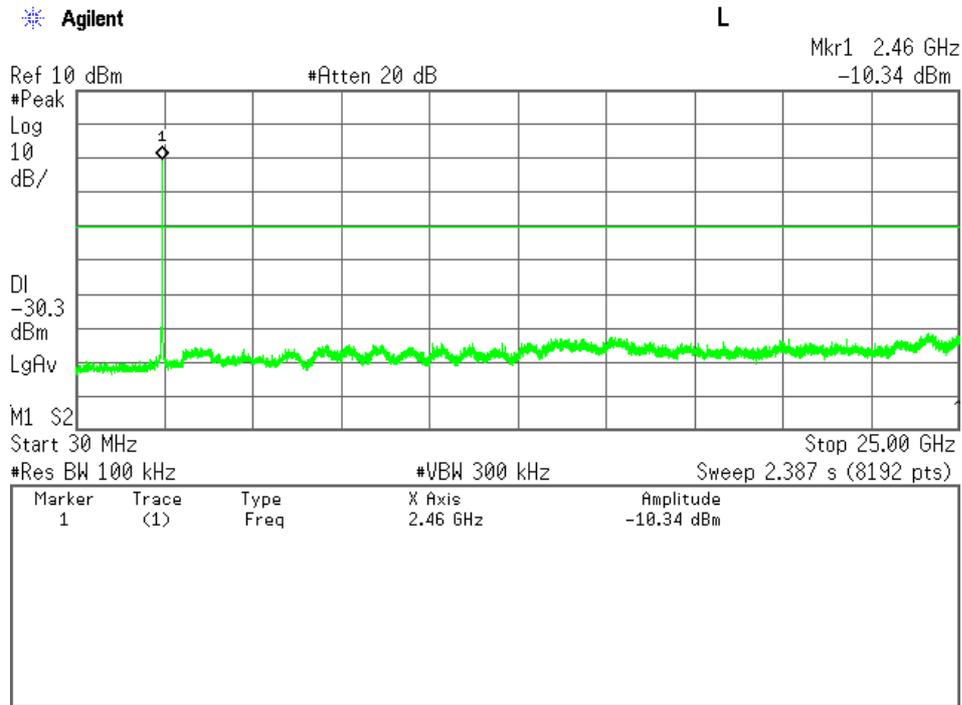
5)Data Rate : 6.5Mbps(IEEE 802.11n)  
Low Channel



Middle Channel

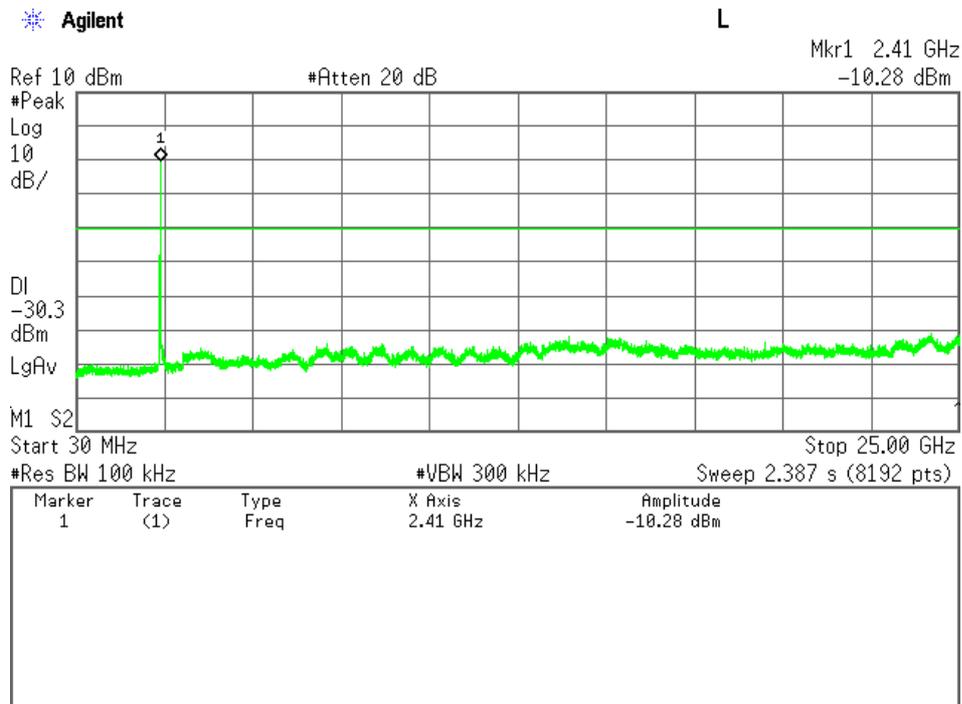


High Channel

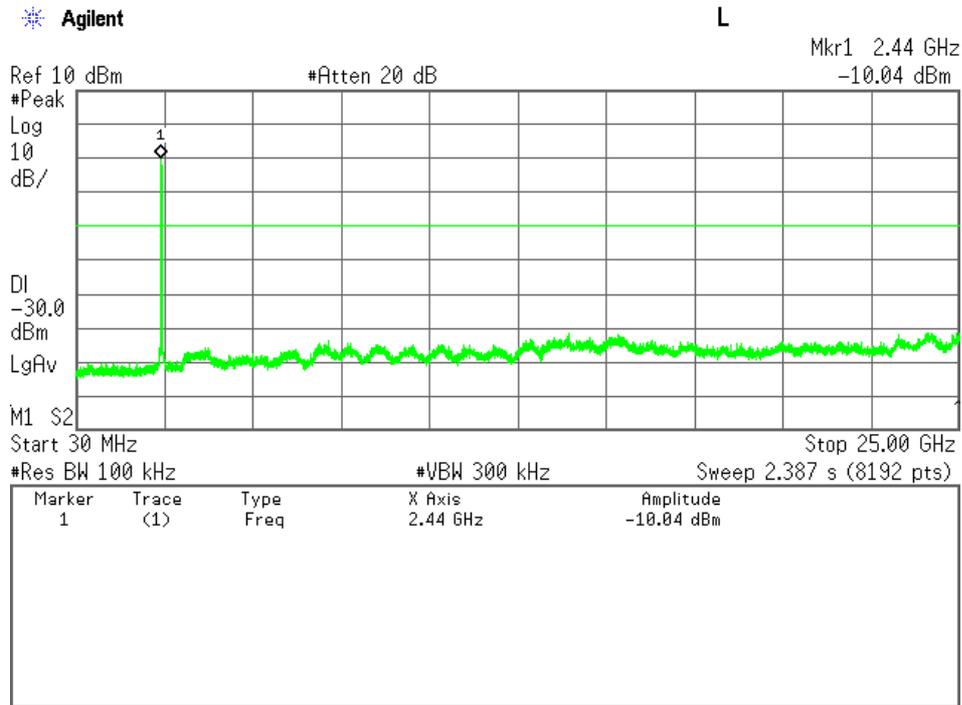


6)Data Rate : 65Mbps(IEEE 802.11n)

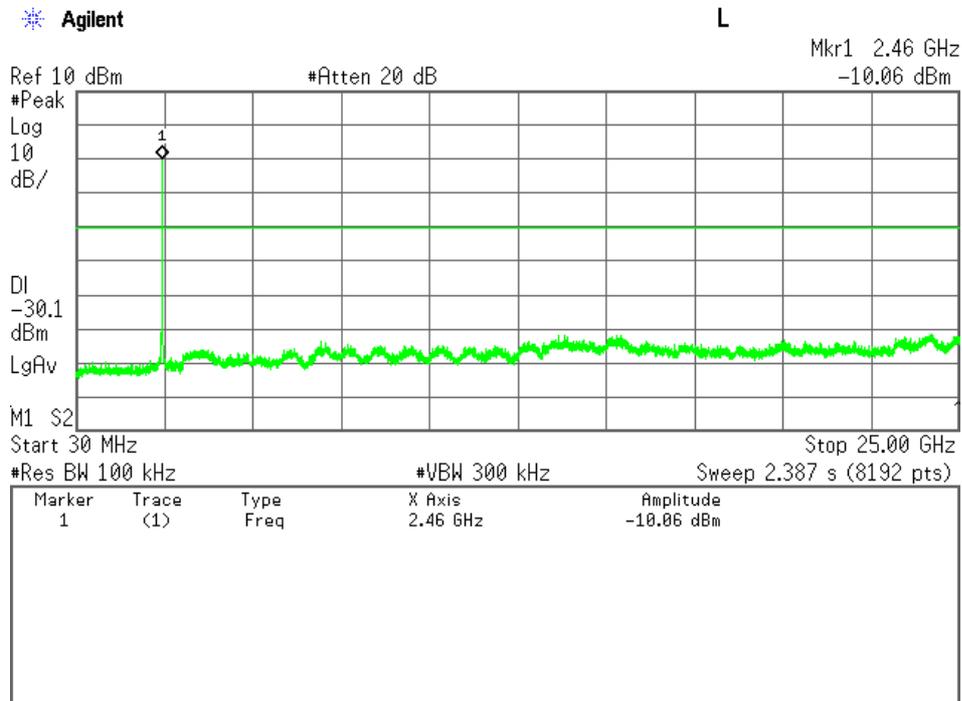
Low Channel



## Middle Channel

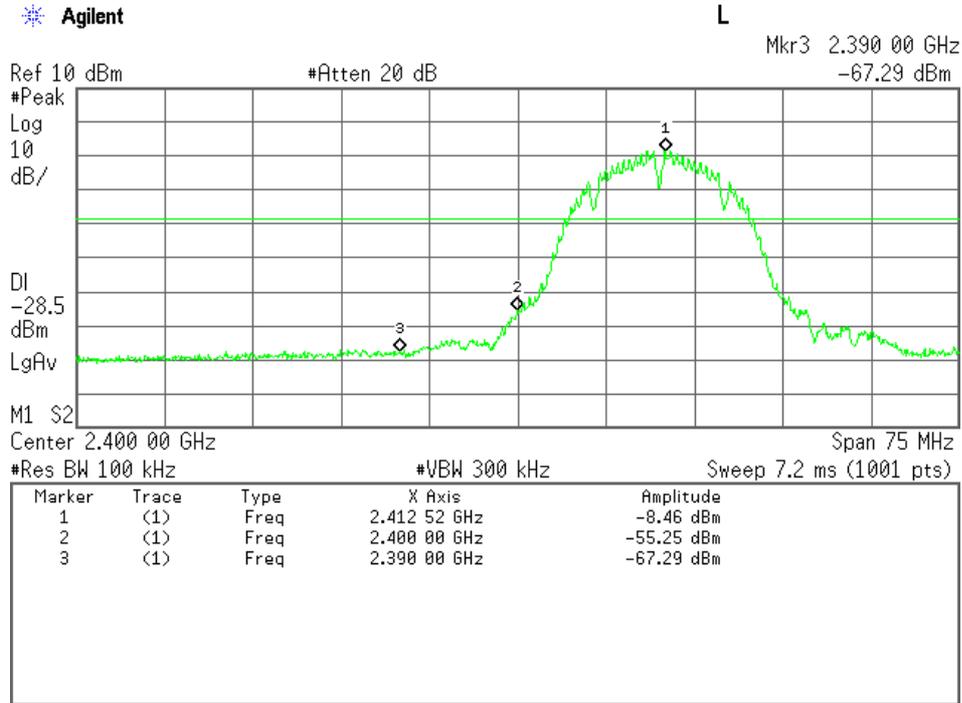


## High Channel

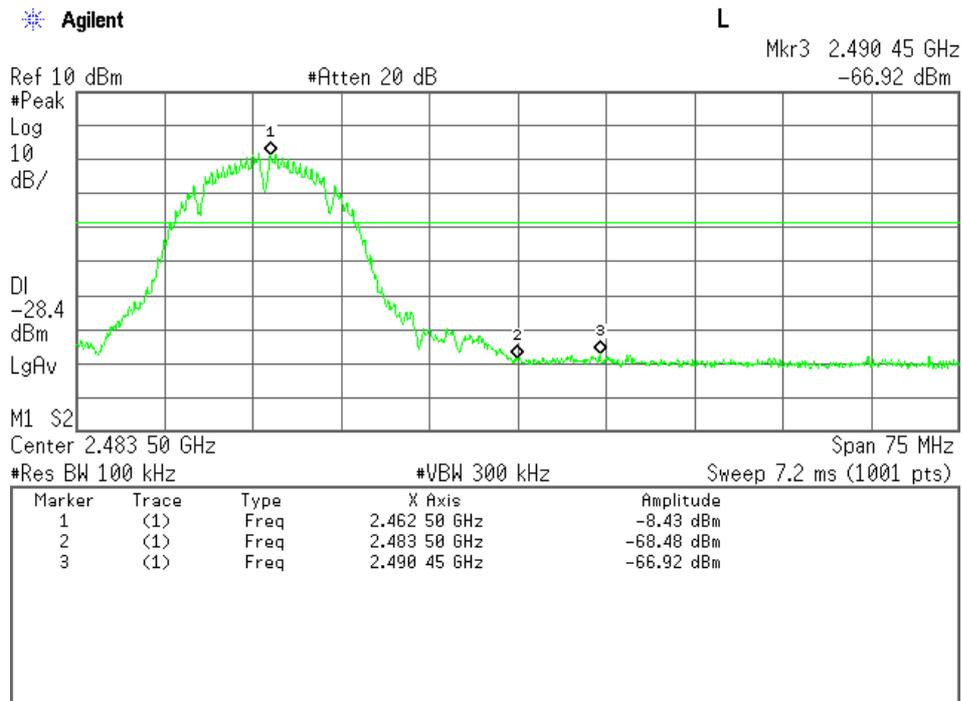


**Band-Edge Emission**

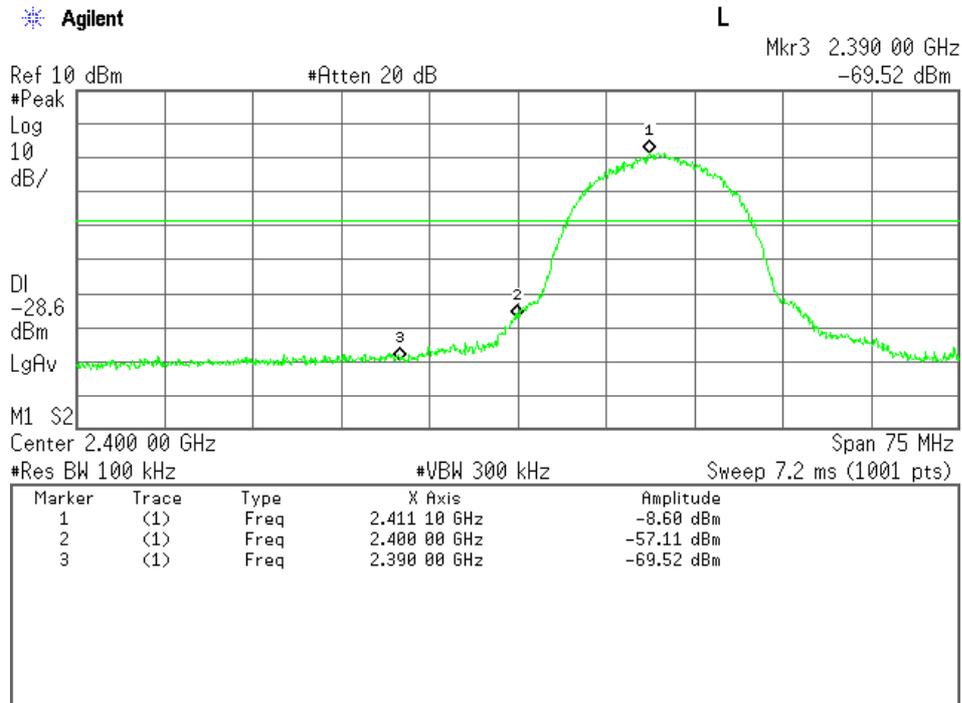
1)Data Rate : 1Mbps(IEEE 802.11b)  
Low Channel



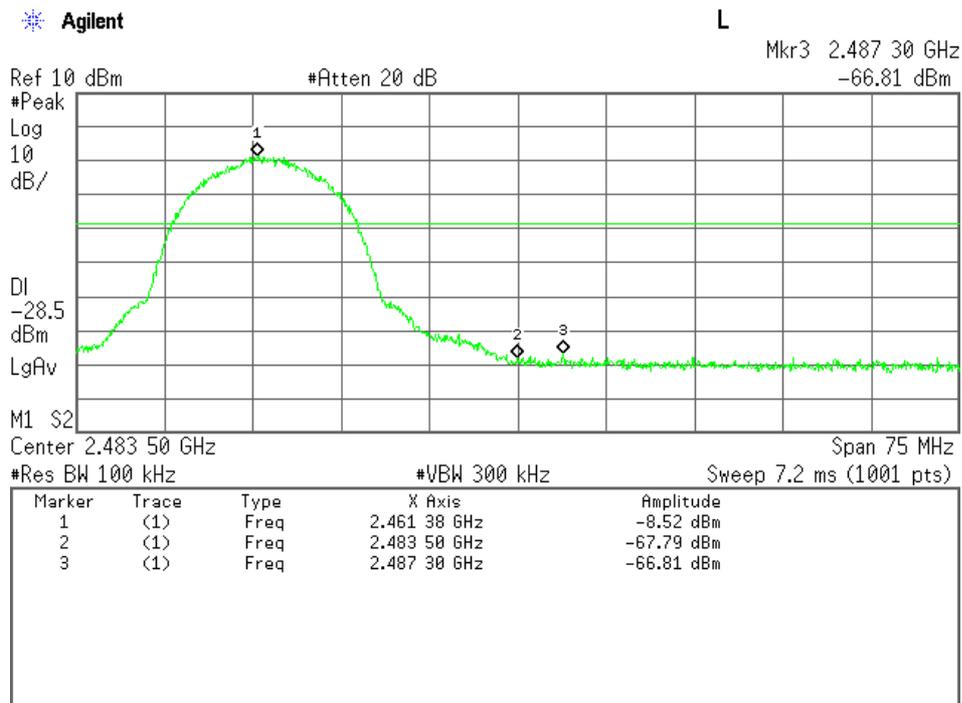
**High Channel**



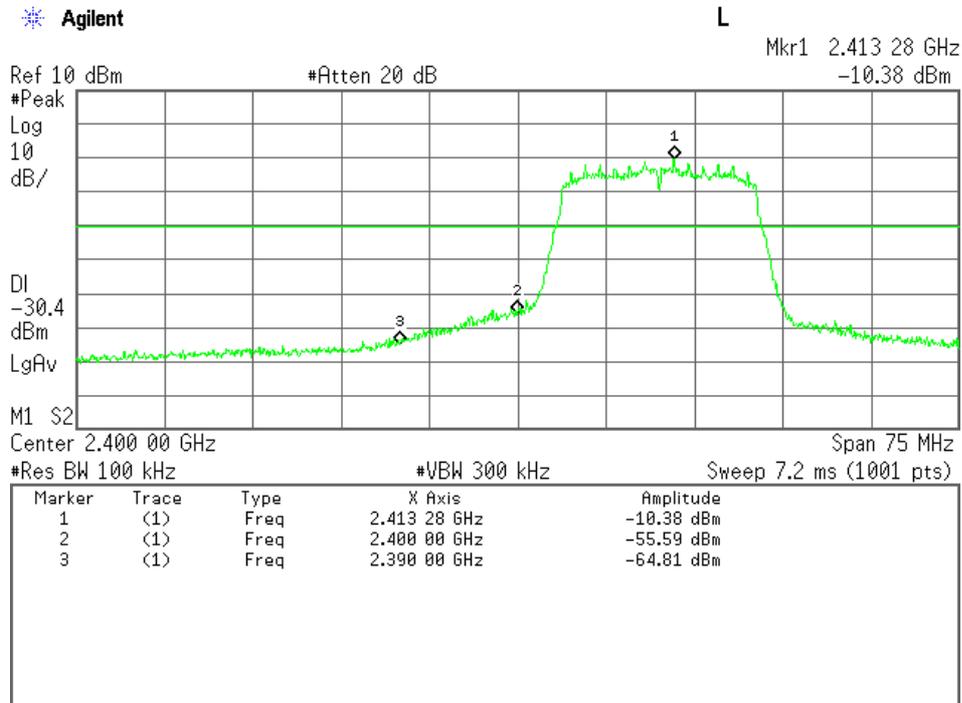
2)Data Rate : 11Mbps(IEEE 802.11b)  
Low Channel



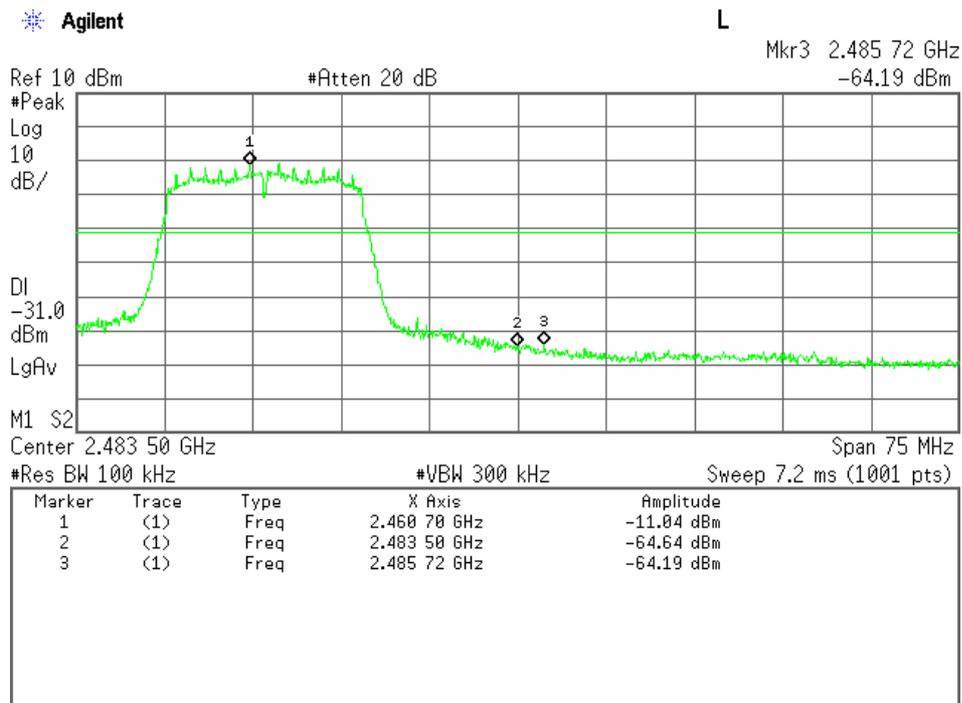
High Channel



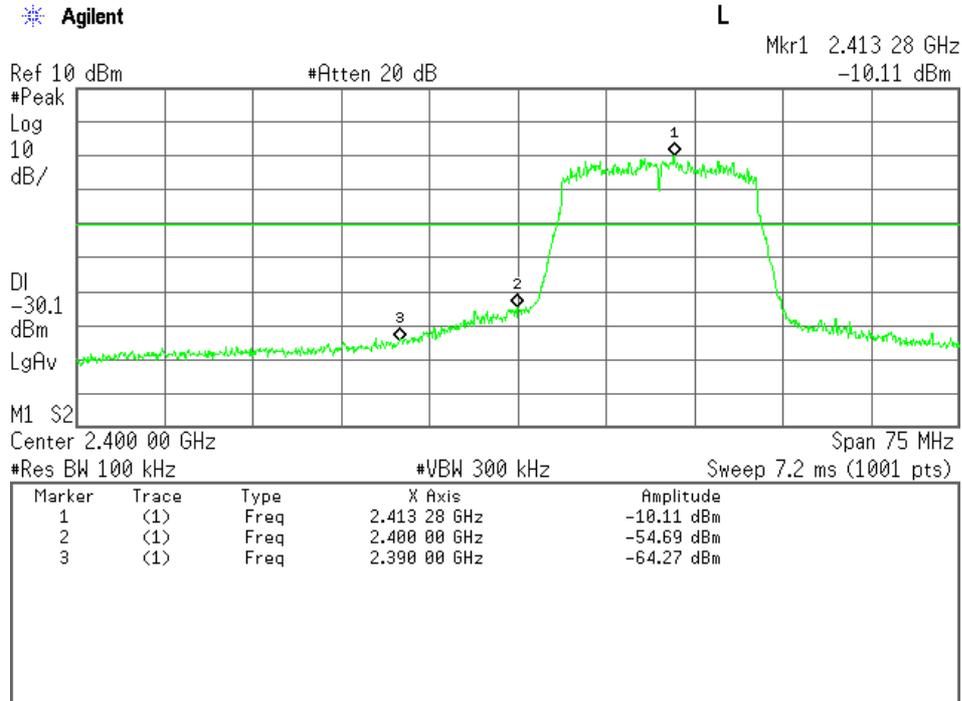
### 3)Data Rate : 6Mbps(IEEE 802.11g) Low Channel



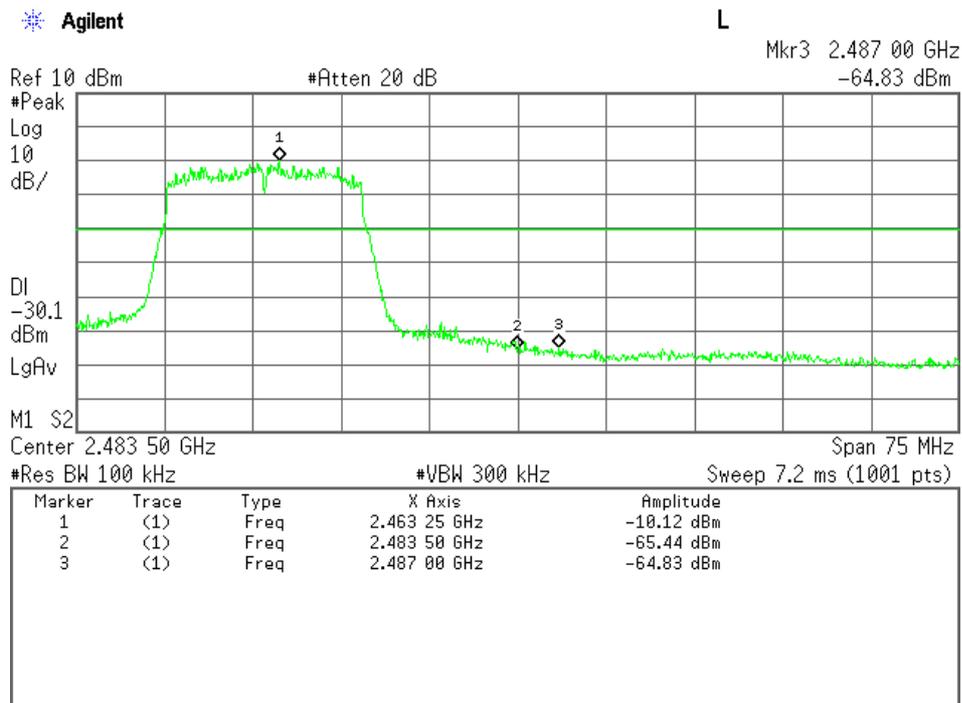
### High Channel



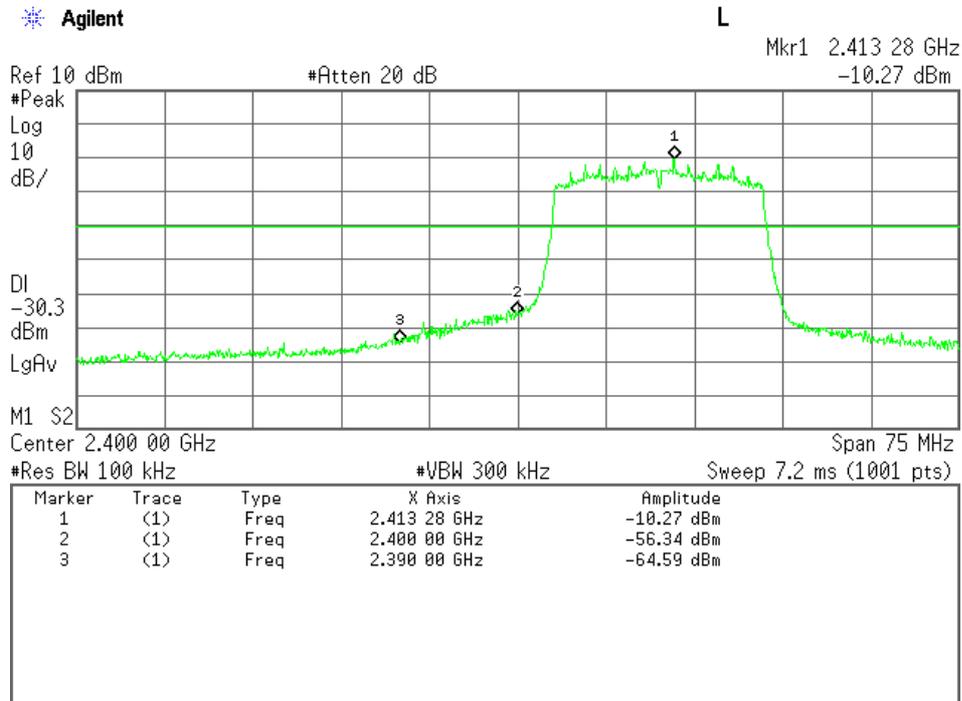
4)Data Rate : 54Mbps(IEEE 802.11g)  
Low Channel



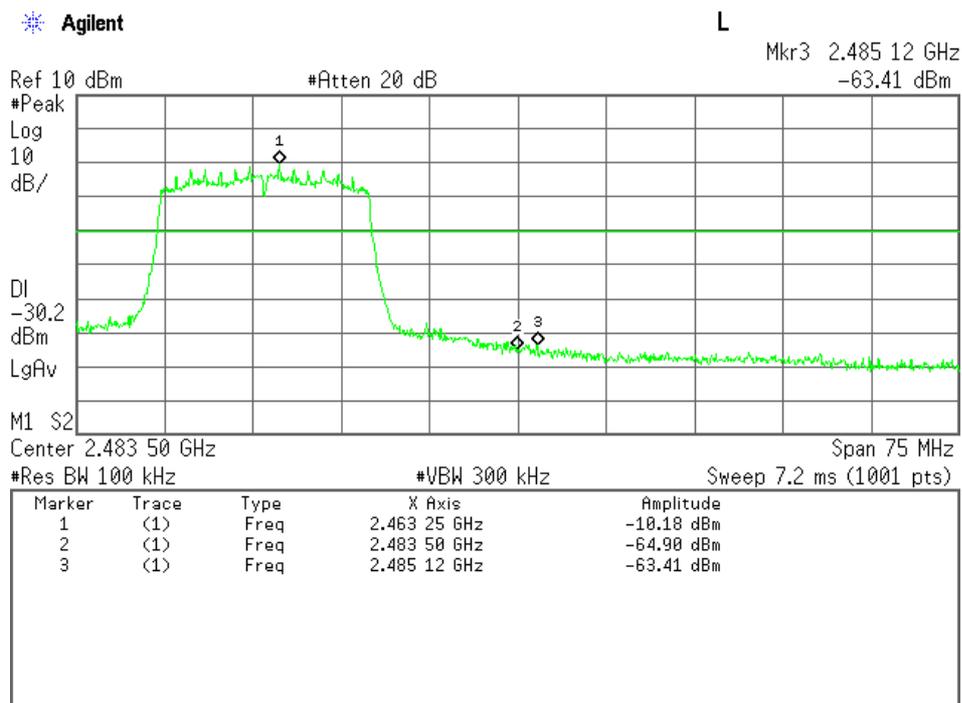
High Channel



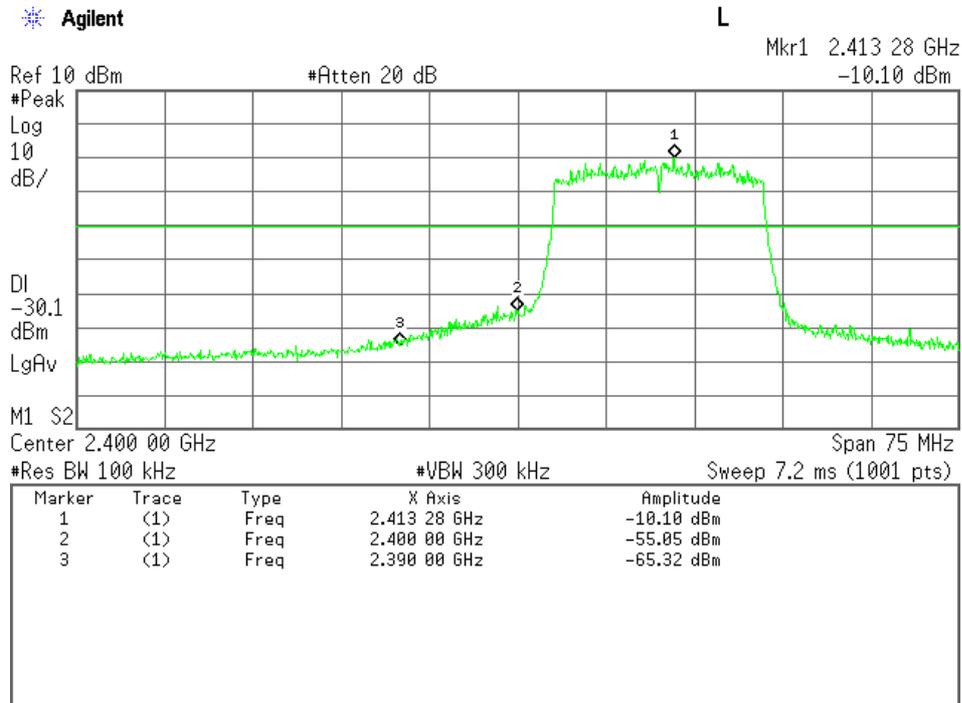
### 5)Data Rate : 6.5Mbps(IEEE 802.11n) Low Channel



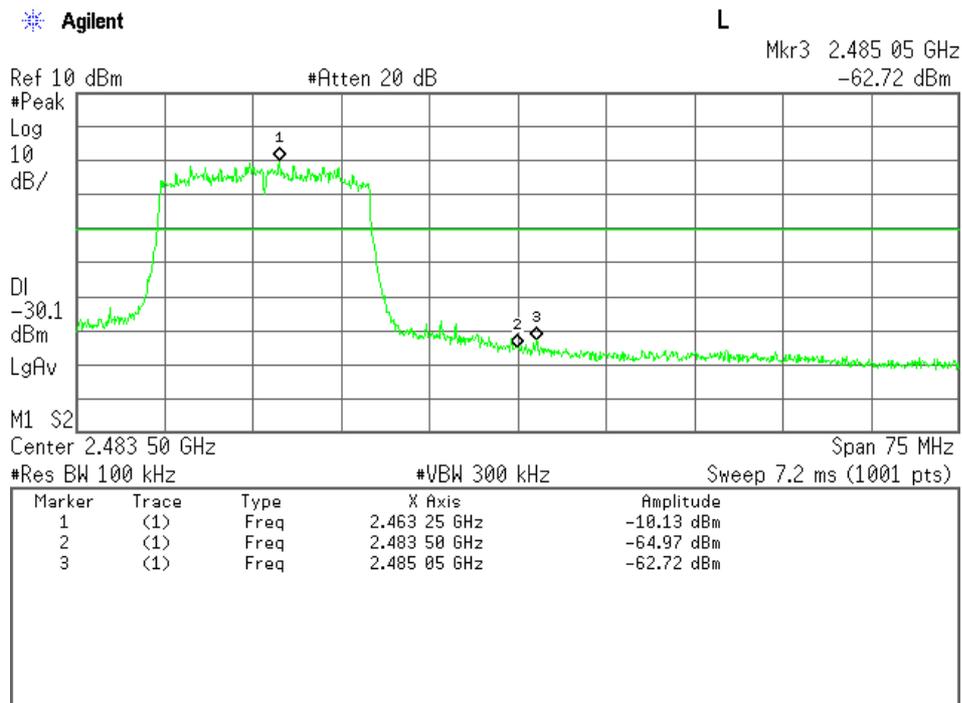
### High Channel



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



High Channel



**7.8 AC Powerline Conducted Emission**

For the requirements,  - Applicable  - Tested.  - Not tested by applicant request.]  
 - Not Applicable

For the limits,  - Passed  - Failed  - Not judged

**7.8.1 Worst Point and Measurement Uncertainty**

Min. Limit Margin (Quasi-Peak) 13.8 dB at 2.77 MHz

Uncertainty of Measurement Results +/-2.7 dB(2σ)

Remarks : \_\_\_\_\_

**7.8.2 Test Site**

KITA-KANSAI Testing Center

Test site : SAITO  - Anechoic chamber (A1)  - Measurement room (M1)  
 - Measurement room (M2)  - Measurement room (M3)  
 - Shielded room (S1)  - Shielded room (S2)  
 - Shielded room (S3)  - Shielded room (S4)

**7.8.3 Test Instruments**

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Test Receiver	ESU 26	Rohde & Schwarz	A-6	2012/4	1 Year
AMN (main)	KNW-407R	Kyoritsu	D-39	2012/9	1 Year
RF Cable	RG223/U	SUHNER	H-9	2012/7	1 Year

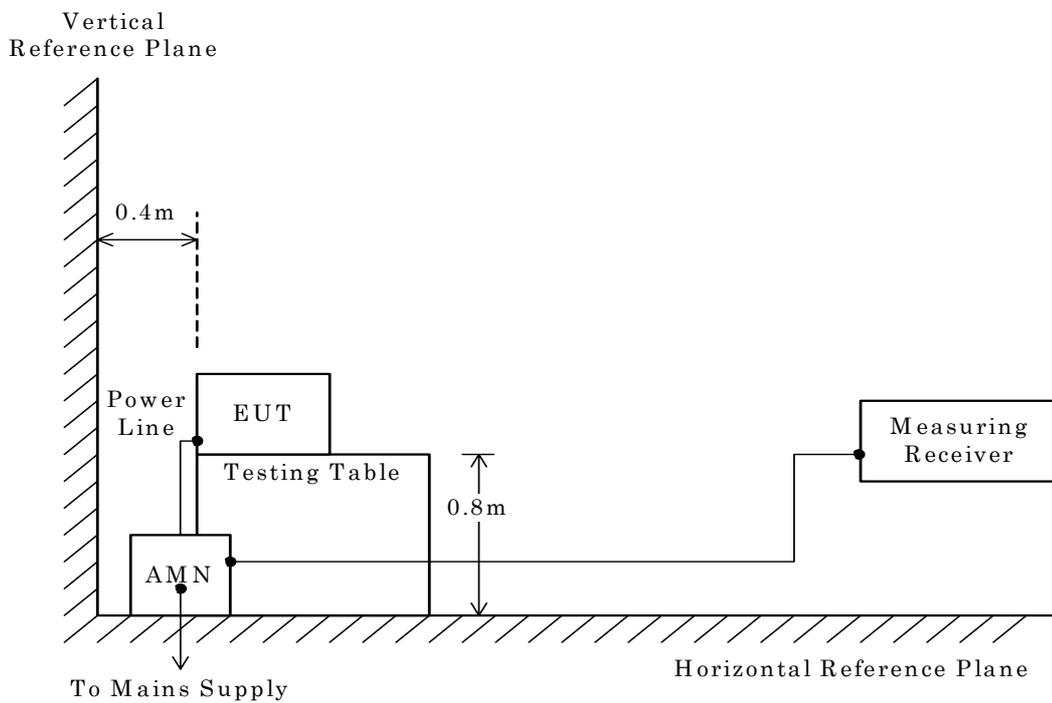
**7.8.4 Test Method and Test Setup (Diagrammatic illustration)**

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

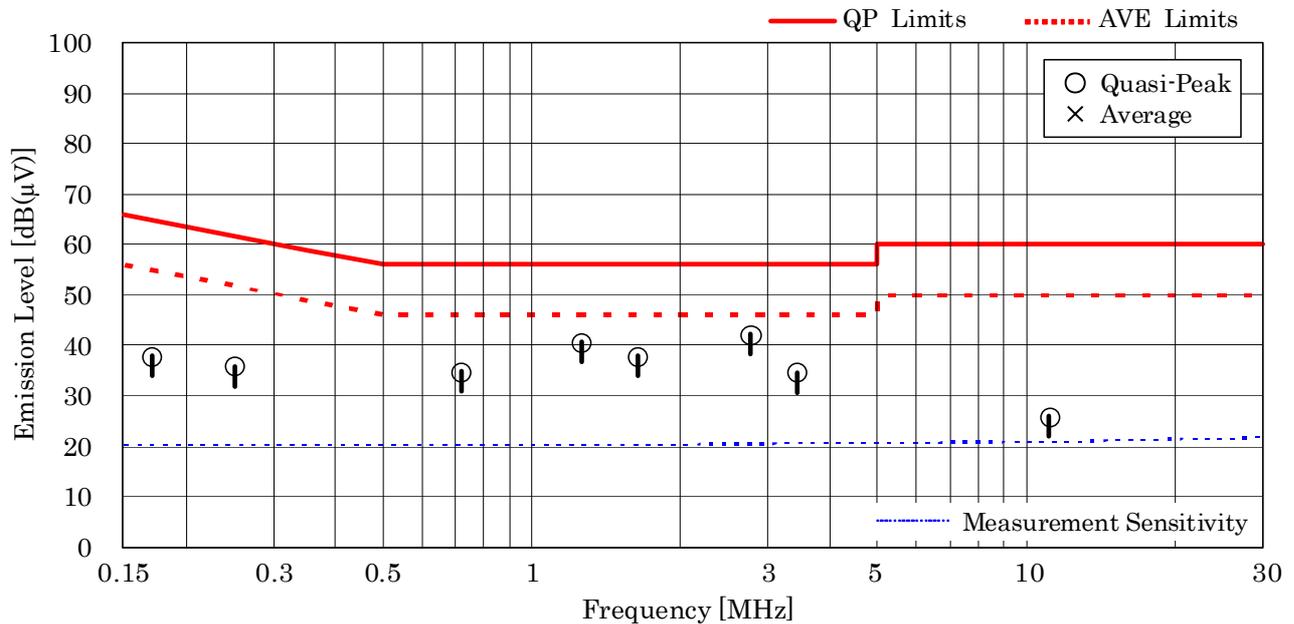
AMN : Artificial Mains Network

### 7.8.5 Test Data

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: December 5, 2012  
Temp.: 23 °C, Humi.: 35 %

Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dB(μV)]				Limits [dB(μV)]		Results [dB(μV)]		Margin [dB]	Remarks
		VA QP	VA AVE	VB QP	VB AVE	QP	AVE	QP	AVE		
0.17	10.4	27.5	--	26.8	--	65.0	55.0	37.9	--	+27.1	-
0.25	10.3	24.8	--	25.6	--	61.8	51.8	35.9	--	+25.9	-
0.72	10.3	24.5	--	21.6	--	56.0	46.0	34.8	--	+21.2	-
1.26	10.3	30.3	--	26.8	--	56.0	46.0	40.6	--	+15.4	-
1.64	10.4	27.5	--	27.3	--	56.0	46.0	37.9	--	+18.1	-
2.77	10.4	24.0	--	31.8	--	56.0	46.0	42.2	--	+13.8	-
3.44	10.4	24.3	--	11.0	--	56.0	46.0	34.7	--	+21.3	-
11.14	10.9	15.0	--	< 10.0	--	60.0	50.0	25.9	--	+34.1	-



#### 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 2.77 MHz, as the worst point shown on underline:  
 Correction Factor + Meter Reading = 10.4 + 31.8 = 42.2 dB(μV)
7. QP : Quasi-Peak Detector / AVE : Average Detector
8. Test receiver setting(s) : CISPR QP 9 kHz / Average 9 kHz

**7.9 Radiated Emission**

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

- Passed  - Failed  - Not judged

**7.9.1 Worst Point and Measurement Uncertainty**

Min. Limit Margin (Average) >5.4 dB at 22158.0 MHz

Uncertainty of Measurement Results	9 kHz – 30 MHz	<u>+/-1.9</u>	dB(2 $\sigma$ )
	30 MHz – 300 MHz	<u>+/-4.3</u>	dB(2 $\sigma$ )
	300 MHz – 1000 MHz	<u>+/-5.4</u>	dB(2 $\sigma$ )
	1 GHz – 6 GHz	<u>+/-4.6</u>	dB(2 $\sigma$ )
	6 GHz – 18 GHz	<u>+/-5.2</u>	dB(2 $\sigma$ )
	18 GHz – 40 GHz	<u>+/-5.4</u>	dB(2 $\sigma$ )

Remarks : \_\_\_\_\_

**7.9.2 Test Site**

KITA-KANSAI Testing Center SAITO EMC Branch

- Anechoic chamber A1

- Anechoic chamber A2

**7.9.3 Test Instruments**

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Test Receiver	ESU26	Rohde & Schwarz	A-6	2012/4	1 Year
Loop Antenna	HFH2-Z2	Rohde & Schwarz	C-2	2012/8	1 Year
RF Cable	RG213/U	SUHNER	H-28	2012/8	1 Year
Biconical Antenna	VHA9103/BBA9106	Schwarzbeck	C-30	2012/5	1 Year
Log-periodic Antenna	UHALP9108-A1	Schwarzbeck	C-31	2012/5	1 Year
RF Cable	S 10162 B-11 etc.	SUHNER	H-4	2012/3	1 Year
Site Attenuation	--	----	H-15	2012/2	1 Year
Pre-Amplifier	WJ-6882-824	Watkins Johnson	A-21	2012/1	1 Year
Pre-Amplifier	WJ-6611-513	Watkins Johnson	A-23	2012/1	1 Year
Pre-Amplifier	BZ1840LD1	B&Z	A-29	2012/1	1 Year
Pre-Amplifier	DBL-0618N515	DBS Microwave	A-33	2012/1	1 Year
Horn Antenna	91888-2	EATON	C-41-1	2012/6	1 Year
Horn Antenna	91889-2	EATON	C-41-2	2012/6	1 Year
Horn Antenna	3160-04	EMCO	C-55	2011/6	2 Years
Horn Antenna	3160-05	EMCO	C-56	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
Attenuator	54A-10	Weinschel	D-29	2012/9	1 Year
Attenuator	2-10	Weinschel	D-79	2012/11	1 Year
Band Rejection Filter	BRM50701	MICRO-TRONICS	D-93	2012/2	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2012/7	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-66	2012/1	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-67	2012/1	1 Year
RF Cable	SUCOFLEX102EA	SUHNER	C-69	2012/1	1 Year
SVSWR	--	----	H-19	2012/2	1 Year

## 7.9.4 Test Method and Test Setup (Diagrammatic illustration)

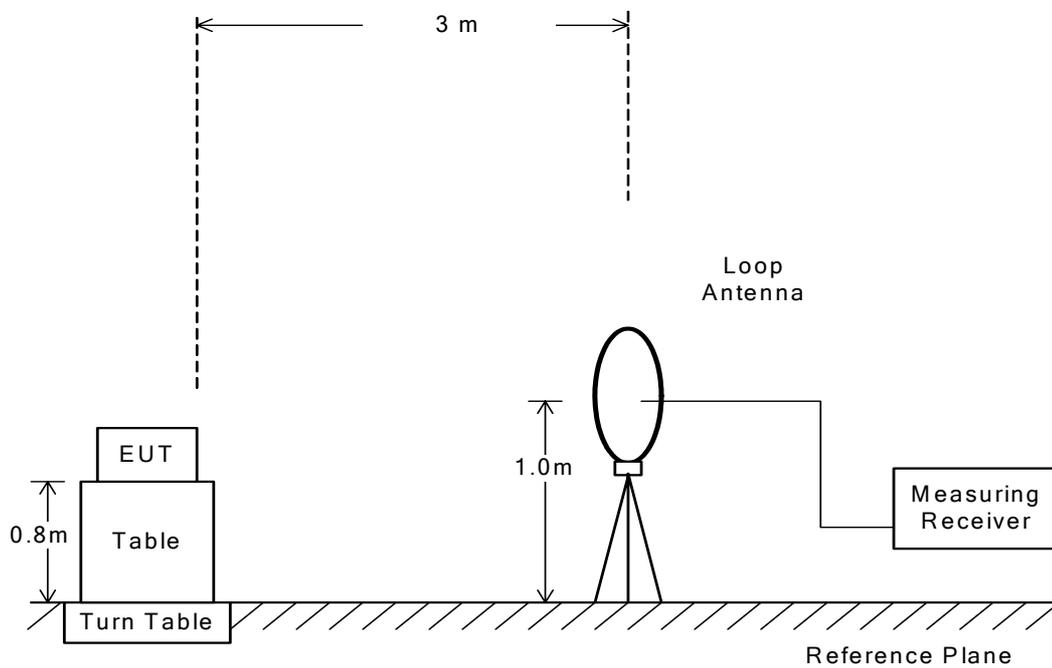
### 7.9.4.1 Radiated Emission 9 kHz – 30 MHz

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 –



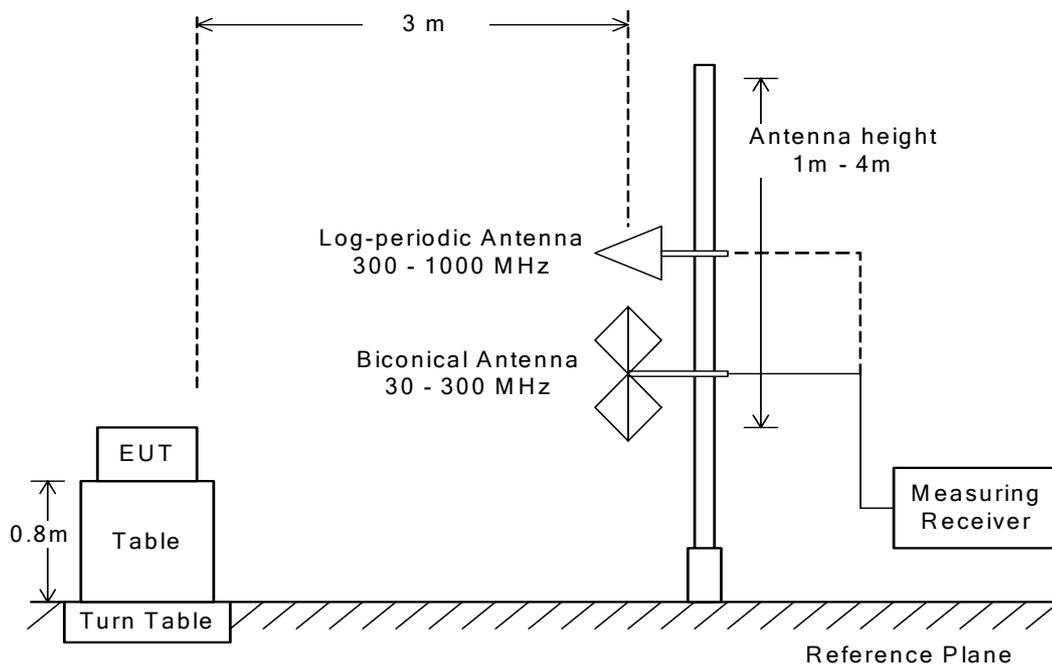
### 7.9.4.2 Radiated Emission 30 MHz – 1000 MHz

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 –



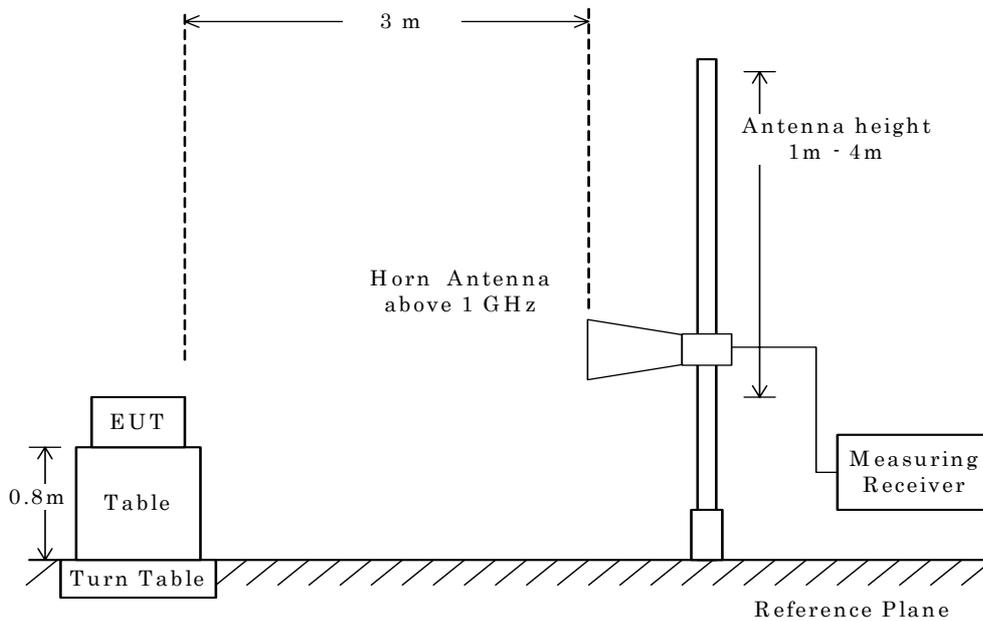
**7.9.4.3 Radiated Emission above 1 GHz**

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.

**7.9.5 Test Data**

**7.9.5.1 Band-edge Compliance**

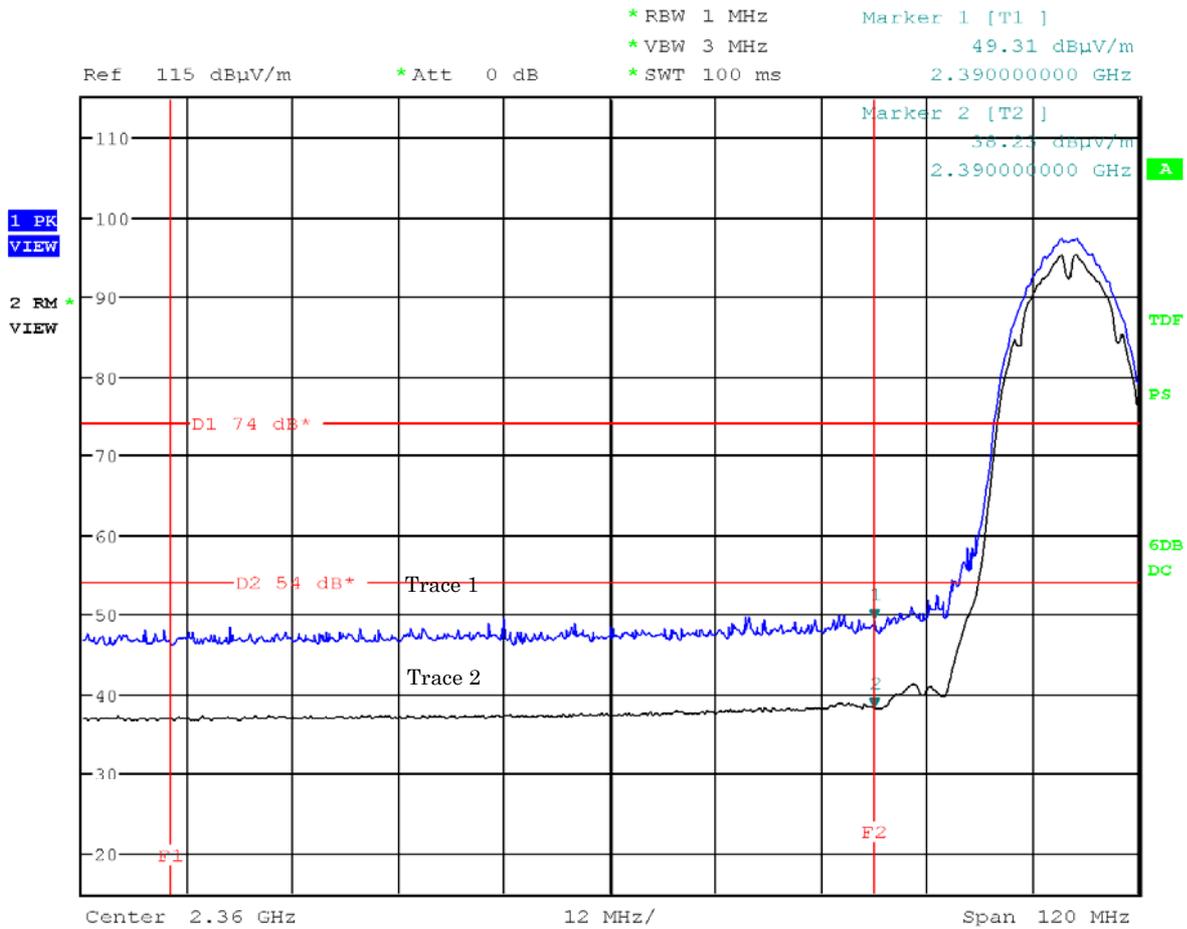
**7.9.5.1.1 Single Unit**

Test Date : December 2, 2012

Temp.:21°C, Humi:40%

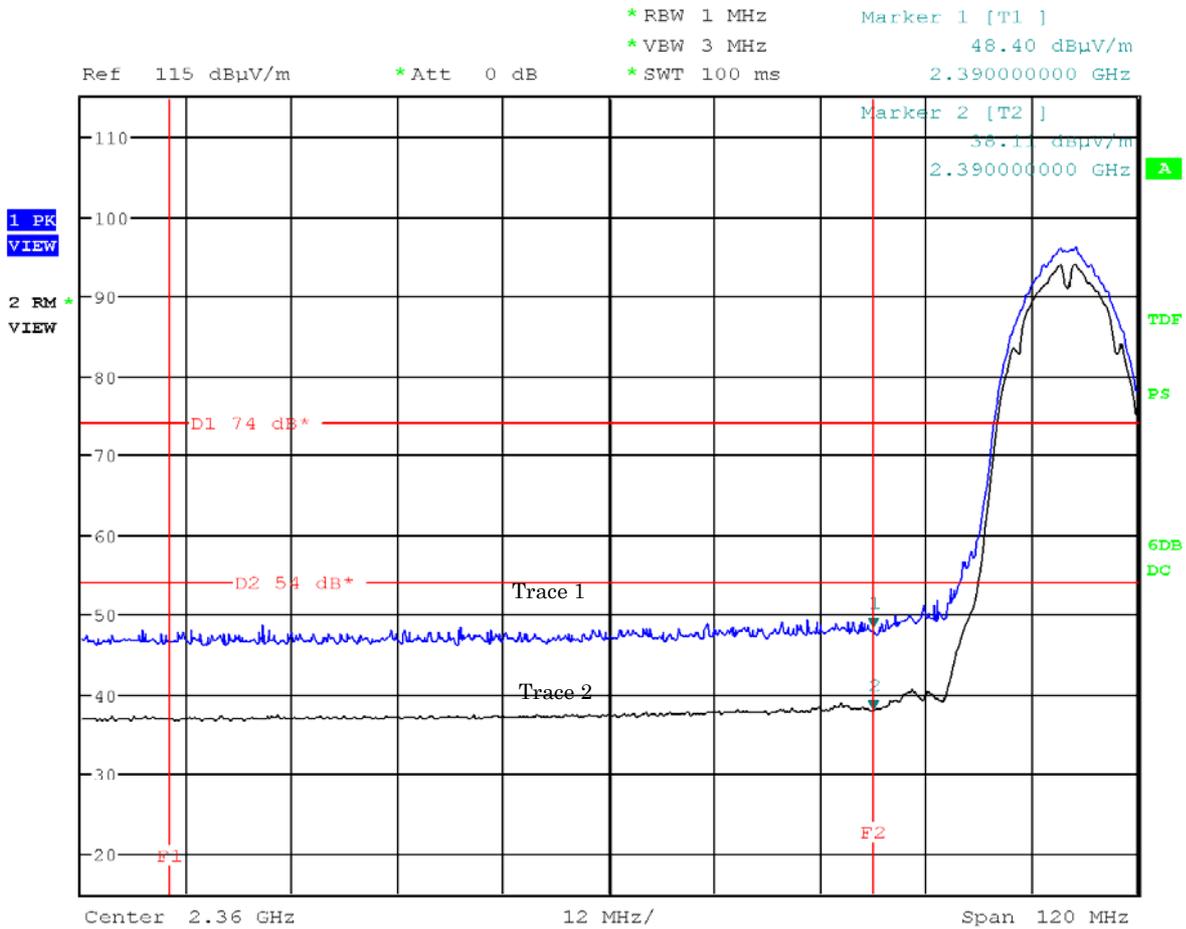
Mode of EUT : TX( 1ch: 2412 MHz, data rate : 1Mbps(IEEE 802.11b))

Antenna Polarization : Horizontal



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

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

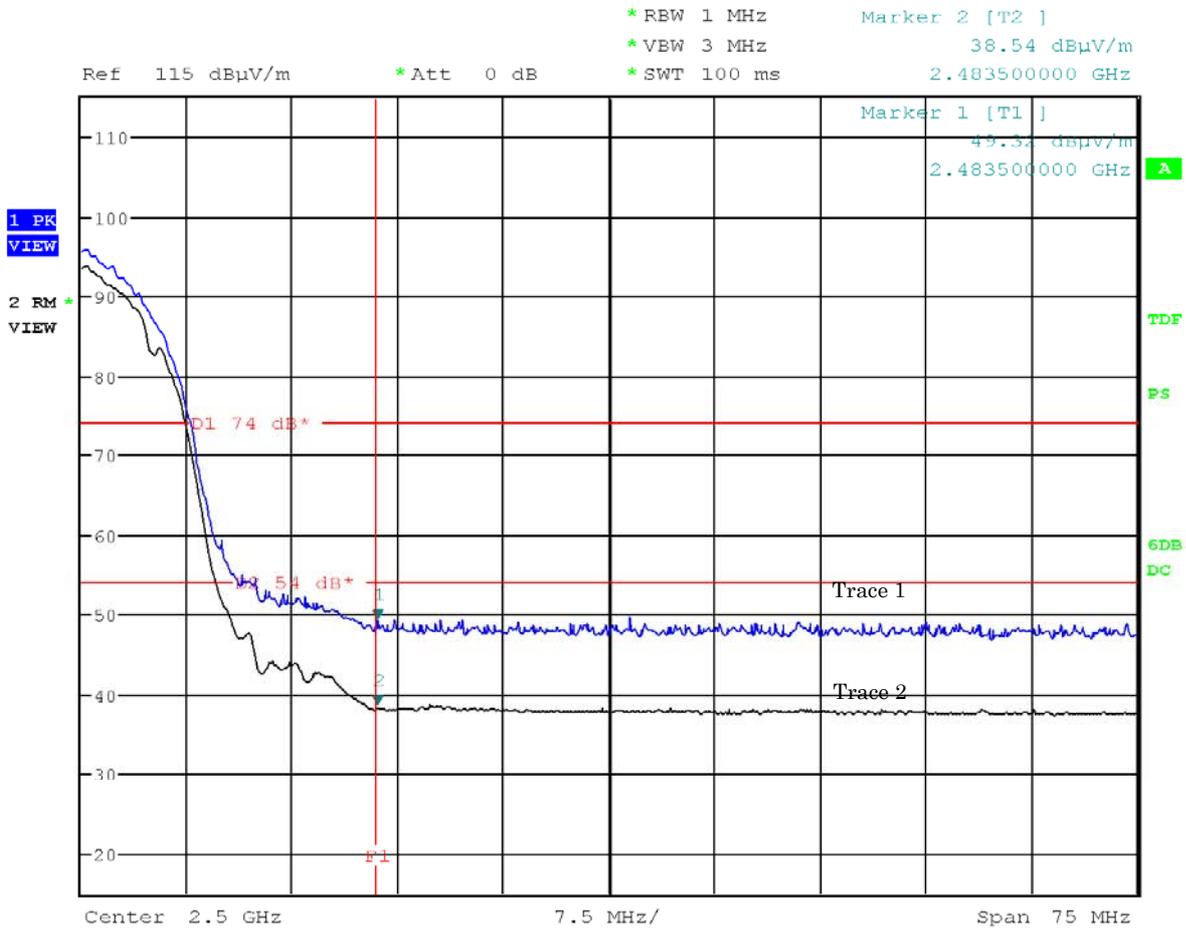


Note: The trace 1 is Peak detection. The trace 2 is RMS detection.



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

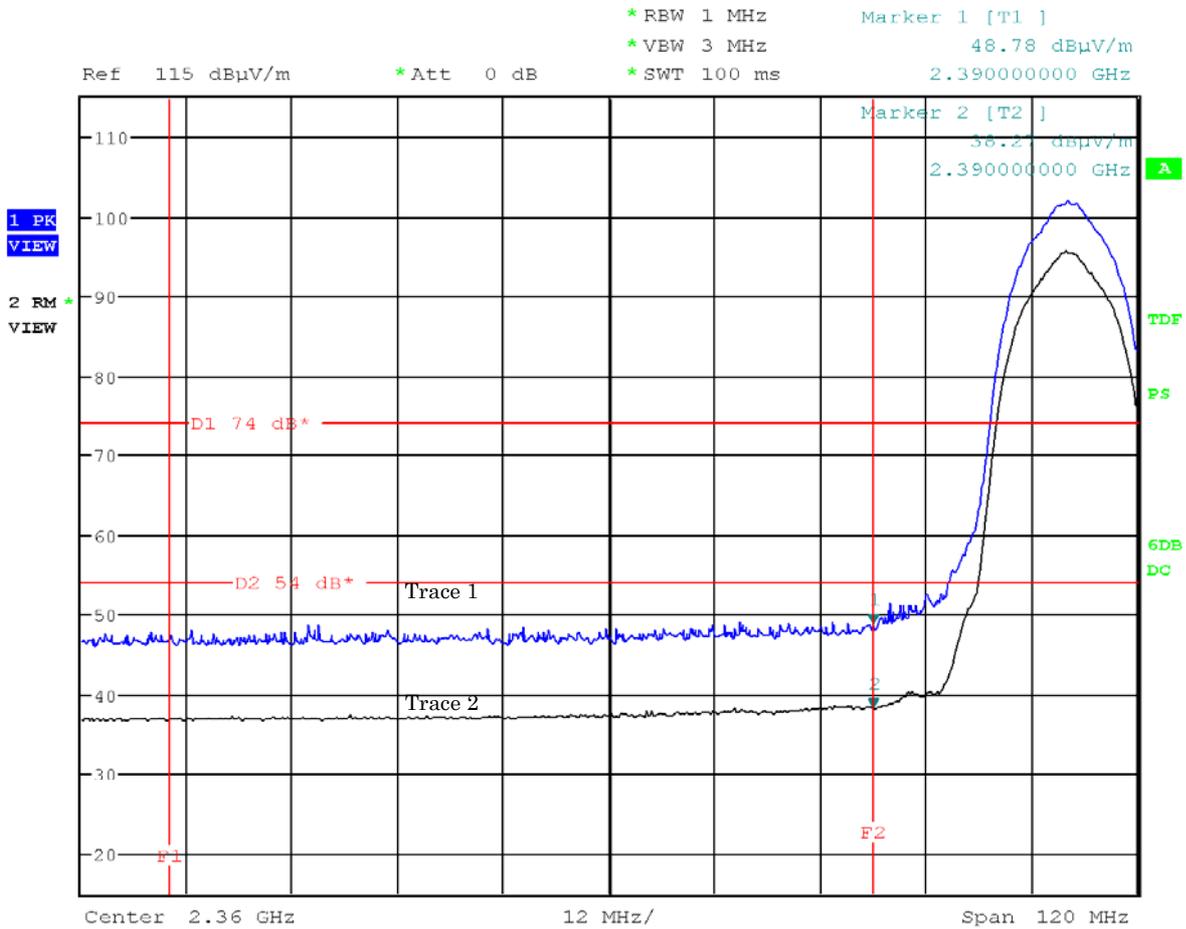
Antenna Polarization : Vertical



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

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 11Mbps(IEEE 802.11b))

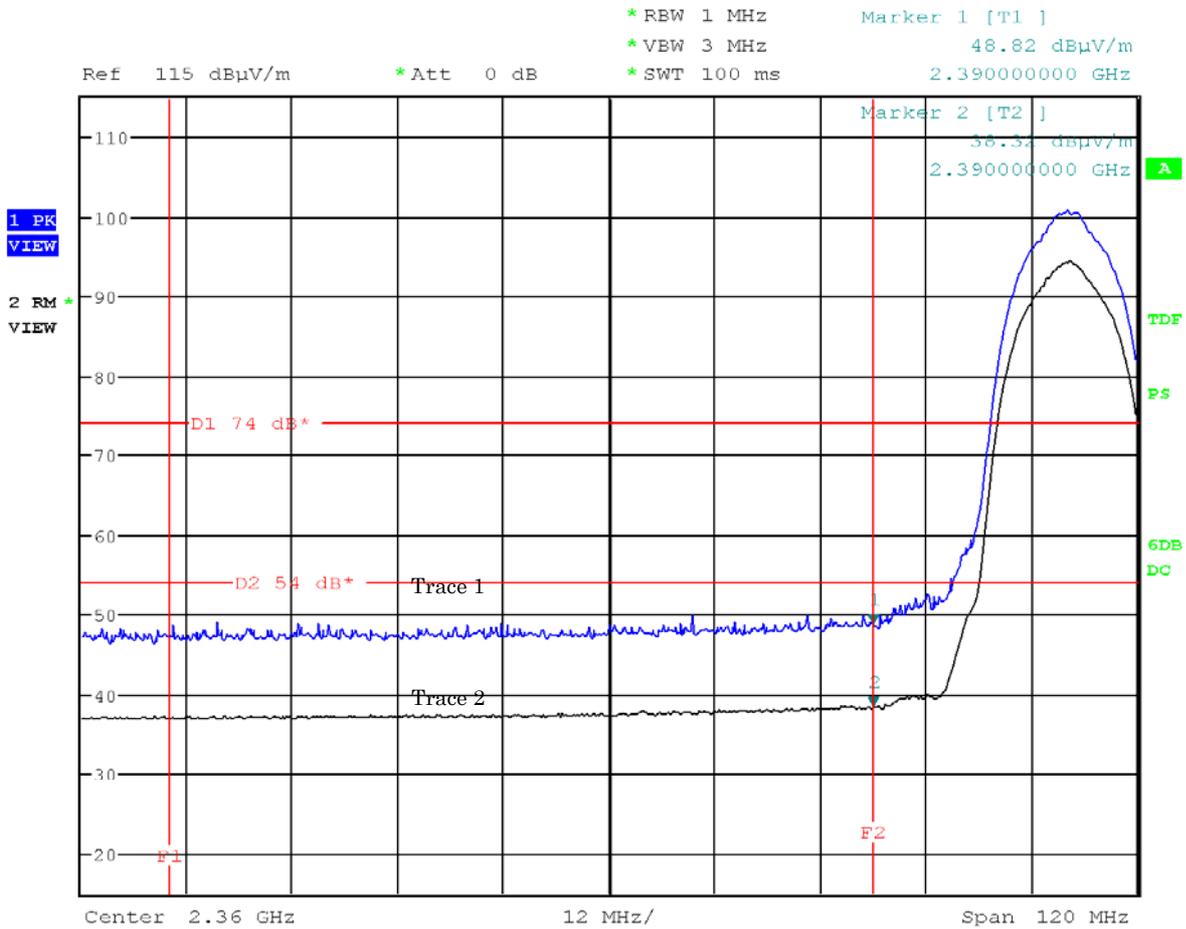
Antenna Polarization : Horizontal



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

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 11Mbps(IEEE 802.11b))

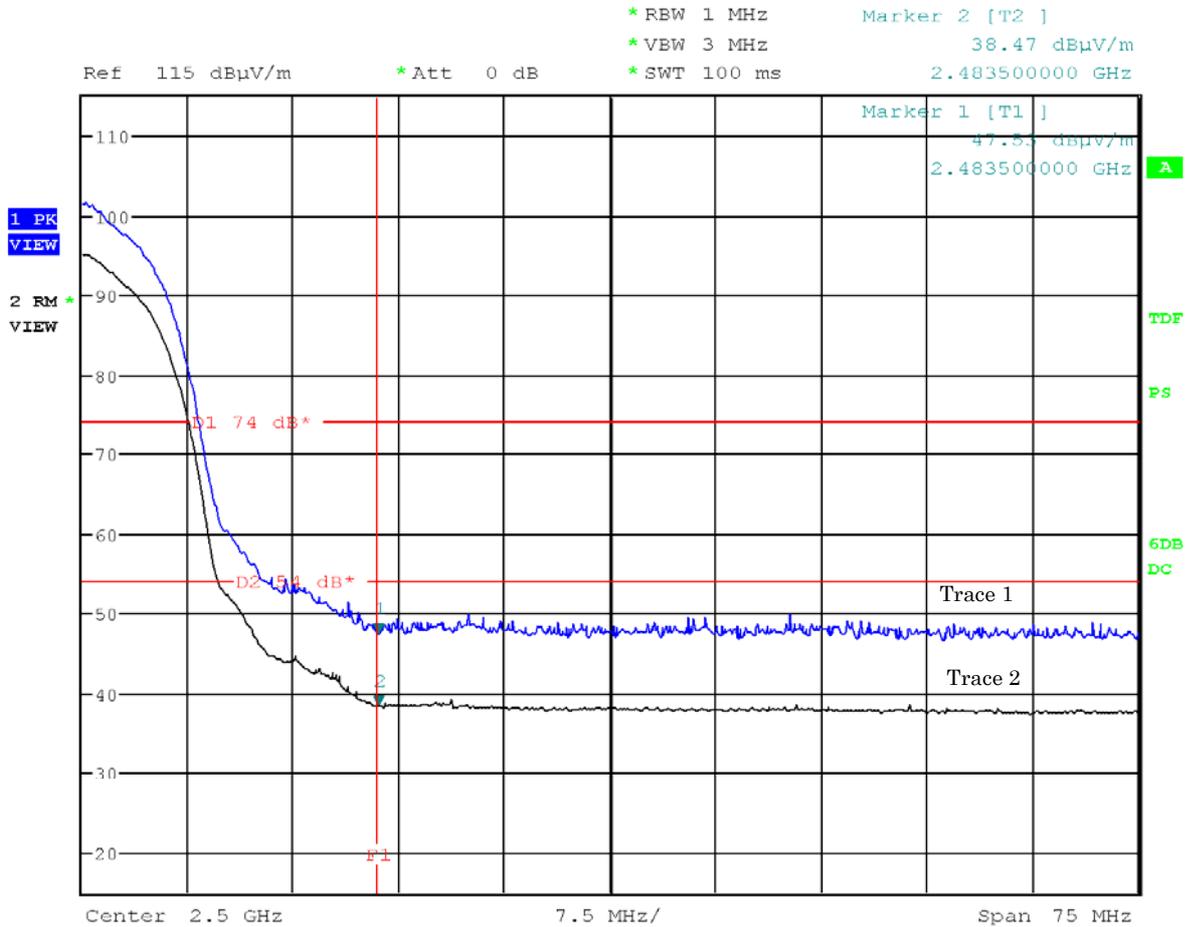
Antenna Polarization : Vertical



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

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

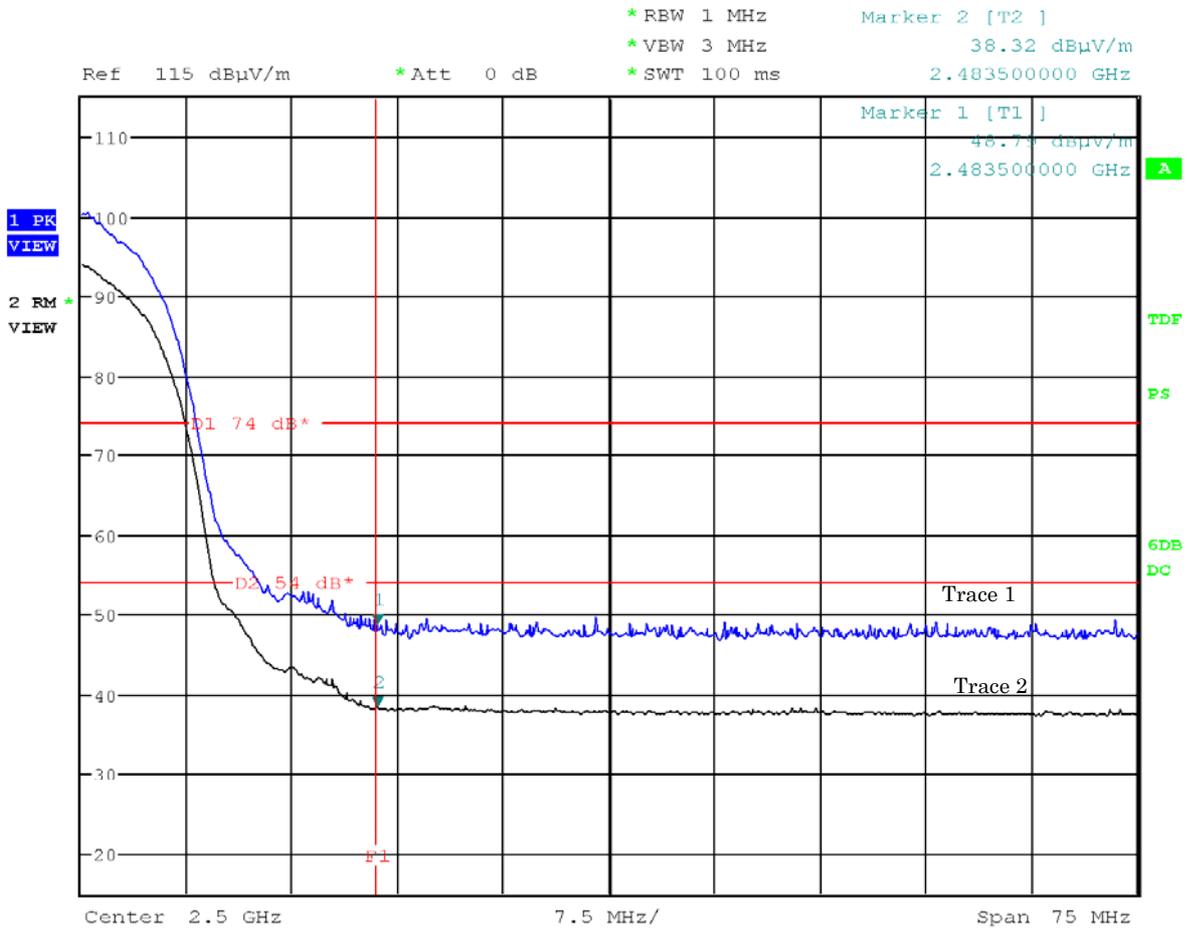
Antenna Polarization : Horizontal



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

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

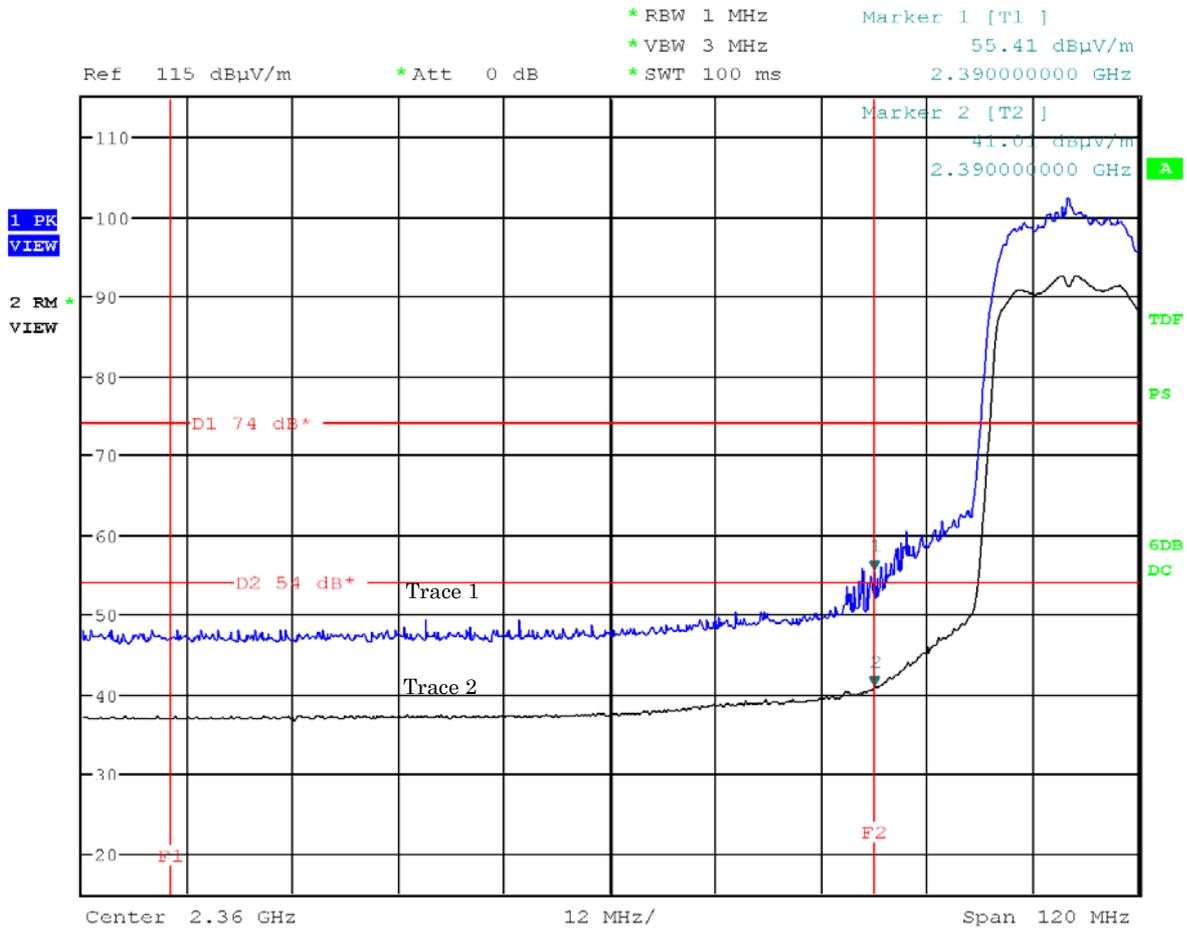
Antenna Polarization : Vertical



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

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

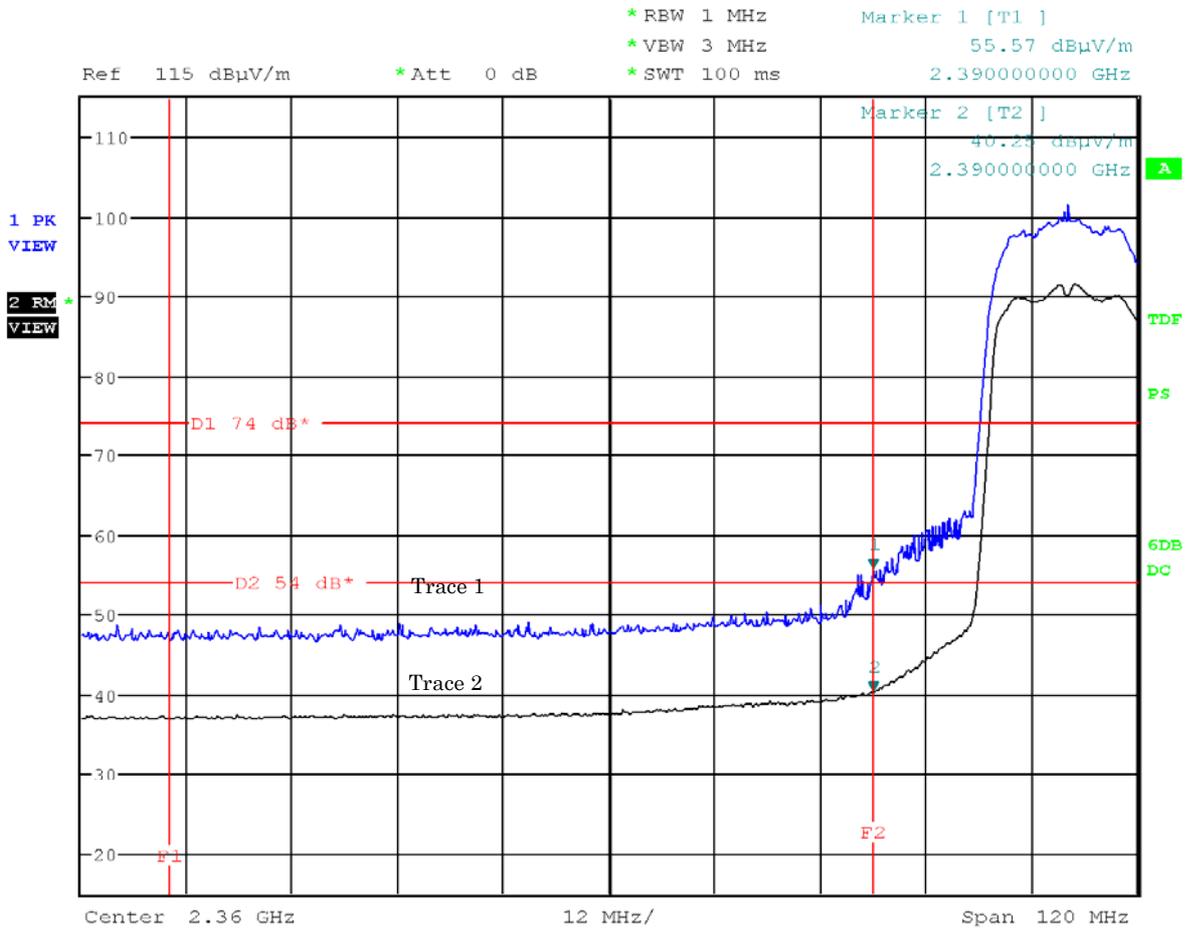
Antenna Polarization : Horizontal



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

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

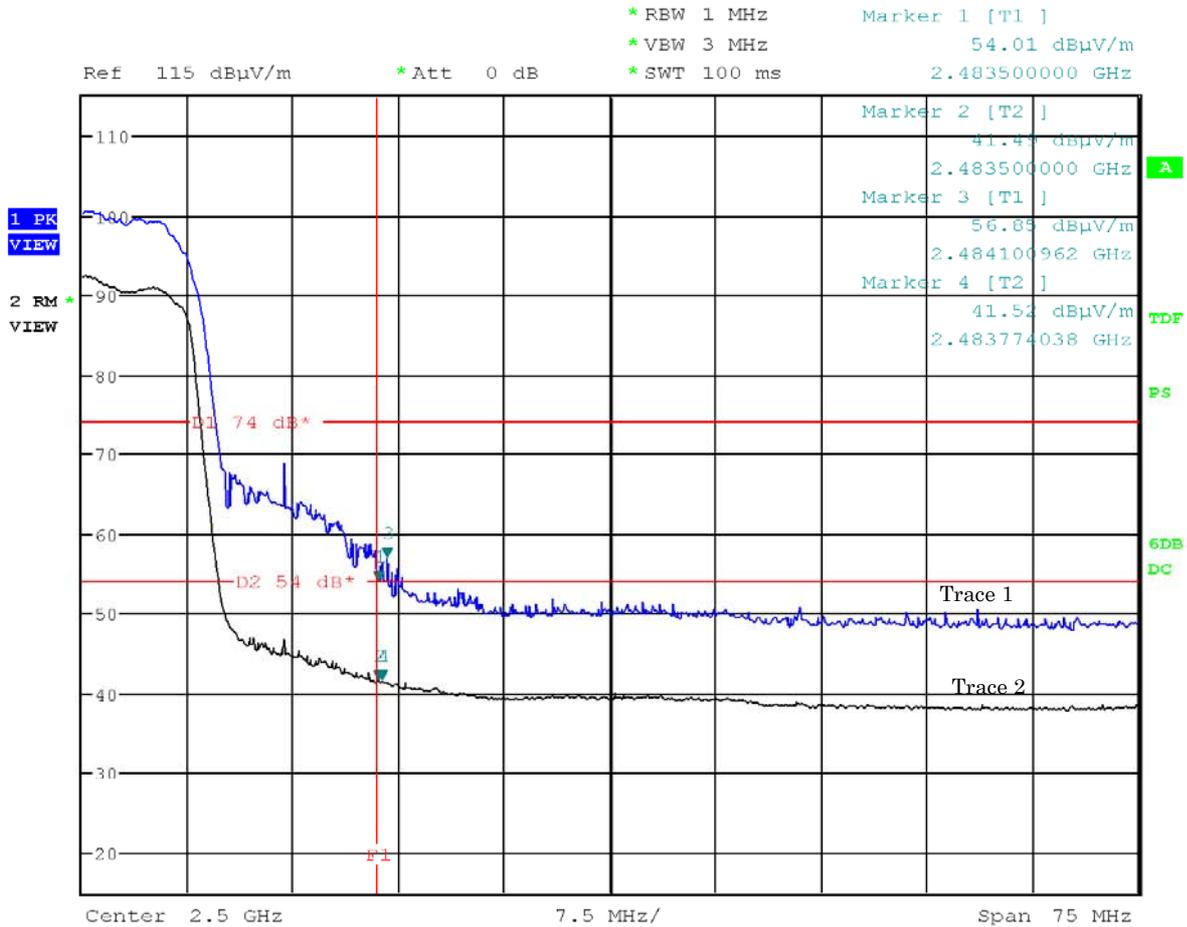
Antenna Polarization : Vertical



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

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

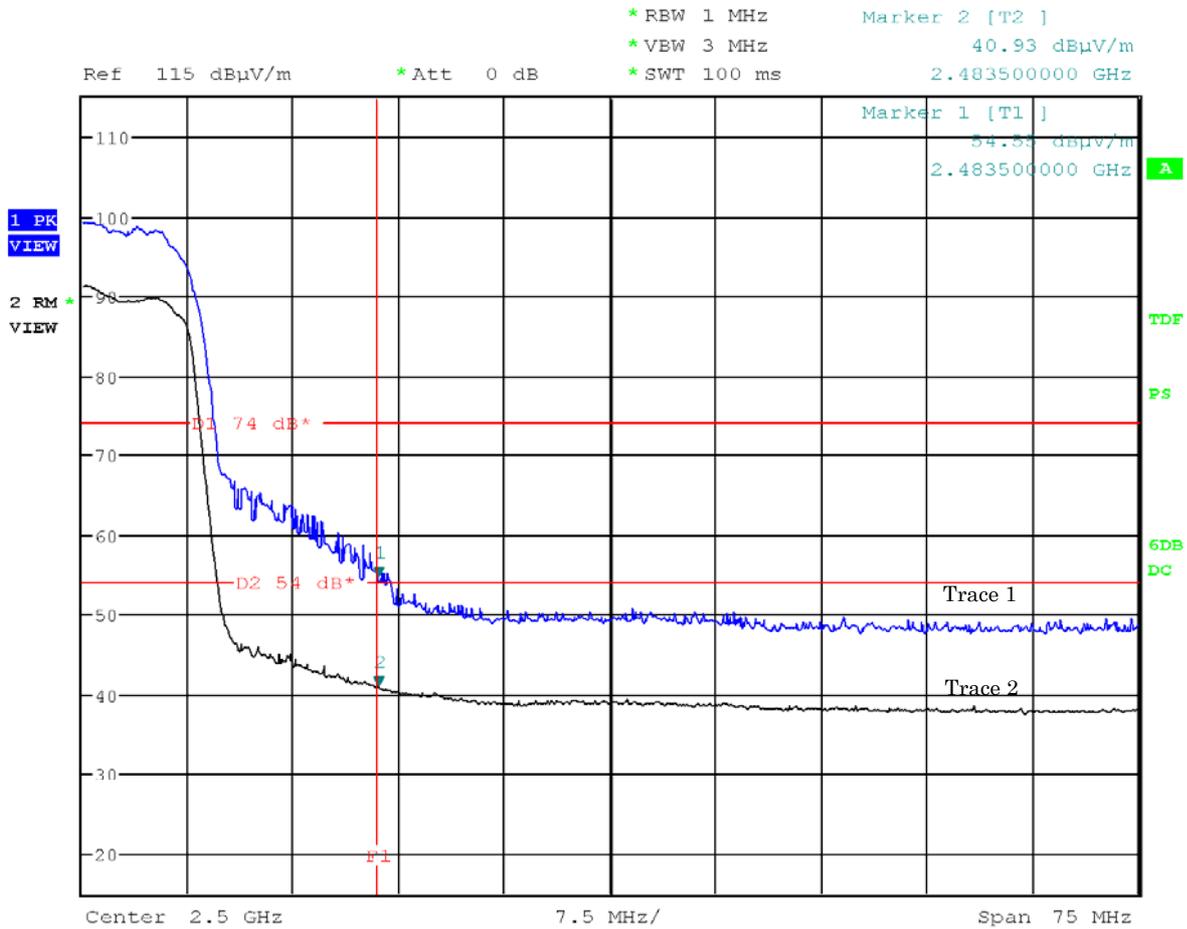
Antenna Polarization : Horizontal



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

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

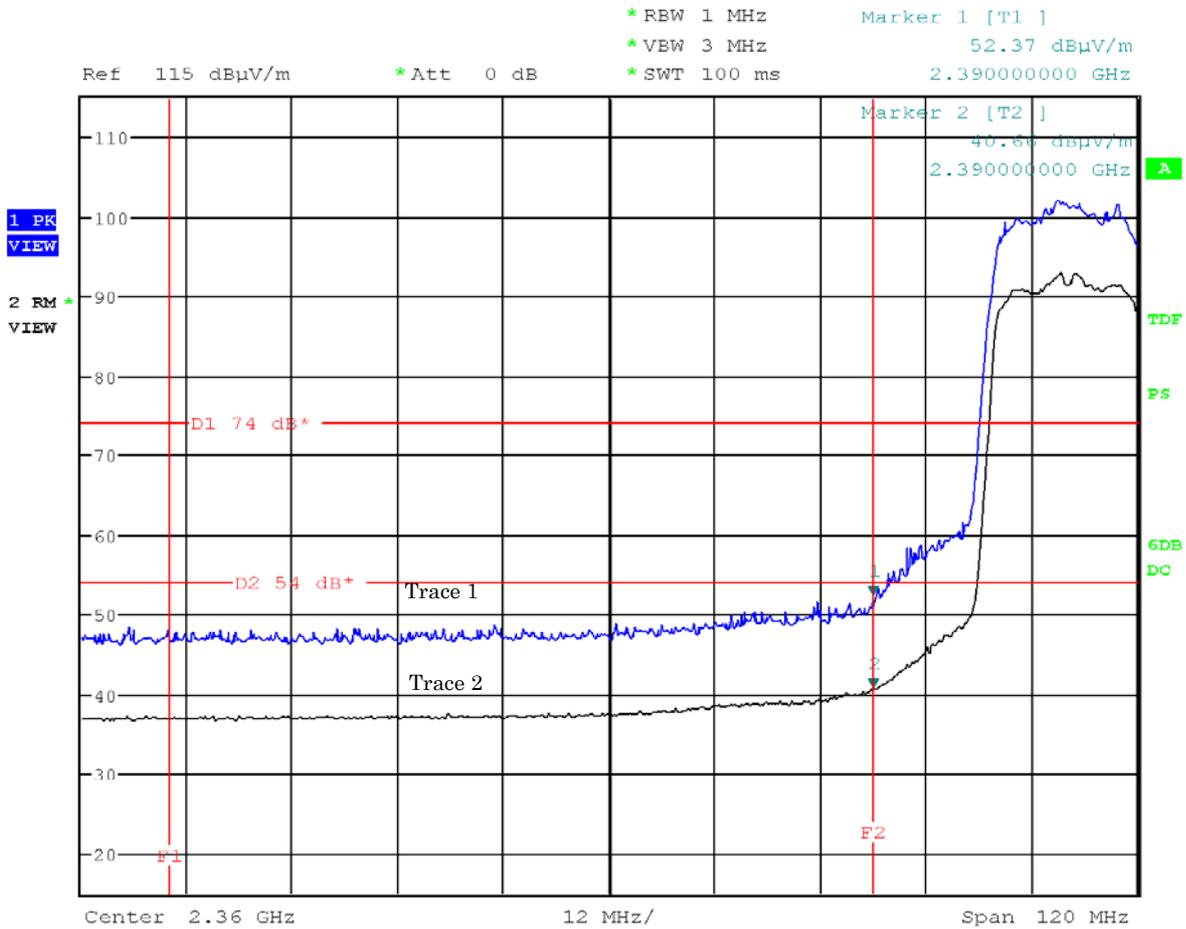
Antenna Polarization : Vertical



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

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 54Mbps(IEEE 802.11g))

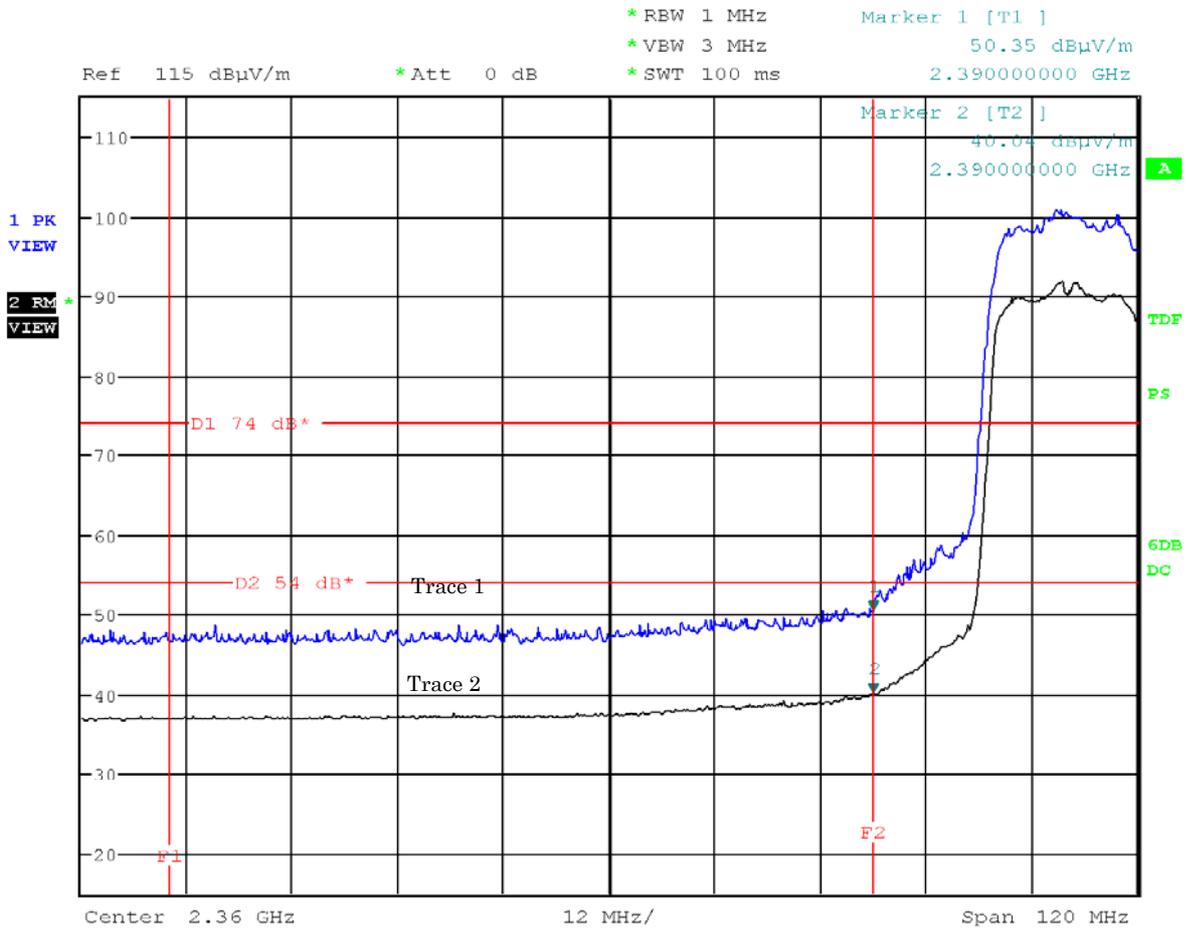
Antenna Polarization : Horizontal



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

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 54Mbps(IEEE 802.11g))

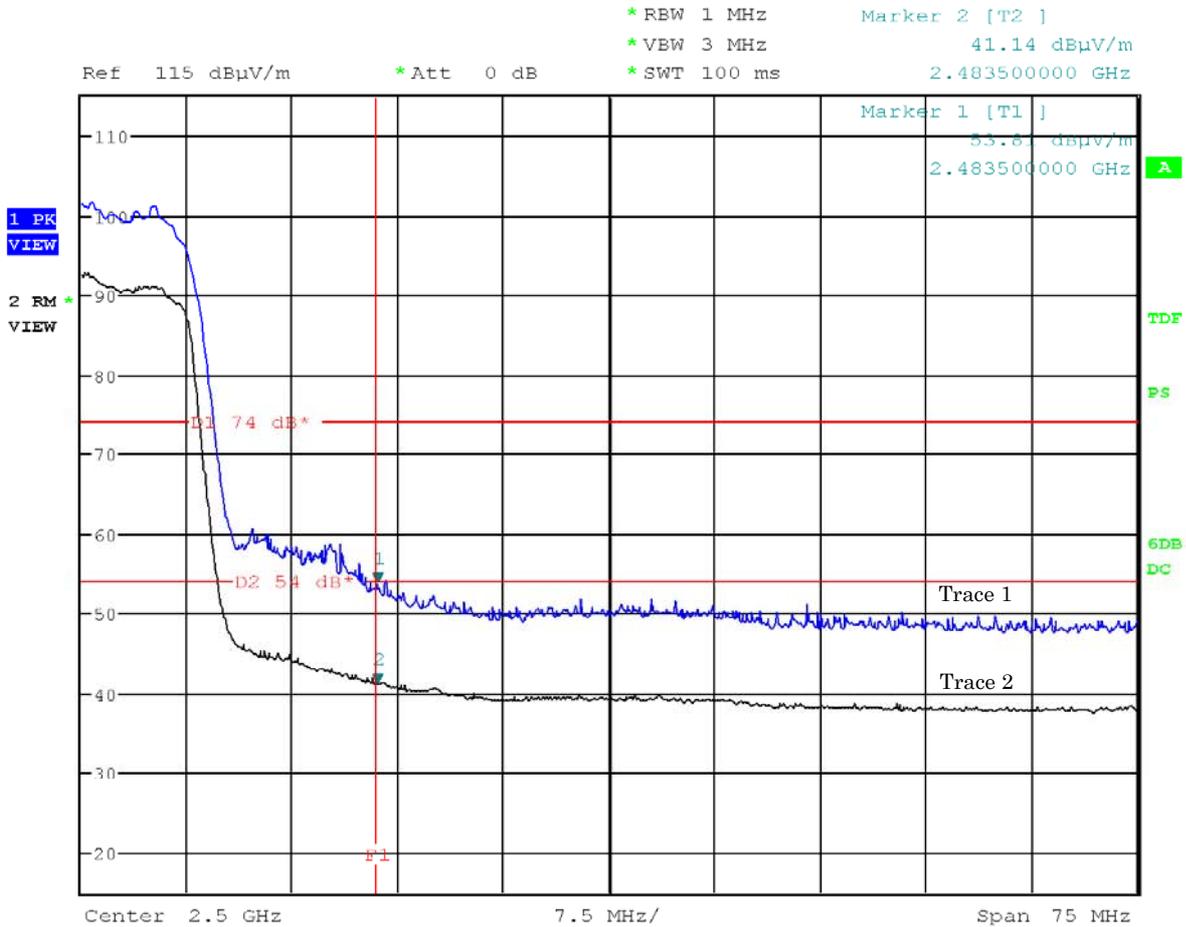
Antenna Polarization : Vertical



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

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 54Mbps(IEEE 802.11g))

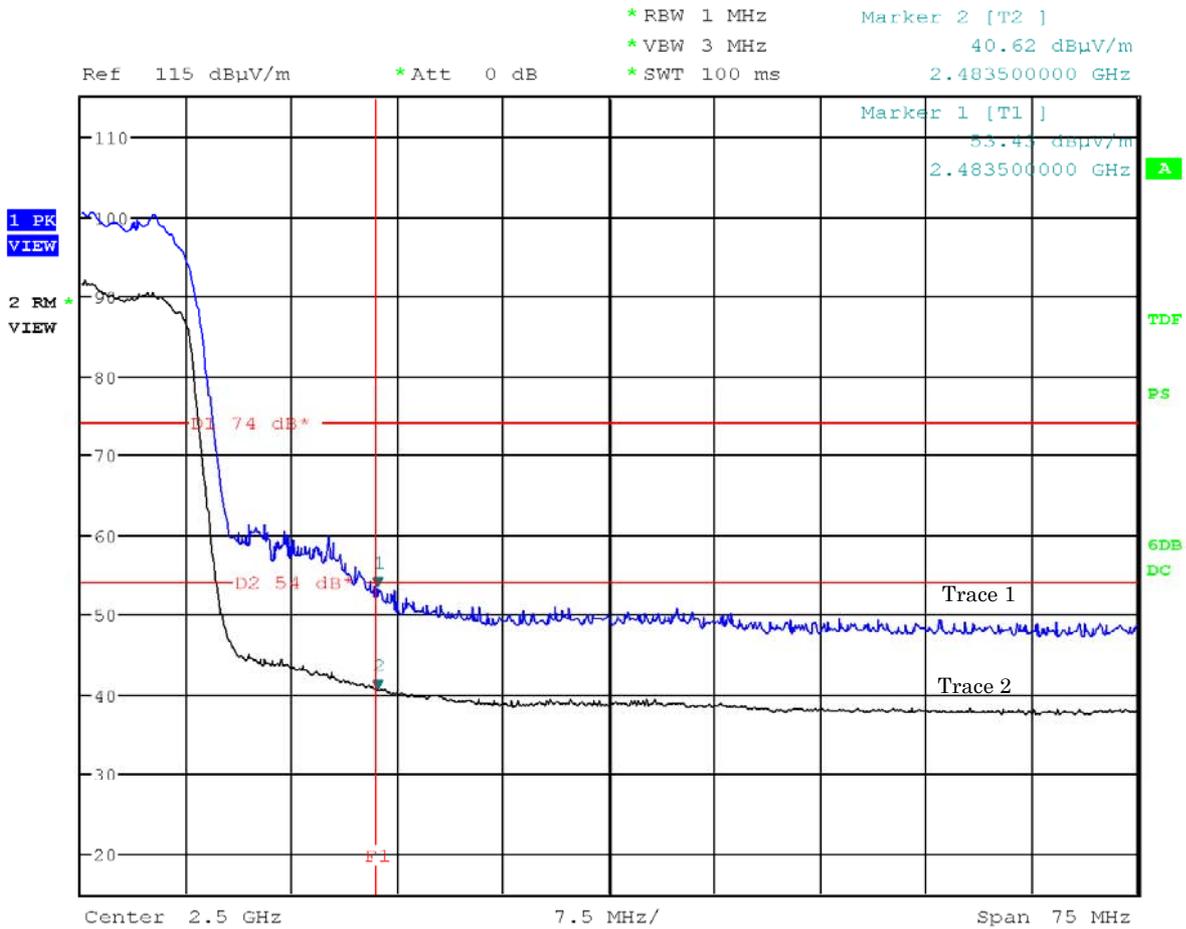
Antenna Polarization : Horizontal



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

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 54Mbps(IEEE 802.11g))

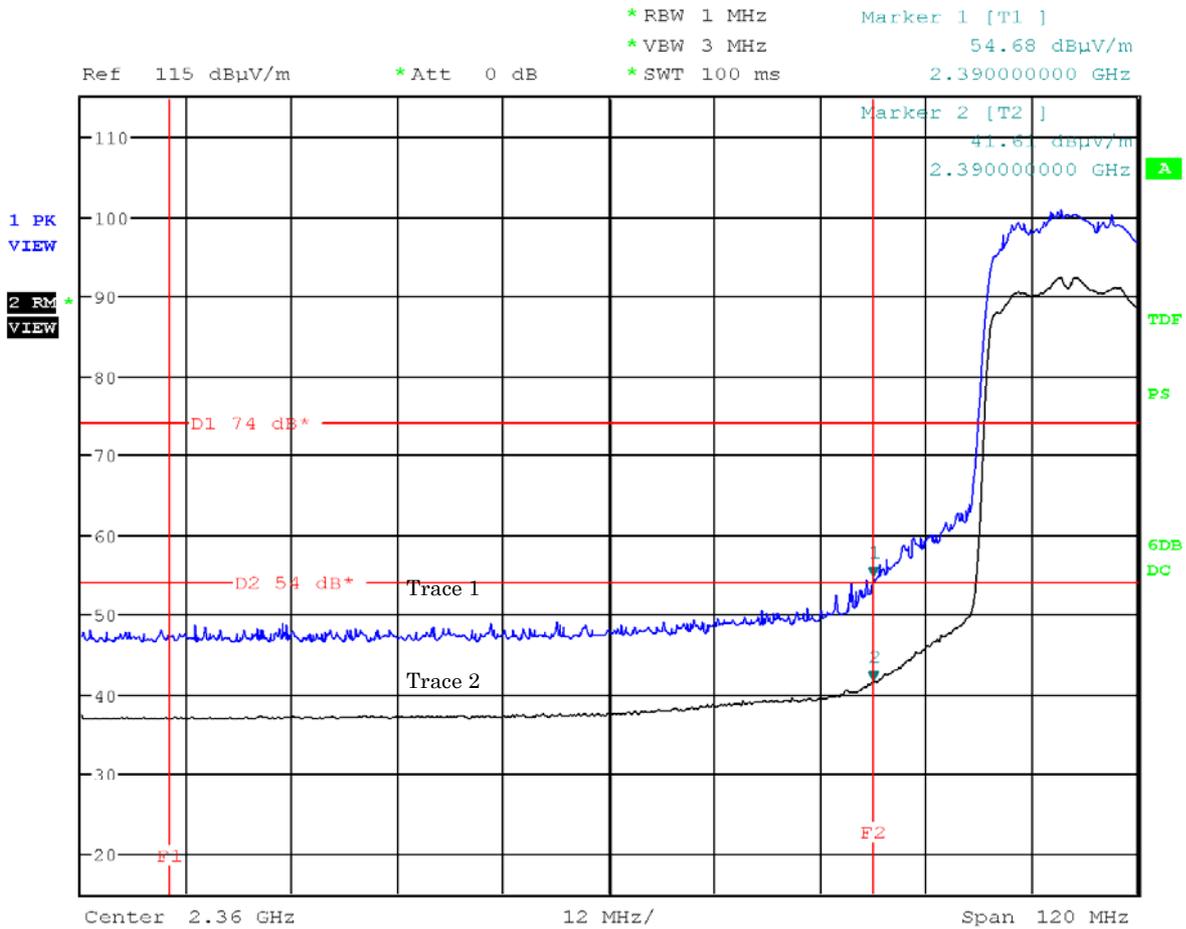
Antenna Polarization : Vertical



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

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

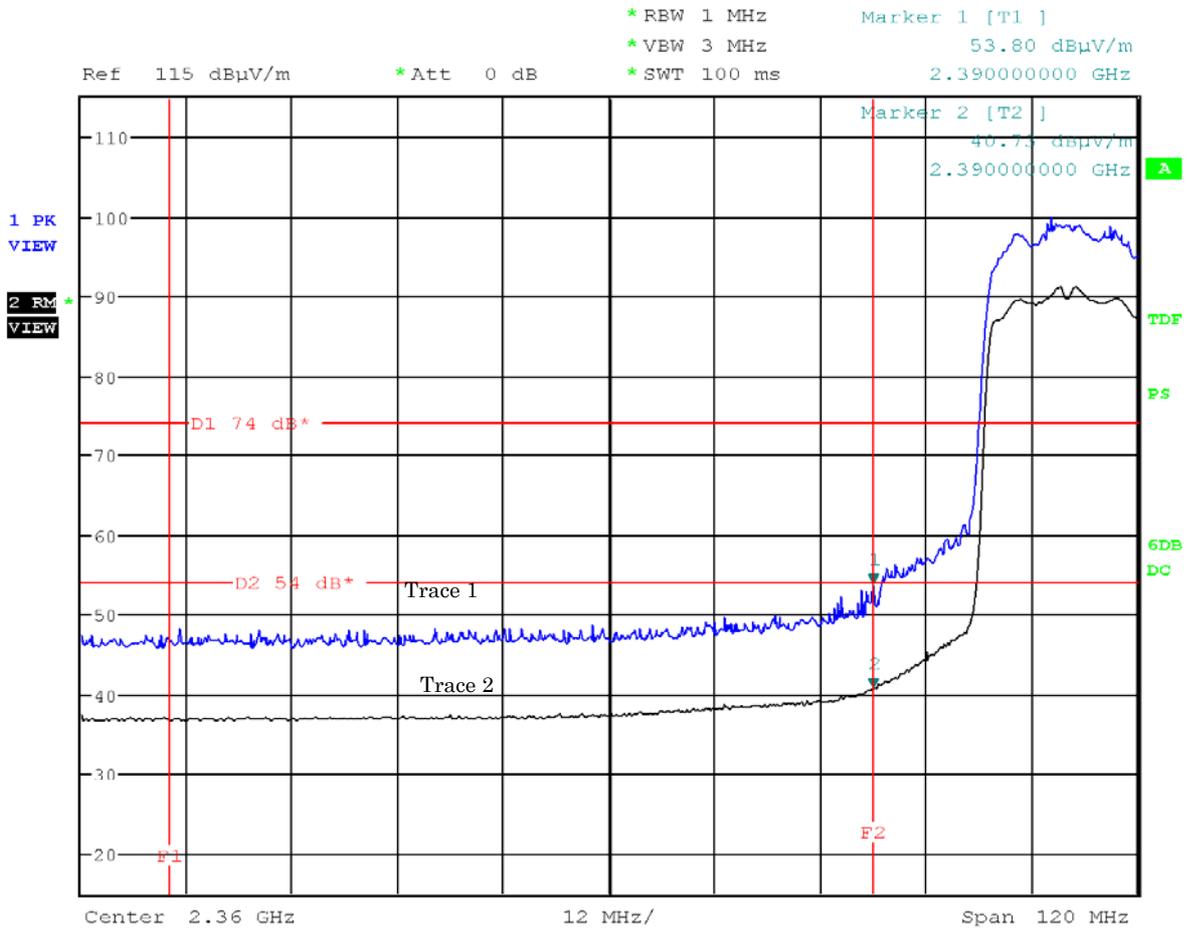
Antenna Polarization : Horizontal



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

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

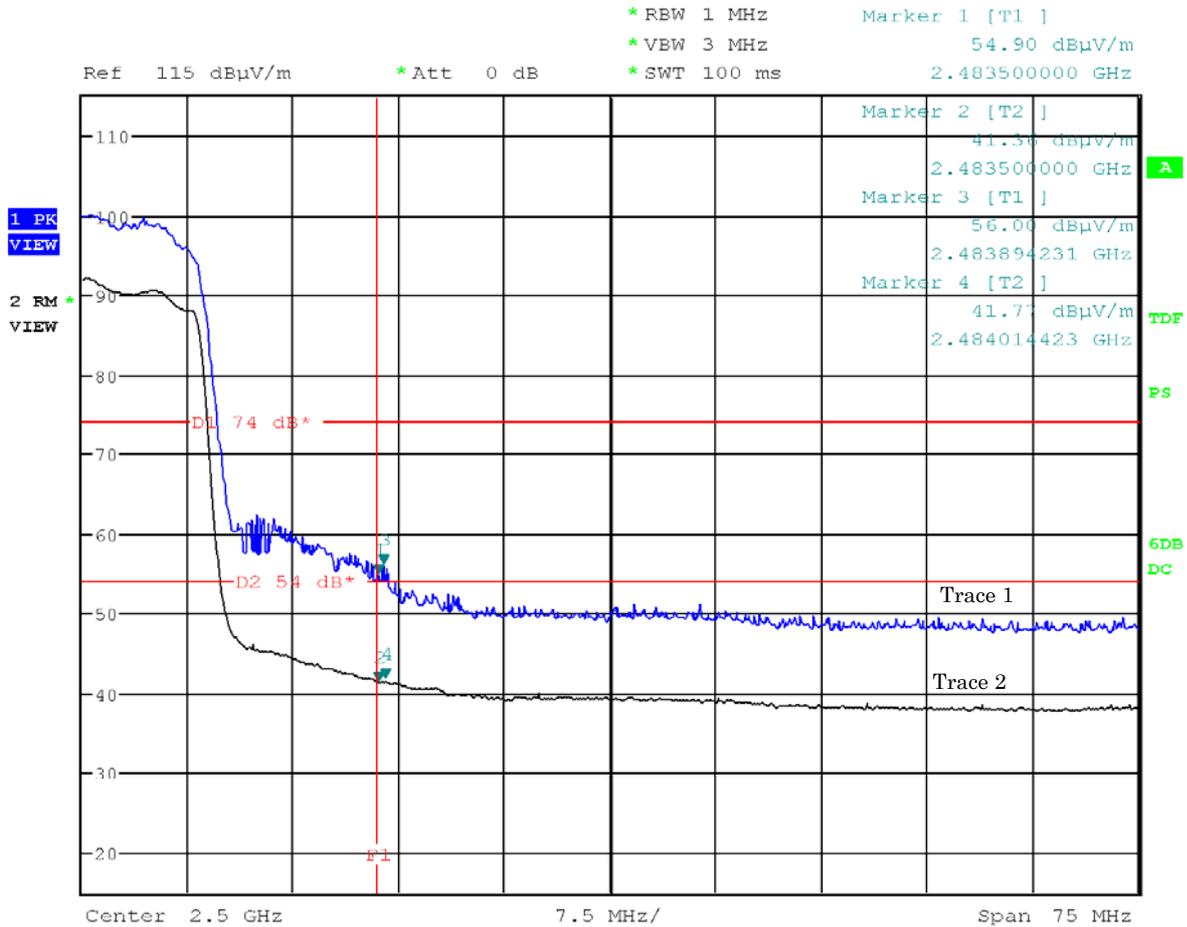
Antenna Polarization : Vertical



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

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

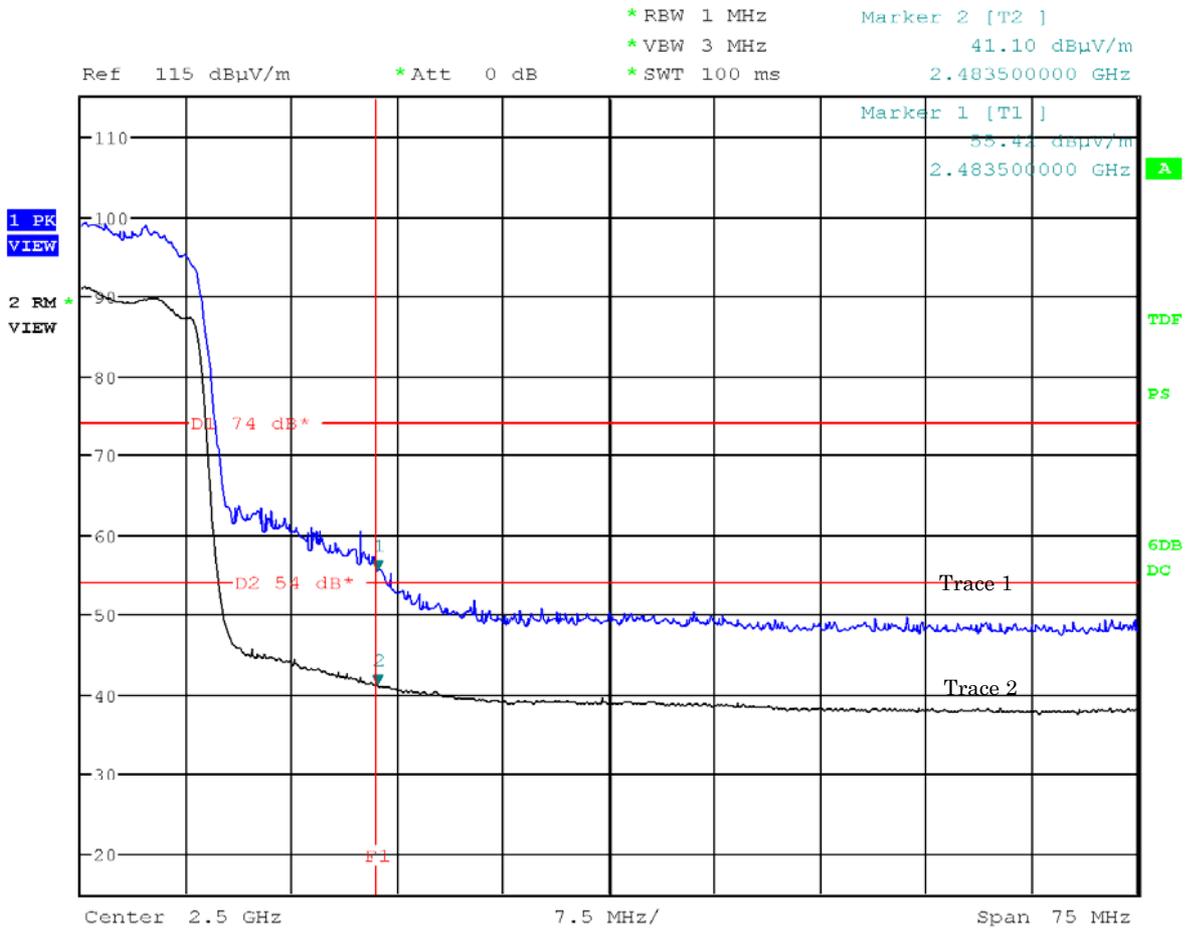
Antenna Polarization : Horizontal



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

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

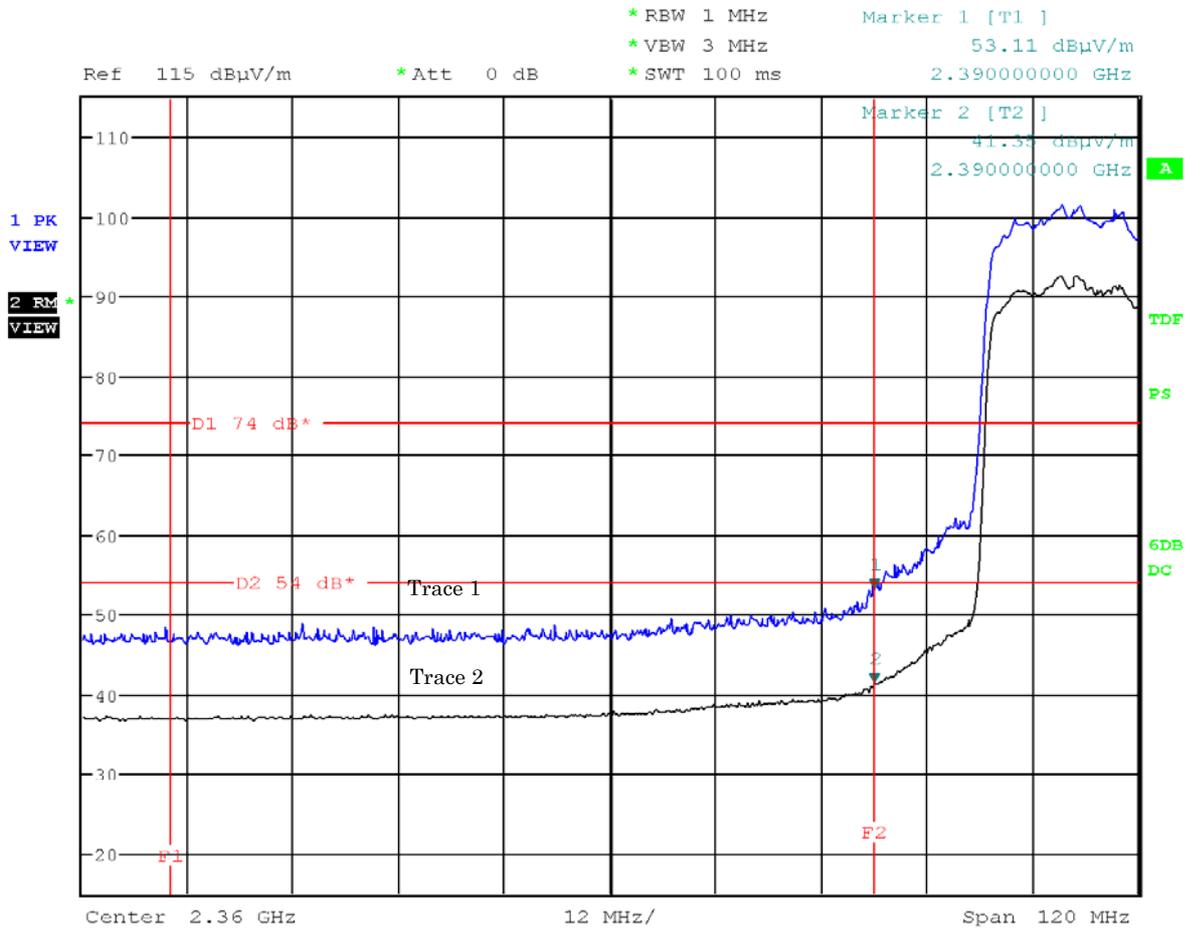
Antenna Polarization : Vertical



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

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 65Mbps(IEEE 802.11n))

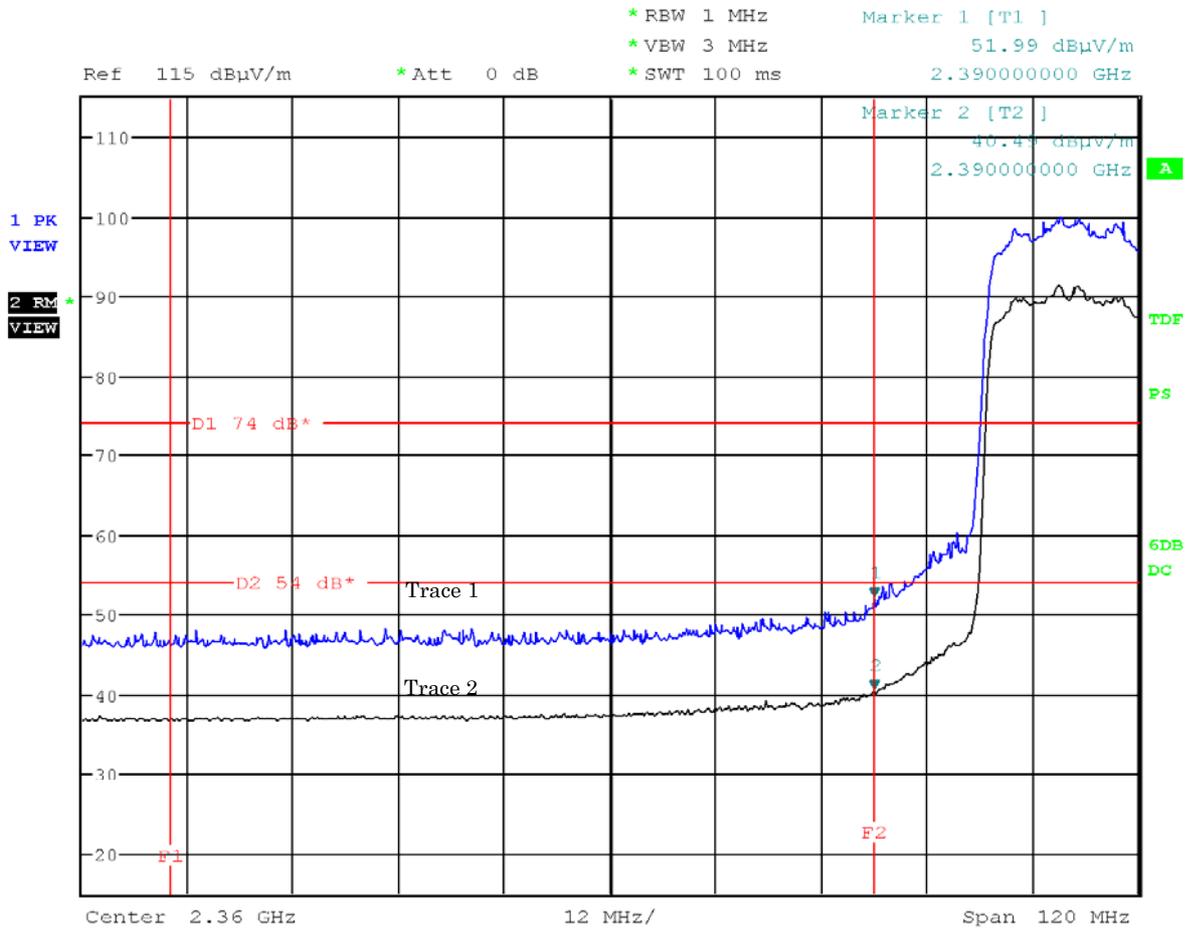
Antenna Polarization : Horizontal



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

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 65Mbps(IEEE 802.11n))

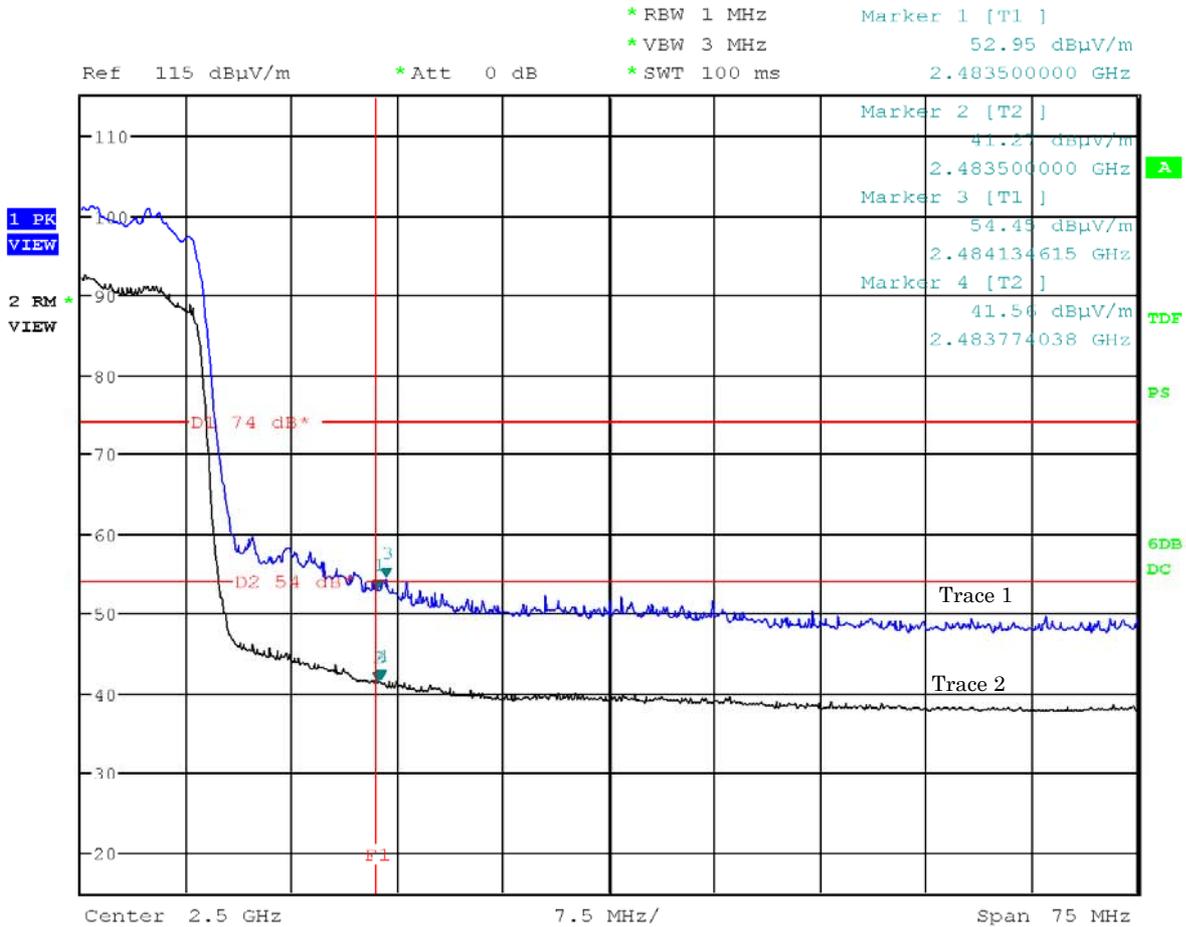
Antenna Polarization : Vertical



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

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 65Mbps(IEEE 802.11n))

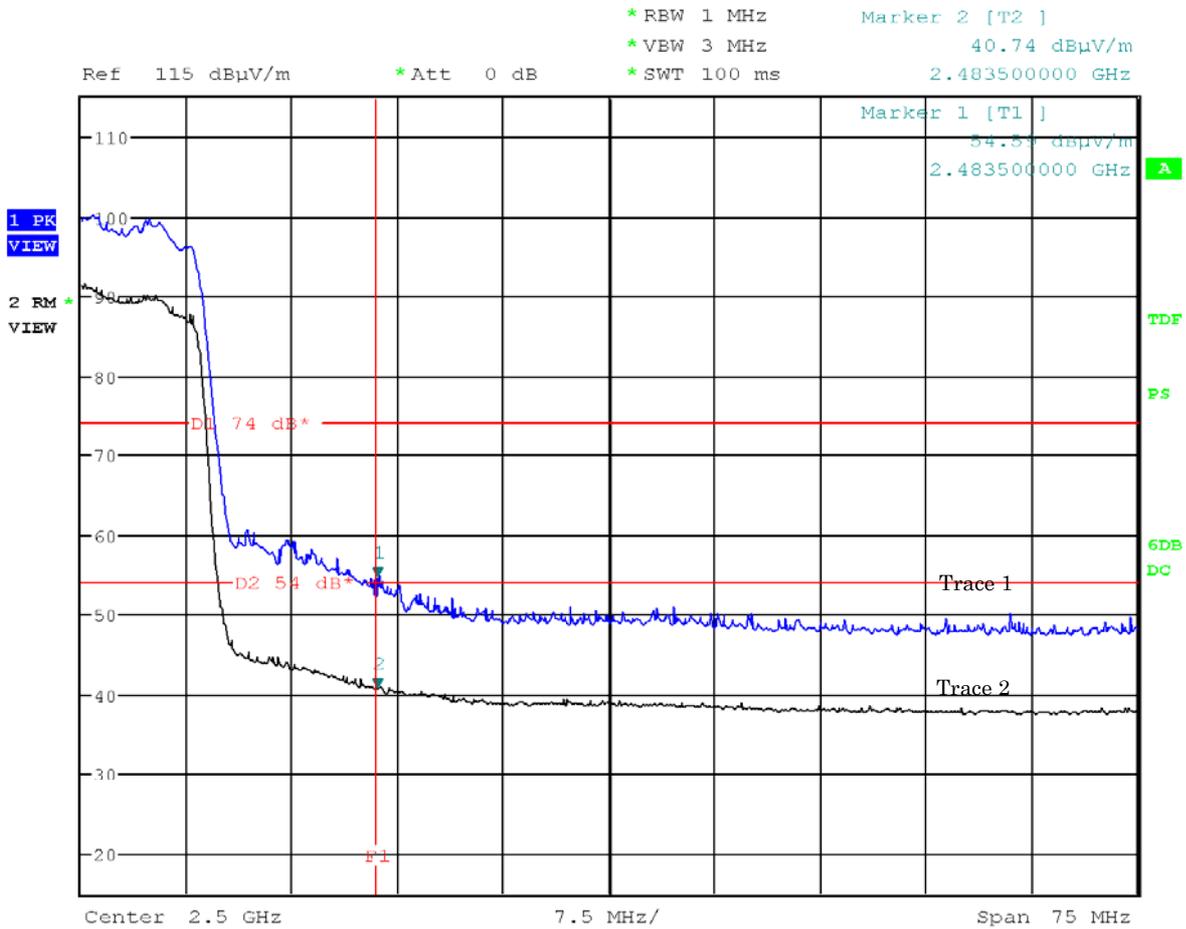
Antenna Polarization : Horizontal



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

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 65Mbps(IEEE 802.11n))

Antenna Polarization : Vertical



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

**7.9.5.1.2 Single Unit with Wireless Charger (WPC mode)**

The Band-Edge emission level on WPC mode is less than ones on Single Unit.

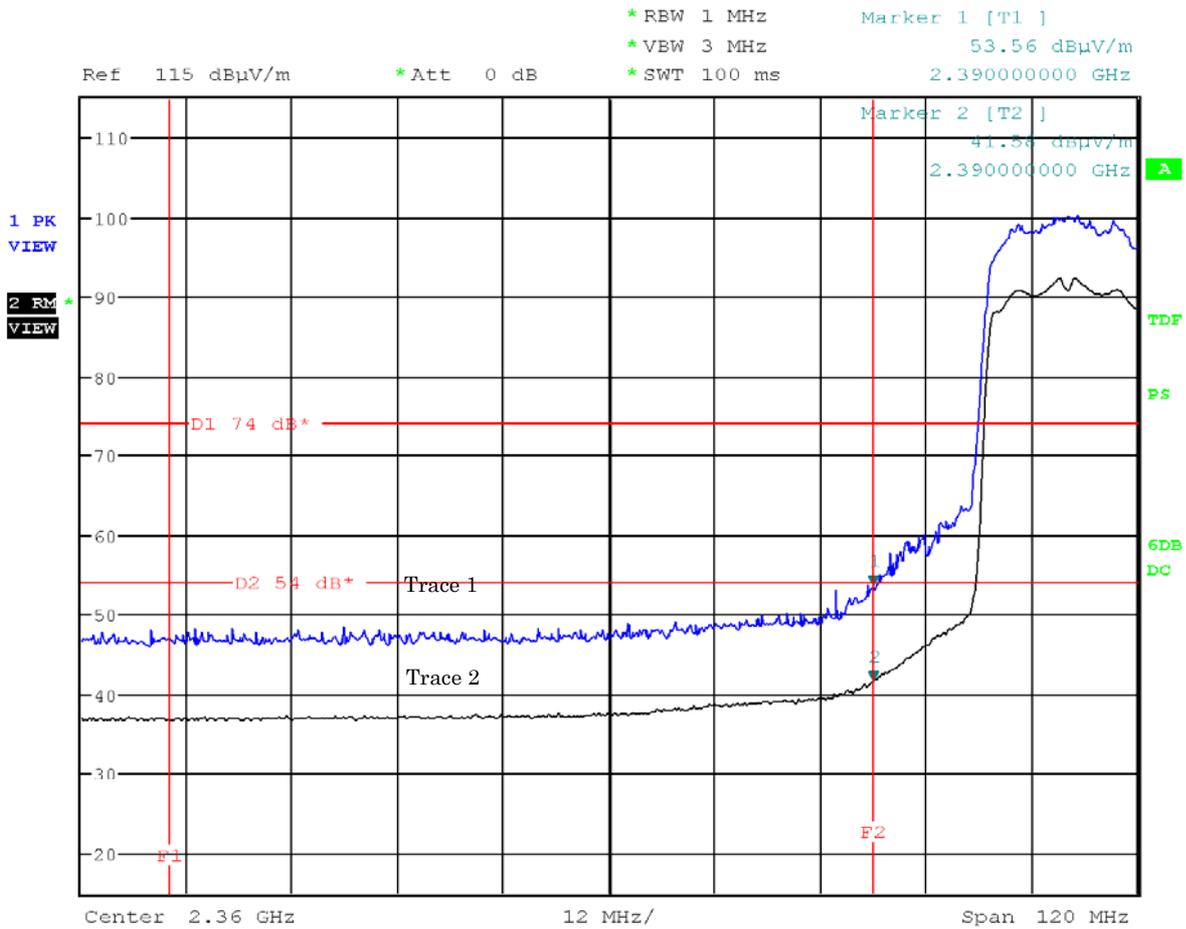
The Band-Edge emission of IEEE802.11n(6.5Mbps) is only reported. (worst case)

Test Date : December 2, 2012

Temp.:21°C, Humi:40%

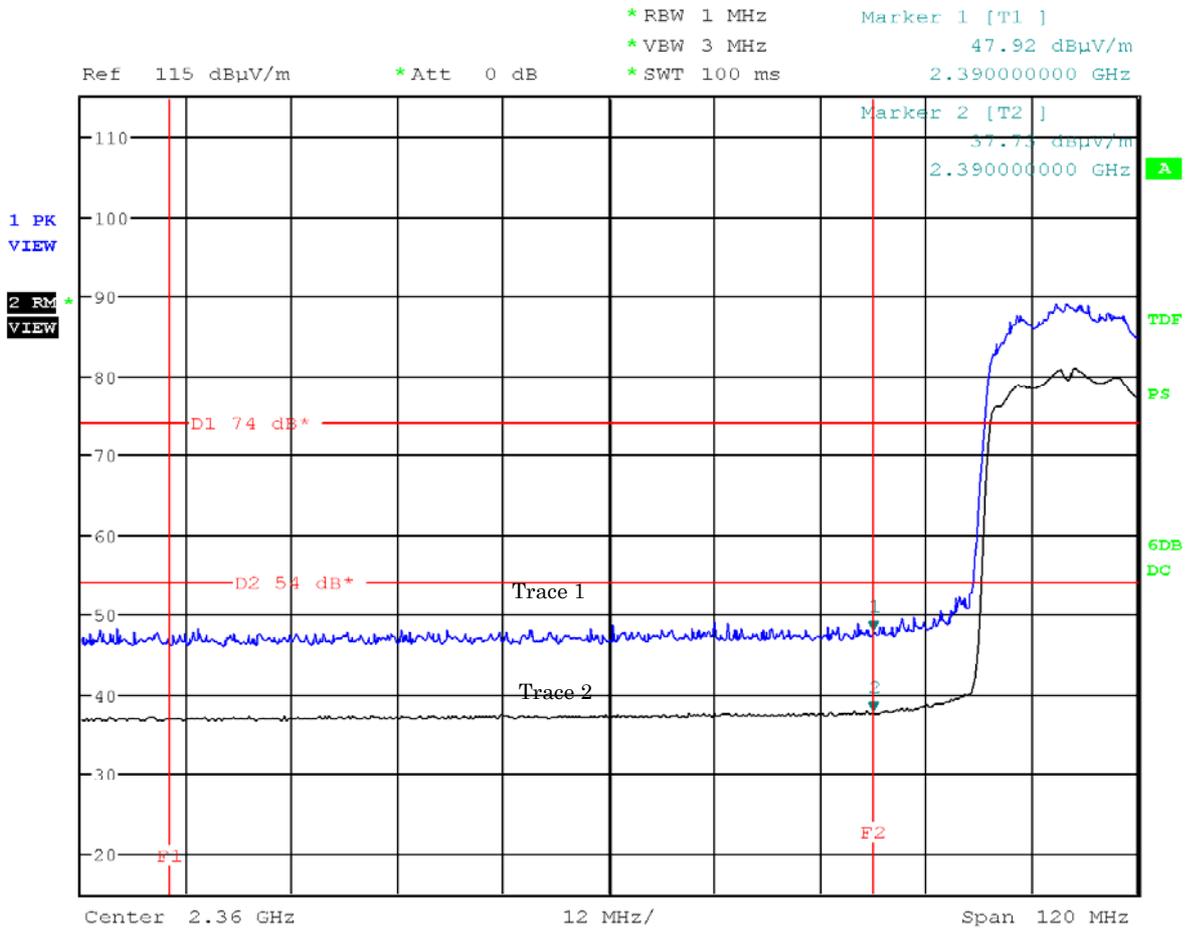
Mode of EUT : TX( 1ch: 2412 MHz, data rate : 6.5Mbps(IEEE 802.11n)) WPC mode

Antenna Polarization : Horizontal



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

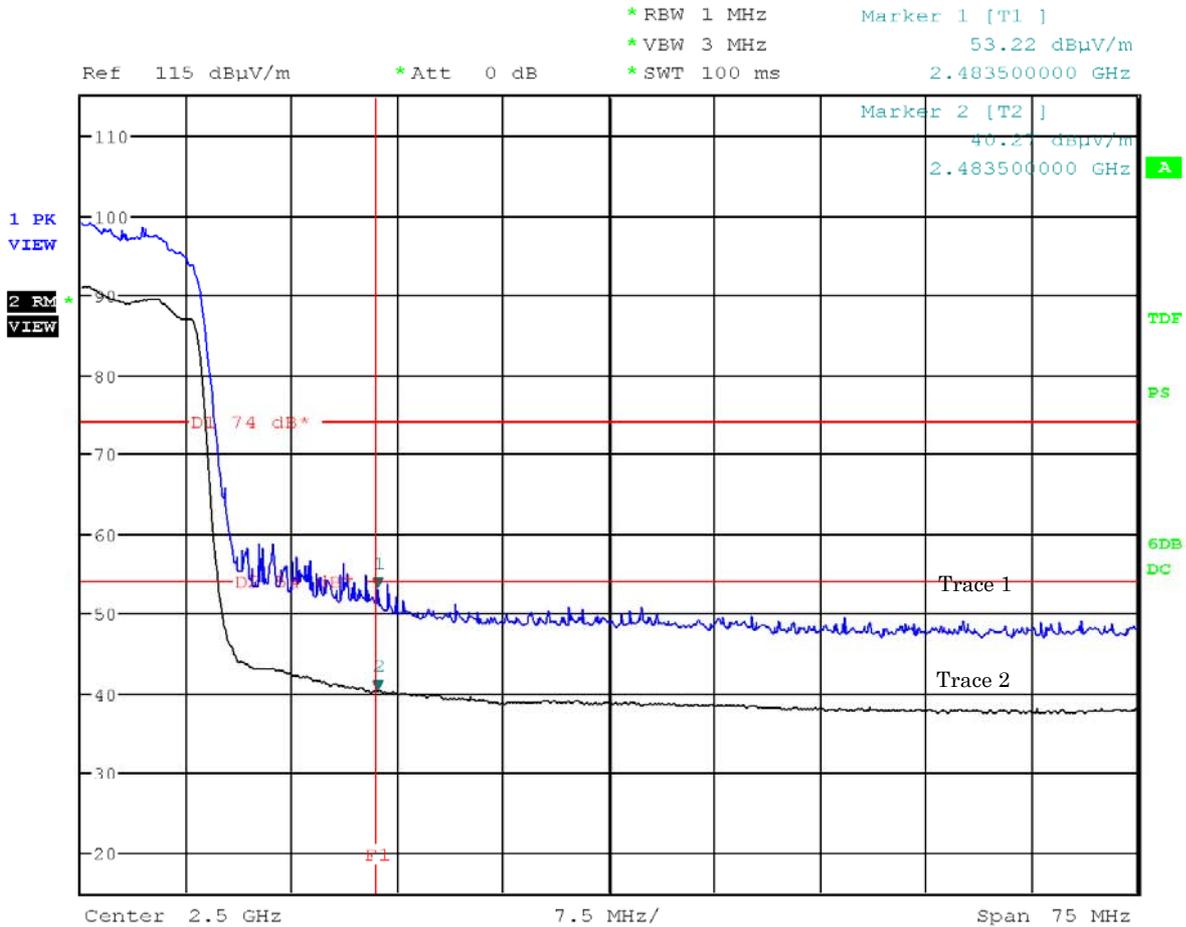
Mode of EUT : TX( 1ch: 2412 MHz, data rate : 6.5Mbps(IEEE 802.11n)) WPC mode  
 Antenna Polarization : Vertical



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

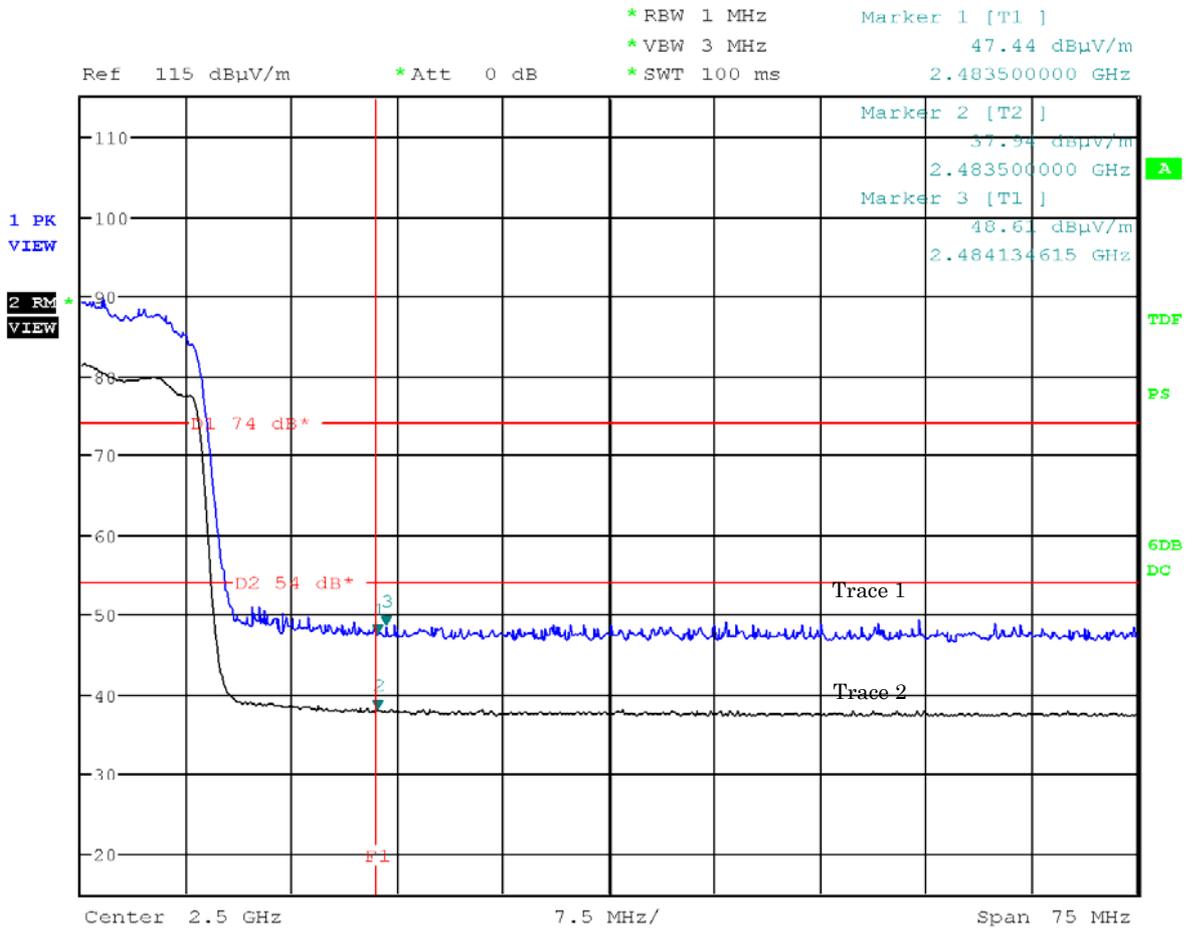
Mode of EUT : TX( 11ch: 2462 MHz, data rate : 6.5Mbps(IEEE 802.11n)) WPC mode

Antenna Polarization : Horizontal



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

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 6.5Mbps(IEEE 802.11n)) WPC mode  
 Antenna Polarization : Vertical



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

**7.9.5.2 Other Spurious Emission (9kHz – 30MHz)**

Test Date : November 28, 2012

Temp.:22°C, Humi:40%

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.

**7.9.5.3 Other Spurious Emission (30MHz – 1000MHz)**

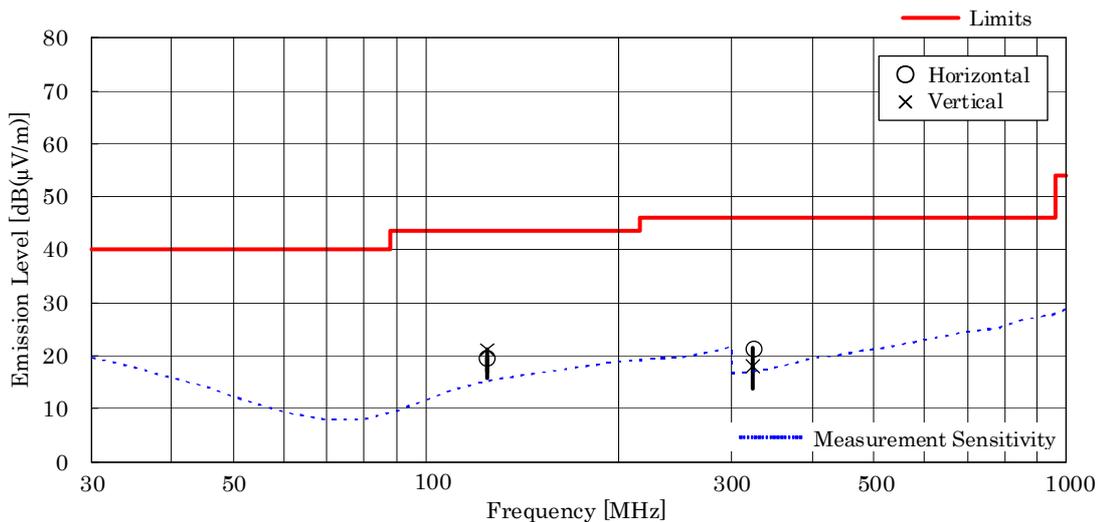
**7.9.5.3.1 AC Adapter used**

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: November 28, 2012

Temp: 22 °C, Humi: 40 %

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.		
<u>124.4</u>	13.4	1.8	4.5	5.9	43.5	19.7	21.1	+22.4	-
323.8	14.1	3.0	4.3	0.8	46.0	21.4	17.9	+24.6	-
395.6	16.1	3.3	< 0.0	< 0.0	46.0	< 19.4	< 19.4	> +26.6	-



**NOTES**

1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 1000 MHz.
3. The cable factor is consist of several combination conductor cables.
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Calculated result at 124.4 MHz, as the worst point shown on underline:  
Antenna Factor + Cable Loss + Meter Reading = 13.4 + 1.8 + 5.9 = 21.1 dB(μV/m)
7. Test receiver setting(s) : CISPR QP 120 kHz (QP : Quasi-Peak)

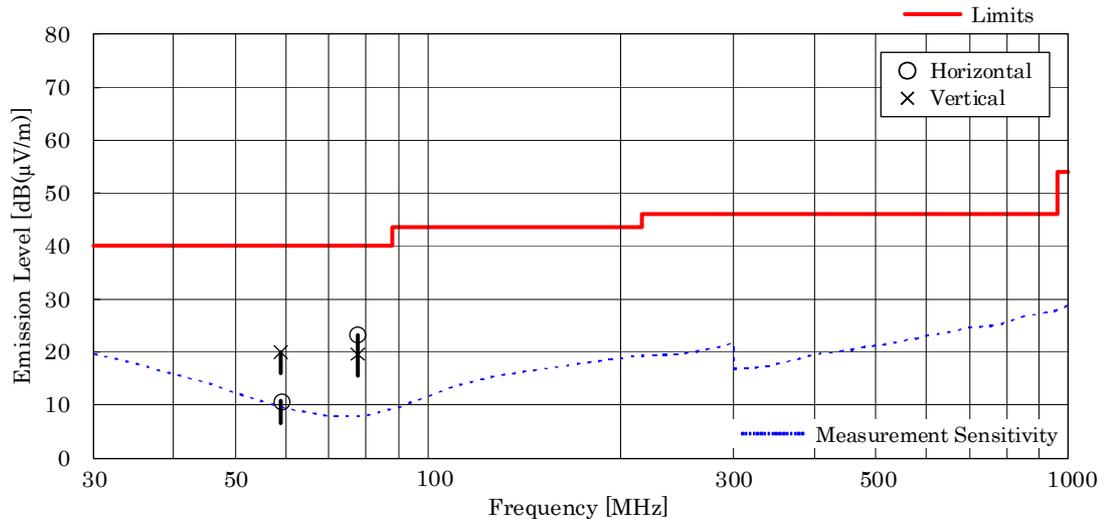
**7.9.5.3.2 Wireless Charger used**

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: November 28, 2012

Temp.: 22 °C, Humi: 40 %

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.		
58.9	8.4	1.2	1.1	10.3	40.0	10.7	19.9	+20.1	-
77.5	6.6	1.4	15.3	11.6	40.0	23.3	19.6	+16.7	-



**NOTES**

1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 1000 MHz.
3. The cable factor is consist of several combination conductor cables.
4. The symbol of “<” means “or less”.
5. The symbol of “>” means “more than”.
6. Calculated result at 77.5 MHz, as the worst point shown on underline:  
 $\text{Antenna Factor} + \text{Cable Loss} + \text{Meter Reading} = 6.6 + 1.4 + 15.3 = 23.3 \text{ dB}(\mu\text{V/m})$
7. Test receiver setting(s) : CISPR QP 120 kHz (QP : Quasi-Peak)

**7.9.5.4 Other Spurious Emission (Above 1000MHz)**

**7.9.5.4.1 Mode of TX**

**7.9.5.4.1.1 Single Unit**

**7.9.5.4.1.1.1 IEEE802.11b**

Test Date: December 3, 2012

Temp.: 20 °C, Humi: 44 %

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		
<b>Test condition : Tx Low Ch</b>												
4824.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
12060.0	33.6	-27.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.4	< 36.4	> +17.6	A/B
19296.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
<b>Test condition : TX Middle Ch</b>												
4874.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
7311.0	29.9	-19.5	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.4	< 40.4	> +13.6	A/B
12185.0	33.5	-26.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.6	< 36.6	> +17.4	A/B
19496.0	40.2	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.5	< 47.5	> + 6.5	A/B
<b>Test condition : TX High Ch</b>												
4924.0	27.3	-21.3	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.0	< 36.0	> +18.0	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	-26.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.7	< 36.7	> +17.3	A/B
19696.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
22158.0	40.3	-21.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.6	< 48.6	> + 5.4	A/B

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

Antenna Factor = 40.3 dB(1/m)  
 Corr. Factor = -21.7 dB  
 +) Meter Reading = <30.0 dB(μV)  
 Result = <48.6 dB(μV/m)

Minimum Margin: 54.0 - <48.6 = >5.4 (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	3 MHz	AUTO
B	RMS	1 MHz	3 MHz	AUTO

7.9.5.4.1.1.2 IEEE802.11g

Test Date: December 3, 2012

Temp.: 20 °C, Humi: 44 %

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	PK	AVE	PK	AVE		
<b>Test condition : Tx Low Ch</b>												
4824.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
12060.0	33.6	-27.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.4	< 36.4	> +17.6	A/B
19296.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
<b>Test condition : TX Middle Ch</b>												
4874.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
7311.0	29.9	-19.5	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.4	< 40.4	> +13.6	A/B
12185.0	33.5	-26.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.6	< 36.6	> +17.4	A/B
19496.0	40.2	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.5	< 47.5	> + 6.5	A/B
<b>Test condition : TX High Ch</b>												
4924.0	27.3	-21.3	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.0	< 36.0	> +18.0	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	-26.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.7	< 36.7	> +17.3	A/B
19696.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
22158.0	40.3	-21.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.6	< 48.6	> + 5.4	A/B

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

Antenna Factor	=	40.3 dB(1/m)
Corr. Factor	=	-21.7 dB
+ ) Meter Reading	=	<30.0 dB(μV)
Result	=	<48.6 dB(μV/m)

Minimum Margin: 54.0 - <48.6 = >5.4 (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	3 MHz	AUTO
B	RMS	1 MHz	3 MHz	AUTO

7.9.5.4.1.1.3 IEEE802.11n

Test Date: December 3, 2012

Temp.: 20 °C, Humi: 44 %

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	PK	AVE	PK	AVE		
<b>Test condition : Tx Low Ch</b>												
4824.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
12060.0	33.6	-27.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.4	< 36.4	> +17.6	A/B
19296.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
<b>Test condition : TX Middle Ch</b>												
4874.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
7311.0	29.9	-19.5	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.4	< 40.4	> +13.6	A/B
12185.0	33.5	-26.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.6	< 36.6	> +17.4	A/B
19496.0	40.2	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.5	< 47.5	> + 6.5	A/B
<b>Test condition : TX High Ch</b>												
4924.0	27.3	-21.3	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.0	< 36.0	> +18.0	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	-26.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.7	< 36.7	> +17.3	A/B
19696.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
22158.0	40.3	-21.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.6	< 48.6	> + 5.4	A/B

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

Antenna Factor	=	40.3 dB(1/m)
Corr. Factor	=	-21.7 dB
+ ) Meter Reading	=	<30.0 dB(μV)
Result	=	<48.6 dB(μV/m)

Minimum Margin: 54.0 - <48.6 = >5.4 (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	3 MHz	AUTO
B	RMS	1 MHz	3 MHz	AUTO

**7.9.5.4.1.2 Single Unit with Wireless Charger (WPC Mode)**

**7.9.5.4.1.2.1 IEEE802.11b**

Test Date: December 3, 2012

Temp.: 20 °C, Humi: 44 %

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						
<b>Test condition : Tx Low Ch</b>												
4824.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
12060.0	33.6	-27.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.4	< 36.4	> +17.6	A/B
19296.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
<b>Test condition : TX Middle Ch</b>												
4874.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
7311.0	29.9	-19.5	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.4	< 40.4	> +13.6	A/B
12185.0	33.5	-26.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.6	< 36.6	> +17.4	A/B
19496.0	40.2	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.5	< 47.5	> + 6.5	A/B
<b>Test condition : TX High Ch</b>												
4924.0	27.3	-21.3	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.0	< 36.0	> +18.0	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	-26.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.7	< 36.7	> +17.3	A/B
19696.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
22158.0	40.3	-21.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.6	< 48.6	> + 5.4	A/B

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

Antenna Factor	=	40.3 dB(1/m)
Corr. Factor	=	-21.7 dB
+ ) Meter Reading	=	<30.0 dB(μV)
Result	=	<48.6 dB(μV/m)

Minimum Margin: 54.0 - <48.6 = >5.4 (dB)

**NOTES**

1. Test Distance : 3 m
2. The spectrum was checked from 1 GHz to 25 GHz (10th harmonic of the highest fundamental frequency).
3. 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)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak Detector / AVE : Average Detector
7. Setting of measuring instrument(s) :

	Detector Function	Resolution B.W.	Video B.W.	Sweep Time
A	Peak	1 MHz	3 MHz	AUTO
B	RMS	1 MHz	3 MHz	AUTO

7.9.5.4.1.2.2 IEEE802.11g

Test Date: December 3, 2012

Temp.: 20 °C, Humi: 44 %

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		
<b>Test condition : Tx Low Ch</b>												
4824.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
12060.0	33.6	-27.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.4	< 36.4	> +17.6	A/B
19296.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
<b>Test condition : TX Middle Ch</b>												
4874.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
7311.0	29.9	-19.5	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.4	< 40.4	> +13.6	A/B
12185.0	33.5	-26.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.6	< 36.6	> +17.4	A/B
19496.0	40.2	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.5	< 47.5	> + 6.5	A/B
<b>Test condition : TX High Ch</b>												
4924.0	27.3	-21.3	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.0	< 36.0	> +18.0	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	-26.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.7	< 36.7	> +17.3	A/B
19696.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
22158.0	40.3	-21.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.6	< 48.6	> + 5.4	A/B

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

Antenna Factor	=	40.3 dB(1/m)
Corr. Factor	=	-21.7 dB
+ ) Meter Reading	=	<30.0 dB(μV)
Result	=	<48.6 dB(μV/m)

Minimum Margin: 54.0 - <48.6 = >5.4 (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	3 MHz	AUTO
B	RMS	1 MHz	3 MHz	AUTO

7.9.5.4.1.2.3 IEEE802.11n

Test Date: December 3, 2012

Temp.: 20 °C, Humi: 44 %

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	PK	AVE	PK	AVE		
<b>Test condition : Tx Low Ch</b>												
4824.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
12060.0	33.6	-27.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.4	< 36.4	> +17.6	A/B
19296.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
<b>Test condition : TX Middle Ch</b>												
4874.0	27.3	-21.2	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.1	< 36.1	> +17.9	A/B
7311.0	29.9	-19.5	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.4	< 40.4	> +13.6	A/B
12185.0	33.5	-26.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.6	< 36.6	> +17.4	A/B
19496.0	40.2	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.5	< 47.5	> + 6.5	A/B
<b>Test condition : TX High Ch</b>												
4924.0	27.3	-21.3	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.0	< 36.0	> +18.0	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	-26.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 46.7	< 36.7	> +17.3	A/B
19696.0	40.3	-22.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 57.6	< 47.6	> + 6.4	A/B
22158.0	40.3	-21.7	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 58.6	< 48.6	> + 5.4	A/B

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

Antenna Factor	=	40.3 dB(1/m)
Corr. Factor	=	-21.7 dB
+ ) Meter Reading	=	<30.0 dB(μV)
Result	=	<48.6 dB(μV/m)

Minimum Margin: 54.0 - <48.6 = >5.4 (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	3 MHz	AUTO
B	RMS	1 MHz	3 MHz	AUTO

7.9.5.4.2 Mode of RX

7.9.5.4.2.1 Single Unit

Test Date: December 3, 2012

Temp.: 20 °C, Humi: 44 %

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	PK	AVE	PK	AVE		
<b>Test condition : RX Middle Ch</b>												
2437.0	21.3	-21.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 39.4	< 29.4	> +24.6	A/B
4874.0	27.3	-21.5	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 45.8	< 35.8	> +18.2	A/B
7311.0	29.9	-19.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.1	< 40.1	> +13.9	A/B

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

Antenna Factor = 27.3 dB(1/m)

Corr. Factor = -21.5 dB

+ ) Meter Reading = <30.0 dB(μV)

Result = <35.8 dB(μV/m)

Minimum Margin: 54.0 - <35.8 = >13.9 (dB)

NOTES

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

	Detector Function	Resolution B.W.	Video B.W.	Sweep Time
A	Peak	1 MHz	3 MHz	AUTO
B	RMS	1 MHz	3 MHz	AUTO

**7.9.5.4.2.2 Single Unit with Wireless Charger (WPC mode)**

Test Date: December 3, 2012

Temp.: 20 °C, Humi: 44 %

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	PK	AVE	PK	AVE		
<b>Test condition : RX Middle Ch</b>												
2437.0	21.3	-21.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 39.4	< 29.4	> +24.6	A/B
4874.0	27.3	-21.5	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 45.8	< 35.8	> +18.2	A/B
7311.0	29.9	-19.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.1	< 40.1	> +13.9	A/B

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

Antenna Factor = 27.3 dB(1/m)

Corr. Factor = -21.5 dB

+ ) Meter Reading = <30.0 dB(μV)

Result = <35.8 dB(μV/m)

Minimum Margin: 54.0 - <35.8 = >13.9 (dB)

**NOTES**

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

	Detector Function	Resolution B.W.	Video B.W.	Sweep Time
A	Peak	1 MHz	3 MHz	AUTO
B	RMS	1 MHz	3 MHz	AUTO