



# RADIO TEST REPORT

Test Report No. : 30BE0051-HO

**Applicant** : Panasonic Communications Co., Ltd.  
**Type of Equipment** : Network Camera  
**Model No.** : BL-C230A  
**FCC ID** : ACJ96NBL-C230  
**Test regulation** : FCC Part 15 Subpart C 2009  
Section 15.207, Section 15.247  
**Test Result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

**Date of test:** September 28 to October 3, 2009

**Tested by:**



Motoya Imura  
EMC Services



Takayuki Shimada  
EMC Services



Hironobu Ohnishi  
EMC Services

**Approved by:**



Shinya Watanabe  
Group Leader of EMC Services



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.

\*As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://uljapan.co.jp/emc/nvlap.html>

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MF060b (06.08.09)

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## **SECTION 1: Customer information**

Company Name\* : Panasonic Communications Co., Ltd.  
Brand Name : Panasonic  
Address : 1-62, 4-chome, Minoshima, Hakata-ku, Fukuoka 812-8531, Japan  
Telephone Number : +81-92-477-1405  
Facsimile Number : +81-92-477-1487  
Contact Person : Yukio Kaneko

\* The company name will change from " Panasonic Communications Co., Ltd." to "Panasonic System Networks Co., Ltd." on January 1, 2010.

## **SECTION 2: Equipment under test (E.U.T.)**

### **2.1 Identification of E.U.T.**

Type of Equipment : Network Camera  
Model No. : BL-C230A  
Serial No. : Refer to Section 4, Clause 4.2  
Rating : AC 100-240V  
Receipt Date of Sample : September 28, 2009  
Country of Mass-production : Malaysia  
Condition of EUT : Engineering prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification of EUT : No Modification by the test lab

### **2.2 Product Description**

Model No: BL-C230A (referred to as the EUT in this report) is the Network Camera.

Feature of EUT : This device is a wireless network camera, operating in the 2.4 - 2.4835GHz band.

#### **General Specification**

Clock frequency(ies) in the system : 25MHz (PHY), 24MHz (CPU), 40MHz (RF), 32.768kHz (RTC)

#### **Radio Specification**

Equipment Type : Tranceiver  
Frequency of Operation : 2412 - 2462MHz  
Frequency Band : 2400 - 2483.5MHz  
Bandwidth & Channel Spacing : 20MHz & 5MHz  
Type of Modulation : DSSS (IEEE802.11b), OFDM (IEEE802.11g)  
Antenna Type : Pattern Antenna  
Antenna Gain : 2.1dBi  
Antenna Connector Type : Direct soldering  
Power Supply : DC3.3V, DC1.8V (RF Board)

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### **SECTION 3: Test specification, procedures & results**

#### **3.1 Test Specification**

Test Specification : FCC Part15 Subpart C: 2009, final revised on February 27, 2009

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.247 Operation within the bands 902-928MHz,  
2400-2483.5MHz, and 5725-5850MHz

#### **3.2 Procedures and results**

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline Conducted Emission measurements	FCC: Section 15.207	[QP] 12.5dB, 0.18402MHz, L [AV] 22.1dB, 0.49002MHz, L	Complied	-
6dB Bandwidth	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	FCC: Section 15.247(a)(2)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	FCC: Section 15.247(b)(3)		Complied	Conducted
Power Density	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	FCC: Section 15.247 (e)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	FCC: Section15.247(d)	4.6dB 2483.500MHz, AV, Hori.	Complied	Conducted/ Radiated

Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15.

\* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

#### **FCC 15.31 (e)**

This EUT provides stable voltage (DC1.8V) constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

#### **FCC Part 15.203 Antenna requirement**

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

### 3.3 Addition to standard

No addition, exclusion nor deviation has been made from the standard.

### 3.4 Uncertainty

#### EMI

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room (semi-anechoic chamber)	Conducted emission (+dB)
	150kHz-30MHz
No.1	3.7dB
No.2	3.7dB
No.3	3.7dB
No.4	3.7dB

Test room (semi-anechoic chamber)	Radiated emission (10m*)(+dB)			Radiated emission (3m*)(+dB)					
	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	1GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz
No.1	3.1dB	4.4dB	3.9dB	3.2dB	3.8dB	3.9dB	5.0dB	5.0dB	5.4dB
No.2	-	-	-	3.2dB	4.4dB	4.0dB	5.0dB	5.2dB	5.4dB
No.3	-	-	-	3.2dB	4.2dB	3.8dB	5.0dB	5.3dB	5.3dB
No.4	-	-	-	3.2dB	4.0dB	3.8dB	5.0dB	5.3dB	5.3dB

\*10m/3m = Measurement distance

Power meter (+dB)	
Below 1GHz	Above 1GHz
1.0dB	1.0dB

Antenna terminal conducted emission and Power density (+dB)			Antenna terminal conducted emission (+dB)		Channel power (±dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

#### Conducted Emission test

The data listed in this test report has enough margin, more than the site margin.

#### Radiated emission test (3m)

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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### 3.5 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

### 3.6 Test set up, Data of EMI, and Test instruments

Refer to APPENDIX.

## **SECTION 4: Operation of E.U.T. during testing**

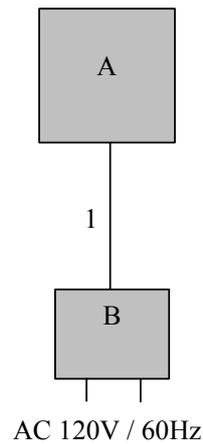
### **4.1 Operating Mode(s)**

Mode	Remarks*
IEEE 802.11b (11b)	11Mbps, PN9
IEEE 802.11g (11g)	54Mbps, PN9
*Transmitting duty was 100% on all tests.	
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel).	

\*The details of Operating mode(s)

Test Item	Operating Mode	Tested Antenna	Tested frequency
Conducted Emission	11b Tx	1	2412MHz
Spurious Emission (Radiated/Conducted)	11g Tx		2437MHz
6dB Bandwidth			2462MHz
Maximum Peak Output Power			
Power Density			

### **4.2 Configuration and peripherals**



\* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

#### **Description of EUT**

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Network Camera	BL-C230A	ES1	Panasonic Communications Co., Ltd.	EUT
B	AC Adaptor	PQLV206	ES1	Panasonic Communications Co., Ltd.	EUT

#### **List of cables used**

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	3.0	Unshielded	Unshielded	-

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## **SECTION 5: Conducted Emission**

### **Test Procedure and conditions**

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN).

DC cables were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

<b>Detector</b>	<b>: QP and AV</b>
<b>Measurement range</b>	<b>: 0.15-30MHz</b>
<b>Test data</b>	<b>: APPENDIX</b>
<b>Test result</b>	<b>: Pass</b>

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## **SECTION 6: Radiated Spurious Emission**

### **Test Procedure**

It was measured based on "2. Radiated emission test" of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247".

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

### **Test Antennas are used as below;**

Frequency	Below 30MHz	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Loop	Biconical	Logperiodic	Horn

In any 100kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

### **20dBc was applied to the frequency over the limit of FCC 15.209 and outside the restricted band of FCC15.205.**

Frequency	Below 1GHz	Above 1GHz	
Instrument used	Test Receiver / Spectrum Analyzer	Spectrum Analyzer	
Detector	QP	PK	AV
IF Bandwidth	BW 120kHz (T/R)	RBW: 1MHz VBW: 1MHz	RBW: 1MHz VBW: 10Hz
	20dBc: RBW: 100kHz VBW: 300kHz (S/A)	20dBc: RBW:100kHz/VBW:300kHz	
Test Distance	3m	3m (below 10GHz), 1m *1) (above 10GHz)	

\*1) Distance Factor:  $20 \times \log(3.0m/1.0m) = 9.5dB$

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

**Measurement range** : 30M-26.5GHz  
**Test data** : APPENDIX  
**Test result** : Pass

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## **SECTION 7: Antenna Terminal Conducted Tests**

### **Test Procedure**

The tests were made with below setting connected to the antenna port.

<b>Test</b>	<b>Span</b>	<b>RBW</b>	<b>VBW</b>	<b>Sweep time</b>	<b>Detector</b>	<b>Trace</b>	<b>Instrument used</b>
6dB Bandwidth	50MHz	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Sensor: 50MHz BW)
Peak Power Density	18MHz	30kHz	100kHz	600sec	Peak	Max Hold	Spectrum Analyzer *1) *2)
Conducted Spurious Emission	Less or equal to 5GHz (Range: 30MHz-25GHz)	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer

\*1) PSD Option 1 of "Guidance on Measurement of Digital Transmission Systems Operating under Section 15.247".  
\*2) The test was not performed at RBW:3kHz since the measurement is to be performed with RBW:30kHz in the regulation, however, the measurement value with RBW:3kHz is less than the value of RBW:30kHz and the test data met the limit with RBW:3kHz.

The test results and limit are rounded off to two decimals place, so some differences might be observed.

**Test data** : **APPENDIX**  
**Test result** : **Pass**

**APPENDIX 1: Photographs of test setup**

**Conducted Emission**

**Photo 1**



**Photo 2**



## Radiated Spurious Emission

Photo 1

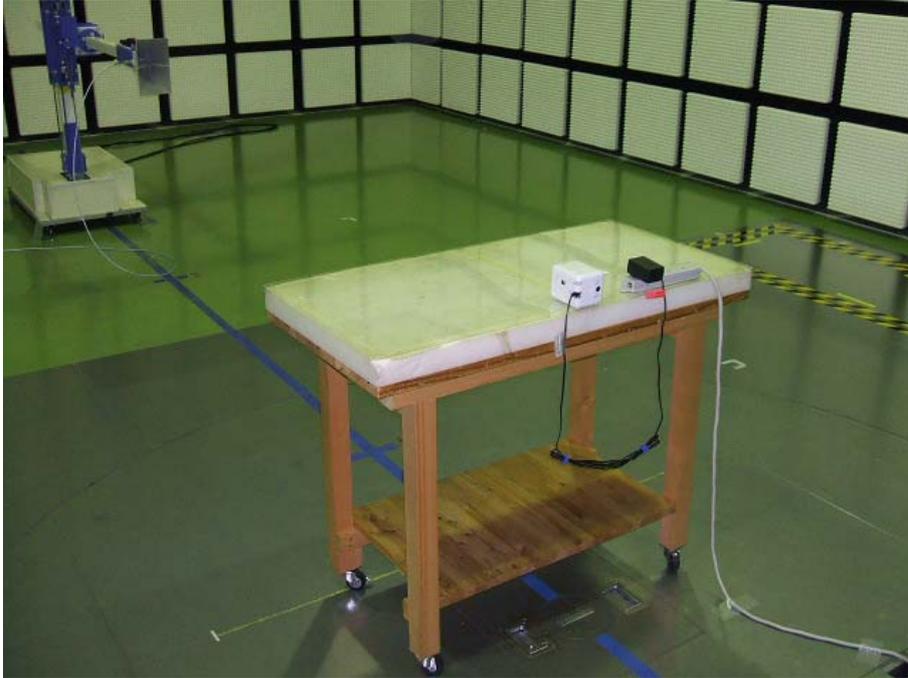


Photo 2



**Worst Case Position (Horizontal: Y-axis/ Vertical:X-axis)**

**X-axis**



**Y-axis**



**Z-axis**



**APPENDIX 2: Data of EMI test**

**Conducted Emission**

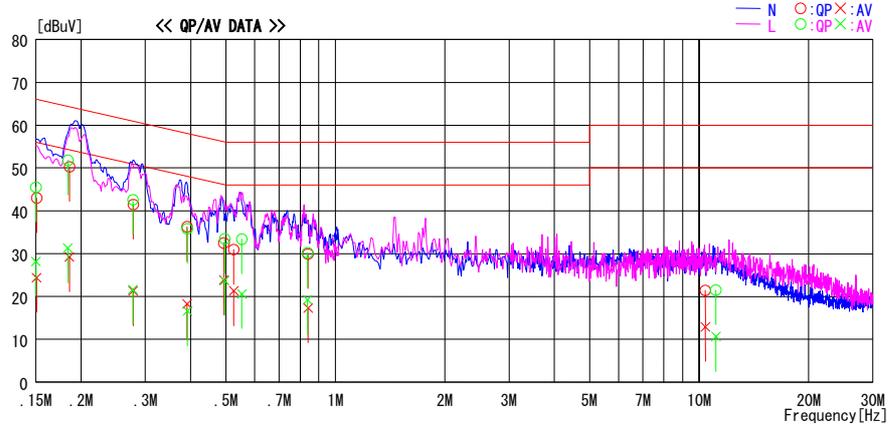
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2009/10/03

Report No. : 30BE0051-HO  
Temp./Humi. : 24deg. C / 72%  
Engineer : Hironobu Ohnishi

Mode / Remarks : 11b, Tx 2412MHz, 11Mbps

LIMIT : FCC15.207 QP  
FCC15.207 AV

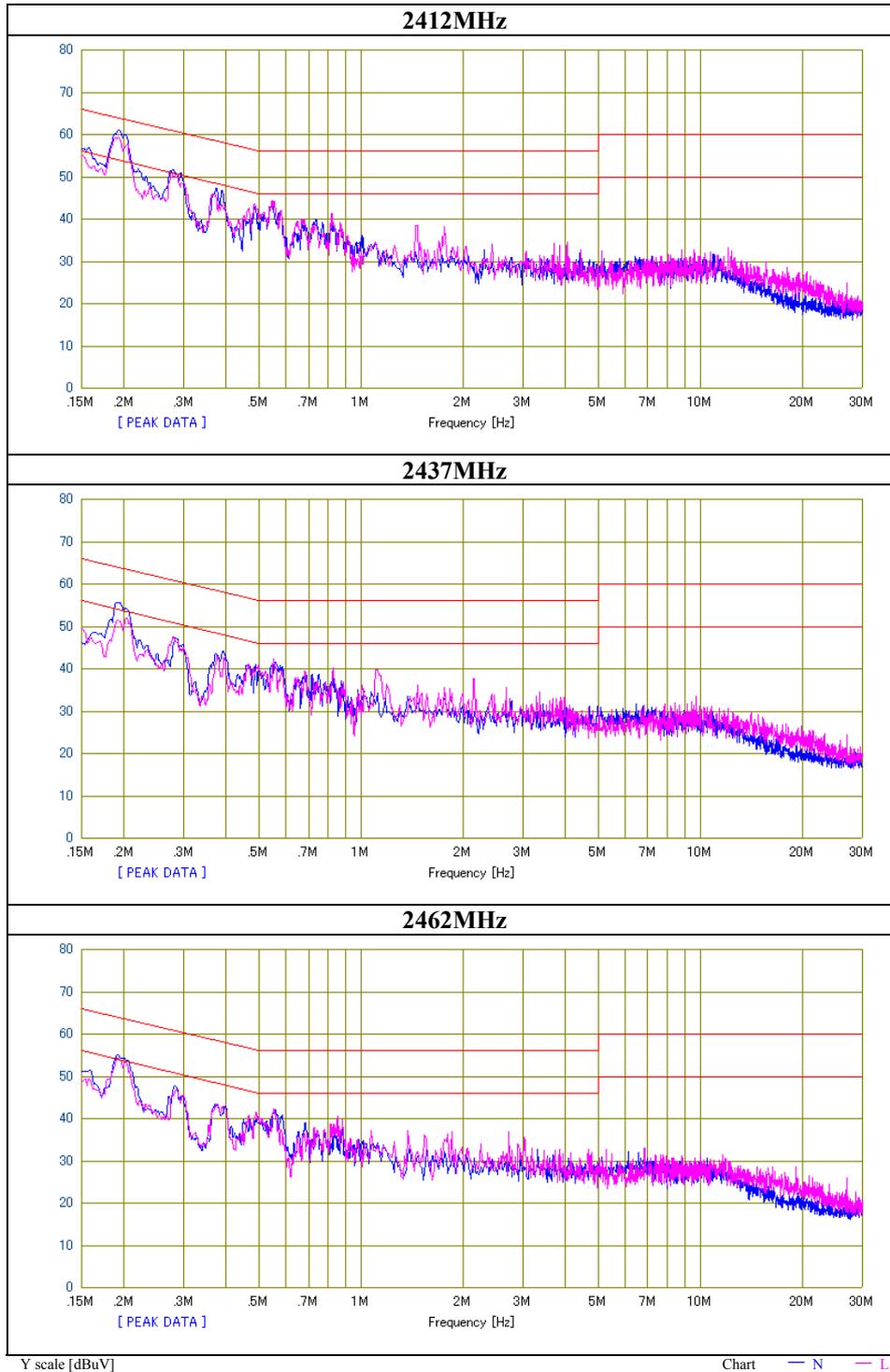


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
0.15087	42.6	24.0	0.4	43.0	24.4	66.0	56.0	23.0	31.6	N
0.18560	49.9	28.8	0.4	50.3	29.2	64.2	54.2	13.9	25.0	N
0.27812	41.1	20.9	0.4	41.5	21.3	60.9	50.9	19.4	29.6	N
0.39078	35.9	17.8	0.4	36.3	18.2	58.0	48.0	21.7	29.8	N
0.49329	32.1	23.4	0.4	32.5	23.8	56.1	46.1	23.6	22.3	N
0.52523	30.6	20.9	0.4	31.0	21.3	56.0	46.0	25.0	24.7	N
0.84054	29.5	16.9	0.4	29.9	17.3	56.0	46.0	26.1	28.7	N
10.40100	19.4	10.9	2.0	21.4	12.9	60.0	50.0	38.6	37.1	N
0.15024	45.1	27.8	0.4	45.5	28.2	66.0	56.0	20.5	27.8	L
0.18402	51.4	30.9	0.4	51.8	31.3	64.3	54.3	12.5	23.0	L
0.27736	42.2	21.2	0.4	42.6	21.6	60.9	50.9	18.3	29.3	L
0.39180	35.4	16.2	0.4	35.8	16.6	58.0	48.0	22.2	31.4	L
0.49562	33.1	23.3	0.4	33.5	23.7	56.1	46.1	22.6	22.4	L
0.55312	33.0	20.2	0.4	33.4	20.6	56.0	46.0	22.6	25.4	L
0.83930	29.8	18.8	0.4	30.2	19.2	56.0	46.0	25.8	26.8	L
11.11787	19.3	8.4	2.2	21.5	10.6	60.0	50.0	38.5	39.4	L

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT [dBuV]=READING [dBuV]+C. F [dB] (L ISN LOSS+CABLE LOSS)  
Except for the above table : adequate margin data below the limits.

## Conducted Emission

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. : 30BE0051-HO  
Date : 10/03/2009  
Temperature/ Humidity : 24 deg.C./ 72%  
Engineer : Hironobu Ohnishi  
Mode : 11b Tx



## Conducted Emission

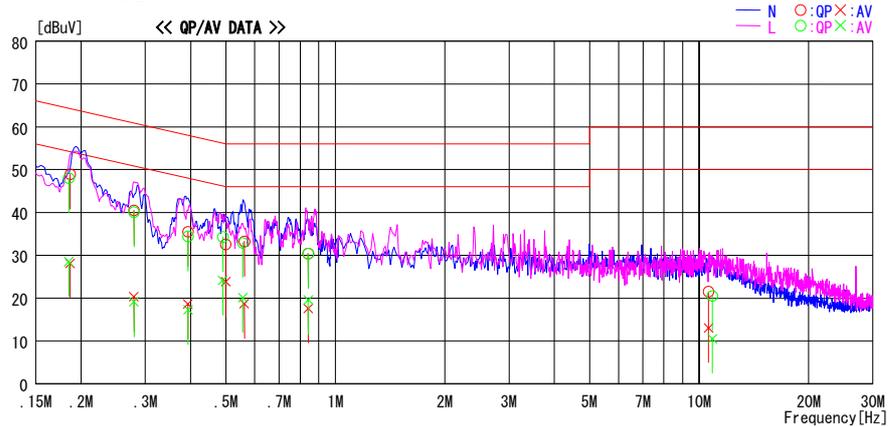
### DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2009/10/03

Report No. : 30BE0051-HO  
Temp./Humi. : 24deg. C. / 72%  
Engineer : Hironobu Ohnishi

Mode / Remarks : 11g, Tx 2412MHz, 54Mbps

LIMIT : FCC15.207 QP  
FCC15.207 AV

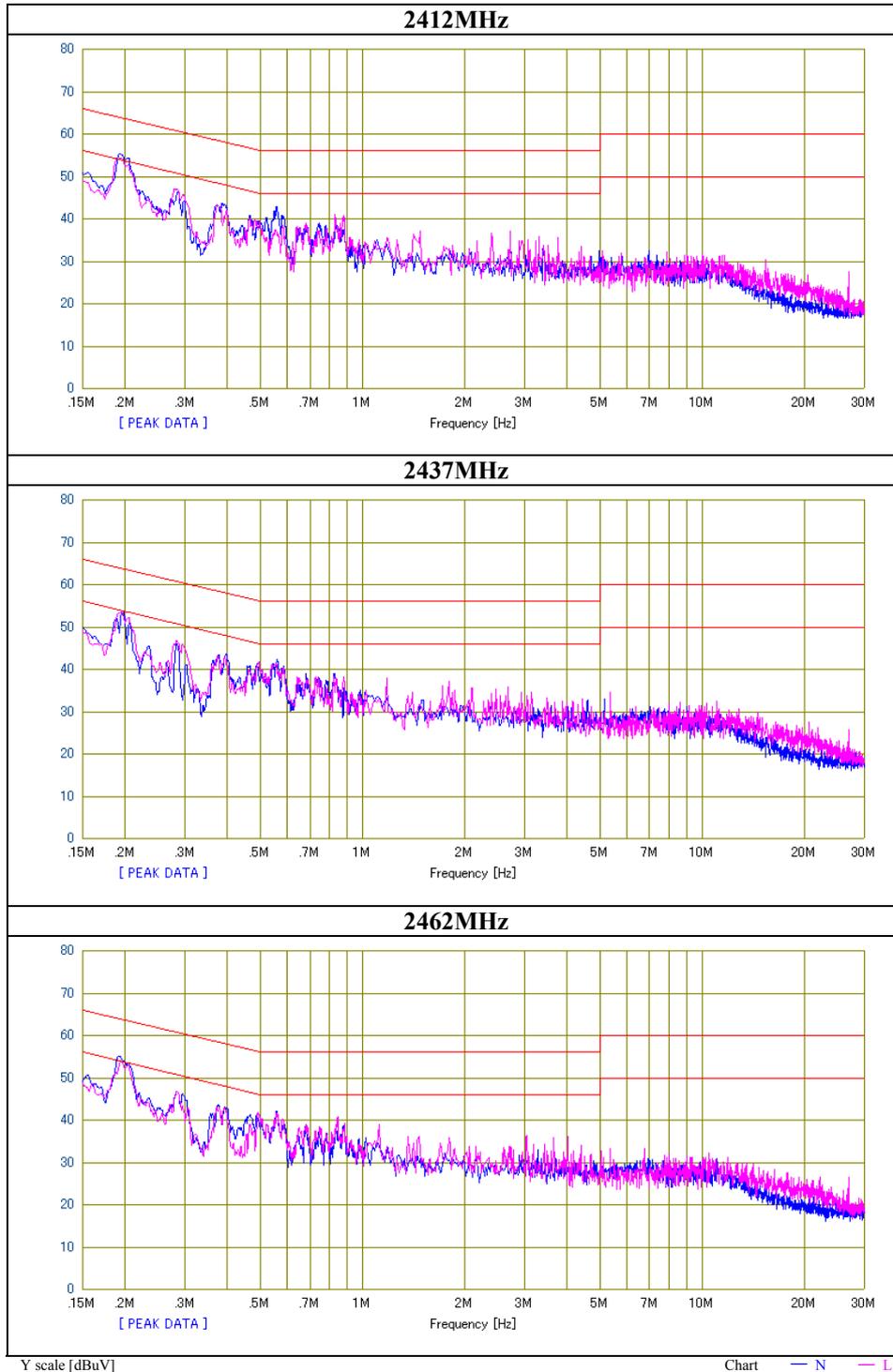


Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
0.18656	48.5	27.7	0.4	48.9	28.1	64.2	54.2	15.3	26.1	N
0.27920	40.1	19.9	0.4	40.5	20.3	60.8	50.8	20.3	30.5	N
0.39320	35.1	18.2	0.4	35.5	18.6	58.0	48.0	22.5	29.4	N
0.49928	32.2	23.4	0.4	32.6	23.8	56.0	46.0	23.4	22.2	N
0.56202	32.8	18.3	0.4	33.2	18.7	56.0	46.0	22.8	27.3	N
0.84204	30.0	17.2	0.4	30.4	17.6	56.0	46.0	25.6	28.4	N
10.61720	19.5	11.1	2.0	21.5	13.1	60.0	50.0	38.5	36.9	N
0.18496	47.6	28.1	0.4	48.0	28.5	64.3	54.3	16.3	25.8	L
0.27910	39.7	18.7	0.4	40.1	19.1	60.8	50.8	20.7	31.7	L
0.39351	34.0	16.9	0.4	34.4	17.3	58.0	48.0	23.6	30.7	L
0.49002	33.9	23.7	0.4	34.3	24.1	56.2	46.2	21.9	22.1	L
0.55662	32.5	19.7	0.4	32.9	20.1	56.0	46.0	23.1	25.9	L
0.84236	30.0	19.2	0.4	30.4	19.6	56.0	46.0	25.6	26.4	L
10.87200	18.4	8.4	2.1	20.5	10.5	60.0	50.0	39.5	39.5	L

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT [dBuV] = READING [dBuV] + C. F [dB] (L ISN LOSS + CABLE LOSS)  
Except for the above table : adequate margin data below the limits.

## Conducted Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	30BE0051-HO
Date	10/03/2009
Temperature/ Humidity	24 deg.C./ 72%
Engineer	Hironobu Ohnishi
Mode	11g Tx



### 6dB Bandwidth

Test place Head Office EMC Lab. No.11 Measurement Room  
Report No. 30BE0051-HO  
Date 09/28/2009  
Temperature/ Humidity 25 deg.C./ 61%  
Engineer Takayuki Shimada  
Mode Tx

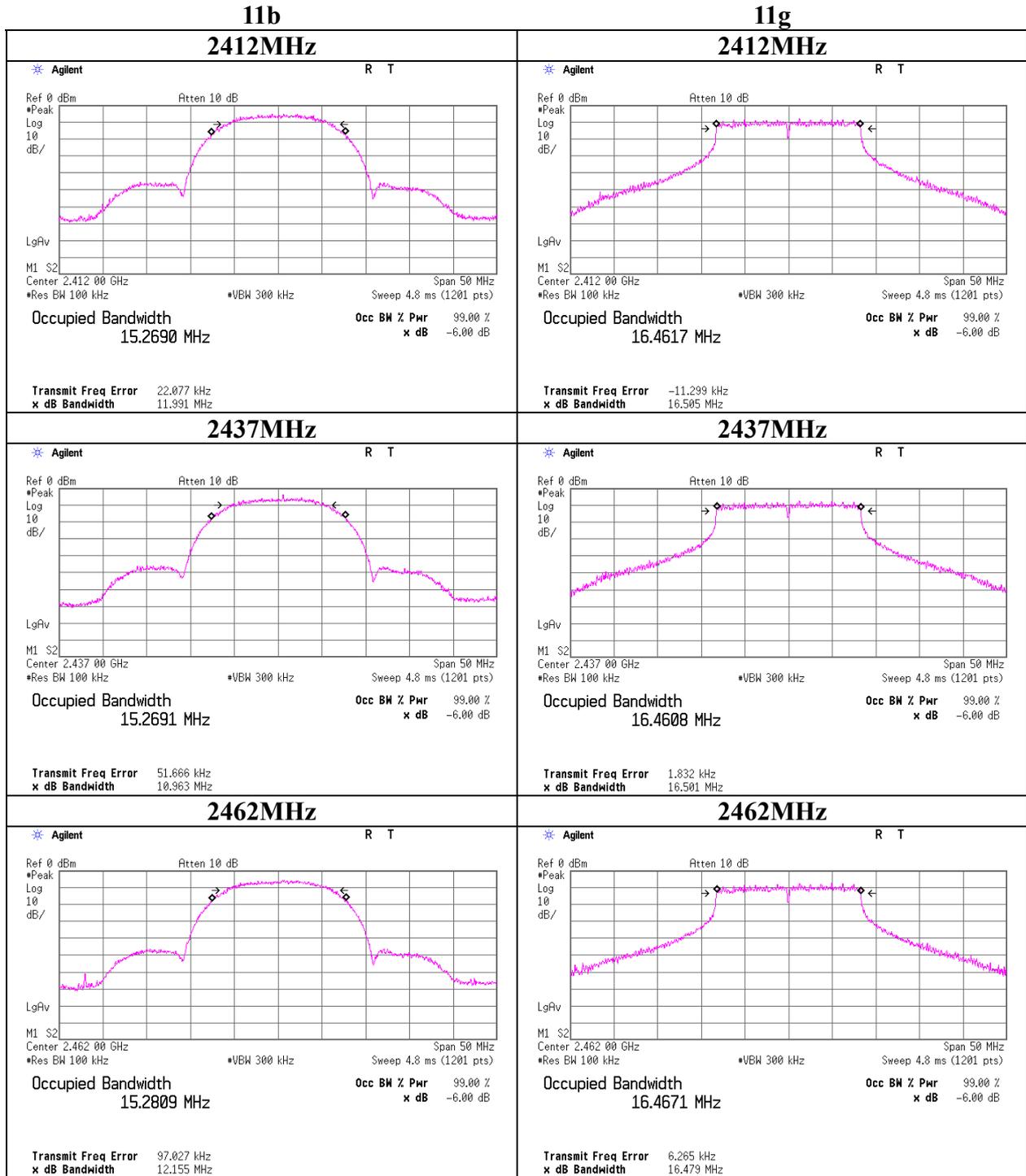
11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	11.991	>500
2437	10.963	>500
2462	12.155	>500

11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.505	>500
2437	16.501	>500
2462	16.479	>500

**6dB Bandwidth**





### Maximum Peak Output Power

Test place	Head Office EMC Lab. No.11 Measurement Room
Report No.	30BE0051-HO
Date	09/28/2009
Temperature/ Humidity	25 deg.C./ 61%
Engineer	Takayuki Shimada
Mode	11g Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	12.03	1.71	10.02	23.76	237.68	30.00	1000	6.24
2437	12.53	1.71	10.02	24.26	266.69	30.00	1000	5.74
2462	12.24	1.71	10.02	23.97	249.46	30.00	1000	6.03

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

2437MHz

Rate [Mbps]	Reading [dBm]	Remark
6	12.20	
9	12.29	
12	12.16	
18	12.26	
24	12.36	
36	12.36	
48	12.10	
54	12.53	*

\*: Worst Rate

All comparizon were carried out on same frequency and measurement factors.

## Radiated Spurious Emission

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. 30BE0051-HO  
Date 10/01/2009 10/01/2009  
Temperature/ Humidity 24 deg.C./ 75% 24 deg.C./ 75%  
Engineer Hironobu Ohnishi Motoya Imura  
(1-10GHz) (Below 1GHz and Above 10GHz)  
Mode 11b Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	55.998	QP	26.2	8.9	7.6	32.0	10.7	40.0	29.3	
Hori	225.010	QP	28.9	17.0	9.3	31.9	23.3	46.0	22.7	
Hori	368.014	QP	39.1	17.3	10.4	32.0	34.8	46.0	11.2	
Hori	644.002	QP	34.4	21.3	12.1	32.1	35.7	46.0	10.3	
Hori	736.012	QP	34.2	22.8	12.5	32.0	37.5	46.0	8.5	
Hori	828.002	QP	34.2	23.6	13.0	31.5	39.3	46.0	6.7	
Hori	1103.991	PK	49.7	23.9	2.0	35.0	40.6	73.9	33.3	
Hori	1655.930	PK	52.9	25.5	2.4	33.6	47.2	73.9	26.7	
Hori	2390.000	PK	57.4	26.7	2.8	32.7	54.2	73.9	19.7	
Hori	2400.000	PK	74.3	26.7	2.8	32.7	71.1	-	-	- See 20dBc Data Sheet
Hori	3216.000	PK	56.0	28.6	3.2	32.4	55.4	-	-	- See 20dBc Data Sheet
Hori	4824.000	PK	44.2	30.9	5.3	31.9	48.5	73.9	25.4	
Hori	7236.000	PK	43.6	35.9	5.6	32.6	52.5	73.9	21.4	
Hori	9648.000	PK	42.9	38.0	6.9	33.4	54.4	73.9	19.5	
Hori	24120.000	PK	47.6	38.2	0.0	32.4	53.4	73.9	20.5	NS
Hori	1103.991	AV	42.5	23.9	2.0	35.0	33.4	53.9	20.5	
Hori	1655.930	AV	46.9	25.5	2.4	33.6	41.2	53.9	12.7	
Hori	2390.000	AV	43.6	26.7	2.8	32.7	40.4	53.9	13.5	
Hori	2400.000	AV	64.5	26.7	2.8	32.7	61.3	-	-	- See 20dBc Data Sheet
Hori	3216.000	AV	54.3	28.6	3.2	32.4	53.7	-	-	- See 20dBc Data Sheet
Hori	4824.000	AV	29.1	30.9	5.3	31.9	33.4	53.9	20.5	
Hori	7236.000	AV	30.0	35.9	5.6	32.6	38.9	53.9	15.0	
Hori	9648.000	AV	30.7	38.0	6.9	33.4	42.2	53.9	11.7	
Hori	24120.000	AV	35.3	38.2	0.0	32.4	41.1	53.9	12.8	NS
Vert	55.962	QP	37.6	9.0	7.6	32.0	22.2	40.0	17.8	
Vert	225.012	QP	31.0	17.0	9.3	31.9	25.4	46.0	20.6	
Vert	368.000	QP	29.3	17.3	10.4	32.0	25.0	46.0	21.0	
Vert	644.000	QP	33.2	21.3	12.1	32.1	34.5	46.0	11.5	
Vert	736.010	QP	33.0	22.8	12.5	32.0	36.3	46.0	9.7	
Vert	828.004	QP	33.7	23.6	13.0	31.5	38.8	46.0	7.2	
Vert	1103.991	PK	54.2	23.9	2.0	35.0	45.1	73.9	28.8	
Vert	1655.930	PK	54.5	25.5	2.4	33.6	48.8	73.9	25.1	
Vert	2390.000	PK	55.0	26.7	2.8	32.7	51.8	73.9	22.1	
Vert	2400.000	PK	71.3	26.7	2.8	32.7	68.1	-	-	- See 20dBc Data Sheet
Vert	3216.000	PK	53.5	28.6	3.2	32.4	52.9	-	-	- See 20dBc Data Sheet
Vert	4824.000	PK	43.7	30.9	5.3	31.9	48.0	73.9	25.9	
Vert	7236.000	PK	42.6	35.9	5.6	32.6	51.5	73.9	22.4	
Vert	9648.000	PK	43.6	38.0	6.9	33.4	55.1	73.9	18.8	
Vert	24120.000	PK	47.6	38.2	0.0	32.4	53.4	73.9	20.5	NS
Vert	1103.991	AV	48.4	23.9	2.0	35.0	39.3	53.9	14.6	
Vert	1655.930	AV	49.2	25.5	2.4	33.6	43.5	53.9	10.4	
Vert	2390.000	AV	41.3	26.7	2.8	32.7	38.1	53.9	15.8	
Vert	2400.000	AV	61.7	26.7	2.8	32.7	58.5	-	-	- See 20dBc Data Sheet
Vert	3216.000	AV	51.3	28.6	3.2	32.4	50.7	-	-	- See 20dBc Data Sheet
Vert	4824.000	AV	28.6	30.9	5.3	31.9	32.9	53.9	21.0	
Vert	7236.000	AV	29.6	35.9	5.6	32.6	38.5	53.9	15.4	
Vert	9648.000	AV	31.2	38.0	6.9	33.4	42.7	53.9	11.2	
Vert	24120.000	AV	35.2	38.2	0.0	32.4	41.0	53.9	12.9	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

\*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

NS: No signal detect.

## Radiated Spurious Emission

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. : 30BE0051-HO  
Date : 10/01/2009  
Temperature/ Humidity : 24 deg.C./ 75%  
Engineer : Hironobu Ohnishi  
(1-10GHz)  
Mode : 11b Tx 2412MHz

### 20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	109.7	26.8	2.8	32.7	106.6	-	-	Carrier
Hori	2400.000	PK	68.4	26.7	2.8	32.7	65.2	86.6	21.4	
Hori	3216.000	PK	54.3	28.6	3.2	32.4	53.7	86.6	32.9	
Vert	2412.000	PK	106.7	26.8	2.8	32.7	103.6	-	-	Carrier
Vert	2400.000	PK	65.6	26.7	2.8	32.7	62.4	83.6	21.2	
Vert	3216.000	PK	51.9	28.6	3.2	32.4	51.3	83.6	32.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor:      10GHz-26.5GHz     $20\log(3.0m/1.0m)= 9.5dB$   
                                 26.5GHz-40GHz     $20\log(3.0m/0.5m)=15.6dB$





## Radiated Spurious Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	30BE0051-HO	
Date	10/01/2009	10/01/2009
Temperature/ Humidity	24 deg.C./ 75%	24 deg.C./ 75%
Engineer	Hironobu Ohnishi	Motoya Imura
	(1-10GHz)	(Below 1GHz and Above 10GHz)
Mode	11b Tx 2462MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	56.792	QP	25.9	8.7	7.6	32.0	10.2	40.0	29.8	
Hori	225.002	QP	28.2	17.0	9.3	31.9	22.6	46.0	23.4	
Hori	368.002	QP	39.1	17.3	10.4	32.0	34.8	46.0	11.2	
Hori	643.992	QP	34.2	21.3	12.1	32.1	35.5	46.0	10.5	
Hori	736.002	QP	34.2	22.8	12.5	32.0	37.5	46.0	8.5	
Hori	828.012	QP	34.2	23.6	13.0	31.5	39.3	46.0	6.7	
Hori	1104.050	PK	49.0	23.9	2.0	35.0	39.9	73.9	34.0	
Hori	1655.933	PK	52.4	25.5	2.4	33.6	46.7	73.9	27.2	
Hori	2483.500	PK	59.3	26.9	2.8	32.7	56.3	73.9	17.6	
Hori	3282.647	PK	56.8	28.7	3.3	32.4	56.4	-	-	See 20dBc Data Sheet
Hori	4924.000	PK	45.6	31.2	5.3	31.9	50.2	73.9	23.7	
Hori	7386.000	PK	47.1	36.2	5.7	32.6	56.4	73.9	17.5	
Hori	9848.000	PK	44.4	38.2	6.9	33.5	56.0	73.9	17.9	
Hori	24620.000	PK	47.6	38.4	0.2	32.2	54.0	73.9	19.9	NS
Hori	1104.050	AV	42.7	23.9	2.0	35.0	33.6	53.9	20.3	
Hori	1655.933	AV	47.7	25.5	2.4	33.6	42.0	53.9	11.9	
Hori	2483.500	AV	45.8	26.9	2.8	32.7	42.8	53.9	11.1	
Hori	3282.647	AV	55.5	28.7	3.3	32.4	55.1	-	-	See 20dBc Data Sheet
Hori	4924.000	AV	29.4	31.2	5.3	31.9	34.0	53.9	19.9	
Hori	7386.000	AV	34.1	36.2	5.7	32.6	43.4	53.9	10.5	
Hori	9848.000	AV	33.5	38.2	6.9	33.5	45.1	53.9	8.8	
Hori	24620.000	AV	35.4	38.4	0.2	32.2	41.8	73.9	32.1	NS
Vert	56.231	QP	38.0	8.9	7.6	32.0	22.5	40.0	17.5	
Vert	225.012	QP	31.2	17.0	9.3	31.9	25.6	46.0	20.4	
Vert	367.999	QP	29.5	17.3	10.4	32.0	25.2	46.0	20.8	
Vert	643.992	QP	33.2	21.3	12.1	32.1	34.5	46.0	11.5	
Vert	736.014	QP	32.9	22.8	12.5	32.0	36.2	46.0	9.8	
Vert	828.004	QP	33.7	23.6	13.0	31.5	38.8	46.0	7.2	
Vert	1104.050	PK	53.8	23.9	2.0	35.0	44.7	73.9	29.2	
Vert	1655.933	PK	54.6	25.5	2.4	33.6	48.9	73.9	25.0	
Vert	2483.500	PK	56.7	26.9	2.8	32.7	53.7	73.9	20.2	
Vert	3282.647	PK	53.7	28.7	3.3	32.4	53.3	-	-	See 20dBc Data Sheet
Vert	4924.000	PK	48.8	31.2	5.3	31.9	53.4	73.9	20.5	
Vert	7386.000	PK	44.5	36.2	5.7	32.6	53.8	73.9	20.1	
Vert	9848.000	PK	44.9	38.2	6.9	33.5	56.5	73.9	17.4	
Vert	24620.000	PK	47.8	38.4	0.2	32.2	54.2	73.9	19.7	NS
Vert	1104.050	AV	48.4	23.9	2.0	35.0	39.3	53.9	14.6	
Vert	1655.933	AV	49.5	25.5	2.4	33.6	43.8	53.9	10.1	
Vert	2483.500	AV	43.5	26.9	2.8	32.7	40.5	53.9	13.4	
Vert	3282.647	AV	51.4	28.7	3.3	32.4	51.0	-	-	See 20dBc Data Sheet
Vert	4924.000	AV	31.1	31.2	5.3	31.9	35.7	53.9	18.2	
Vert	7386.000	AV	31.3	36.2	5.7	32.6	40.6	53.9	13.3	
Vert	9848.000	AV	35.3	38.2	6.9	33.5	46.9	53.9	7.0	
Vert	24620.000	AV	35.2	38.4	0.2	32.2	41.6	53.9	12.3	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

\*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

NS: No signal detect.

### Radiated Spurious Emission

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. 30BE0051-HO  
Date 10/01/2009  
Temperature/ Humidity 24 deg.C./ 75%  
Engineer Hironobu Ohnishi  
(1-10GHz)  
Mode 11b Tx 2462MHz

#### 20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2462.000	PK	109.2	26.8	2.8	32.7	106.1	-	-	Carrier
Hori	3282.647	PK	56.1	28.7	3.3	32.4	55.7	86.1	30.4	
Vert	2462.000	PK	106.9	26.8	2.8	32.7	103.8	-	-	Carrier
Vert	3282.647	PK	52.3	28.7	3.3	32.4	51.9	83.8	31.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz  $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$   
26.5GHz-40GHz  $20\log(3.0\text{m}/0.5\text{m})=15.6\text{dB}$

## Radiated Spurious Emission

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. 30BE0051-HO  
Date 10/01/2009 10/01/2009  
Temperature/ Humidity 24 deg.C./ 75% 24 deg.C./ 75%  
Engineer Hironobu Ohnishi Motoya Imura  
(1-10GHz) (Below 1GHz and Above 10GHz)  
Mode 11g Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	55.582	QP	25.8	9.1	7.6	32.0	10.5	40.0	29.5	
Hori	225.020	QP	27.0	17.0	9.3	31.9	21.4	46.0	24.6	
Hori	367.998	QP	38.3	17.3	10.4	32.0	34.0	46.0	12.0	
Hori	643.990	QP	33.0	21.3	12.1	32.1	34.3	46.0	11.7	
Hori	735.993	QP	34.0	22.8	12.5	32.0	37.3	46.0	8.7	
Hori	827.994	QP	34.3	23.6	13.0	31.5	39.4	46.0	6.6	
Hori	1559.120	PK	53.5	25.4	2.3	33.8	47.4	73.9	26.5	
Hori	1655.930	PK	54.3	25.5	2.4	33.6	48.6	73.9	25.3	
Hori	2390.000	PK	64.6	26.7	2.8	32.7	61.4	73.9	12.5	
Hori	2400.000	PK	87.4	26.7	2.8	32.7	84.2	-	-	- See 20dBc Data Sheet
Hori	3216.000	PK	56.9	28.6	3.2	32.4	56.3	-	-	- See 20dBc Data Sheet
Hori	24120.000	PK	47.4	38.2	0.0	32.4	53.2	73.9	20.7	NS
Hori	1559.120	AV	46.1	25.4	2.3	33.8	40.0	53.9	13.9	
Hori	1655.930	AV	49.2	25.5	2.4	33.6	43.5	53.9	10.4	
Hori	2390.000	AV	46.1	26.7	2.8	32.7	42.9	53.9	11.0	
Hori	2400.000	AV	62.3	26.7	2.8	32.7	59.1	-	-	- See 20dBc Data Sheet
Hori	3216.000	AV	54.1	28.6	3.2	32.4	53.5	-	-	- See 20dBc Data Sheet
Hori	24120.000	AV	35.1	38.2	0.0	32.4	40.9	53.9	13.0	NS
Vert	56.160	QP	37.9	8.9	7.6	32.0	22.4	40.0	17.6	
Vert	225.012	QP	30.5	17.0	9.3	31.9	24.9	46.0	21.1	
Vert	368.004	QP	29.4	17.3	10.4	32.0	25.1	46.0	20.9	
Vert	643.998	QP	32.2	21.3	12.1	32.1	33.5	46.0	12.5	
Vert	736.009	QP	33.1	22.8	12.5	32.0	36.4	46.0	9.6	
Vert	828.002	QP	33.1	23.6	13.0	31.5	38.2	46.0	7.8	
Vert	1559.120	PK	51.4	25.4	2.3	33.8	45.3	73.9	28.6	
Vert	1655.930	PK	54.5	25.5	2.4	33.6	48.8	73.9	25.1	
Vert	2390.000	PK	61.5	26.7	2.8	32.7	58.3	73.9	15.6	
Vert	2400.000	PK	85.2	26.7	2.8	32.7	82.0	-	-	- See 20dBc Data Sheet
Vert	3216.000	PK	51.7	28.6	3.2	32.4	51.1	-	-	- See 20dBc Data Sheet
Vert	9648.000	PK	42.9	38.0	6.9	33.4	54.4	73.9	19.5	
Vert	24120.000	PK	47.5	38.2	0.0	32.4	53.3	73.9	20.6	NS
Vert	1559.120	AV	44.9	25.4	2.3	33.8	38.8	53.9	15.1	
Vert	1655.930	AV	50.8	25.5	2.4	33.6	45.1	53.9	8.8	
Vert	2390.000	AV	43.3	26.7	2.8	32.7	40.1	53.9	13.8	
Vert	2400.000	AV	59.4	26.7	2.8	32.7	56.2	-	-	- See 20dBc Data Sheet
Vert	3216.000	AV	49.5	28.6	3.2	32.4	48.9	-	-	- See 20dBc Data Sheet
Vert	9648.000	AV	30.2	38.0	6.9	33.4	41.7	53.9	12.2	
Vert	24120.000	AV	35.2	38.2	0.0	32.4	41.0	53.9	12.9	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

\*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 10GHz-26.5GHz  $20\log(3.0m/1.0m)= 9.5dB$

26.5GHz-40GHz  $20\log(3.0m/0.5m)=15.6dB$

NS: No signal detect.



## Radiated Spurious Emission

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. 30BE0051-HO  
Date 10/01/2009 10/01/2009  
Temperature/ Humidity 24 deg.C./ 75% 24 deg.C./ 75%  
Engineer Hironobu Ohnishi Motoya Imura  
(1-10GHz) (Below 1GHz and Above 10GHz)  
Mode 11g Tx 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	56.120	QP	27.2	8.9	7.6	32.0	11.7	40.0	28.3	
Hori	225.017	QP	28.5	17.0	9.3	31.9	22.9	46.0	23.1	
Hori	325.002	QP	32.7	16.7	10.1	32.0	27.5	46.0	18.5	
Hori	368.002	QP	37.9	17.3	10.4	32.0	33.6	46.0	12.4	
Hori	736.002	QP	34.2	22.8	12.5	32.0	37.5	46.0	8.5	
Hori	827.997	QP	34.0	23.6	13.0	31.5	39.1	46.0	6.9	
Hori	1104.050	PK	50.0	23.9	2.0	35.0	40.9	73.9	33.0	
Hori	1655.933	PK	53.1	25.5	2.4	33.6	47.4	73.9	26.5	
Hori	3249.316	PK	56.9	28.7	3.3	32.4	56.5	-	-	See 20dBc Data Sheet
Hori	4874.000	PK	43.1	31.0	5.3	31.9	47.5	73.9	26.4	
Hori	7311.000	PK	50.4	36.1	5.6	32.6	59.5	73.9	14.4	
Hori	9748.000	PK	43.2	38.1	6.9	33.4	54.8	73.9	19.1	
Hori	24370.000	PK	47.4	38.3	0.0	32.3	53.4	73.9	20.5	NS
Hori	1104.050	AV	44.4	23.9	2.0	35.0	35.3	53.9	18.6	
Hori	1655.933	AV	49.3	25.5	2.4	33.6	43.6	53.9	10.3	
Hori	3249.316	AV	55.6	28.7	3.3	32.4	55.2	-	-	See 20dBc Data Sheet
Hori	4874.000	AV	30.6	31.0	5.3	31.9	35.0	53.9	18.9	
Hori	7311.000	AV	34.5	36.1	5.6	32.6	43.6	53.9	10.3	
Hori	9748.000	AV	29.6	38.1	6.9	33.4	41.2	53.9	12.7	
Hori	24370.000	AV	35.3	38.3	0.0	32.3	41.3	53.9	12.6	NS
Vert	55.693	QP	38.5	9.0	7.6	32.0	23.1	40.0	16.9	
Vert	225.019	QP	31.5	17.0	9.3	31.9	25.9	46.0	20.1	
Vert	325.014	QP	27.2	16.7	10.1	32.0	22.0	46.0	24.0	
Vert	368.009	QP	29.7	17.3	10.4	32.0	25.4	46.0	20.6	
Vert	736.014	QP	33.2	22.8	12.5	32.0	36.5	46.0	9.5	
Vert	827.997	QP	33.2	23.6	13.0	31.5	38.3	46.0	7.7	
Vert	1104.050	PK	54.4	23.9	2.0	35.0	45.3	73.9	28.6	
Vert	1655.933	PK	55.1	25.5	2.4	33.6	49.4	73.9	24.5	
Vert	3249.316	PK	54.6	28.7	3.3	32.4	54.2	-	-	See 20dBc Data Sheet
Vert	4874.000	PK	43.7	31.0	5.3	31.9	48.1	73.9	25.8	
Vert	7311.000	PK	47.5	36.1	5.6	32.6	56.6	73.9	17.3	
Vert	9748.000	PK	43.0	38.1	6.9	33.4	54.6	73.9	19.3	
Vert	24370.000	PK	47.6	38.3	0.0	32.3	53.6	73.9	20.3	NS
Vert	1104.050	AV	50.0	23.9	2.0	35.0	40.9	53.9	13.0	
Vert	1655.933	AV	51.3	25.5	2.4	33.6	45.6	53.9	8.3	
Vert	3249.316	AV	53.0	28.7	3.3	32.4	52.6	-	-	See 20dBc Data Sheet
Vert	4874.000	AV	31.7	31.0	5.3	31.9	36.1	53.9	17.8	
Vert	7311.000	AV	32.5	36.1	5.6	32.6	41.6	53.9	12.3	
Vert	9748.000	AV	30.2	38.1	6.9	33.4	41.8	53.9	12.1	
Vert	24370.000	AV	35.2	38.3	0.0	32.3	41.2	53.9	12.7	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

\*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 10GHz-26.5GHz  $20\log(3.0m/1.0m)= 9.5dB$

26.5GHz-40GHz  $20\log(3.0m/0.5m)=15.6dB$

NS: No signal detect.



## Radiated Spurious Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	30BE0051-HO	
Date	10/01/2009	10/01/2009
Temperature/ Humidity	24 deg.C./ 75%	24 deg.C./ 75%
Engineer	Hironobu Ohnishi	Motoya Imura
	(1-10GHz)	(Below 1GHz and Above 10GHz)
Mode	11g Tx 2462MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	56.230	QP	27.9	8.9	7.6	32.0	12.4	40.0	27.6	
Hori	225.004	QP	27.9	17.0	9.3	31.9	22.3	46.0	23.7	
Hori	325.002	QP	32.9	16.7	10.1	32.0	27.7	46.0	18.3	
Hori	368.004	QP	38.6	17.3	10.4	32.0	34.3	46.0	11.7	
Hori	736.011	QP	34.3	22.8	12.5	32.0	37.6	46.0	8.4	
Hori	828.001	QP	34.1	23.6	13.0	31.5	39.2	46.0	6.8	
Hori	1104.050	PK	49.2	23.9	2.0	35.0	40.1	73.9	33.8	
Hori	1655.933	PK	52.8	25.5	2.4	33.6	47.1	73.9	26.8	
Hori	2483.500	PK	71.0	26.9	2.8	32.7	68.0	73.9	5.9	
Hori	3282.647	PK	59.0	28.7	3.3	32.4	58.6	-	-	See 20dBc Data Sheet
Hori	4924.000	PK	41.3	31.2	5.3	31.9	45.9	73.9	28.0	
Hori	7386.000	PK	48.5	36.2	5.7	32.6	57.8	73.9	16.1	
Hori	9848.000	PK	41.6	38.2	6.9	33.5	53.2	73.9	20.7	
Hori	24620.000	PK	47.8	38.4	0.2	32.2	54.2	73.9	19.7	NS
Hori	1104.050	AV	44.3	23.9	2.0	35.0	35.2	53.9	18.7	
Hori	1655.933	AV	49.0	25.5	2.4	33.6	43.3	53.9	10.6	
Hori	2483.500	AV	52.3	26.9	2.8	32.7	49.3	53.9	4.6	
Hori	3282.647	AV	57.9	28.7	3.3	32.4	57.5	-	-	See 20dBc Data Sheet
Hori	4924.000	AV	29.0	31.2	5.3	31.9	33.6	53.9	20.3	
Hori	7386.000	AV	32.6	36.2	5.7	32.6	41.9	53.9	12.0	
Hori	9848.000	AV	29.4	38.2	6.9	33.5	41.0	53.9	12.9	
Hori	24620.000	AV	35.4	38.4	0.2	32.2	41.8	53.9	12.1	NS
Vert	55.497	QP	39.2	9.1	7.6	32.0	23.9	40.0	16.1	
Vert	225.002	QP	32.0	17.0	9.3	31.9	26.4	46.0	19.6	
Vert	325.001	QP	27.9	16.7	10.1	32.0	22.7	46.0	23.3	
Vert	368.013	QP	30.0	17.3	10.4	32.0	25.7	46.0	20.3	
Vert	736.012	QP	33.4	22.8	12.5	32.0	36.7	46.0	9.3	
Vert	827.998	QP	33.9	23.6	13.0	31.5	39.0	46.0	7.0	
Vert	1104.050	PK	54.0	23.9	2.0	35.0	44.9	73.9	29.0	
Vert	1655.933	PK	55.0	25.5	2.4	33.6	49.3	73.9	24.6	
Vert	2483.500	PK	66.8	26.9	2.8	32.7	63.8	73.9	10.1	
Vert	3282.647	PK	55.9	28.7	3.3	32.4	55.5	-	-	See 20dBc Data Sheet
Vert	4924.000	PK	44.1	31.2	5.3	31.9	48.7	73.9	25.2	
Vert	7386.000	PK	44.9	36.2	5.7	32.6	54.2	73.9	19.7	
Vert	9848.000	PK	41.6	38.2	6.9	33.5	53.2	73.9	20.7	
Vert	24620.000	PK	47.6	38.4	0.2	32.2	54.0	73.9	19.9	NS
Vert	1104.050	AV	49.9	23.9	2.0	35.0	40.8	53.9	13.1	
Vert	1655.933	AV	51.4	25.5	2.4	33.6	45.7	53.9	8.2	
Vert	2483.500	AV	49.0	26.9	2.8	32.7	46.0	53.9	7.9	
Vert	3282.647	AV	54.3	28.7	3.3	32.4	53.9	-	-	See 20dBc Data Sheet
Vert	4924.000	AV	30.6	31.2	5.3	31.9	35.2	53.9	18.7	
Vert	7386.000	AV	31.1	36.2	5.7	32.6	40.4	53.9	13.5	
Vert	9848.000	AV	30.1	38.2	6.9	33.5	41.7	53.9	12.2	
Vert	24620.000	AV	35.3	38.4	0.2	32.2	41.7	53.9	12.2	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

\*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

NS: No signal detect.

## Radiated Spurious Emission

Test place                    Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No.                    30BE0051-HO  
Date                            10/01/2009  
Temperature/ Humidity      24 deg.C./ 75%  
Engineer                      Hironobu Ohnishi  
                                      (1-10GHz)  
Mode                            11g Tx 2462MHz

### 20dBc Data Sheet

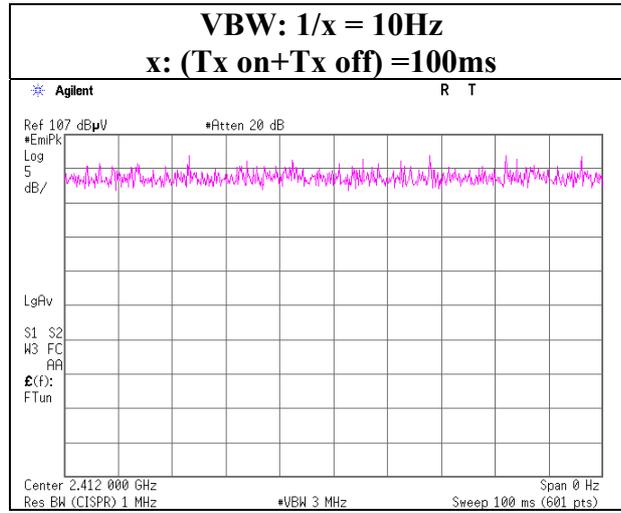
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2462.000	PK	104.6	26.8	2.8	32.7	101.5	-	-	Carrier
Hori	3282.647	PK	58.4	28.7	3.3	32.4	58.0	81.5	23.5	
Vert	2462.000	PK	101.9	26.8	2.8	32.7	98.8	-	-	Carrier
Vert	3282.647	PK	54.8	28.7	3.3	32.4	54.4	78.8	24.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

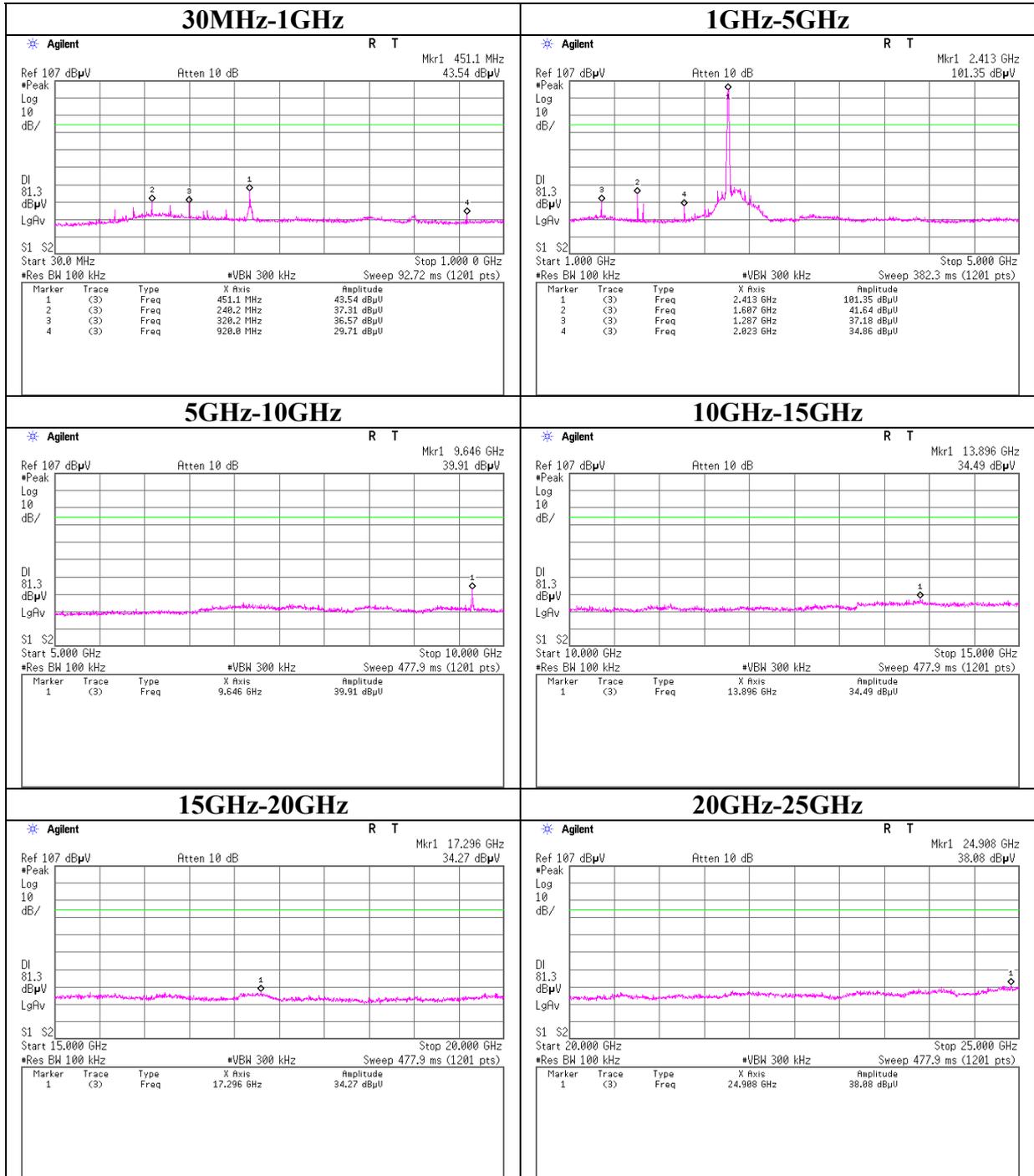
Distance factor:      10GHz-26.5GHz    20log(3.0m/1.0m)= 9.5dB  
                              26.5GHz-40GHz    20log(3.0m/0.5m)=15.6dB

### VBW (AV) Calculation



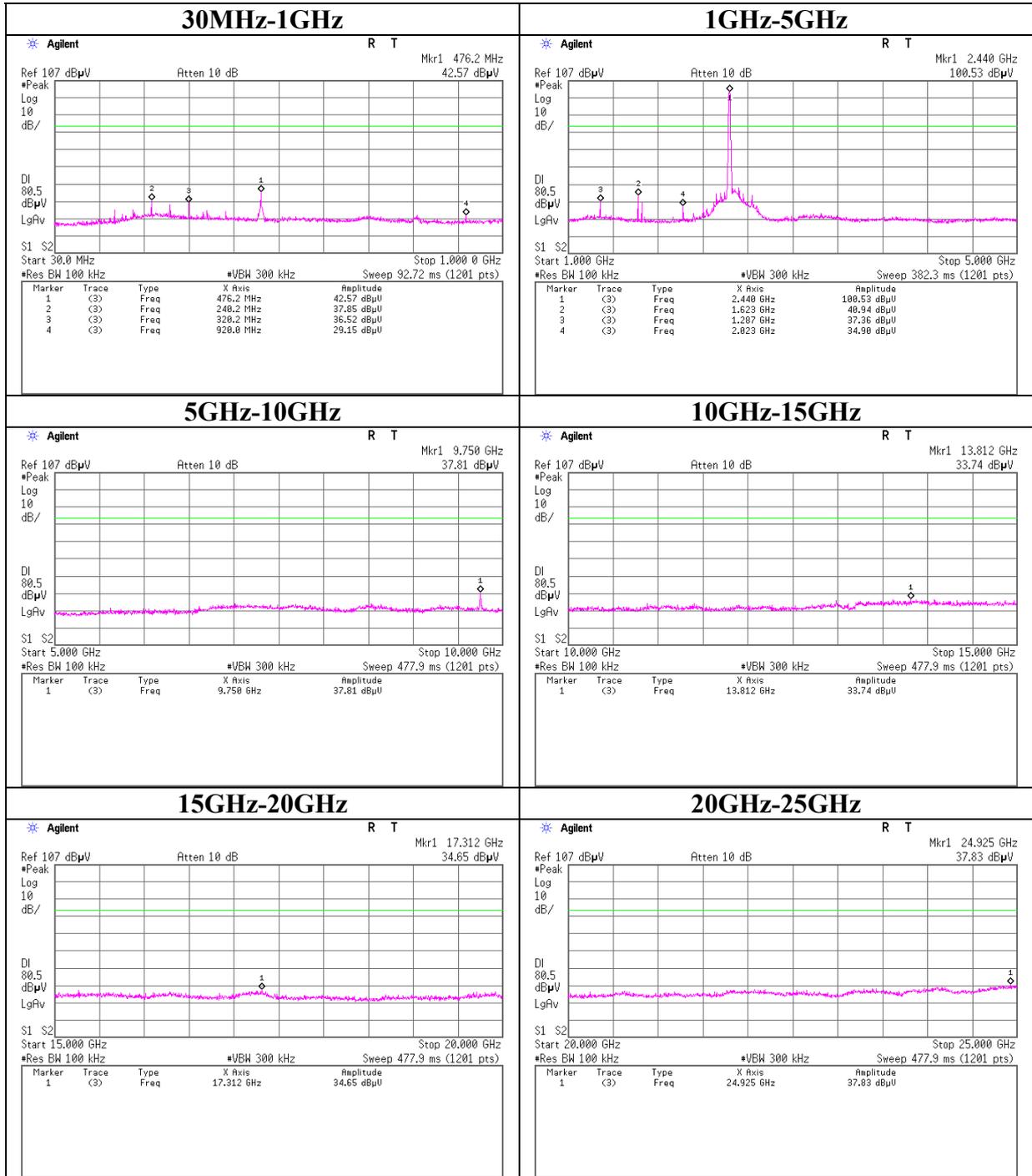
## Conducted Spurious Emission

### 11b Tx 2412MHz



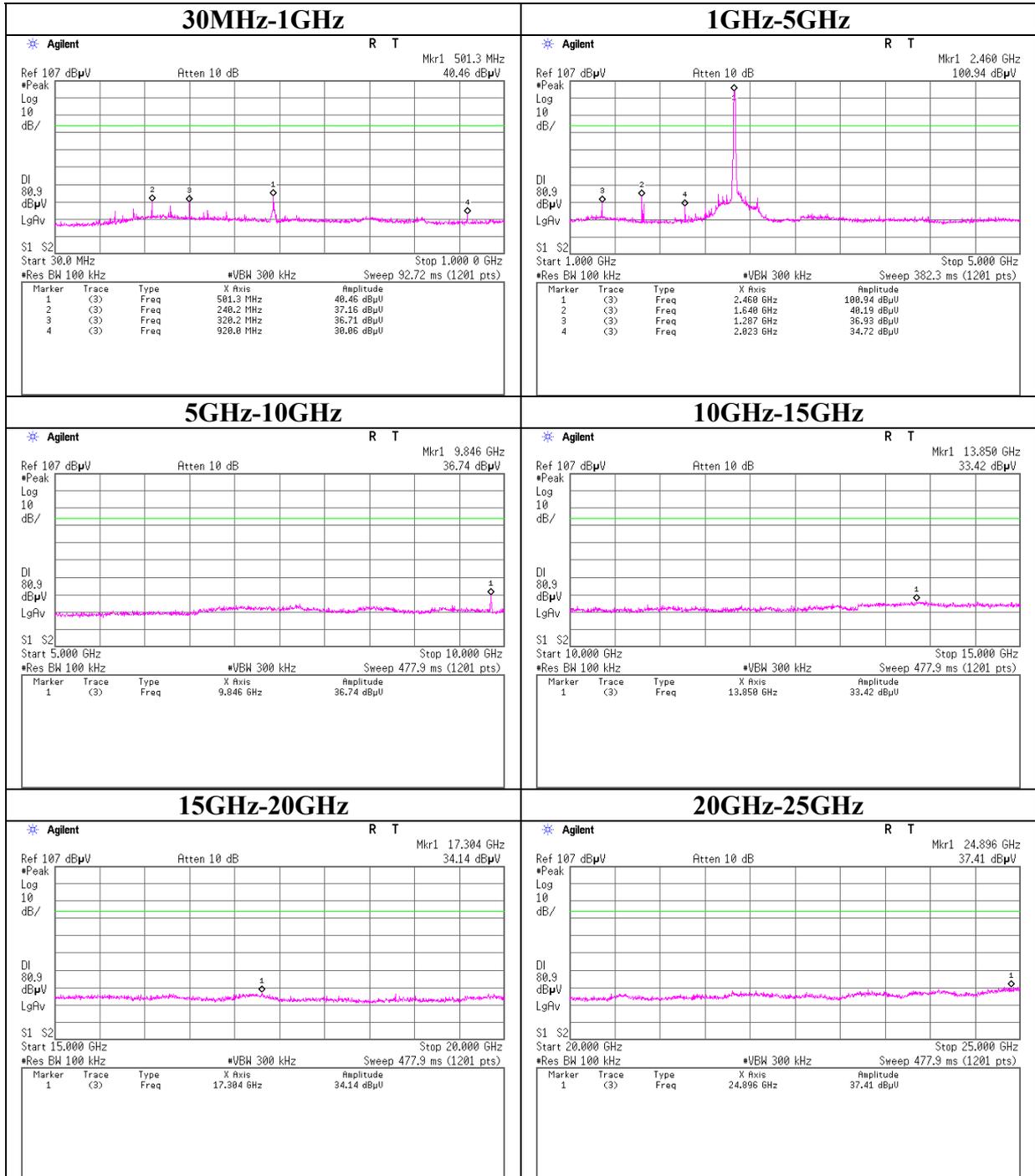
## Conducted Spurious Emission

### 11b Tx 2437MHz



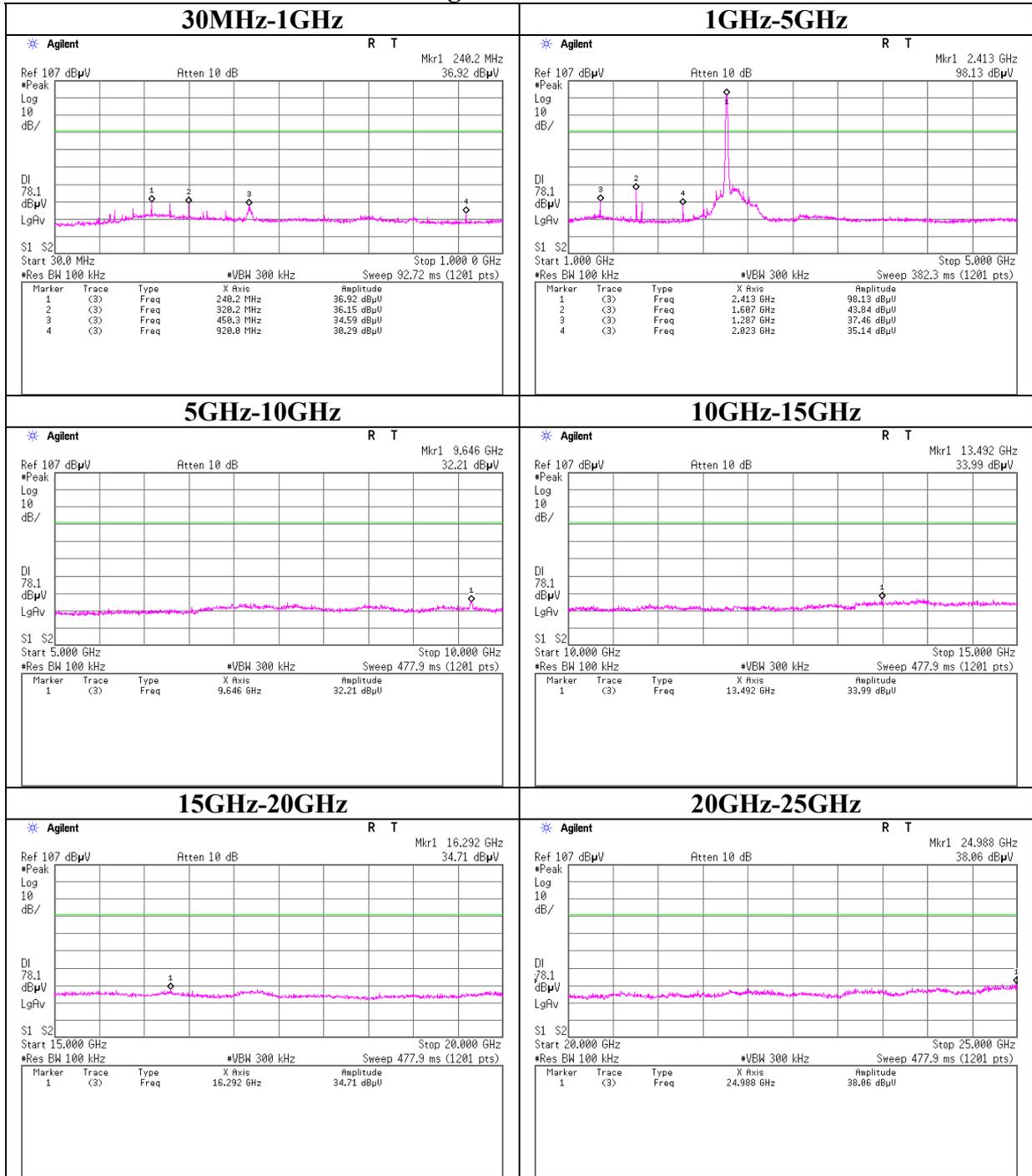
## Conducted Spurious Emission

### 11b Tx 2462MHz



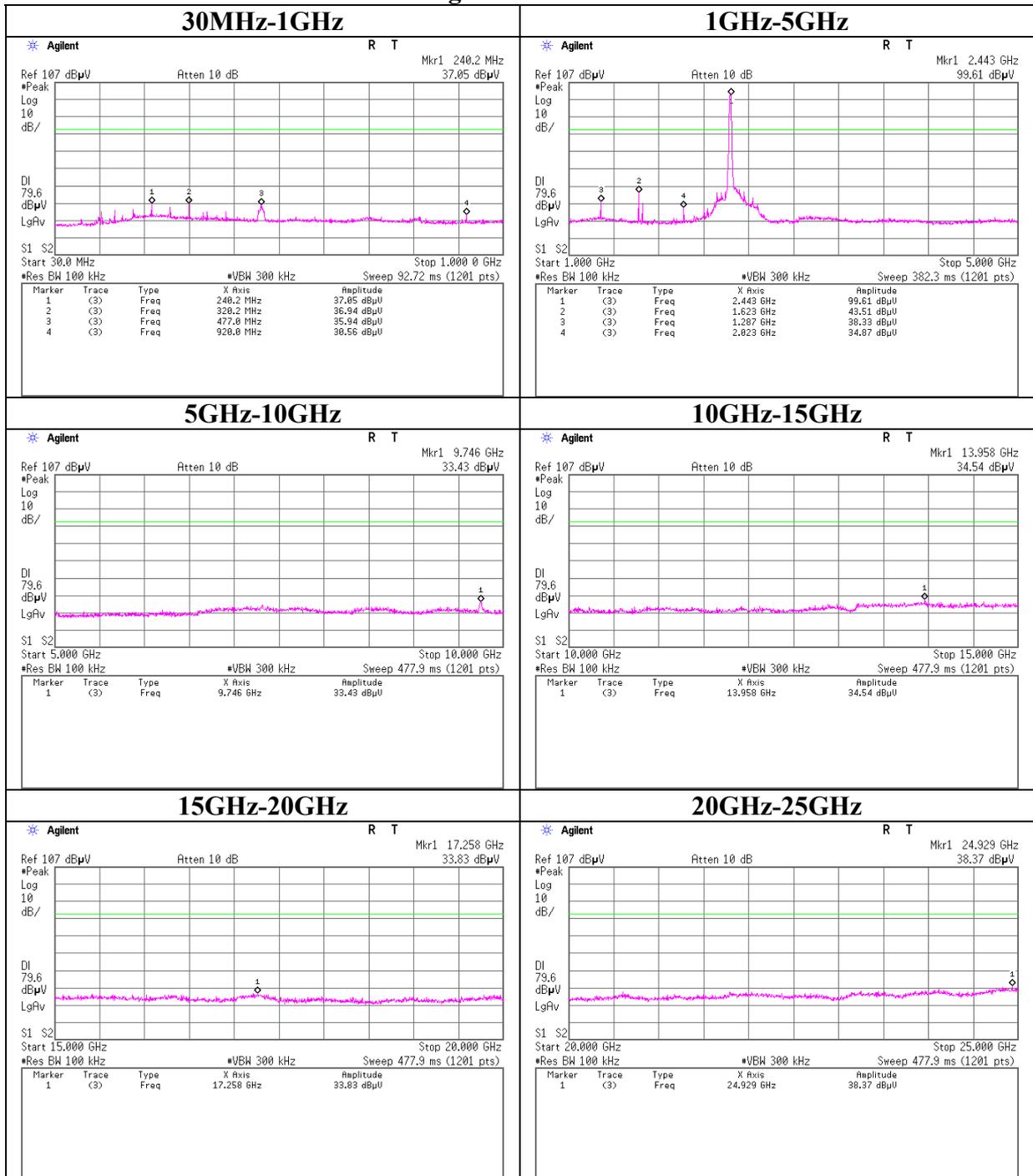
## Conducted Spurious Emission

### 11g Tx 2412MHz



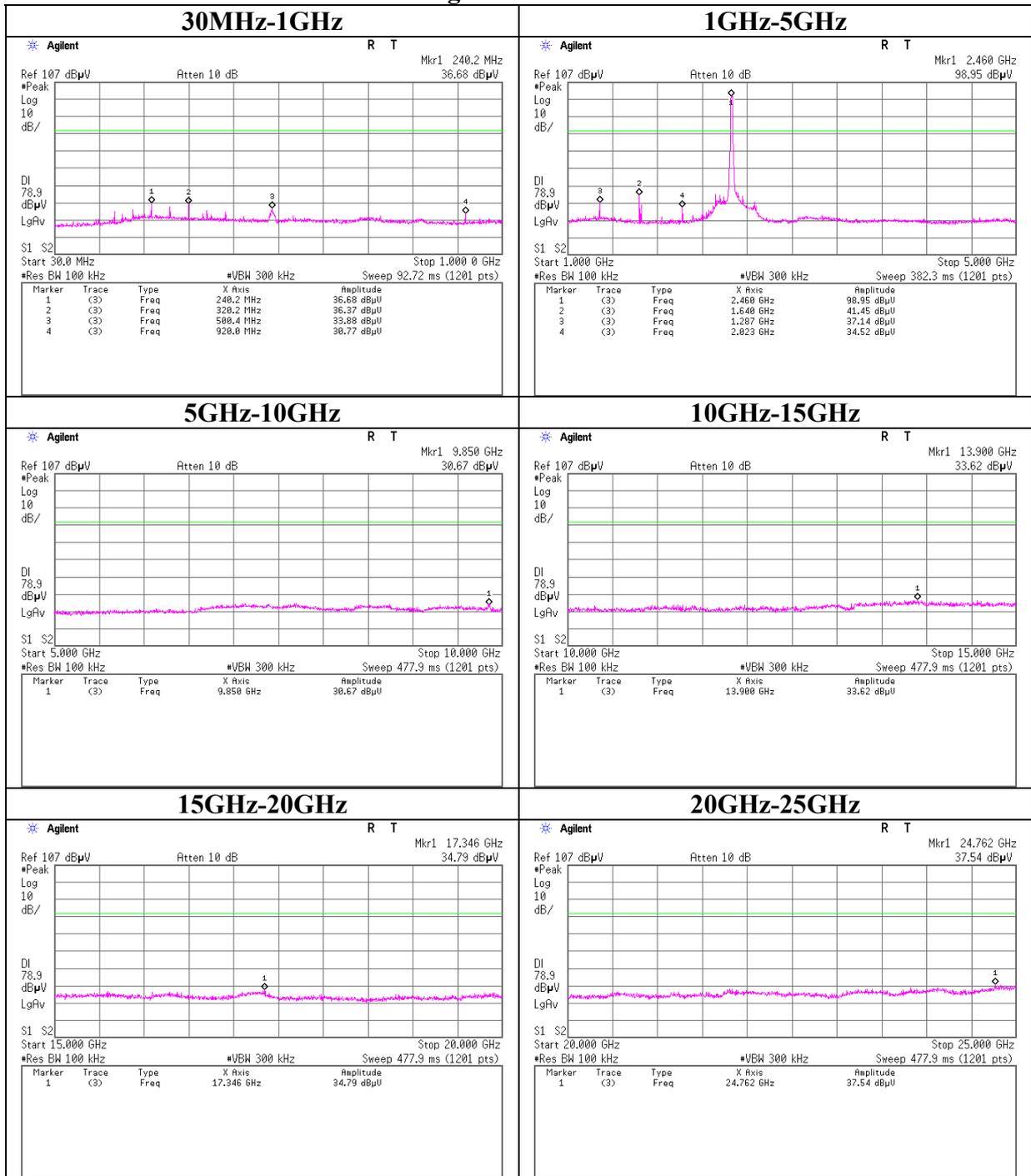
## Conducted Spurious Emission

### 11g Tx 2437MHz



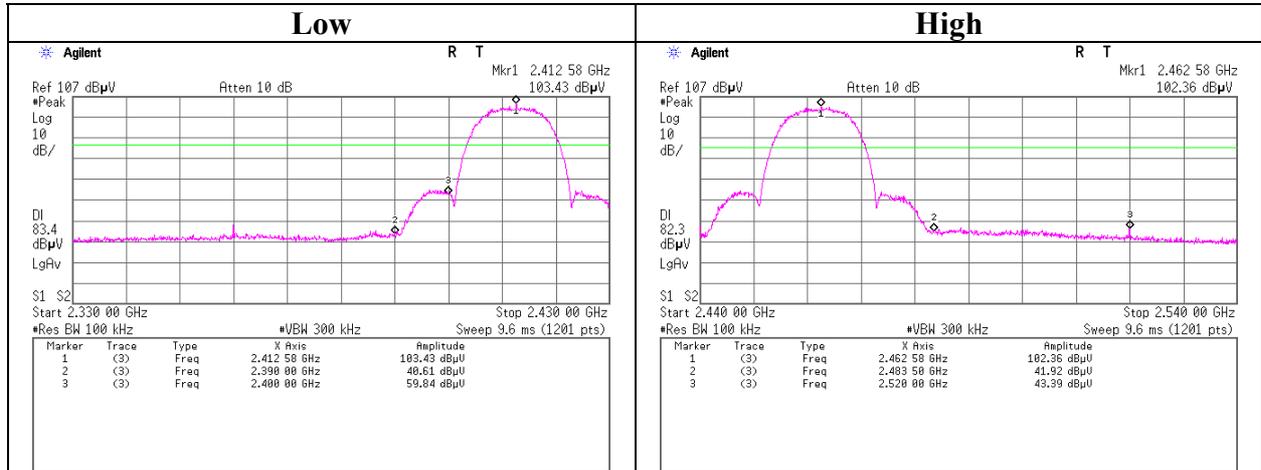
## Conducted Spurious Emission

### 11g Tx 2462MHz

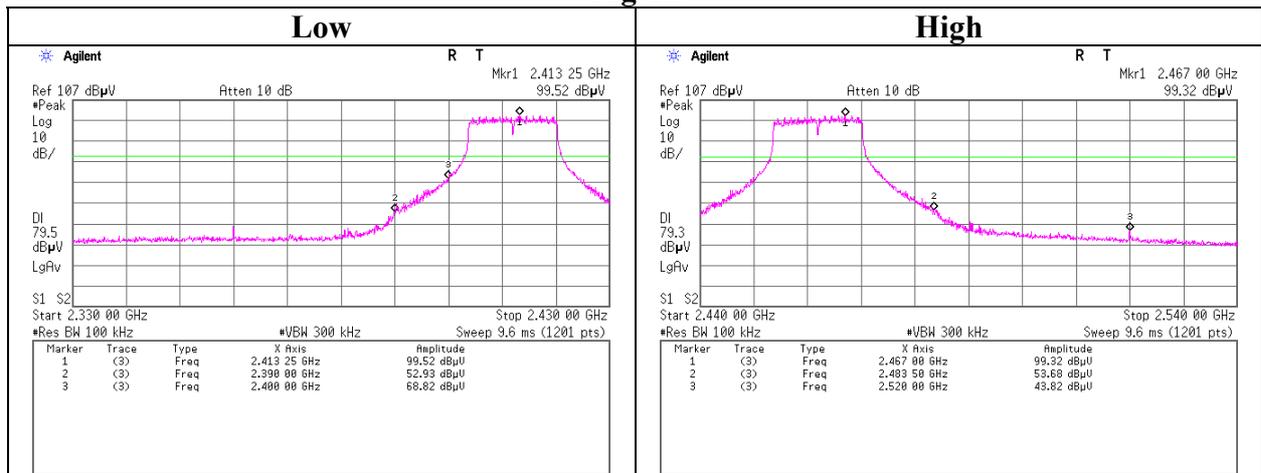


## Conducted Emission Band Edge compliance

### 11b Tx



### 11g Tx



### Power Density

Test place Head Office EMC Lab. No.11 Measurement Room  
Report No. 30BE0051-HO  
Date 09/28/2009  
Temperature/ Humidity 25 deg.C./ 61%  
Engineer Takayuki Shimada  
Mode 11b Tx, 11g Tx

11b

Freq. [MHz]	Reading [dBuV]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.60	97.45	-9.55	1.71	10.02	2.18	8.00	5.82
2439.36	97.13	-9.87	1.71	10.02	1.86	8.00	6.14
2462.60	97.33	-9.67	1.71	10.02	2.06	8.00	5.94

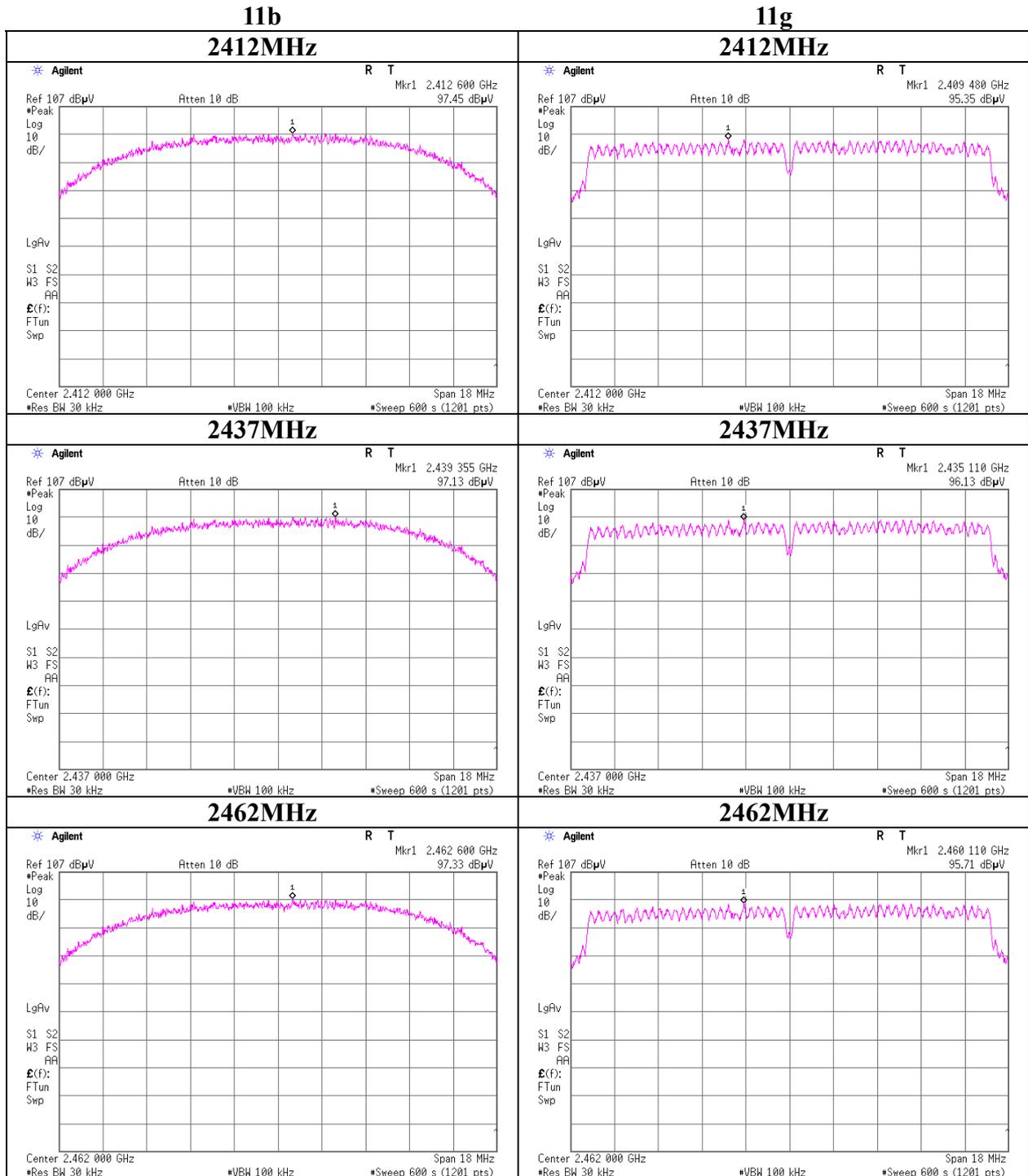
11g

Freq. [MHz]	Reading [dBuV]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2409.48	95.35	-11.65	1.71	10.02	0.08	8.00	7.92
2435.11	96.13	-10.87	1.71	10.02	0.86	8.00	7.14
2460.11	95.71	-11.29	1.71	10.02	0.44	8.00	7.56

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

**Power Density**



### APPENDIX 3: Test instruments

#### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2008/12/08 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT/RE/CE	2008/11/07 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2009/08/26 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2009/08/26 * 12
MCC-114	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	290212/4	AT	2009/08/27 * 12
MAT-22	Attenuator(10dB) DC-18GHz	Orient Microwave	BX10-0476-00	-	AT	2009/03/24 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2009/02/03 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2009/02/06 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2009/08/10 * 12
MCC-57	Microwave Cable 1G-26.5GHz 6m	Suhner	SUCOFLEX104	246769(1m) / 292411(5m)	RE	2008/11/05 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2009/03/19 * 12
MHF-20	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCC	607	RE	2008/12/12 * 12
MCC-79	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278923/4	RE	2008/12/17 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2009/06/18 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2009/06/29 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE/CE	2008/10/03 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2009/01/10 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2009/01/10 * 12
MCC-50	Coaxial cable	UL Japan	-	-	RE	2009/03/18 * 12
MAT-31	Attenuator(6dB)	TME	UFA-01	-	RE	2009/03/03 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2009/03/18 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE	2009/02/18 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/ TSJ	5D-2W(10m)/ SFM141(5m)/ 421-010(1m)/ sucoform141-PE(1m)/ RFM-E121(Switcher)	-/04178	CE	2009/07/01 * 12

**The expiration date of the calibration is the end of the expired month.**

**All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.**

**As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.**

**Test Item: CE: Conducted Emission  
RE: Radiated Emission  
AT: Antenna Terminal Conducted test**

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