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### **APPENDIX 2: Data of EMI test**

### **Conducted Emission**

# DATA OF CONDUCTED EMISSION TEST UL Japan, Inc. Head Office EMC Lab

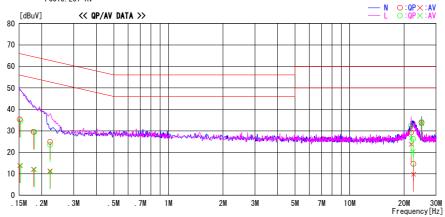
UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber Date : 2011/06/21

Report No. : 31HE0184-H0-02

Temp./Humi. : 22deg. C / 65% RH
Engineer : Keisuke Kawamura

Mode / Remarks : Tx 11n-20, MCSO, 2462MHz

LIMIT : FCC15. 207 QP FCC15. 207 AV



-	Reading	Level	Corr.	Resi	Results Limit Margin		gin				
Frequency	QP	AV	Factor	QP	AV	QP	AV	QP	AV	Phase	Comment
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0. 15145	22. 2	0.8	13. 1	35. 3	13. 9	65. 9	55. 9			N	
0.18045	16.4	-1. 0	13. 1	29. 5		64. 5	54. 5			N	
0. 22251	11.5	-1. 9	13. 3	24. 8		62. 7	52. 7		41. 3	N	
21.89031	14.6	9. 1	14. 6	29. 2		60. 0	50. 0			N	
22. 51471	0.0	-4. 8	14. 6	14. 6		60. 0	50. 0		40. 2	N	
24. 95711		18. 9		33. 7		60. 0	50. 0		16. 4		
0. 15291		0. 7	13. 1	34. 7		65. 8	55. 8		42. 0	L	
0. 18191	16.3	-1. 1	13. 1	29. 4	12. 0	64. 4	54. 4	35.0	42. 4	L	
0. 22251		-2. 3	13. 3	23. 5		62. 7	52. 7	39. 2	41. 7	L	
21.89026		12. 0	14. 6			60. 0	50. 0		23. 4	L	
22. 44786	11.7	5. 8	14. 6	26. 3	20. 4	60. 0	50. 0	33.7	29. 6	L	
24. 95762	19.4	18. 7	14. 7	34. 1	33. 4	60. 0	50. 0	25. 9	16. 6	L	

UL Japan, Inc.

**Head Office EMC Lab.** 

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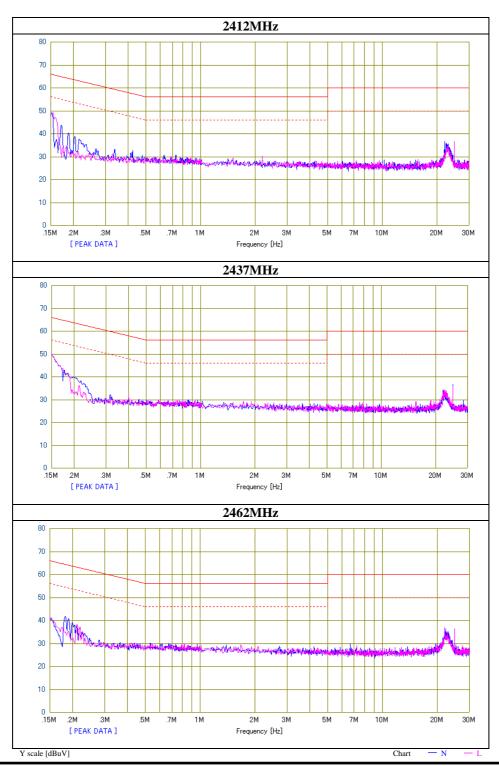
#### **Conducted Emission**

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02 Date 06/21/2011

Temperature/ Humidity 22 deg.C / 65% RH Engineer Keisuke Kawamura

Mode 11b Tx



## UL Japan, Inc.

**Head Office EMC Lab.** 

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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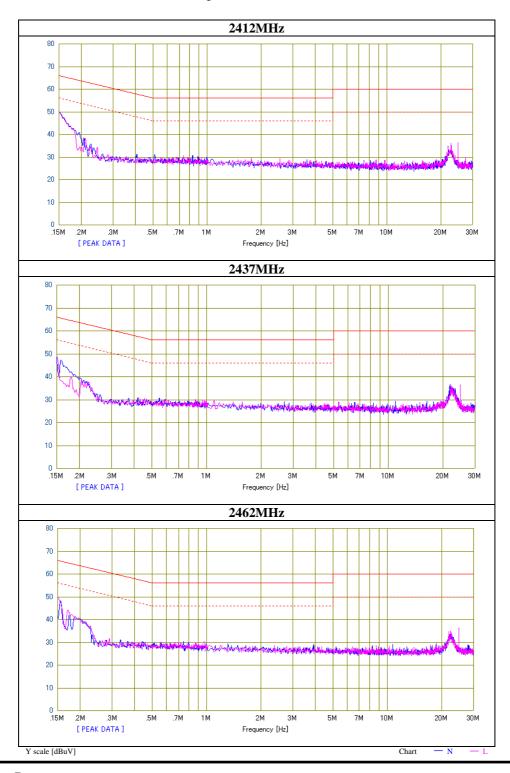
#### **Conducted Emission**

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02 Date 06/21/2011

Temperature/ Humidity 22 deg.C / 65% RH Engineer Keisuke Kawamura

Mode 11g Tx



## UL Japan, Inc.

**Head Office EMC Lab.** 

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#### **Conducted Emission**

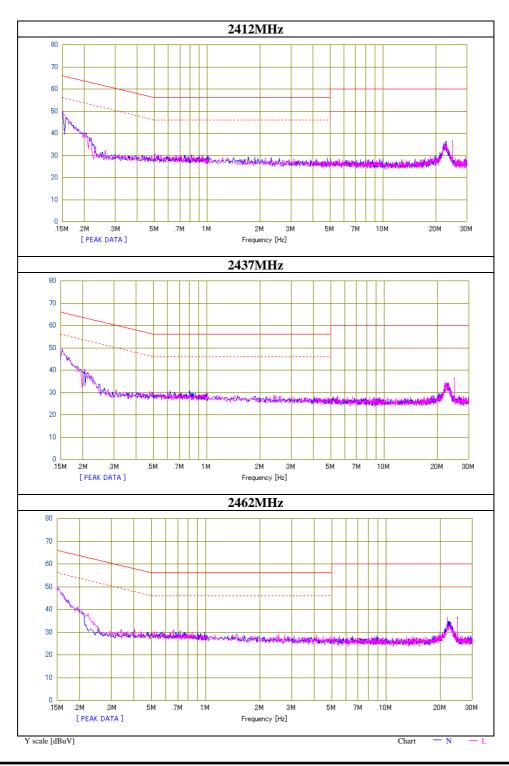
Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02 Date 06/21/2011

Temperature/ Humidity
Engineer

22 deg.C / 65%RH
Keisuke Kawamura

Mode 11n-20 Tx



## UL Japan, Inc.

**Head Office EMC Lab.** 

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### **6dB Bandwidth**

Test place Head Office EMC Lab. No.11 Measurement Room

Report No. 31HE0184-HO-02
Date 06/14/2011
Temperature/ Humidity 26 deg.C / 51%RH
Engineer Satofumi Matsuyama

Mode T:

11b

Frequency	6dB Bandwidth	Limit		
[MHz]	[MHz]	[kHz]		
2412	7.598	>500		
2437	8.083	>500		
2462	8.089	>500		

11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	15.148	>500
2437	15.138	>500
2462	15.162	>500

11n-20

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]		
2412	15.114	>500		
2437	15.146	>500		
2462	15.113	>500		

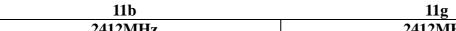
# UL Japan, Inc.

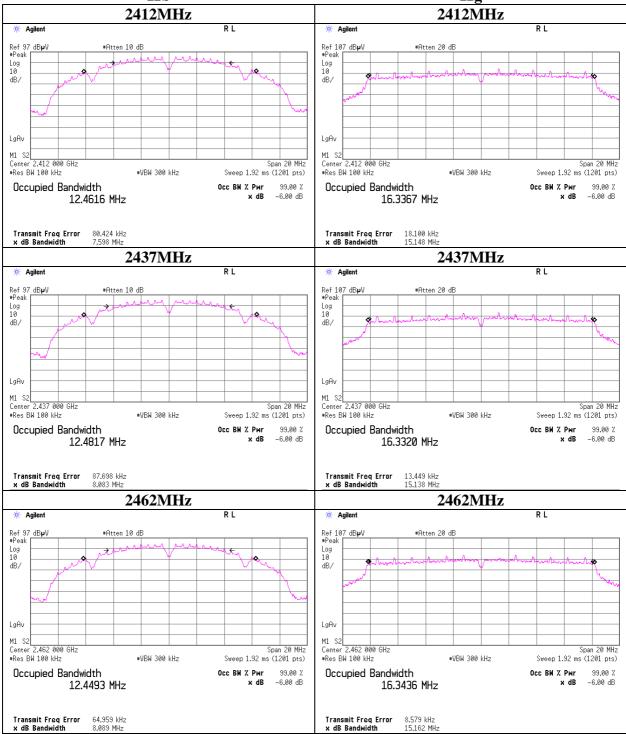
**Head Office EMC Lab.** 

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: 31HE0184-HO-02 Test report No. Page : 20 of 60 : July 11, 2011 Issued date FCC ID : VPYLBQX466

## 6dB Bandwidth





### UL Japan, Inc.

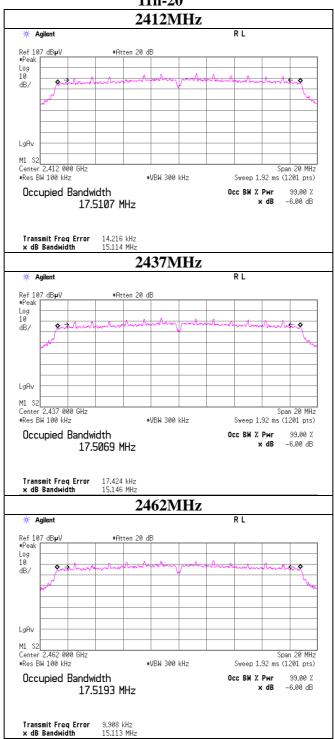
Head Office EMC Lab.

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### 6dB Bandwidth

11n-20



**Head Office EMC Lab.** 

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### **Maximum Peak Output Power**

Test place Head Office EMC Lab. No.6 Measurement Room

Report No. 31HE0184-HO-02

Date 06/11/2011

Temperature/ Humidity 24deg. C / 52% RH Engineer Takayuki Shimada

Mode 11b Tx

#### 11b

Freq.	Reading	Cable	Atten.	Result		Liı	Margin	
		Loss						
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm] [mW]		[mW]	[dB]
2412	-5.53	1.67	9.97	6.11	4.08	30.00	1000	23.89
2437	-6.10	1.68	9.97	5.55	3.59	30.00	1000	24.45
2462	-6.61	1.68	9.97	5.04	3.19	30.00	1000	24.96

#### Sample Calculation:

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

#### 2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	-6.10	*
2	-7.09	
5.5	-6.45	
11	-8.69	

<sup>\*:</sup> Worst Rate

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

# UL Japan, Inc.

**Head Office EMC Lab.** 

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### **Maximum Peak Output Power**

Test place Head Office EMC Lab. No.6 Measurement Room

Report No. 31HE0184-HO-02 Date 06/11/2011

Temperature/ Humidity 24deg. C / 52% RH Engineer Takayuki Shimada

Mode 11g Tx

11g

	115								
Ī	Freq.	Reading	Cable	Atten.	Result		Limit		Margin
			Loss						
	[MHz]	[dBm]	[dB]	[dB]	[dBm] [mW]		[dBm] [mW]		[dB]
ľ	2412	-7.20	1.67	9.97	4.44	2.78	30.00	1000	25.56
I	2437	-7.25	1.68	9.97	4.40	2.75	30.00	1000	25.60
I	2462	-7.02	1.68	9.97	4.63	2.90	30.00	1000	25.37

Sample Calculation:

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

#### 2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	-9.06	
9	-7.25	*
12	-8.82	
18	-7.98	
24	-8.94	
36	-8.88	
48	-9.26	
54	-9.71	

<sup>\*:</sup> Worst Rate

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

# UL Japan, Inc.

**Head Office EMC Lab.** 

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 : VPYLBQX466

### **Maximum Peak Output Power**

Test place Head Office EMC Lab. No.6 Measurement Room

Report No. 31HE0184-HO-02

Date 06/11/2011

Temperature/ Humidity 24deg. C / 52% RH Engineer Takayuki Shimada Mode 11n-20 Tx

#### 11n-20

Freq.	Reading	Cable	Atten.	Result		Li	Margin	
		Loss						
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm] [mW]		[mW]	[dB]
2412	-6.55	1.67	9.97	5.09	3.23	30.00	1000	24.91
2437	-6.61	1.68	9.97	5.04	3.19	30.00	1000	24.96
2462	-6.63	1.68	9.97	5.02	3.18	30.00	1000	24.98

Sample Calculation:

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

#### 2437MHz

Rate	Reading	Remark
[MCS]	[dBm]	
0	-6.61	*
1	-7.01	
2	-7.21	
3	-7.72	
4	-8.00	
5	-8.32	
6	-8.80	
7	-8.59	

\*: Worst Rate

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

# UL Japan, Inc.

**Head Office EMC Lab.** 

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: 31HE0184-HO-02 Test report No.

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## **Radiated Spurious Emission**

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02

06/19/2011 Date 06/16/2011 06/17/2011

Temperature/ Humidity 24deg. C / 61% RH 23deg. C / 65% RH 24deg. C / 58% RH Takayuki Shimada Takayuki Shimada Tomohisa Nakagawa Engineer

(1-10GHz) (10-26.5GHz) (Below 1GHz)

Mode 11b Tx 2412MHz

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
'	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	180.120	QP	26.8	15.7	8.9	32.0	19.4	43.5	24.1	
Hori	2332.740	PK	49.0	26.3	2.6	32.7	45.2	73.9	28.7	
Hori	2390.000	PK	44.3	26.4	2.6	32.6	40.7	73.9	33.2	
Hori	2400.000	PK	48.0	26.4	2.6	32.6	44.4	73.9	29.5	
Hori	2492.940	PK	47.4	26.5	2.7	32.6	44.0	73.9	29.9	
Hori	4824.000	PK	42.4	30.4	4.4	31.9	45.3	73.9	28.6	
Hori	7236.000	PK	42.8	35.2	5.3	32.4	50.9	73.9	23.0	
Hori	9648.000	PK	43.5	38.1	6.2	32.9	54.9	73.9	19.0	
Hori	24120.000	PK	46.4	38.6	-1.0	31.6	52.4	73.9	21.5	
Hori	2332.740	AV	41.6	26.3	2.6	32.7	37.8	53.9	16.1	
Hori	2390.000	AV	32.1	26.4	2.6	32.6	28.5	53.9	25.4	
Hori	2400.000	AV	37.2	26.4	2.6	32.6	33.6	53.9	20.3	
Hori	2492.940	AV	38.3	26.5	2.7	32.6	34.9	53.9	19.0	
Hori	4824.000	AV	29.5	30.4	4.4	31.9	32.4	53.9	21.5	
Hori	7236.000	AV	30.7	35.2	5.3	32.4	38.8	53.9	15.1	
Hori	9648.000	AV	29.9	38.1	6.2	32.9	41.3	53.9	12.6	
Hori	24120.000	AV	32.0	38.6	-1.0	31.6	38.0	53.9	15.9	
Vert	180.120	QP	29.4	15.7	8.9	32.0	22.0	43.5	21.5	
Vert	2332.740	PK	48.3	26.3	2.6	32.7	44.5	73.9	29.4	
Vert	2390.000	PK	43.5	26.4	2.6	32.6	39.9	73.9	34.0	
Vert	2400.000	PK	47.8	26.4	2.6	32.6	44.2	73.9	29.7	
Vert	2492.940	PK	45.8	26.5	2.7	32.6	42.4	73.9	31.5	
Vert	4824.000	PK	42.6	30.4	4.4	31.9	45.5	73.9	28.4	
Vert	7236.000	PK	42.9	35.2	5.3	32.4	51.0	73.9	22.9	
Vert	9648.000	PK	43.3	38.1	6.2	32.9	54.7	73.9	19.2	
Vert	24120.000	PK	46.3	38.6	-1.0	31.6	52.3	73.9	21.6	
Vert	2332.740	AV	40.3	26.3	2.6	32.7	36.5	53.9	17.4	
Vert	2390.000	AV	32.0	26.4	2.6	32.6	28.4	53.9	25.5	
Vert	2400.000	AV	36.4	26.4	2.6	32.6	32.8	53.9	21.1	
Vert	2492.940	AV	35.7	26.5	2.7	32.6	32.3	53.9	21.6	
Vert	4824.000	AV	29.5	30.4	4.4	31.9	32.4	53.9	21.5	
Vert	7236.000	AV	30.7	35.2	5.3	32.4	38.8	53.9	15.1	
Vert	9648.000	AV	29.9	38.1	6.2	32.9	41.3	53.9	12.6	
Vert	24120.000	AV	32.0	38.6	-1.0	31.6	38.0	53.9	15.9	

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

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

: +81 596 24 8116 Telephone Facsimile : +81 596 24 8124

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

<sup>\*</sup>The 10th harmonic was not seen so the result was its base noise level. 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB 26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB Distance factor:

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Issued date : July 11, 2011
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### **Radiated Spurious Emission**

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02

Date 06/16/2011 06/17/2011 06/19/2011

Temperature/ Humidity 24deg. C / 61% RH 23deg. C / 65% RH 24deg. C / 58% RH Engineer Takayuki Shimada Takayuki Shimada Tomohisa Nakagawa

(1-10GHz) (10-26.5GHz) (Below 1GHz)

Mode 11b Tx 2437MHz

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	180.120	QP	26.7	15.7	8.9	32.0	19.3	43.5	24.2	
Hori	2357.780	PK	48.5	26.3	2.6	32.7	44.7	73.9	29.2	
Hori	2516.200	PK	48.4	26.5	2.7	32.5	45.1	73.9	28.8	
Hori	4874.000	PK	42.5	30.5	4.4	31.9	45.5	73.9	28.4	
Hori	7311.000	PK	42.9	35.2	5.3	32.4	51.0	73.9	22.9	
Hori	9748.000	PK	43.5	38.3	6.2	32.9	55.1	73.9	18.8	
Hori	24370.000	PK	46.8	38.8	-1.0	31.4	53.2	73.9	20.7	
Hori	2357.780	AV	40.6	26.3	2.6	32.7	36.8	53.9	17.1	
Hori	2516.200	AV	40.2	26.5	2.7	32.5	36.9	53.9	17.0	
Hori	4874.000	AV	29.7	30.5	4.4	31.9	32.7	53.9	21.2	
Hori	7311.000	AV	31.0	35.2	5.3	32.4	39.1	53.9	14.8	
Hori	9748.000	AV	30.0	38.3	6.2	32.9	41.6	53.9	12.3	
Hori	24370.000	AV	32.6	38.8	-1.0	31.4	39.0	53.9	14.9	
Vert	180.120	QP	29.4	15.7	8.9	32.0	22.0	43.5	21.5	
Vert	2357.780	PK	47.9	26.3	2.6	32.7	44.1	73.9	29.8	
Vert	2516.200	PK	46.6	26.5	2.7	32.5	43.3	73.9	30.6	
Vert	4874.000	PK	42.6	30.5	4.4	31.9	45.6	73.9	28.3	
Vert	7311.000	PK	43.1	35.2	5.3	32.4	51.2	73.9	22.7	
Vert	9748.000	PK	43.5	38.3	6.2	32.9	55.1	73.9	18.8	
Vert	24370.000	PK	46.9	38.8	-1.0	31.4	53.3	73.9	20.6	
Vert	2357.780	AV	39.8	26.3	2.6	32.7	36.0	53.9	17.9	
Vert	2516.200	AV	38.0	26.5	2.7	32.5	34.7	53.9	19.3	
Vert	4874.000	AV	29.7	30.5	4.4	31.9	32.7	53.9	21.2	
Vert	7311.000	AV	31.0	35.2	5.3	32.4	39.1	53.9	14.8	
Vert	9748.000	AV	30.0	38.3	6.2	32.9	41.6	53.9	12.3	
Vert	24370.000	AV	32.6	38.8	-1.0	31.4	39.0	53.9	14.9	

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

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

\*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

**Head Office EMC Lab.** 

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Issued date : July 11, 2011
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## **Radiated Spurious Emission**

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02

Date 06/16/2011 06/17/2011 06/19/2011

Temperature/ Humidity 24deg. C / 61% RH 23deg. C / 65% RH 24deg. C / 58% RH Engineer Takayuki Shimada Takayuki Shimada Tomohisa Nakagawa

(1-10GHz) (10-26.5GHz) (Below 1GHz)

Mode 11b Tx 2462MHz

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	180.120	QP	29.4	15.7	8.9	32.0	22.0	43.5	21.5	
Hori	2382.840	PK	47.5	26.4	2.6	32.6	43.9	73.9	30.0	
Hori	2483.500	PK	43.6	26.5	2.7	32.6	40.2	73.9	33.7	
Hori	2543.240	PK	46.1	26.6	2.7	32.5	42.9	73.9	31.0	
Hori	4924.000	PK	42.3	30.5	4.5	31.9	45.4	73.9	28.5	
Hori	7386.000	PK	43.6	35.2	5.3	32.4	51.7	73.9	22.2	
Hori	9848.000	PK	43.5	38.5	6.2	32.9	55.3	73.9	18.6	
Hori	24620.000	PK	47.4	38.9	-1.0	31.3	54.0	73.9	19.9	
Hori	2382.840	AV	39.0	26.4	2.6	32.6	35.4	53.9	18.5	
Hori	2483.500	AV	31.2	26.5	2.7	32.6	27.8	53.9	26.1	
Hori	2543.240	AV	36.1	26.6	2.7	32.5	32.9	53.9	21.0	
Hori	4924.000	AV	29.9	30.5	4.5	31.9	33.0	53.9	20.9	
Hori	7386.000	AV	31.2	35.2	5.3	32.4	39.3	53.9	14.6	
Hori	9848.000	AV	29.8	38.5	6.2	32.9	41.6	53.9	12.3	
Hori	24620.000	AV	32.4	38.9	-1.0	31.3	39.0	53.9	14.9	
Vert	180.120	QP	30.0	15.7	8.9	32.0	22.6	43.5	20.9	
Vert	2382.840	PK	46.9	26.4	2.6	32.6	43.3	73.9	30.6	
Vert	2483.500	PK	43.0	26.5	2.7	32.6	39.6	73.9	34.3	
Vert	2543.240	PK	45.2	26.6	2.7	32.5	42.0	73.9	31.9	
Vert	4924.000	PK	42.5	30.5	4.5	31.9	45.6	73.9	28.3	
Vert	7386.000	PK	43.8	35.2	5.3	32.4	51.9	73.9	22.0	
Vert	9848.000	PK	43.6	38.5	6.2	32.9	55.4	73.9	18.5	
Vert	24620.000	PK	47.4	38.9	-1.0	31.3	54.0	73.9	19.9	
Vert	2382.840	AV	37.6	26.4	2.6	32.6	34.0	53.9	19.9	
Vert	2483.500	AV	31.0	26.5	2.7	32.6	27.6	53.9	26.3	
Vert	2543.240	AV	34.2	26.6	2.7	32.5	31.0	53.9	22.9	
Vert	4924.000	AV	29.9	30.5	4.5	31.9	33.0	53.9	20.9	
Vert	7386.000	AV	31.2	35.2	5.3	32.4	39.3	53.9	14.6	
Vert	9848.000	AV	29.8	38.5	6.2	32.9	41.6	53.9	12.3	
Vert	24620.000	AV	32.4	38.9	-1.0	31.3	39.0	53.9	14.9	

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

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

<sup>\*</sup>The 10th harmonic was not seen so the result was its base noise level. Distance factor:  $\begin{array}{ccc} 10 GHz - 26.5 GHz & 20 \log(3.0 m/1.0 m) = 9.5 dB \\ 26.5 GHz - 40 GHz & 20 \log(3.0 m/0.5 m) = 15.6 dB \\ \end{array}$ 

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#### **Radiated Spurious Emission**

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02

Date 06/17/2011 06/17/2011 06/19/2011

(1-26.5GHz) (10-26.5GHz) (Below 1GHz)

Mode 11g Tx 2412MHz

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
'	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	180.120	QP	29.4	15.7	8.9	32.0	22.0	43.5	21.5	
Hori	2333.420	PK	52.9	26.3	2.6	32.7	49.1	73.9	24.8	
Hori	2390.000	PK	57.6	26.4	2.6	32.6	54.0	73.9	19.9	
Hori	2400.000	PK	75.6	26.4	2.6	32.6	72.0	_	_	
Hori	2490.940	PK	54.1	26.5	2.7	32.6	50.7	73.9	23.2	
Hori	4824.000	PK	42.3	30.4	4.4	31.9	45.2	73.9	28.7	
Hori		PK	42.7	35.2	5.3	32.4	50.8	73.9	23.1	
Hori	9648.000	PK	43.6	38.1	6.2	32.9	55.0	73.9	18.9	
Hori	24120.000	PK	46.4	38.6	-1.0	31.6	52.4	73.9	21.5	
Hori	2333.420	AV	41.9	26.3	2.6	32.7	38.1	53.9	15.8	
Hori	2390.000	AV	40.8	26.4	2.6	32.6	37.2	53.9	16.7	
Hori	2400.000	AV	49.2	26.4	2.6	32.6	45.6	_	_	
Hori	2490.940	AV	42.3	26.5	2.7	32.6	38.9	53.9	15.0	
Hori	4824.000	AV	29.5	30.4	4.4	31.9	32.4	53.9	21.5	
Hori	7236.000	AV	30.7	35.2	5.3	32.4	38.8	53.9	15.1	
Hori	9648.000	AV	29.9	38.1	6.2	32.9	41.3	53.9	12.6	
Hori	24120.000	AV	32.0	38.6	-1.0	31.6	38.0	53.9	15.9	
Vert	180.120	QP	30.3	15.7	8.9	32.0	22.9	43.5	20.6	
Vert	2333.420	PK	52.1	26.3	2.6	32.7	48.3	73.9	25.6	
Vert	2390.000	PK	54.8	26.4	2.6	32.6	51.2	73.9	22.7	
Vert	2400.000	PK	74.5	26.4	2.6	32.6	70.9	-	-	
Vert	2490.940	PK	51.2	26.5	2.7	32.6	47.8	73.9	26.1	
Vert	4824.000	PK	42.6	30.4	4.4	31.9	45.5	73.9	28.4	
Vert	7236.000	PK	42.8	35.2	5.3	32.4	50.9	73.9	23.0	
Vert	9648.000	PK	43.3	38.1	6.2	32.9	54.7	73.9	19.2	
Vert	24120.000	PK	46.4	38.6	-1.0	31.6	52.4	73.9	21.5	
Vert	2333.420	AV	40.5	26.3	2.6	32.7	36.7	53.9	17.2	
Vert	2390.000	AV	38.8	26.4	2.6	32.6	35.2	53.9	18.7	
Vert	2400.000	AV	47.7	26.4	2.6	32.6	44.1	-	-	
Vert	2490.940	AV	40.1	26.5	2.7	32.6	36.7	53.9	17.2	
Vert	4824.000	AV	29.5	30.4	4.4	31.9	32.4	53.9	21.5	
Vert	7236.000	AV	30.7	35.2	5.3	32.4	38.8	53.9	15.1	
Vert	9648.000	AV	29.9	38.1	6.2	32.9	41.3	53.9	12.6	
Vert	24120.000	AV	32.0	38.6	-1.0	31.6	38.0	53.9	15.9	

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

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

#### 30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant	Loss	Gain	Result	Limit	Margin	Remark
				Factor						
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	2412.000	PK	92.1	26.4	2.6	32.6	88.5	-	-	Carrier
Hori	2400.000	PK	58.5	26.4	2.6	32.6	54.9	58.5	3.6	
Vert	2412.000	PK	91.0	26.4	2.6	32.6	87.4	-	-	Carrier
Vert	2400.000	PK	56.9	26.4	2.6	32.6	53.3	57.4	4.1	

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

UL Japan, Inc.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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

<sup>\*</sup>The 10th harmonic was not seen so the result was its base noise level. Distance factor:  $10 GHz - 26.5 GHz \quad 20 log (3.0 m/1.0 m) = \ 9.5 dB$ 

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## **Radiated Spurious Emission**

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02

Date 06/17/2011 06/17/2011 06/19/2011

Temperature/ Humidity 23deg. C / 65% RH 23deg. C / 65% RH 24deg. C / 58% RH Engineer Takayuki Shimada Takayuki Shimada Tomohisa Nakagawa

(1-26.5GHz) (10-26.5GHz) (Below 1GHz)

Mode 11g Tx 2437MHz

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
1 oming	[MHz]	Bettettor	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]		[dB]	roman
Hori	180.120	OP	29.4	15.7	8.9	32.0	22.0	43.5	21.5	
Hori	2358.380	`	50.1	26.3	2.6	32.6	46.4	73.9	27.5	
Hori	2515.840	PK	48.2	26.5	2.7	32.5	44.9	73.9	29.0	
Hori	4874.000	PK	42.6	30.5	4.4	31.9	45.6	73.9	28.3	
Hori	7311.000	PK	42.9	35.2	5.3	32.4	51.0	73.9	22.9	
Hori	9748.000	PK	43.3	38.3	6.2	32.9	54.9	73.9	19.0	
Hori	24370.000	PK	46.8	38.8	-1.0	31.4	53.2	73.9	20.7	
Hori	2358.380	AV	38.5	26.3	2.6	32.6	34.8	53.9	19.1	
Hori	2515.840	AV	36.6	26.5	2.7	32.5	33.3	53.9	20.6	
Hori	4874.000	AV	29.7	30.5	4.4	31.9	32.7	53.9	21.2	
Hori	7311.000	AV	31.0	35.2	5.3	32.4	39.1	53.9	14.8	
Hori	9748.000	AV	30.0	38.3	6.2	32.9	41.6	53.9	12.3	
Hori	24370.000	AV	32.6	38.8	-1.0	31.4	39.0	53.9	14.9	
Vert	180.120	QP	30.4	15.7	8.9	32.0	23.0	43.5	20.5	
Vert	2358.380	PK	49.6	26.3	2.6	32.6	45.9	73.9	28.0	
Vert	2515.840	PK	47.6	26.5	2.7	32.5	44.3	73.9	29.6	
Vert	4874.000	PK	42.6	30.5	4.4	31.9	45.6	73.9	28.3	
Vert	7311.000	PK	43.2	35.2	5.3	32.4	51.3	73.9	22.6	
Vert	9748.000	PK	43.4	38.3	6.2	32.9	55.0	73.9	18.9	
Vert	24370.000	PK	46.8	38.8	-1.0	31.4	53.2	73.9	20.7	
Vert	2358.380	AV	38.3	26.3	2.6	32.6	34.6	53.9	19.3	
Vert	2515.840	AV	35.9	26.5	2.7	32.5	32.6	53.9	21.3	
Vert	4874.000	AV	29.7	30.5	4.4	31.9	32.7	53.9	21.2	
Vert	7311.000	AV	31.0	35.2	5.3	32.4	39.1	53.9	14.8	
Vert	9748.000	AV	30.0	38.3	6.2	32.9	41.6	53.9	12.3	
Vert	24370.000	AV	32.6	38.8	-1.0	31.4	39.0	53.9	14.9	

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

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

\*The 10th harmonic was not seen so the result was its base noise level. Distance factor:  $\begin{array}{ccc} 10 GHz - 26.5 GHz & 20 \log(3.0 m/1.0 m) = 9.5 dB \\ 26.5 GHz - 40 GHz & 20 \log(3.0 m/0.5 m) = 15.6 dB \\ \end{array}$ 

Head Office ENIC Lab.

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### **Radiated Spurious Emission**

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02

Date 06/17/2011 06/17/2011 06/19/2011

Temperature/ Humidity 23deg. C / 65% RH 23deg. C / 65% RH 24deg. C / 58% RH Engineer Takayuki Shimada Takayuki Shimada Tomohisa Nakagawa

(1-26.5GHz) (10-26.5GHz) (Below 1GHz)

Mode 11g Tx 2462MHz

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	180.120	QP	29.3	15.7	8.9	32.0	21.9	43.5	21.6	
Hori	2383.400	PK	51.8	26.4	2.6	32.6	48.2	73.9	25.7	
Hori	2483.500	PK	55.4	26.5	2.7	32.6	52.0	73.9	21.9	
Hori	2540.880	PK	51.3	26.6	2.7	32.5	48.1	73.9	25.8	
Hori	4924.000	PK	42.4	30.5	4.5	31.9	45.5	73.9	28.4	
Hori	7386.000	PK	43.7	35.2	5.3	32.4	51.8	73.9	22.1	
Hori	9848.000	PK	43.4	38.5	6.2	32.9	55.2	73.9	18.7	
Hori	24620.000	PK	47.5	38.9	-1.0	31.3	54.1	73.9	19.8	
Hori	2383.400	AV	41.0	26.4	2.6	32.6	37.4	53.9	16.5	
Hori	2483.500	AV	38.5	26.5	2.7	32.6	35.1	53.9	18.8	
Hori	2540.880	AV	39.2	26.6	2.7	32.5	36.0	53.9	17.9	
Hori	4924.000	AV	29.9	30.5	4.5	31.9	33.0	53.9	20.9	
Hori	7386.000	AV	31.2	35.2	5.3	32.4	39.3	53.9	14.6	
Hori	9848.000	AV	29.8	38.5	6.2	32.9	41.6	53.9	12.3	
Hori	24620.000	AV	32.4	38.9	-1.0	31.3	39.0	53.9	14.9	
Vert	180.120	QP	30.5	15.7	8.9	32.0	23.1	43.5	20.4	
Vert	2383.400	PK	53.4	26.4	2.6	32.6	49.8	73.9	24.1	
Vert	2483.500	PK	56.3	26.5	2.7	32.6	52.9	73.9	21.0	
Vert	2540.880	PK	50.2	26.6	2.7	32.5	47.0	73.9	26.9	
Vert	4924.000	PK	42.5	30.5	4.5	31.9	45.6	73.9	28.3	
Vert	7386.000	PK	43.7	35.2	5.3	32.4	51.8	73.9	22.1	
Vert	9848.000	PK	43.6	38.5	6.2	32.9	55.4	73.9	18.5	
Vert	24620.000	PK	47.4	38.9	-1.0	31.3	54.0	73.9	19.9	
Vert	2383.400	AV	41.9	26.4	2.6	32.6	38.3	53.9	15.6	
Vert	2483.500	AV	38.8	26.5	2.7	32.6	35.4	53.9	18.5	
Vert	2540.880	AV	38.5	26.6	2.7	32.5	35.3	53.9	18.6	
Vert	4924.000	AV	29.9	30.5	4.5	31.9	33.0	53.9	20.9	
Vert	7386.000	AV	31.2	35.2	5.3	32.4	39.3	53.9	14.6	
Vert	9848.000	AV	29.8	38.5	6.2	32.9	41.6	53.9	12.3	
Vert	24620.000	AV	32.4	38.9	-1.0	31.3	39.0	53.9	14.9	

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

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

 $<sup>{}^{*}</sup>$ Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

<sup>\*</sup>The 10th harmonic was not seen so the result was its base noise level. Distance factor:  $\begin{array}{ccc} 10 GHz - 26.5 GHz & 20 \log(3.0 \text{m/}1.0 \text{m}) = 9.5 \text{dB} \\ 26.5 GHz - 40 GHz & 20 \log(3.0 \text{m/}0.5 \text{m}) = 15.6 \text{dB} \\ \end{array}$ 

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### **Radiated Spurious Emission**

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02

Date 06/17/2011 06/17/2011 06/19/2011

Temperature/ Humidity 23deg. C / 65% RH 23deg. C / 65% RH 24deg. C / 58% RH Engineer Takayuki Shimada Takayuki Shimada Tomohisa Nakagawa

(1-26.5GHz) (10-26.5GHz) (Below 1GHz)

Mode 11n-20 Tx 2412MHz

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	180.120	QP	29.7	15.7	8.9	32.0	22.3	43.5	21.2	
Hori	2333.160	PK	45.2	26.3	2.6	32.7	41.4	73.9	32.5	
Hori	2390.000	PK	49.7	26.4	2.6	32.6	46.1	73.9	27.8	
Hori	2399.870	PK	65.7	26.4	2.6	32.6	62.1	73.9	11.8	
Hori	2400.000	PK	66.4	26.4	2.6	32.6	62.8	73.9	11.1	
Hori	2493.340	PK	45.4	26.5	2.7	32.6	42.0	73.9	31.9	
Hori	4824.000	PK	42.2	30.4	4.4	31.9	45.1	73.9	28.8	
Hori	7236.000	PK	43.0	35.2	5.3	32.4	51.1	73.9	22.8	
Hori	9648.000	PK	43.6	38.1	6.2	32.9	55.0	73.9	18.9	
Hori	24120.000	PK	46.4	38.6	-1.0	31.6	52.4	73.9	21.5	
Hori	2333.160	AV	33.2	26.3	2.6	32.7	29.4	53.9	24.5	
Hori	2390.000	AV	32.5	26.4	2.6	32.6	28.9	53.9	25.0	
Hori	2399.870	AV	38.1	26.4	2.6	32.6	34.5	53.9	19.4	
Hori	2400.000	AV	38.4	26.4	2.6	32.6	34.8	53.9	19.1	
Hori	2493.340	AV	33.7	26.5	2.7	32.6	30.3	53.9	23.6	
Hori	4824.000	AV	29.5	30.4	4.4	31.9	32.4	53.9	21.5	
Hori	7236.000	AV	30.7	35.2	5.3	32.4	38.8	53.9	15.1	
Hori	9648.000	AV	29.9	38.1	6.2	32.9	41.3	53.9	12.6	
Hori	24120.000	AV	32.0	38.6	-1.0	31.6	38.0	53.9	15.9	
Vert	180.120	QP	30.6	15.7	8.9	32.0	23.2	43.5	20.3	
Vert	2333.160	PK	47.8	26.3	2.6	32.7	44.0	73.9	29.9	
Vert	2390.000	PK	52.6	26.4	2.6	32.6	49.0	73.9	24.9	
Vert	2399.870	PK	70.5	26.4	2.6	32.6	66.9	73.9	7.0	
Vert	2400.000	PK	70.4	26.4	2.6	32.6	66.8	73.9	7.1	
Vert	2493.340	PK	47.4	26.5	2.7	32.6	44.0	73.9	29.9	
Vert	4824.000	PK	42.4	30.4	4.4	31.9	45.3	73.9	28.6	
Vert	7236.000	PK	42.9	35.2	5.3	32.4	51.0	73.9	22.9	
Vert	9648.000	PK	43.5	38.1	6.2	32.9	54.9	73.9	19.0	
Vert	24120.000	PK	46.4	38.6	-1.0	31.6	52.4	73.9	21.5	
Vert	2333.160	AV	36.0	26.3	2.6	32.7	32.2	53.9	21.7	
Vert	2390.000	AV	34.3	26.4	2.6	32.6	30.7	53.9	23.2	
Vert	2399.870	AV	41.3	26.4	2.6	32.6	37.7	53.9	16.2	
Vert	2400.000	AV	41.5	26.4	2.6	32.6	37.9	53.9	16.0	
Vert	2493.340	AV	35.3	26.5	2.7	32.6	31.9	53.9	22.0	
Vert	4824.000	AV	29.5	30.4	4.4	31.9	32.4	53.9	21.5	
Vert	7236.000	AV	30.7	35.2	5.3	32.4	38.8	53.9	15.1	
Vert	9648.000	AV	29.9	38.1	6.2	32.9	41.3	53.9	12.6	
Vert	24120.000	AV	32.0	38.6	-1.0	31.6	38.0	53.9	15.9	

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

\*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

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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

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### **Radiated Spurious Emission**

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02

Date 06/17/2011 06/17/2011 06/19/2011

Temperature/ Humidity 23deg. C / 65% RH 23deg. C / 65% RH 24deg. C / 58% RH Engineer Takayuki Shimada Takayuki Shimada Tomohisa Nakagawa

(1-26.5GHz) (10-26.5GHz) (Below 1GHz)

Mode 11n-20 Tx 2437MHz

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
1 orang	[MHz]	Bettettor	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]		[dB]	TOTAL N
Hori	180.120	QP	30.4	15.7	8.9	32.0	23.0	43.5	20.5	
Hori	2358.360	PK	46.2	26.3	2.6	32.6	42.5	73.9	31.4	
Hori	2515.880	PK	45.6	26.5	2.7	32.5	42.3	73.9	31.6	
Hori	4874.000	PK	42.7	30.5	4.4	31.9	45.7	73.9	28.2	
Hori	7311.000	PK	43.0	35.2	5.3	32.4	51.1	73.9	22.8	
Hori	9748.000	PK	43.4	38.3	6.2	32.9	55.0	73.9	18.9	
Hori	24370.000	PK	46.7	38.8	-1.0	31.4	53.1	73.9	20.8	
Hori	2358.360	AV	34.1	26.3	2.6	32.6	30.4	53.9	23.5	
Hori	2515.880	AV	33.2	26.5	2.7	32.5	29.9	53.9	24.0	
Hori	4874.000	AV	29.7	30.5	4.4	31.9	32.7	53.9	21.2	
Hori	7311.000	AV	31.0	35.2	5.3	32.4	39.1	53.9	14.8	
Hori	9748.000	AV	30.0	38.3	6.2	32.9	41.6	53.9	12.3	
Hori	24370.000	AV	32.6	38.8	-1.0	31.4	39.0	53.9	14.9	
Vert	180.120	QP	30.7	15.7	8.9	32.0	23.3	43.5	20.2	
Vert	2358.360	PK	46.7	26.3	2.6	32.6	43.0	73.9	30.9	
Vert	2515.880	PK	44.4	26.5	2.7	32.5	41.1	73.9	32.8	
Vert	4874.000	PK	42.6	30.5	4.4	31.9	45.6	73.9	28.3	
Vert	7311.000	PK	43.1	35.2	5.3	32.4	51.2	73.9	22.7	
Vert	9748.000	PK	43.4	38.3	6.2	32.9	55.0	73.9	18.9	
Vert	24370.000	PK	46.9	38.8	-1.0	31.4	53.3	73.9	20.6	
Vert	2358.360	AV	34.1	26.3	2.6	32.6	30.4	53.9	23.5	
Vert	2515.880	AV	32.3	26.5	2.7	32.5	29.0	53.9	24.9	
Vert	4874.000	AV	29.7	30.5	4.4	31.9	32.7	53.9	21.2	
Vert	7311.000	AV	31.0	35.2	5.3	32.4	39.1	53.9	14.8	
Vert	9748.000	AV	30.0	38.3	6.2	32.9	41.6	53.9	12.3	
Vert	24370.000	AV	32.6	38.8	-1.0	31.4	39.0	53.9	14.9	

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

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

**Head Office EMC Lab.** 

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

<sup>\*</sup>The 10th harmonic was not seen so the result was its base noise level. Distance factor:  $10 GHz - 26.5 GHz \quad 20 log (3.0 m/1.0 m) = \ 9.5 dB$ 

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## **Radiated Spurious Emission**

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber

Report No. 31HE0184-HO-02

Date 06/17/2011 06/17/2011 06/19/2011

Temperature/ Humidity 23deg. C / 65% RH 23deg. C / 65% RH 24deg. C / 58% RH Engineer Takayuki Shimada Takayuki Shimada Tomohisa Nakagawa

(1-26.5GHz) (10-26.5GHz) (Below 1GHz)

Mode 11n-20 Tx 2462MHz

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	180.120	QP	30.3	15.7	8.9	32.0	22.9	43.5	20.6	
Hori	2383.180	PK	47.4	26.4	2.6	32.6	43.8	73.9	30.1	
Hori	2483.500	PK	51.2	26.5	2.7	32.6	47.8	73.9	26.1	
Hori	2540.700	PK	44.9	26.6	2.7	32.5	41.7	73.9	32.2	
Hori	4924.000	PK	42.5	30.5	4.5	31.9	45.6	73.9	28.3	
Hori	7386.000	PK	43.8	35.2	5.3	32.4	51.9	73.9	22.0	
Hori	9848.000	PK	43.5	38.5	6.2	32.9	55.3	73.9	18.6	
Hori	24620.000	PK	47.4	38.9	-1.0	31.3	54.0	73.9	19.9	
Hori	2383.180	AV	35.5	26.4	2.6	32.6	31.9	53.9	22.0	
Hori	2483.500	AV	33.5	26.5	2.7	32.6	30.1	53.9	23.8	
Hori	2540.700	AV	33.4	26.6	2.7	32.5	30.2	53.9	23.7	
Hori	4924.000	AV	29.9	30.5	4.5	31.9	33.0	53.9	20.9	
Hori	7386.000	AV	31.2	35.2	5.3	32.4	39.3	53.9	14.6	
Hori	9848.000	AV	29.8	38.5	6.2	32.9	41.6	53.9	12.3	
Hori	24620.000	AV	32.4	38.9	-1.0	31.3	39.0	53.9	14.9	
Vert	180.120	QP	30.8	15.7	8.9	32.0	23.4	43.5	20.1	
Vert	2383.180	PK	47.0	26.4	2.6	32.6	43.4	73.9	30.5	
Vert	2483.500	PK	50.1	26.5	2.7	32.6	46.7	73.9	27.2	
Vert	2540.700	PK	44.5	26.6	2.7	32.5	41.3	73.9	32.6	
Vert	4924.000	PK	42.4	30.5	4.5	31.9	45.5	73.9	28.4	
Vert	7386.000	PK	43.7	35.2	5.3	32.4	51.8	73.9	22.1	
Vert	9848.000	PK	43.5	38.5	6.2	32.9	55.3	73.9	18.6	
Vert	24620.000	PK	47.4	38.9	-1.0	31.3	54.0	73.9	19.9	
Vert	2383.180	AV	33.8	26.4	2.6	32.6	30.2	53.9	23.7	
Vert	2483.500	AV	32.5	26.5	2.7	32.6	29.1	53.9	24.8	
Vert	2540.700	AV	32.1	26.6	2.7	32.5	28.9	53.9	25.0	
Vert	4924.000	AV	29.9	30.5	4.5	31.9	33.0	53.9	20.9	
Vert	7386.000	AV	31.2	35.2	5.3	32.4	39.3	53.9	14.6	
Vert	9848.000	AV	29.8	38.5	6.2	32.9	41.6	53.9	12.3	
Vert	24620.000	AV	32.4	38.9	-1.0	31.3	39.0	53.9	14.9	

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

**Head Office EMC Lab.** 

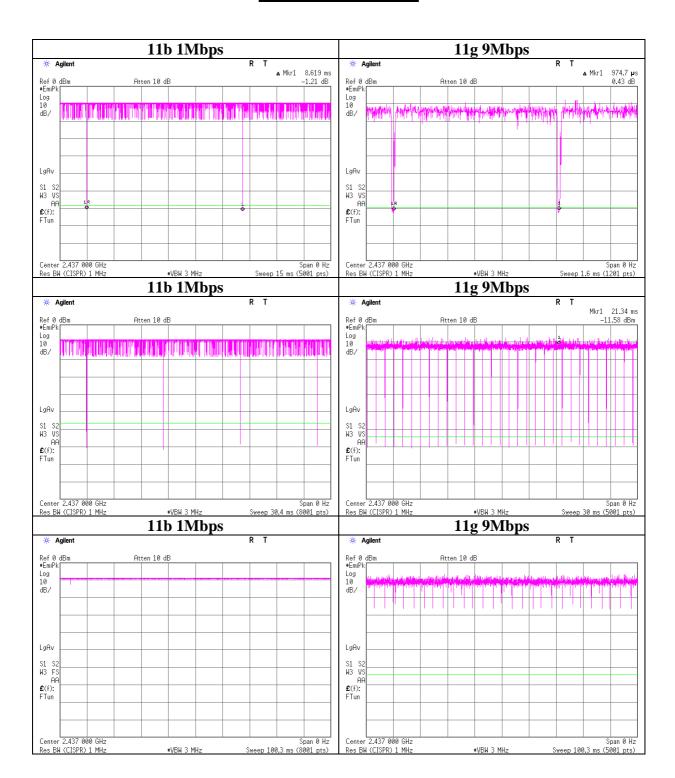
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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

<sup>\*</sup>The 10th harmonic was not seen so the result was its base noise level. Distance factor:  $\begin{array}{ccc} 10 GHz - 26.5 GHz & 20 \log(3.0 m/1.0 m) = 9.5 dB \\ 26.5 GHz - 40 GHz & 20 \log(3.0 m/0.5 m) = 15.6 dB \\ \end{array}$ 

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#### The tested burst timing



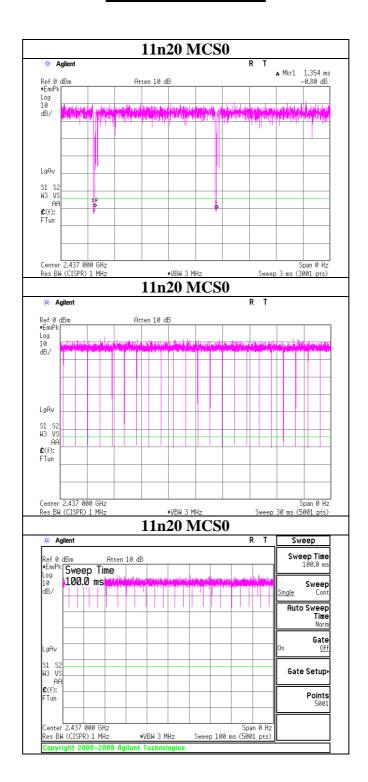
# UL Japan, Inc.

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#### The tested burst timing



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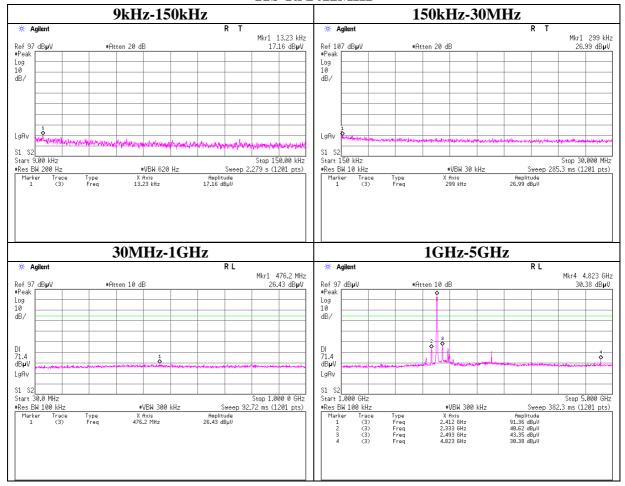
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#### **Conducted Spurious Emission**

#### 11b Tx 2412MHz



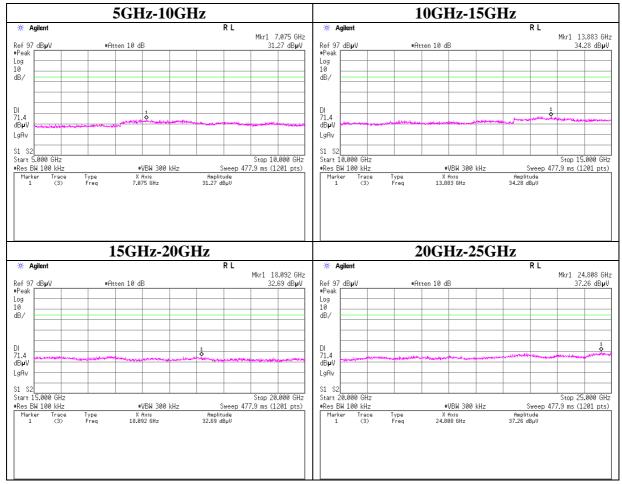
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## **Conducted Spurious Emission**

#### 11b Tx 2412MHz



Head Office EMC Lab.

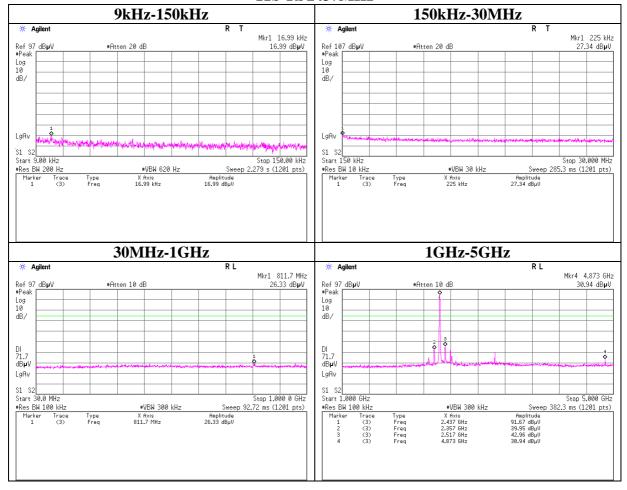
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#### **Conducted Spurious Emission**

#### 11b Tx 2437MHz



**Head Office EMC Lab.** 

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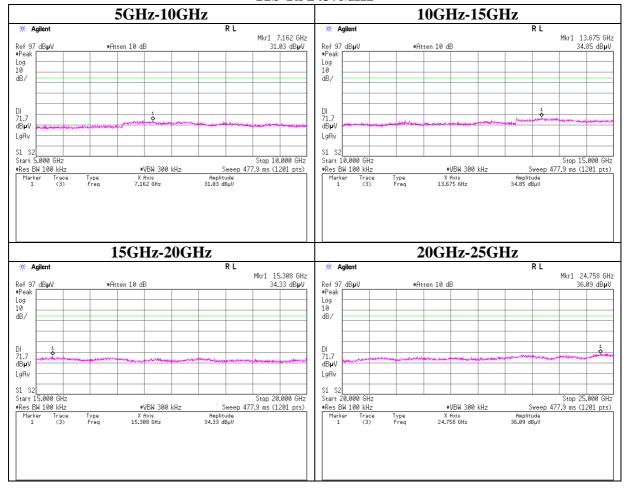
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#### **Conducted Spurious Emission**

#### 11b Tx 2437MHz



**Head Office EMC Lab.** 

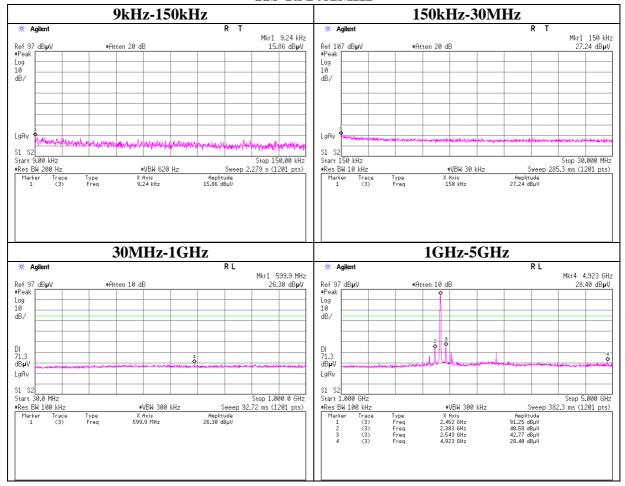
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#### **Conducted Spurious Emission**

#### 11b Tx 2462MHz



**Head Office EMC Lab.** 

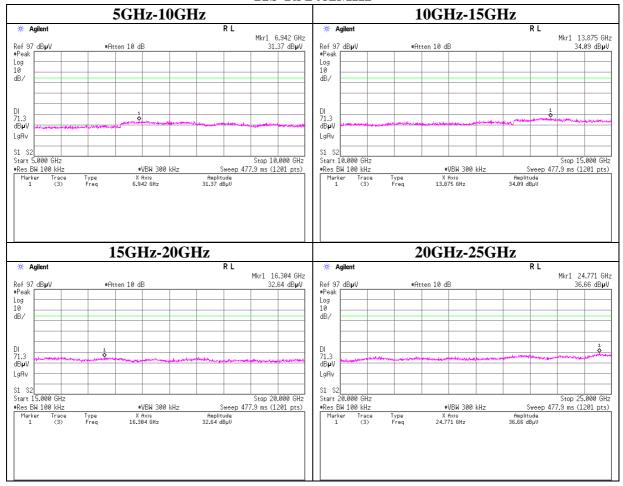
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#### **Conducted Spurious Emission**

#### 11b Tx 2462MHz



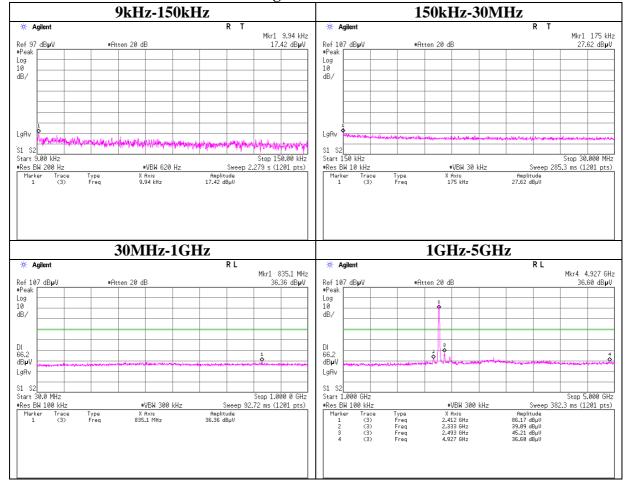
**Head Office EMC Lab.** 

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#### **Conducted Spurious Emission**

11g Tx 2412MHz



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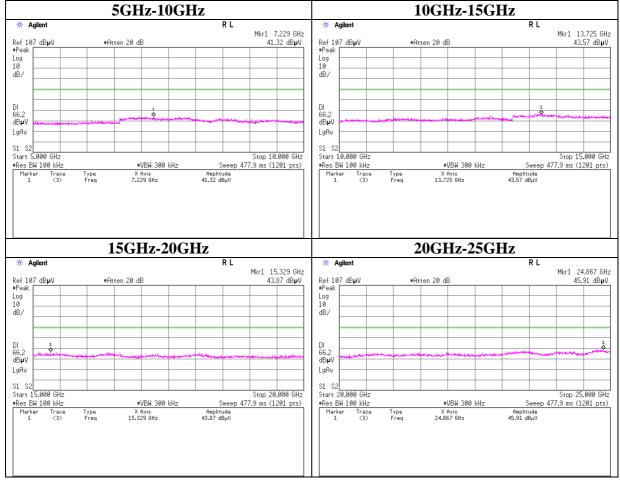
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#### **Conducted Spurious Emission**

11g Tx 2412MHz



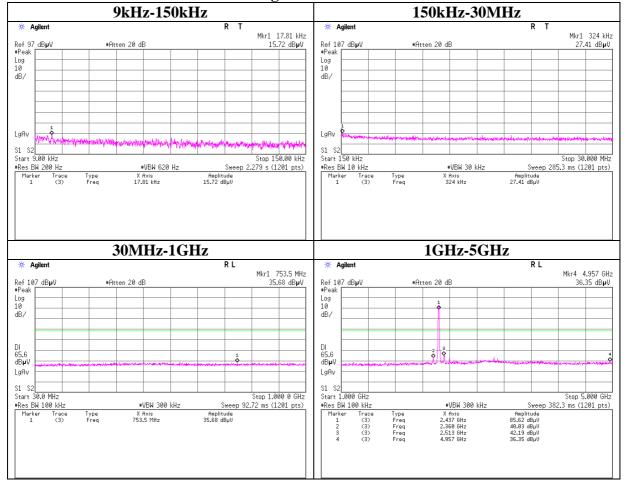
Head Office EMC Lab.

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#### **Conducted Spurious Emission**

11g Tx 2437MHz



Head Office EMC Lab.

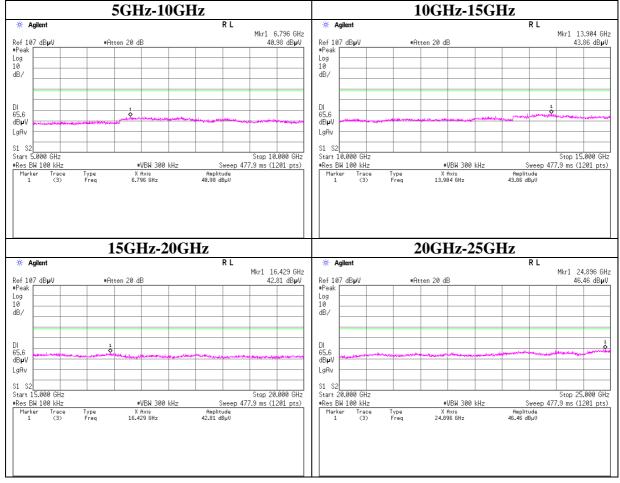
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#### **Conducted Spurious Emission**

11g Tx 2437MHz



Head Office EMC Lab.

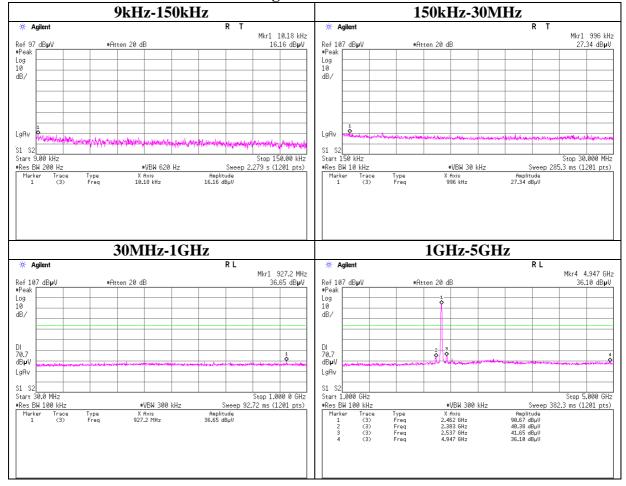
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#### **Conducted Spurious Emission**

11g Tx 2462MHz



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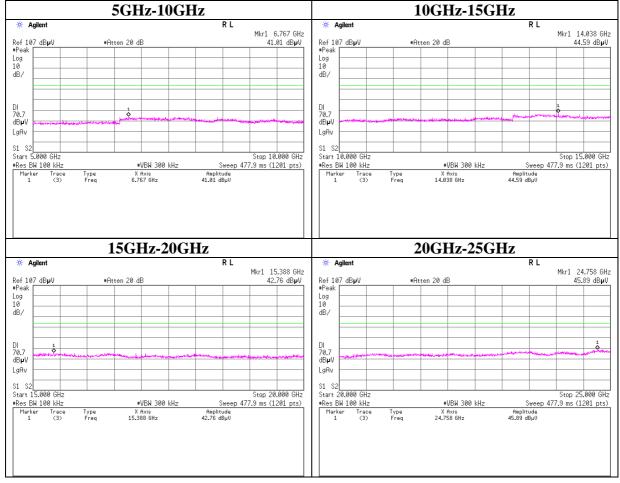
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Issued date : July 11, 2011

FCC ID : VPYLBQX466

#### **Conducted Spurious Emission**

11g Tx 2462MHz



**Head Office EMC Lab.** 

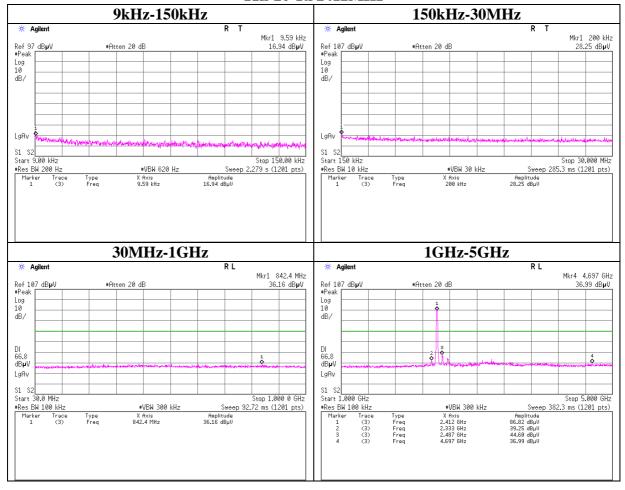
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#### **Conducted Spurious Emission**

#### 11n-20 Tx 2412MHz



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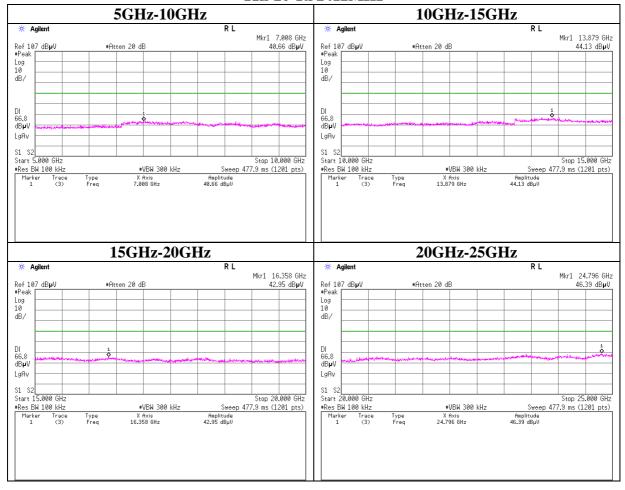
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#### **Conducted Spurious Emission**

#### 11n-20 Tx 2412MHz



Head Office EMC Lab.

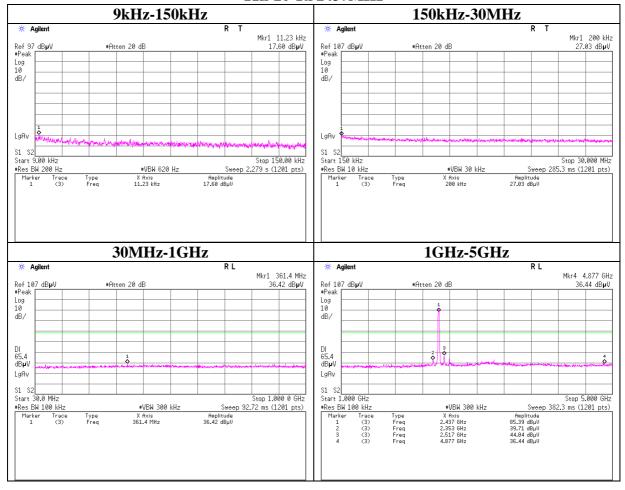
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#### **Conducted Spurious Emission**

#### 11n-20 Tx 2437MHz



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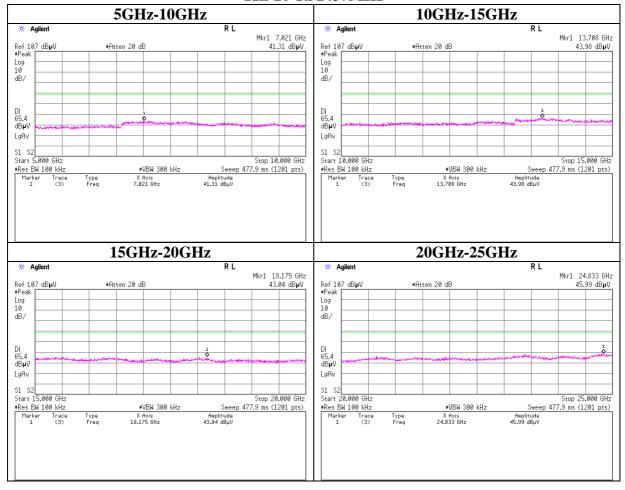
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#### **Conducted Spurious Emission**

#### 11n-20 Tx 2437MHz



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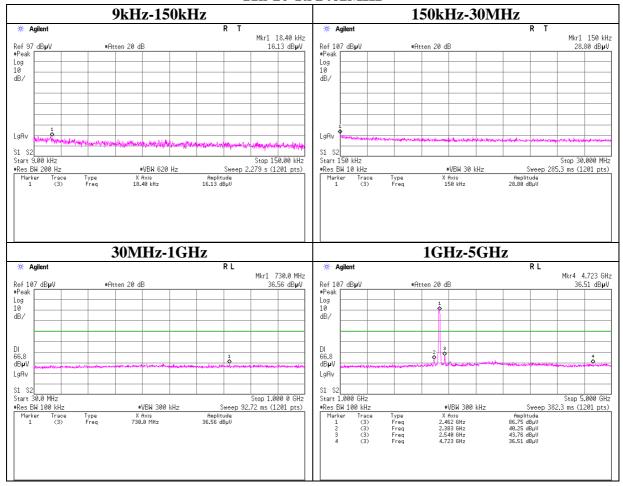
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#### **Conducted Spurious Emission**

#### 11n-20 Tx 2462MHz



Head Office EMC Lab.

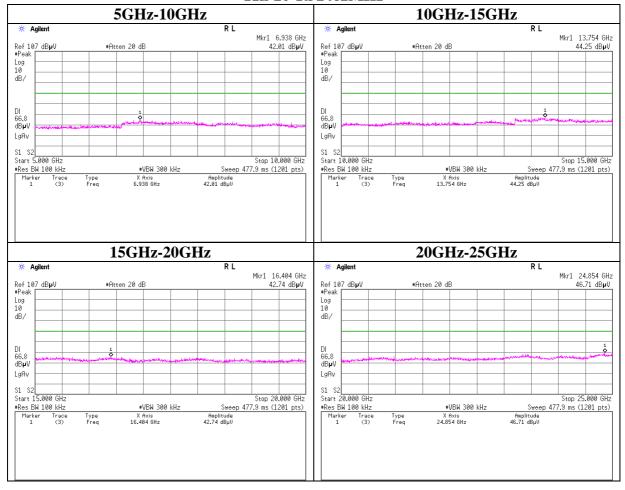
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#### **Conducted Spurious Emission**

#### 11n-20 Tx 2462MHz



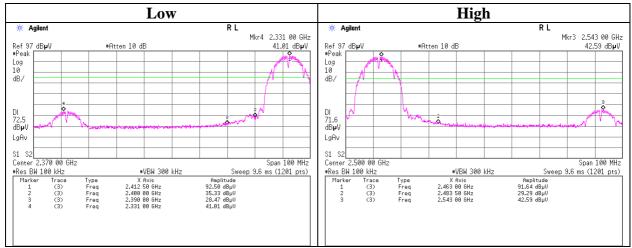
Head Office EMC Lab.

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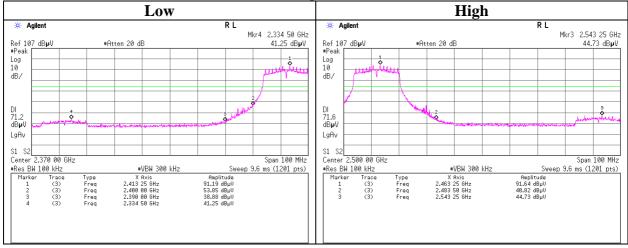
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#### **Conducted Emission Band Edge compliance**

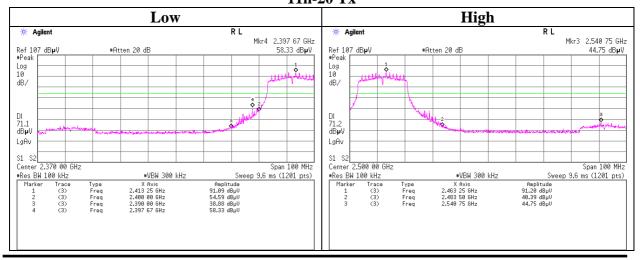
#### 11b Tx



11g Tx



#### 11n-20 Tx



## UL Japan, Inc.

**Head Office EMC Lab.** 

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## **Power Density**

Test place Head Office EMC Lab. No.11 Measurement Room

Report No. 31HE0184-HO-02
Date 06/14/2011
Temperature/ Humidity 26 deg.C./ 51%
Engineer Satofumi Matsuyama
Mode 11b Tx, 11g Tx, 11n-20 Tx

#### 11b

Freq.	Reading	Cable	Atten.	Result	Limit	Margin
		Loss				
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-16.16	0.94	9.97	-5.25	8.00	13.25
2437.00	-16.58	0.95	9.97	-5.66	8.00	13.66
2462.00	-16.74	0.95	9.97	-5.82	8.00	13.82

#### 11g

Freq.	Reading	Cable	Atten.	Result	Limit	Margin
		Loss				
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-21.10	0.94	9.97	-10.19	8.00	18.19
2437.00	-21.60	0.95	9.97	-10.68	8.00	18.68
2462.00	-20.58	0.95	9.97	-9.66	8.00	17.66

#### 11n-20

Freq.	Reading	Cable	Atten.	Result	Limit	Margin
		Loss				
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-21.00	0.94	9.97	-10.09	8.00	18.09
2437.00	-22.30	0.95	9.97	-11.38	8.00	19.38
2462.00	-21.34	0.95	9.97	-10.42	8.00	18.42

Sample Calculation:

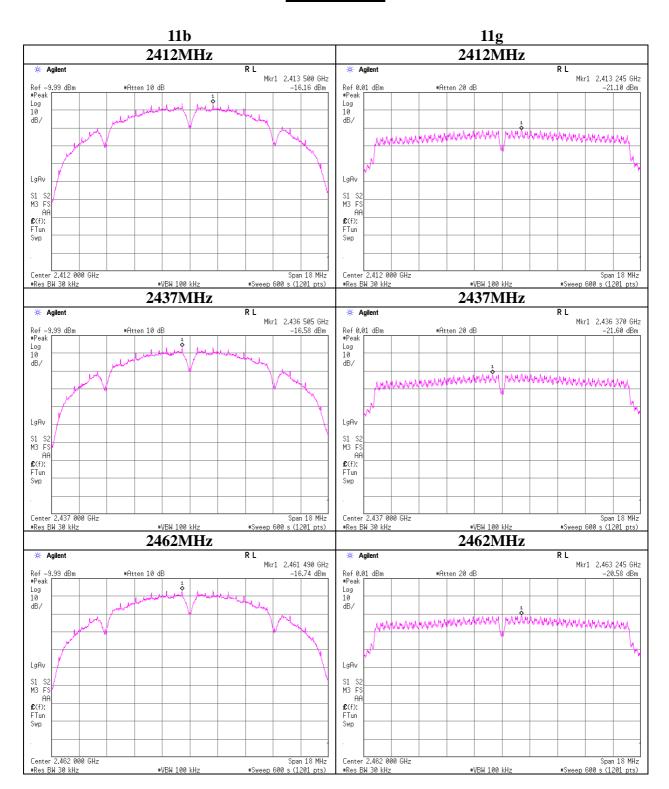
 $Result = Reading + Cable \ Loss + Attenuator$ 

**Head Office EMC Lab.** 

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#### **Power Density**



## UL Japan, Inc.

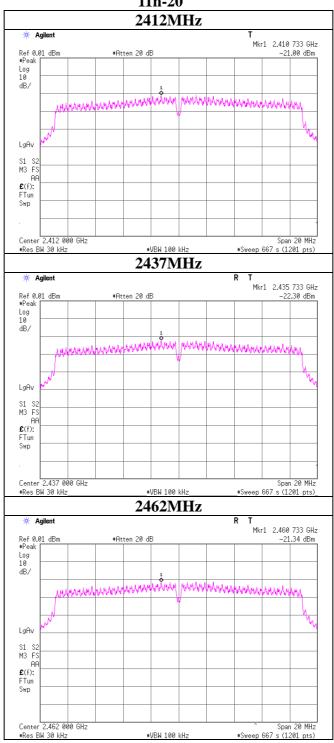
**Head Office EMC Lab.** 

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: 31HE0184-HO-02 Test report No. Page : 57 of 60 **Issued date** : July 11, 2011 FCC ID : VPYLBQX466

### **Power Density**

11n-20

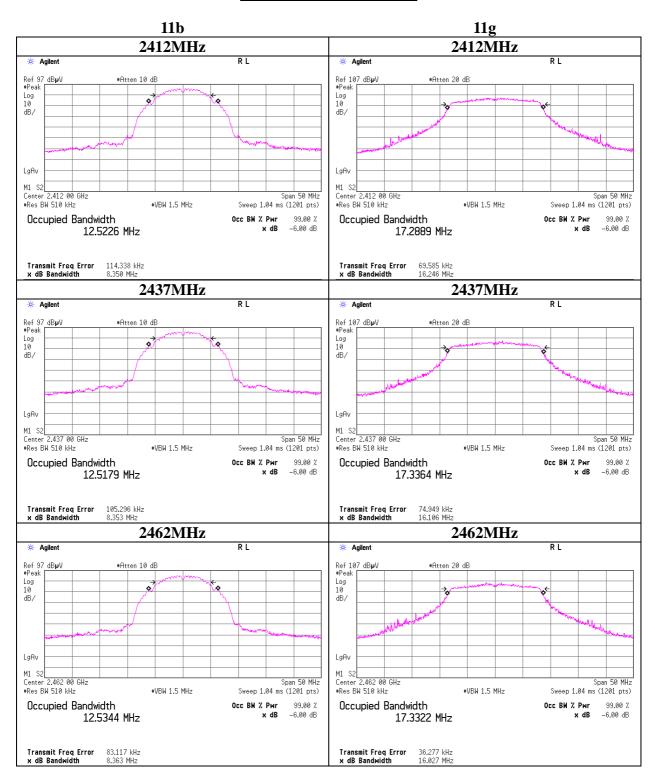


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#### 99%Occupied Bandwidth



## UL Japan, Inc.

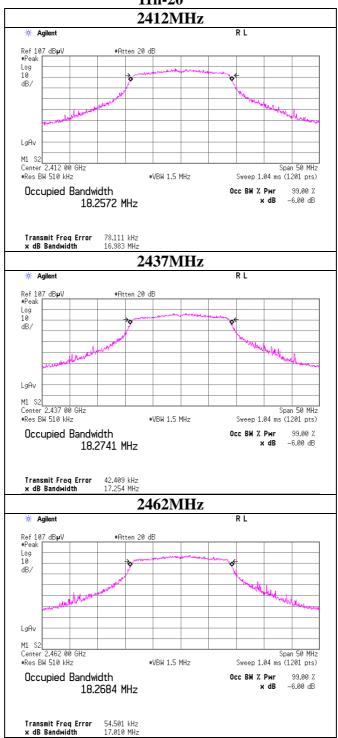
**Head Office EMC Lab.** 

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### 99% Occupied Bandwidth

11n-20



# UL Japan, Inc.

**Head Office EMC Lab.** 

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#### **APPENDIX 3: Test instruments**

**EMI** test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2011/02/23 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2010/11/30 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2010/09/10 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2010/09/10 * 12
MAT-24	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71389	AT	2010/06/14 * 12
MCC-114	Microwave Cable 1G- 26.5GHz	Suhner	SUCOFLEX104	290212/4	AT	2010/08/05 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2010/12/13 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT/CE	2011/02/15 * 12
MCC-115	Microwave Cable 1G- 26.5GHz	Suhner	SUCOFLEX104	290211/4	AT	2010/08/05 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2011/02/22 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2011/02/23 * 12
MJM-15	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2010/11/18 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2011/05/23 * 12
MCC-18	Microwave Cable 1G- 26.5GHz	Suhner	SUCOFLEX 104	148048-143(1m) / 292410(5m)	RE	2010/09/30 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2011/03/10 * 12
MHF-06	High Pass Filter 3.5- 24GHz	TOKIMEC	TF323DCA	601	RE	2011/05/16 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2011/05/23 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE/CE	2010/08/23 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2010/10/11 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2010/10/11 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2010/07/06 * 12
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2010/11/05 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2011/03/04 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2011/02/22 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D- 2W(10m)/SFM141(3m)/sucoform141- PE(1m)/421- 010(1.5m)/RFM- E321(Switcher)	-/00640	CE	2010/07/23 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2011/02/22 * 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

# UL Japan, Inc.

**Head Office EMC Lab.** 

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