

APPENDIX 2: Data of EMI test

Conducted Emission

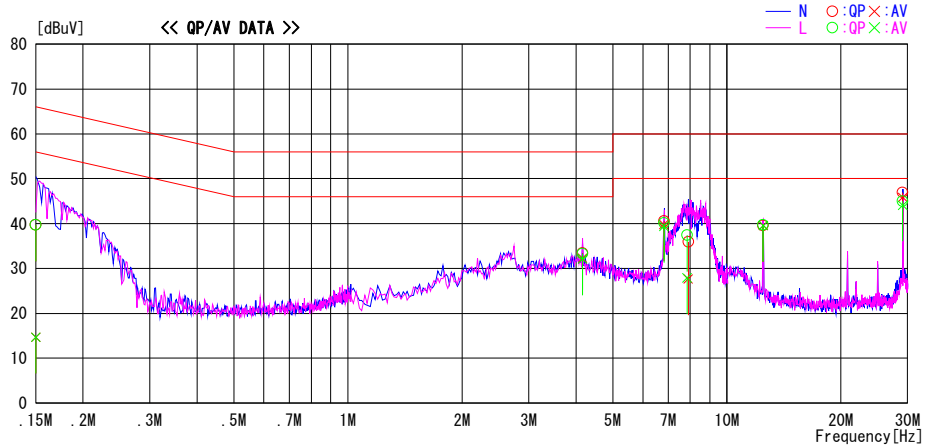
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
 Date : 2011/02/16

Report No. : 31CE0169-HO-02
 Temp./Humi. : 22deg. C / 29%
 Engineer : Hiroshi Kukita

Mode / Remarks : Tx 11b 5.5Mbps 2437MHz

LIMIT : FCC15.207 QP
 FCC15.207 AV

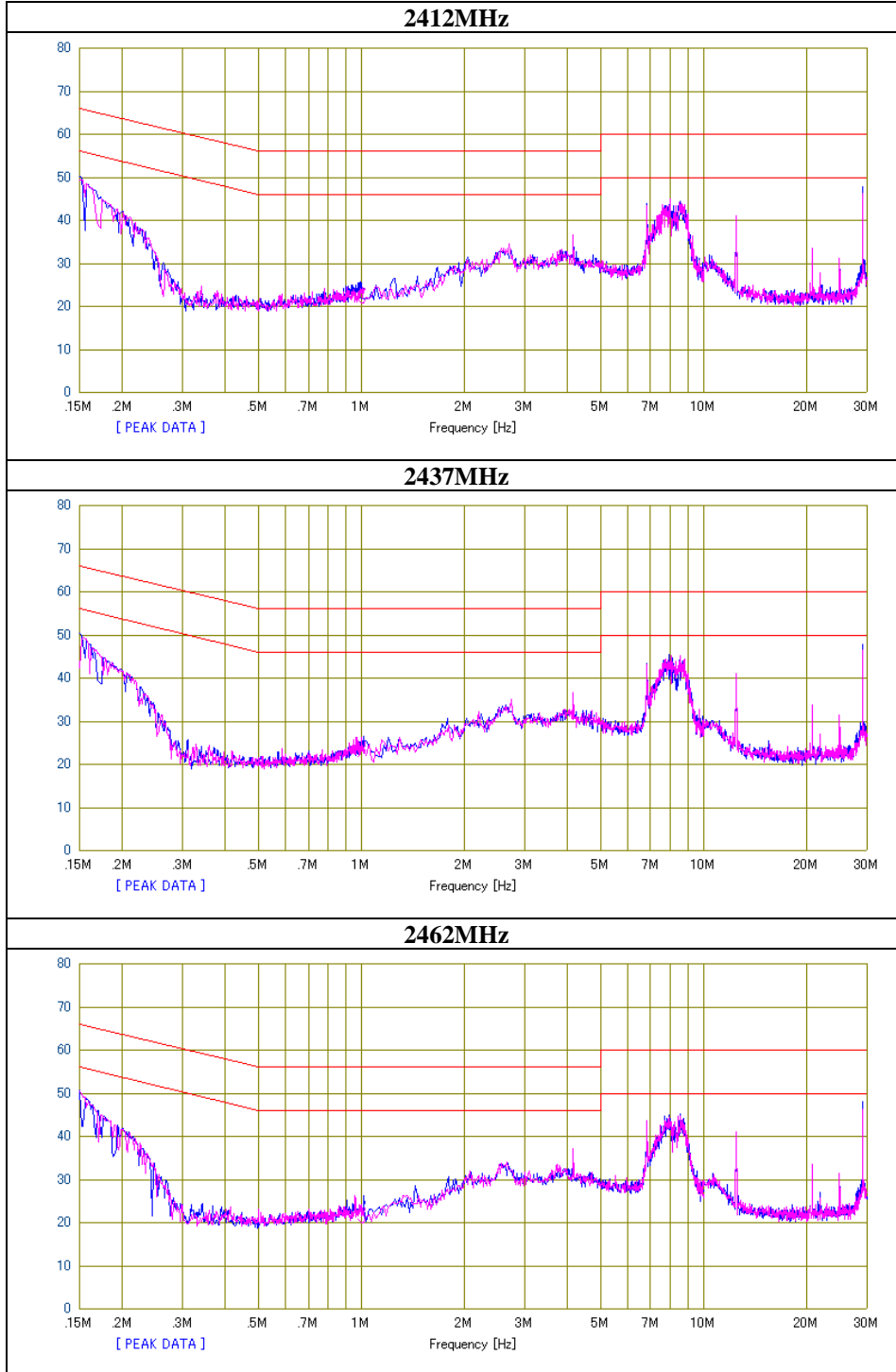


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
0.15000	26.4	1.4	13.3	39.7	14.7	66.0	56.0	26.3	41.3	N
4.15732	19.8	18.6	13.7	33.5	32.3	56.0	46.0	22.5	13.7	N
6.81628	26.7	25.9	13.9	40.6	39.8	60.0	50.0	19.4	10.2	N
7.90561	21.9	13.6	14.1	36.0	27.7	60.0	50.0	24.0	22.3	N
12.46903	25.1	25.1	14.5	39.6	39.6	60.0	50.0	20.4	10.4	N
29.09388	31.5	30.4	15.5	47.0	45.9	60.0	50.0	13.0	4.1	N
0.15000	26.4	1.4	13.3	39.7	14.7	66.0	56.0	26.3	41.3	L
4.15740	19.6	18.4	13.7	33.3	32.1	56.0	46.0	22.7	13.9	L
6.81720	26.3	25.5	13.9	40.2	39.4	60.0	50.0	19.8	10.6	L
7.85560	23.3	13.8	14.1	37.4	27.9	60.0	50.0	22.6	22.1	L
12.46976	25.2	25.1	14.5	39.7	39.6	60.0	50.0	20.3	10.4	L
29.09280	29.5	28.6	15.5	45.0	44.1	60.0	50.0	15.0	5.9	L

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT=READING+C.F (LISN LOSS+CABLE LOSS+ATTEN. LOSS)
 Except for the above table : adequate margin data below the limits.

Conducted Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	31CE0169-HO-02
Date	02/16/2011
Temperature/ Humidity	22 deg.C./ 29%
Engineer	Hiroshi Kukita
Mode	11b Tx



Conducted Emission

DATA OF CONDUCTED EMISSION TEST

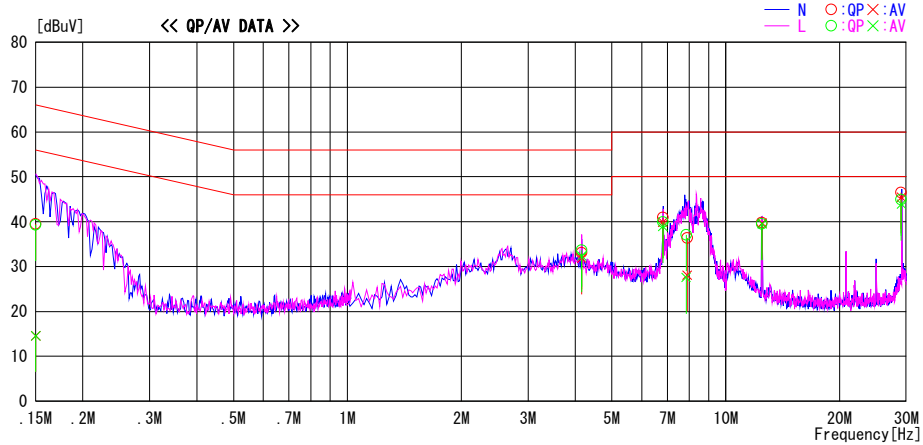
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2011/02/16

Report No. : 31CE0169-HO-02

Temp./Humi. : 22deg.C / 29%
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 11g 24Mbps 2437MHz

LIMIT : FCC15.207 QP
FCC15.207 AV

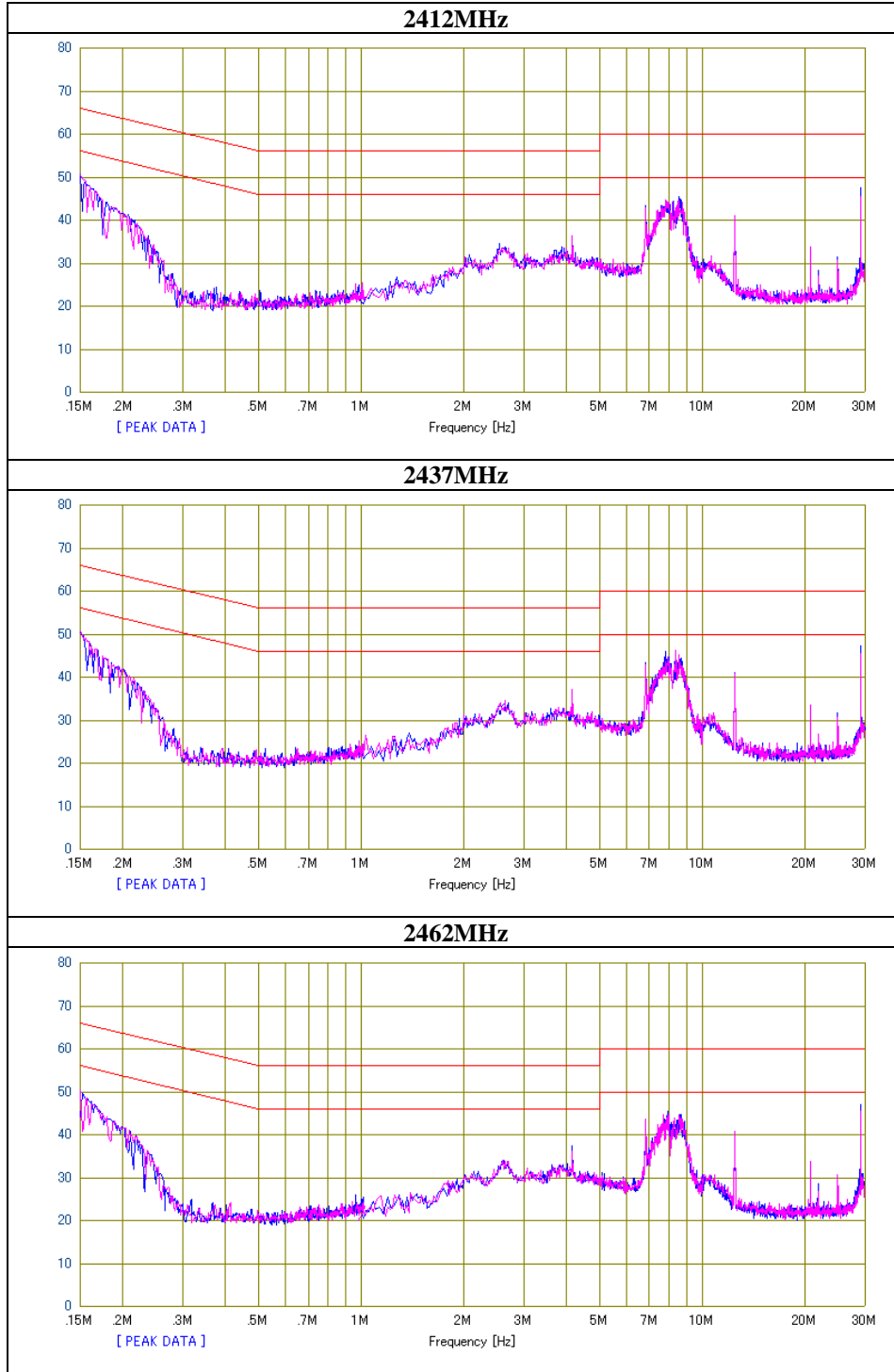


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
0.15000	26.2	1.3	13.3	39.5	14.6	66.0	56.0	26.5	41.4	N
4.15911	19.4	18.2	13.7	33.1	31.9	56.0	46.0	22.9	14.1	N
6.81678	27.0	26.0	13.9	40.9	39.9	60.0	50.0	19.1	10.1	N
7.90433	22.3	14.0	14.1	36.4	28.1	60.0	50.0	23.6	21.9	N
12.47028	25.3	25.2	14.5	39.8	39.7	60.0	50.0	20.2	10.3	N
29.08891	31.0	30.0	15.5	46.5	45.5	60.0	50.0	13.5	4.5	N
0.15000	26.0	1.3	13.3	39.3	14.6	66.0	56.0	26.7	41.4	L
4.16086	19.9	18.7	13.7	33.6	32.4	56.0	46.0	22.4	13.6	L
6.81773	26.0	25.0	13.9	39.9	38.9	60.0	50.0	20.1	11.1	L
7.84899	23.0	13.5	14.1	37.1	27.6	60.0	50.0	22.9	22.4	L
12.46211	25.0	25.0	14.5	39.5	39.5	60.0	50.0	20.5	10.5	L
29.09256	29.4	28.4	15.5	44.9	43.9	60.0	50.0	15.1	6.1	L

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT=READING+C.F (LISN LOSS+CABLE LOSS+ATTEN. LOSS)
Except for the above table : adequate margin data below the limits.

Conducted Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	31CE0169-HO-02
Date	02/16/2011
Temperature/ Humidity	22 deg.C./ 29%
Engineer	Hiroshi Kukita
Mode	11g Tx



Conducted Emission

DATA OF CONDUCTED EMISSION TEST

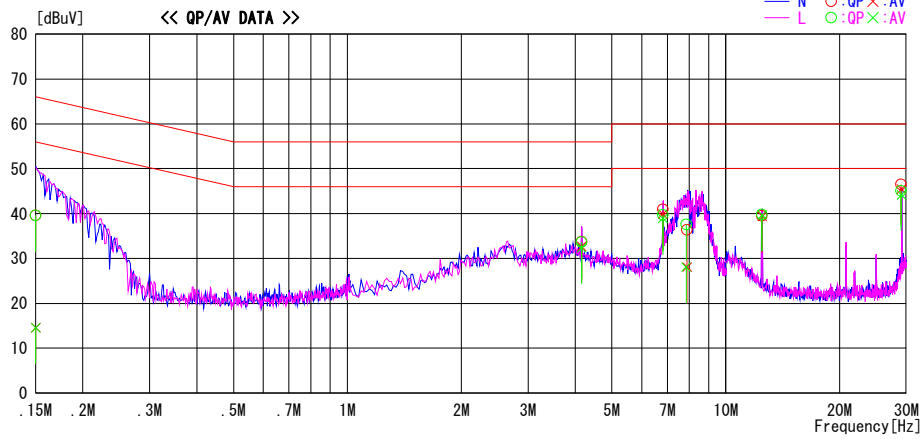
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
 Date : 2011/02/16

Report No. : 31CE0169-HO-02

Temp./Humi. : 22deg.C / 29%
 Engineer : Hiroshi Kukita

Mode / Remarks : Tx 11n MCS4 2437MHz

LIMIT : FCC15.207 QP
 FCC15.207 AV

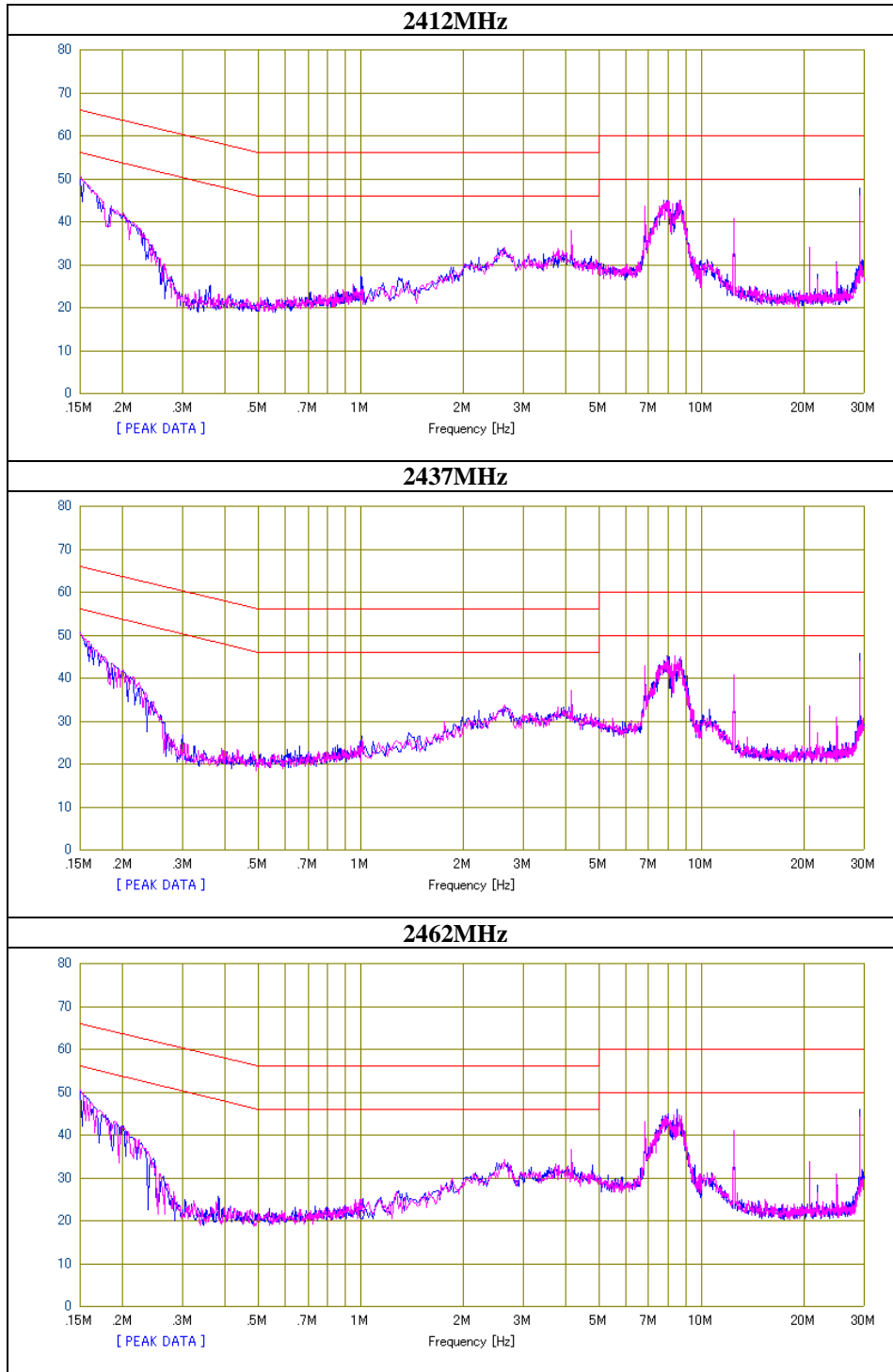


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
0.15000	26.3	1.3	13.3	39.6	14.6	66.0	56.0	26.4	41.4	N
4.15744	20.0	19.0	13.7	33.7	32.7	56.0	46.0	22.3	13.3	N
6.81634	27.0	26.0	13.9	40.9	39.9	60.0	50.0	19.1	10.1	N
7.89412	22.3	14.0	14.1	36.4	28.1	60.0	50.0	23.6	21.9	N
12.46835	25.0	24.9	14.5	39.5	39.4	60.0	50.0	20.5	10.6	N
29.09365	31.0	30.0	15.5	46.5	45.5	60.0	50.0	13.5	4.5	N
0.15000	26.3	1.3	13.3	39.6	14.6	66.0	56.0	26.4	41.4	L
4.15810	19.9	18.7	13.7	33.6	32.4	56.0	46.0	22.4	13.6	L
6.81811	25.8	25.0	13.9	39.7	38.9	60.0	50.0	20.3	11.1	L
7.85573	23.5	14.0	14.1	37.6	28.1	60.0	50.0	22.4	21.9	L
12.46982	25.3	25.2	14.5	39.8	39.7	60.0	50.0	20.2	10.3	L
29.08056	29.6	28.7	15.5	45.1	44.2	60.0	50.0	14.9	5.8	L

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT=READING+C.F (L1SN LOSS+CABLE LOSS+ATTEN. LOSS)
 Except for the above table : adequate margin data below the limits.

Conducted Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	31CE0169-HO-02
Date	02/16/2011
Temperature/ Humidity	22 deg.C./ 29%
Engineer	Hiroshi Kukita
Mode	11n Tx



Conducted Emission

DATA OF CONDUCTED EMISSION TEST

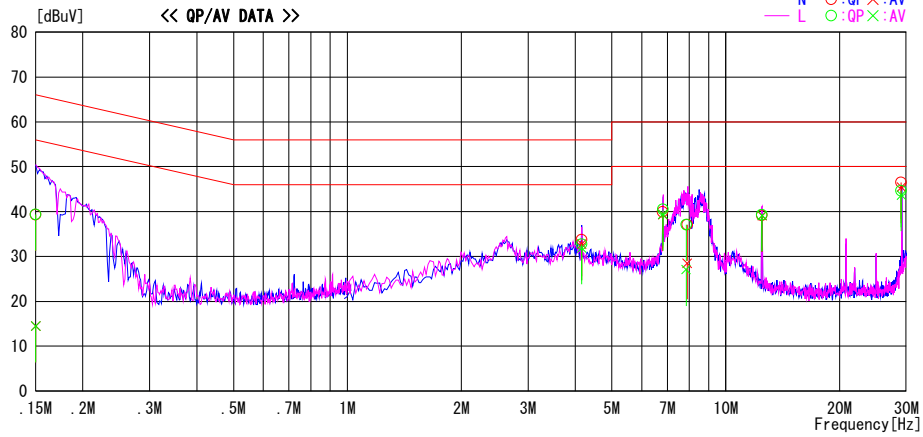
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
 Date : 2011/02/16

Report No. : 31CE0169-HO-02

Temp./Humi. : 22deg.C / 29%
 Engineer : Hiroshi Kukita

Mode / Remarks : Rx 2437MHz

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]	
0.15000	26.0	1.2	13.3	39.3	14.5	66.0	56.0	26.7	41.5	N
4.15755	20.0	19.1	13.7	33.7	32.8	56.0	46.0	22.3	13.2	N
6.81281	26.0	25.4	13.9	39.9	39.3	60.0	50.0	20.1	10.7	N
7.90502	23.0	14.4	14.1	37.1	28.5	60.0	50.0	22.9	21.5	N
12.46435	24.6	24.6	14.5	39.1	39.1	60.0	50.0	20.9	10.9	N
29.09566	31.0	30.0	15.5	46.5	45.5	60.0	50.0	13.5	4.5	N
0.15000	26.1	1.2	13.3	39.4	14.5	66.0	56.0	26.6	41.5	L
4.16120	19.0	18.2	13.7	32.7	31.9	56.0	46.0	23.3	14.1	L
6.81689	26.6	25.5	13.9	40.5	39.4	60.0	50.0	19.5	10.6	L
7.85521	23.0	13.0	14.1	37.1	27.1	60.0	50.0	22.9	22.9	L
12.46945	24.8	24.7	14.5	39.3	39.2	60.0	50.0	20.7	10.8	L
29.09256	29.1	28.2	15.5	44.6	43.7	60.0	50.0	15.4	6.3	L

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT=READING+C.F (L1SN LOSS+CABLE LOSS+ATTEN. LOSS)
 Except for the above table : adequate margin data below the limits.

6dB Bandwidth

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 31CE0169-HO-02
Date 02/16/2011
Temperature/ Humidity 21 deg.C./ 31%
Engineer Keisuke Kawamura
Mode Tx

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	10.130	>500
2437	9.782	>500
2462	9.779	>500

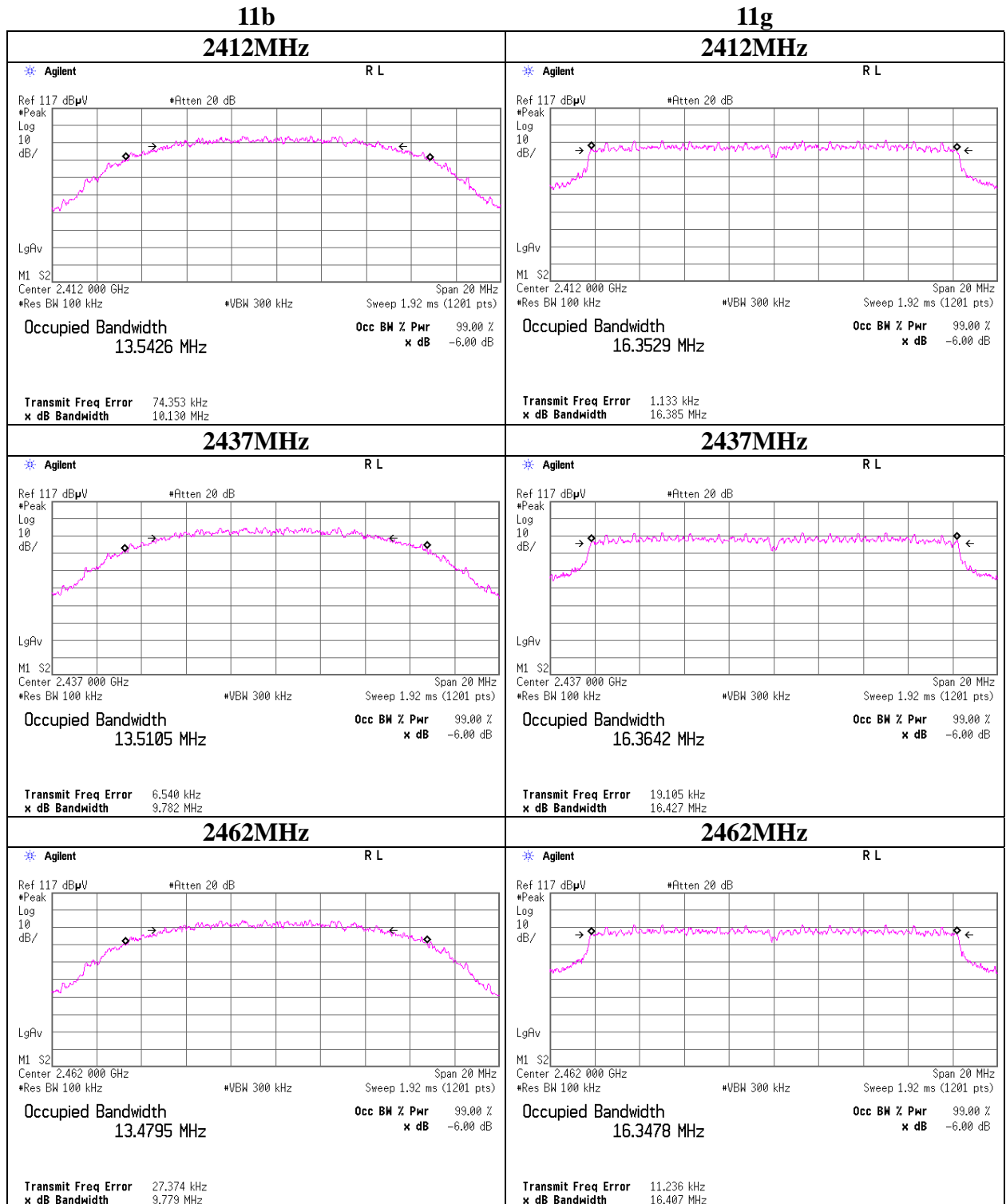
11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.385	>500
2437	16.427	>500
2462	16.407	>500

11n-20

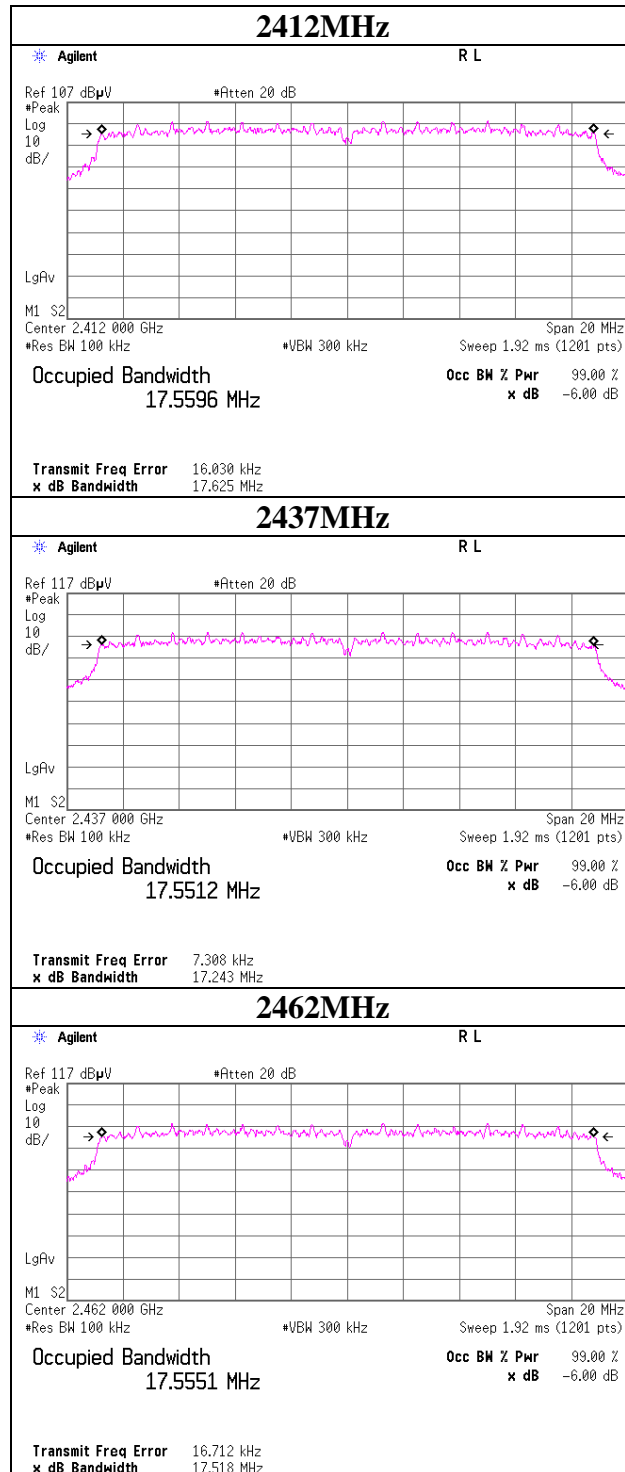
Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	17.625	>500
2437	17.243	>500
2462	17.518	>500

6dB Bandwidth



6dB Bandwidth

11n-20



Maximum Peak Output Power

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	31CE0169-HO-02
Date	02/07/2011
Temperature/ Humidity	21 deg.C./ 33%
Engineer	Satofumi Matsuyama
Mode	11b Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	5.87	0.97	10.07	16.91	49.09	30.00	1000	13.09
2437	6.59	0.98	10.07	17.64	58.08	30.00	1000	12.36
2462	6.28	0.98	10.07	17.33	54.08	30.00	1000	12.67

Sample Calculation:

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

2437MHz

Rate [Mbps]	Reading PK [dBm]	Remark
1	6.56	
2 long	6.49	
2 Short	6.51	
5.5 long	6.57	
5.5 Short	6.59	*
11 long	6.54	
11 Short	6.56	

*: Worst Rate

Result=Reading + Duty Factor

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

Maximum Peak Output Power

Test place	Head Office EMC Lab. No.6 Measurement room
Report No.	31CE0169-HO-02
Date	02/07/2011
Temperature/ Humidity	21 deg.C./ 33%
Engineer	Satofumi Matsuyama
Mode	11g Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	9.90	0.97	10.07	20.94	124.17	30.00	1000	9.06
2437	9.96	0.98	10.07	21.01	126.18	30.00	1000	8.99
2462	10.36	0.98	10.07	21.41	138.36	30.00	1000	8.59

Sample Calculation:

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

2437MHz

Rate [Mbps]	Reading PK [dBm]	Remark
6	9.80	
9	9.83	
12	9.85	
18	9.93	
24	9.96	*
36	9.91	
48	9.41	
54	8.37	

*: Worst Rate

Result=Reading + Duty Factor

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

Maximum Peak Output Power

Test place	Head Office EMC Lab. No.6 Measurement room
Report No.	31CE0169-HO-02
Date	02/07/2011
Temperature/ Humidity	21 deg.C./ 33%
Engineer	Satofumi Matsuyama
Mode	11n-20 Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	9.98	0.97	10.07	21.02	126.47	30.00	1000	8.98
2437	10.08	0.98	10.07	21.13	129.72	30.00	1000	8.87
2462	10.62	0.98	10.07	21.67	146.89	30.00	1000	8.33

Sample Calculation:

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

2437MHz

MCS Number	Reading PK [dBm]	Remark
0	9.76	
1	9.72	
2	9.67	
3	9.70	
4	10.08	*
5	9.58	
6	8.81	
7	7.86	

*: Worst Rate

Result=Reading + Duty Factor

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 and 4 Semi Anechoic Chamber
Report No. : 31CE0169-HO-02
Date : 02/09/2011 Takumi Shimada 02/13/2011 02/24/2011
Temperature/ Humidity : 24 deg.C./ 21% (Below 1GHz) 20 deg.C./ 29% 25 deg.C./ 25%
Engineer : Satofumi Matsuyama Takayuki Shimada Takumi Shimada Katsunori Okai
(Bandedge) (Above 1GHz) (Below 1GHz) (Bandedge)
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	72.020	QP	47.6	6.5	7.2	28.6	32.7	40.0	7.3	
Hori	91.560	QP	46.2	8.5	7.4	28.5	33.6	43.5	9.9	
Hori	199.772	QP	36.5	16.7	8.1	28.0	33.3	43.5	10.2	
Hori	364.504	QP	35.5	16.5	9.1	28.1	33.0	46.0	13.0	
Hori	458.633	QP	30.7	17.7	9.5	28.7	29.2	46.0	16.8	
Hori	729.008	QP	37.6	20.9	10.5	28.4	40.6	46.0	5.4	
Hori	2390.000	PK	53.2	27.2	3.0	32.1	51.3	73.9	22.6	
Hori	2397.500	PK	75.5	27.2	3.1	32.1	73.7	-	-	- See 20dBc Data Sheet
Hori	2400.000	PK	71.9	27.2	3.1	32.1	70.1	-	-	- See 20dBc Data Sheet
Hori	4824.000	PK	40.8	31.4	5.0	31.3	45.9	73.9	28.0	
Hori	7236.000	PK	41.4	35.5	5.3	31.6	50.6	73.9	23.3	
Hori	9648.000	PK	41.1	38.4	6.1	31.9	53.7	73.9	20.2	
Hori	24120.000	PK	45.5	40.4	-0.9	29.6	55.4	73.9	18.5	
Hori	2390.000	AV	37.2	27.2	3.0	32.1	35.3	53.9	18.6	
Hori	2397.500	AV	58.9	27.2	3.1	32.1	57.1	-	-	- See 20dBc Data Sheet
Hori	2400.000	AV	56.4	27.2	3.1	32.1	54.6	-	-	- See 20dBc Data Sheet
Hori	4824.000	AV	28.8	31.4	5.0	31.3	33.9	53.9	20.0	
Hori	7236.000	AV	29.6	35.5	5.3	31.6	38.8	53.9	15.1	
Hori	9648.000	AV	29.0	38.4	6.1	31.9	41.6	53.9	12.3	
Hori	24120.000	AV	33.9	40.4	-0.9	29.6	43.8	53.9	10.1	
Vert	72.020	QP	52.6	6.5	7.2	28.6	37.7	40.0	2.3	
Vert	91.568	QP	43.6	8.5	7.4	28.5	31.0	43.5	12.5	
Vert	199.586	QP	40.0	16.7	8.1	28.0	36.8	43.5	6.7	
Vert	364.506	QP	33.8	16.5	9.1	28.1	31.3	46.0	14.7	
Vert	458.622	QP	32.5	17.7	9.5	28.7	31.0	46.0	15.0	
Vert	729.011	QP	31.8	20.9	10.5	28.4	34.8	46.0	11.2	
Vert	2390.000	PK	51.2	27.2	3.0	32.1	49.3	73.9	24.6	
Vert	2397.500	PK	72.7	27.2	3.1	32.1	70.9	-	-	- See 20dBc Data Sheet
Vert	2400.000	PK	69.3	27.2	3.1	32.1	67.5	-	-	- See 20dBc Data Sheet
Vert	4824.000	PK	41.0	31.4	5.0	31.3	46.1	73.9	27.8	
Vert	7236.000	PK	41.7	35.5	5.3	31.6	50.9	73.9	23.0	
Vert	9648.000	PK	41.3	38.4	6.1	31.9	53.9	73.9	20.0	
Vert	24120.000	PK	45.6	40.4	-0.9	29.6	55.5	73.9	18.4	
Vert	2390.000	AV	35.4	27.2	3.0	32.1	33.5	53.9	20.4	
Vert	2397.500	AV	55.1	27.2	3.1	32.1	53.3	-	-	- See 20dBc Data Sheet
Vert	2400.000	AV	54.1	27.2	3.1	32.1	52.3	-	-	- See 20dBc Data Sheet
Vert	4824.000	AV	28.8	31.4	5.0	31.3	33.9	53.9	20.0	
Vert	7236.000	AV	29.6	35.5	5.3	31.6	38.8	53.9	15.1	
Vert	9648.000	AV	29.0	38.4	6.1	31.9	41.6	53.9	12.3	
Vert	24120.000	AV	33.9	40.4	-0.9	29.6	43.8	53.9	10.1	

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

Radiated Spurious Emission
(20dBc data sheet)

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 31CE0169-HO-02
Date : 02/09/2011 02/24/2011
Temperature/ Humidity : 24 deg.C./ 21% 25 deg.C./ 25%
Engineer : Satofumi Matsuyama Katsunori Okai

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	105.2	27.2	3.1	32.1	103.4	-	-	Carrier
Hori	2397.500	PK	69.6	27.2	3.1	32.1	67.8	83.4	15.6	
Hori	2400.000	PK	64.7	27.2	3.1	32.1	62.9	83.4	20.5	
Vert	2412.000	PK	102.9	27.2	3.1	32.1	101.1	-	-	Carrier
Vert	2397.500	PK	64.7	27.2	3.1	32.1	62.9	81.1	18.2	
Vert	2400.000	PK	62.5	27.2	3.1	32.1	60.7	81.1	20.4	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31CE0169-HO-02
Date 02/12/2011 02/13/2011
Temperature/ Humidity 22 deg.C./ 27% 20 deg.C./ 29%
Engineer Takayuki Shimada Takumi Shimada
(Above 1GHz) (Below 1GHz)
Mode 11b 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	72.019	QP	47.5	6.5	7.2	28.6	32.6	40.0	7.4	
Hori	91.562	QP	46.4	8.5	7.4	28.5	33.8	43.5	9.7	
Hori	199.675	QP	36.3	16.7	8.1	28.0	33.1	43.5	10.4	
Hori	364.505	QP	35.6	16.5	9.1	28.1	33.1	46.0	12.9	
Hori	458.615	QP	30.6	17.7	9.5	28.7	29.1	46.0	16.9	
Hori	729.009	QP	37.8	20.9	10.5	28.4	40.8	46.0	5.2	
Hori	4874.000	PK	43.3	31.5	5.0	31.3	48.5	73.9	25.4	
Hori	7311.000	PK	41.4	35.6	5.4	31.6	50.8	73.9	23.1	
Hori	9748.000	PK	40.6	38.5	6.2	31.8	53.5	73.9	20.4	
Hori	24370.000	PK	45.0	40.4	-0.9	29.5	55.0	73.9	18.9	
Hori	4874.000	AV	29.5	31.5	5.0	31.3	34.7	53.9	19.2	
Hori	7311.000	AV	29.2	35.6	5.4	31.6	38.6	53.9	15.3	
Hori	9748.000	AV	28.2	38.5	6.2	31.8	41.1	53.9	12.8	
Hori	24370.000	AV	33.0	40.4	-0.9	29.5	43.0	53.9	10.9	
Vert	72.020	QP	52.4	6.5	7.2	28.6	37.5	40.0	2.5	
Vert	91.567	QP	43.5	8.5	7.4	28.5	30.9	43.5	12.6	
Vert	199.623	QP	39.9	16.7	8.1	28.0	36.7	43.5	6.8	
Vert	364.501	QP	33.5	16.5	9.1	28.1	31.0	46.0	15.0	
Vert	458.631	QP	32.2	17.7	9.5	28.7	30.7	46.0	15.3	
Vert	729.007	QP	31.6	20.9	10.5	28.4	34.6	46.0	11.4	
Vert	4874.000	PK	47.6	31.5	5.0	31.3	52.8	73.9	21.1	
Vert	7311.000	PK	41.4	35.6	5.4	31.6	50.8	73.9	23.1	
Vert	9748.000	PK	40.7	38.5	6.2	31.8	53.6	73.9	20.3	
Vert	24370.000	PK	45.2	40.4	-0.9	29.5	55.2	73.9	18.7	
Vert	4874.000	AV	36.8	31.5	5.0	31.3	42.0	53.9	11.9	
Vert	7311.000	AV	29.2	35.6	5.4	31.6	38.6	53.9	15.3	
Vert	9748.000	AV	28.2	38.5	6.2	31.8	41.1	53.9	12.8	
Vert	24370.000	AV	33.0	40.4	-0.9	29.5	43.0	53.9	10.9	

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 and 4 Semi Anechoic Chamber
Report No. : 31CE0169-HO-02
Date : 02/09/2011 02/12/2011 02/13/2011
Temperature/ Humidity : 24 deg.C./ 21% 22 deg.C./ 27% 20 deg.C./ 29%
Engineer : Satofumi Matsuyama Takayuki Shimada Takumi Shimada
(Bandedge) (Above 1GHz) (Below 1GHz)
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	72.021	QP	46.0	6.5	7.2	28.6	31.1	40.0	8.9	
Hori	91.392	QP	45.3	8.5	7.4	28.5	32.7	43.5	10.8	
Hori	199.473	QP	34.6	16.7	8.1	28.0	31.4	43.5	12.1	
Hori	364.505	QP	35.7	16.5	9.1	28.1	33.2	46.0	12.8	
Hori	458.632	QP	32.4	17.7	9.5	28.7	30.9	46.0	15.1	
Hori	729.009	QP	36.9	20.9	10.5	28.4	39.9	46.0	6.1	
Hori	2483.500	PK	51.1	27.2	3.1	32.1	49.3	73.9	24.6	
Hori	4924.000	PK	43.6	31.6	5.0	31.3	48.9	73.9	25.0	
Hori	7386.000	PK	42.0	35.7	5.4	31.6	51.5	73.9	22.4	
Hori	9848.000	PK	41.0	38.6	6.3	31.8	54.1	73.9	19.8	
Hori	24620.000	PK	46.1	40.3	-0.9	29.4	56.1	73.9	17.8	
Hori	2483.500	AV	35.5	27.2	3.1	32.1	33.7	53.9	20.2	
Hori	4924.000	AV	29.7	31.6	5.0	31.3	35.0	53.9	18.9	
Hori	7386.000	AV	29.6	35.7	5.4	31.6	39.1	53.9	14.8	
Hori	9848.000	AV	29.3	38.6	6.3	31.8	42.4	53.9	11.5	
Hori	24620.000	AV	33.9	40.3	-0.9	29.4	43.9	53.9	10.0	
Vert	72.018	QP	51.7	6.5	7.2	28.6	36.8	40.0	3.2	
Vert	91.498	QP	43.4	8.5	7.4	28.5	30.8	43.5	12.7	
Vert	199.535	QP	40.6	16.7	8.1	28.0	37.4	43.5	6.1	
Vert	364.502	QP	34.6	16.5	9.1	28.1	32.1	46.0	13.9	
Vert	458.629	QP	34.1	17.7	9.5	28.7	32.6	46.0	13.4	
Vert	729.010	QP	31.1	20.9	10.5	28.4	34.1	46.0	11.9	
Vert	2483.500	PK	49.4	27.2	3.1	32.1	47.6	73.9	26.3	
Vert	4924.000	PK	45.6	31.6	5.0	31.3	50.9	73.9	23.0	
Vert	7386.000	PK	41.8	35.7	5.4	31.6	51.3	73.9	22.6	
Vert	9848.000	PK	41.2	38.6	6.3	31.8	54.3	73.9	19.6	
Vert	24620.000	PK	45.8	40.3	-0.9	29.4	55.8	73.9	18.1	
Vert	2483.500	AV	34.8	27.2	3.1	32.1	33.0	53.9	20.9	
Vert	4924.000	AV	30.7	31.6	5.0	31.3	36.0	53.9	17.9	
Vert	7386.000	AV	29.6	35.7	5.4	31.6	39.1	53.9	14.8	
Vert	9848.000	AV	29.3	38.6	6.3	31.8	42.4	53.9	11.5	
Vert	24620.000	AV	33.9	40.3	-0.9	29.4	43.9	53.9	10.0	

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 and 4 Semi Anechoic Chamber
Report No. : 31CE0169-HO-02
Date : 02/09/2011 02/12/2011 02/13/2011
Temperature/ Humidity : 24 deg.C./ 21% 22 deg.C./ 27% 20 deg.C./ 29%
Engineer : Satofumi Matsuyama Takayuki Shimada Takumi Shimada
(Bandedge) (Above 1GHz) (Below 1GHz)
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	72.021	QP	46.1	6.5	7.2	28.6	31.2	40.0	8.8	
Hori	91.311	QP	46.0	8.5	7.4	28.5	33.4	43.5	10.1	
Hori	199.485	QP	34.1	16.7	8.1	28.0	30.9	43.5	12.6	
Hori	364.507	QP	35.5	16.5	9.1	28.1	33.0	46.0	13.0	
Hori	458.629	QP	32.9	17.7	9.5	28.7	31.4	46.0	14.6	
Hori	729.009	QP	38.0	20.9	10.5	28.4	41.0	46.0	5.0	
Hori	2390.000	PK	71.2	27.2	3.0	32.1	69.3	73.9	4.6	
Hori	2400.000	PK	85.3	27.2	3.1	32.1	83.5	-	-	See 20dBc Data Sheet
Hori	2400.000	PK	73.2	27.2	3.1	32.1	71.4	73.9	2.5	
Hori	4824.000	PK	40.7	31.4	5.0	31.3	45.8	73.9	28.1	
Hori	7236.000	PK	41.6	35.5	5.3	31.6	50.8	73.9	23.1	
Hori	9648.000	PK	40.9	38.4	6.1	31.9	53.5	73.9	20.4	
Hori	24120.000	PK	45.7	40.4	-0.9	29.6	55.6	73.9	18.3	
Hori	2390.000	AV	48.6	27.2	3.0	32.1	46.7	53.9	7.2	
Hori	2400.000	AV	64.5	27.2	3.1	32.1	62.7	-	-	See 20dBc Data Sheet
Hori	4824.000	AV	28.8	31.4	5.0	31.3	33.9	53.9	20.0	
Hori	7236.000	AV	29.6	35.5	5.3	31.6	38.8	53.9	15.1	
Hori	9648.000	AV	29.0	38.4	6.1	31.9	41.6	53.9	12.3	
Hori	24120.000	AV	33.9	40.4	-0.9	29.6	43.8	53.9	10.1	
Vert	72.021	QP	52.2	6.5	7.2	28.6	37.3	40.0	2.7	
Vert	91.346	QP	43.9	8.5	7.4	28.5	31.3	43.5	12.2	
Vert	199.613	QP	41.5	16.7	8.1	28.0	38.3	43.5	5.2	
Vert	364.505	QP	34.7	16.5	9.1	28.1	32.2	46.0	13.8	
Vert	458.631	QP	33.2	17.7	9.5	28.7	31.7	46.0	14.3	
Vert	729.009	QP	31.4	20.9	10.5	28.4	34.4	46.0	11.6	
Vert	2390.000	PK	69.5	27.2	3.0	32.1	67.6	73.9	6.3	
Vert	2400.000	PK	83.6	27.2	3.1	32.1	81.8	-	-	See 20dBc Data Sheet
Vert	2400.000	PK	71.4	27.2	3.1	32.1	69.6	73.9	4.3	
Vert	4824.000	PK	41.1	31.4	5.0	31.3	46.2	73.9	27.7	
Vert	7236.000	PK	41.5	35.5	5.3	31.6	50.7	73.9	23.2	
Vert	9648.000	PK	40.9	38.4	6.1	31.9	53.5	73.9	20.4	
Vert	24120.000	PK	45.6	40.4	-0.9	29.6	55.5	73.9	18.4	
Vert	2390.000	AV	45.9	27.2	3.0	32.1	44.0	53.9	9.9	
Vert	2400.000	AV	62.9	27.2	3.1	32.1	61.1	-	-	See 20dBc Data Sheet
Vert	4824.000	AV	28.8	31.4	5.0	31.3	33.9	53.9	20.0	
Vert	7236.000	AV	29.6	35.5	5.3	31.6	38.8	53.9	15.1	
Vert	9648.000	AV	29.0	38.4	6.1	31.9	41.6	53.9	12.3	
Vert	24120.000	AV	33.9	40.4	-0.9	29.6	43.8	53.9	10.1	

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

Radiated Spurious Emission
(20dBc data sheet)

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 31CE0169-HO-02
Date : 02/09/2011
Temperature/ Humidity : 24 deg.C./ 21%
Engineer : Satofumi Matsuyama
(Bandedge)
Mode : 11g 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	101.7	27.2	3.1	32.1	99.9	-	-	Carrier
Hori	2400.000	PK	73.2	27.2	3.1	32.1	71.4	79.9	8.5	
Vert	2412.000	PK	100.6	27.2	3.1	32.1	98.8	-	-	Carrier
Vert	2400.000	PK	71.4	27.2	3.1	32.1	69.6	78.8	9.2	

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 and 4 Semi Anechoic Chamber
Report No. : 31CE0169-HO-02
Date : 02/09/2011 02/12/2011 02/13/2011
Temperature/ Humidity : 24 deg.C./ 21% 22 deg.C./ 27% 20 deg.C./ 29%
Engineer : Satofumi Matsuyama Takayuki Shimada Takumi Shimada
(Bandedge) (Above 1GHz) (Below 1GHz)
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	72.021	QP	47.2	6.5	7.2	28.6	32.3	40.0	7.7	
Hori	91.424	QP	45.7	8.5	7.4	28.5	33.1	43.5	10.4	
Hori	199.524	QP	34.4	16.7	8.1	28.0	31.2	43.5	12.3	
Hori	364.504	QP	35.2	16.5	9.1	28.1	32.7	46.0	13.3	
Hori	458.631	QP	31.8	17.7	9.5	28.7	30.3	46.0	15.7	
Hori	729.007	QP	36.1	20.9	10.5	28.4	39.1	46.0	6.9	
Hori	2483.500	PK	74.7	27.2	3.1	32.1	72.9	73.9	1.0	
Hori	4924.000	PK	40.6	31.6	5.0	31.3	45.9	73.9	28.0	
Hori	7386.000	PK	41.7	35.7	5.4	31.6	51.2	73.9	22.7	
Hori	9848.000	PK	40.9	38.6	6.3	31.8	54.0	73.9	19.9	
Hori	24620.000	PK	45.8	40.3	-0.9	29.4	55.8	73.9	18.1	
Hori	2483.500	AV	51.2	27.2	3.1	32.1	49.4	53.9	4.5	
Hori	4924.000	AV	28.8	31.6	5.0	31.3	34.1	53.9	19.8	
Hori	7386.000	AV	29.6	35.7	5.4	31.6	39.1	53.9	14.8	
Hori	9848.000	AV	29.3	38.6	6.3	31.8	42.4	53.9	11.5	
Hori	24620.000	AV	33.9	40.3	-0.9	29.4	43.9	53.9	10.0	
Vert	72.022	QP	51.9	6.5	7.2	28.6	37.0	40.0	3.0	
Vert	91.522	QP	42.8	8.5	7.4	28.5	30.2	43.5	13.3	
Vert	199.515	QP	41.7	16.7	8.1	28.0	38.5	43.5	5.0	
Vert	364.505	QP	35.3	16.5	9.1	28.1	32.8	46.0	13.2	
Vert	458.633	QP	36.5	17.7	9.5	28.7	35.0	46.0	11.0	
Vert	729.009	QP	32.1	20.9	10.5	28.4	35.1	46.0	10.9	
Vert	2483.500	PK	75.4	27.2	3.1	32.1	73.6	73.9	0.3	
Vert	4924.000	PK	40.8	31.6	5.0	31.3	46.1	73.9	27.8	
Vert	7386.000	PK	41.9	35.7	5.4	31.6	51.4	73.9	22.5	
Vert	9848.000	PK	40.9	38.6	6.3	31.8	54.0	73.9	19.9	
Vert	24620.000	PK	45.8	40.3	-0.9	29.4	55.8	73.9	18.1	
Vert	2483.500	AV	51.9	27.2	3.1	32.1	50.1	53.9	3.8	
Vert	4924.000	AV	28.8	31.6	5.0	31.3	34.1	53.9	19.8	
Vert	7386.000	AV	29.6	35.7	5.4	31.6	39.1	53.9	14.8	
Vert	9848.000	AV	29.3	38.6	6.3	31.8	42.4	53.9	11.5	
Vert	24620.000	AV	33.9	40.3	-0.9	29.4	43.9	53.9	10.0	

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 and 4 Semi Anechoic Chamber
Report No. : 31CE0169-HO-02
Date : 02/09/2011 02/12/2011 02/13/2011
Temperature/ Humidity : 24 deg.C./ 21% 22 deg.C./ 27% 20 deg.C./ 29%
Engineer : Satofumi Matsuyama Takayuki Shimada Takumi Shimada
(Bandedge) (Above 1GHz) (Below 1GHz)
Mode : 11n 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	72.023	QP	47.1	6.5	7.2	28.6	32.2	40.0	7.8	
Hori	91.424	QP	46.1	8.5	7.4	28.5	33.5	43.5	10.0	
Hori	199.521	QP	34.3	16.7	8.1	28.0	31.1	43.5	12.4	
Hori	364.507	QP	36.0	16.5	9.1	28.1	33.5	46.0	12.5	
Hori	458.633	QP	32.2	17.7	9.5	28.7	30.7	46.0	15.3	
Hori	729.012	QP	36.8	20.9	10.5	28.4	39.8	46.0	6.2	
Hori	2390.000	PK	73.4	27.2	3.0	32.1	71.5	73.9	2.4	
Hori	2400.000	PK	86.2	27.2	3.1	32.1	84.4	-	-	See 20dBc Data Sheet
Hori	4824.000	PK	41.0	31.4	5.0	31.3	46.1	73.9	27.8	
Hori	7236.000	PK	41.4	35.5	5.3	31.6	50.6	73.9	23.3	
Hori	9648.000	PK	41.0	38.4	6.1	31.9	53.6	73.9	20.3	
Hori	24120.000	PK	45.6	40.4	-0.9	29.6	55.5	73.9	18.4	
Hori	2390.000	AV	50.3	27.2	3.0	32.1	48.4	53.9	5.5	
Hori	2400.000	AV	64.4	27.2	3.1	32.1	62.6	-	-	See 20dBc Data Sheet
Hori	4824.000	AV	28.8	31.4	5.0	31.3	33.9	53.9	20.0	
Hori	7236.000	AV	29.6	35.5	5.3	31.6	38.8	53.9	15.1	
Hori	9648.000	AV	29.0	38.4	6.1	31.9	41.6	53.9	12.3	
Hori	24120.000	AV	33.9	40.4	-0.9	29.6	43.8	53.9	10.1	
Vert	72.021	QP	52.3	6.5	7.2	28.6	37.4	40.0	2.6	
Vert	91.538	QP	42.6	8.5	7.4	28.5	30.0	43.5	13.5	
Vert	199.521	QP	41.4	16.7	8.1	28.0	38.2	43.5	5.3	
Vert	364.508	QP	34.2	16.5	9.1	28.1	31.7	46.0	14.3	
Vert	458.630	QP	34.7	17.7	9.5	28.7	33.2	46.0	12.8	
Vert	729.011	QP	31.1	20.9	10.5	28.4	34.1	46.0	11.9	
Vert	2390.000	PK	72.3	27.2	3.0	32.1	70.4	73.9	3.5	
Vert	2400.000	PK	84.9	27.2	3.1	32.1	83.1	-	-	See 20dBc Data Sheet
Vert	4824.000	PK	41.0	31.4	5.0	31.3	46.1	73.9	27.8	
Vert	7236.000	PK	41.4	35.5	5.3	31.6	50.6	73.9	23.3	
Vert	9648.000	PK	41.2	38.4	6.1	31.9	53.8	73.9	20.1	
Vert	24120.000	PK	46.0	40.4	-0.9	29.6	55.9	73.9	18.0	
Vert	2390.000	AV	48.5	27.2	3.0	32.1	46.6	53.9	7.3	
Vert	2400.000	AV	63.1	27.2	3.1	32.1	61.3	-	-	See 20dBc Data Sheet
Vert	4824.000	AV	28.8	31.4	5.0	31.3	33.9	53.9	20.0	
Vert	7236.000	AV	29.6	35.5	5.3	31.6	38.8	53.9	15.1	
Vert	9648.000	AV	29.0	38.4	6.1	31.9	41.6	53.9	12.3	
Vert	24120.000	AV	33.9	40.4	-0.9	29.6	43.8	53.9	10.1	

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

Radiated Spurious Emission
 (20dBc data sheet)

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
 Report No. : 31CE0169-HO-02
 Date : 02/09/2011
 Temperature/ Humidity : 24 deg.C./ 21%
 Engineer : Satofumi Matsuyama
 (Bandedge)
 Mode : 11n 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	101.9	27.2	3.1	32.1	100.1	-	-	Carrier
Hori	2400.000	PK	73.4	27.2	3.1	32.1	71.6	80.1	8.5	
Vert	2412.000	PK	100.5	27.2	3.1	32.1	98.7	-	-	Carrier
Vert	2400.000	PK	72.3	27.2	3.1	32.1	70.5	78.7	8.2	

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 31CE0169-HO-02
Date : 02/12/2011 02/13/2011
Temperature/ Humidity : 22 deg.C./ 27% 20 deg.C./ 29%
Engineer : Takayuki Shimada Takumi Shimada
(Above 1GHz) (Below 1GHz)
Mode : 11n 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	72.022	QP	46.3	6.5	7.2	28.6	31.4	40.0	8.6	
Hori	91.312	QP	45.9	8.5	7.4	28.5	33.3	43.5	10.2	
Hori	199.487	QP	34.2	16.7	8.1	28.0	31.0	43.5	12.5	
Hori	364.504	QP	35.7	16.5	9.1	28.1	33.2	46.0	12.8	
Hori	458.629	QP	32.7	17.7	9.5	28.7	31.2	46.0	14.8	
Hori	729.009	QP	37.7	20.9	10.5	28.4	40.7	46.0	5.3	
Hori	4874.000	PK	40.6	31.5	5.0	31.3	45.8	73.9	28.1	
Hori	7311.000	PK	41.2	35.6	5.4	31.6	50.6	73.9	23.3	
Hori	9748.000	PK	41.0	38.5	6.2	31.8	53.9	73.9	20.0	
Hori	24370.000	PK	44.9	40.4	-0.9	29.5	54.9	73.9	19.0	
Hori	4874.000	AV	28.8	31.5	5.0	31.3	34.0	53.9	19.9	
Hori	7311.000	AV	29.2	35.6	5.4	31.6	38.6	53.9	15.3	
Hori	9748.000	AV	28.2	38.5	6.2	31.8	41.1	53.9	12.8	
Hori	24370.000	AV	33.0	40.4	-0.9	29.5	43.0	53.9	10.9	
Vert	72.021	QP	52.1	6.5	7.2	28.6	37.2	40.0	2.8	
Vert	91.338	QP	43.3	8.5	7.4	28.5	30.7	43.5	12.8	
Vert	199.514	QP	41.3	16.7	8.1	28.0	38.1	43.5	5.4	
Vert	364.505	QP	34.6	16.5	9.1	28.1	32.1	46.0	13.9	
Vert	458.630	QP	33.1	17.7	9.5	28.7	31.6	46.0	14.4	
Vert	729.010	QP	31.3	20.9	10.5	28.4	34.3	46.0	11.7	
Vert	4874.000	PK	40.5	31.5	5.0	31.3	45.7	73.9	28.2	
Vert	7311.000	PK	41.3	35.6	5.4	31.6	50.7	73.9	23.2	
Vert	9748.000	PK	40.7	38.5	6.2	31.8	53.6	73.9	20.3	
Vert	24370.000	PK	45.0	40.4	-0.9	29.5	55.0	73.9	18.9	
Vert	4874.000	AV	28.8	31.5	5.0	31.3	34.0	53.9	19.9	
Vert	7311.000	AV	29.2	35.6	5.4	31.6	38.6	53.9	15.3	
Vert	9748.000	AV	28.2	38.5	6.2	31.8	41.1	53.9	12.8	
Vert	24370.000	AV	33.0	40.4	-0.9	29.5	43.0	53.9	10.9	

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 and 4 Semi Anechoic Chamber
Report No. : 31CE0169-HO-02
Date : 02/09/2011 02/12/2011 02/13/2011
Temperature/ Humidity : 24 deg.C./ 21% 22 deg.C./ 27% 20 deg.C./ 29%
Engineer : Satofumi Matsuyama Takayuki Shimada Takumi Shimada
(Bandedge) (Above 1GHz) (Below 1GHz)
Mode : 11n 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	72.021	QP	46.1	6.5	7.2	28.6	31.2	40.0	8.8	
Hori	91.295	QP	46.3	8.4	7.4	28.5	33.6	43.5	9.9	
Hori	199.521	QP	34.5	16.7	8.1	28.0	31.3	43.5	12.2	
Hori	364.506	QP	35.5	16.5	9.1	28.1	33.0	46.0	13.0	
Hori	458.610	QP	32.2	17.7	9.5	28.7	30.7	46.0	15.3	
Hori	729.003	QP	36.9	20.9	10.5	28.4	39.9	46.0	6.1	
Hori	2483.500	PK	75.5	27.2	3.1	32.1	73.7	73.9	0.2	
Hori	4924.000	PK	40.8	31.6	5.0	31.3	46.1	73.9	27.8	
Hori	7386.000	PK	41.7	35.7	5.4	31.6	51.2	73.9	22.7	
Hori	9848.000	PK	41.1	38.6	6.3	31.8	54.2	73.9	19.7	
Hori	24620.000	PK	46.0	40.3	-0.9	29.4	56.0	73.9	17.9	
Hori	2483.500	AV	53.2	27.2	3.1	32.1	51.4	53.9	2.5	
Hori	4924.000	AV	28.8	31.6	5.0	31.3	34.1	53.9	19.8	
Hori	7386.000	AV	29.6	35.7	5.4	31.6	39.1	53.9	14.8	
Hori	9848.000	AV	29.3	38.6	6.3	31.8	42.4	53.9	11.5	
Hori	24620.000	AV	33.9	40.3	-0.9	29.4	43.9	53.9	10.0	
Vert	72.022	QP	52.2	6.5	7.2	28.6	37.3	40.0	2.7	
Vert	91.426	QP	42.9	8.5	7.4	28.5	30.3	43.5	13.2	
Vert	199.616	QP	41.6	16.7	8.1	28.0	38.4	43.5	5.1	
Vert	364.503	QP	35.0	16.5	9.1	28.1	32.5	46.0	13.5	
Vert	458.628	QP	35.4	17.7	9.5	28.7	33.9	46.0	12.1	
Vert	729.008	QP	31.4	20.9	10.5	28.4	34.4	46.0	11.6	
Vert	2483.500	PK	75.4	27.2	3.1	32.1	73.6	73.9	0.3	
Vert	4924.000	PK	40.7	31.6	5.0	31.3	46.0	73.9	27.9	
Vert	7386.000	PK	41.8	35.7	5.4	31.6	51.3	73.9	22.6	
Vert	9848.000	PK	41.0	38.6	6.3	31.8	54.1	73.9	19.8	
Vert	24620.000	PK	46.1	40.3	-0.9	29.4	56.1	73.9	17.8	
Vert	2483.500	AV	53.1	27.2	3.1	32.1	51.3	53.9	2.6	
Vert	4924.000	AV	28.8	31.6	5.0	31.3	34.1	53.9	19.8	
Vert	7386.000	AV	29.6	35.7	5.4	31.6	39.1	53.9	14.8	
Vert	9848.000	AV	29.3	38.6	6.3	31.8	42.4	53.9	11.5	
Vert	24620.000	AV	33.9	40.3	-0.9	29.4	43.9	53.9	10.0	

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 31CE0169-HO-02
Date : 02/12/2011 02/13/2011
Temperature/ Humidity : 22 deg.C./ 27% 20 deg.C./ 29%
Engineer : Takayuki Shimada Takumi Shimada
(Above 1GHz) (Below 1GHz)
Mode : 11b/g/n Rx 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	72.022	QP	46.6	6.5	7.2	28.6	31.7	40.0	8.3	
Hori	91.327	QP	46.7	8.5	7.4	28.5	34.1	43.5	9.4	
Hori	199.625	QP	34.7	16.7	8.1	28.0	31.5	43.5	12.0	
Hori	364.507	QP	35.3	16.5	9.1	28.1	32.8	46.0	13.2	
Hori	458.633	QP	32.3	17.7	9.5	28.7	30.8	46.0	15.2	
Hori	729.005	QP	36.9	20.9	10.5	28.4	39.9	46.0	6.1	
Hori	2437.000	PK	41.7	27.5	3.1	32.4	39.9	73.9	34.0	
Hori	3249.500	PK	45.5	28.8	3.5	32.1	45.7	73.9	28.2	
Hori	4874.000	PK	40.7	31.5	4.3	31.3	45.2	73.9	28.7	
Hori	7311.000	PK	41.4	35.6	4.8	31.6	50.2	73.9	23.7	
Hori	2437.000	AV	29.8	27.5	3.1	32.4	28.0	53.9	25.9	
Hori	3249.500	AV	37.3	28.8	3.5	32.1	37.5	53.9	16.4	
Hori	4874.000	AV	28.7	31.5	4.3	31.3	33.2	53.9	20.7	
Hori	7311.000	AV	29.2	35.6	4.8	31.6	38.0	53.9	15.9	
Vert	72.023	QP	52.5	6.5	7.2	28.6	37.6	40.0	2.4	
Vert	91.434	QP	44.0	8.5	7.4	28.5	31.4	43.5	12.1	
Vert	199.633	QP	40.5	16.7	8.1	28.0	37.3	43.5	6.2	
Vert	364.502	QP	34.2	16.5	9.1	28.1	31.7	46.0	14.3	
Vert	458.632	QP	35.5	17.7	9.5	28.7	34.0	46.0	12.0	
Vert	729.012	QP	31.6	20.9	10.5	28.4	34.6	46.0	11.4	
Vert	2437.000	PK	41.8	27.5	3.1	32.4	40.0	73.9	33.9	
Vert	3249.500	PK	45.6	28.8	3.5	32.1	45.8	73.9	28.1	
Vert	4874.000	PK	40.7	31.5	4.3	31.3	45.2	73.9	28.7	
Vert	7311.000	PK	41.3	35.6	4.8	31.6	50.1	73.9	23.8	
Vert	2437.000	AV	29.8	27.5	3.1	32.4	28.0	53.9	25.9	
Vert	3249.500	AV	37.7	28.8	3.5	32.1	37.9	53.9	16.0	
Vert	4874.000	AV	28.7	31.5	4.3	31.3	33.2	53.9	20.7	
Vert	7311.000	AV	29.2	35.6	4.8	31.6	38.0	53.9	15.9	

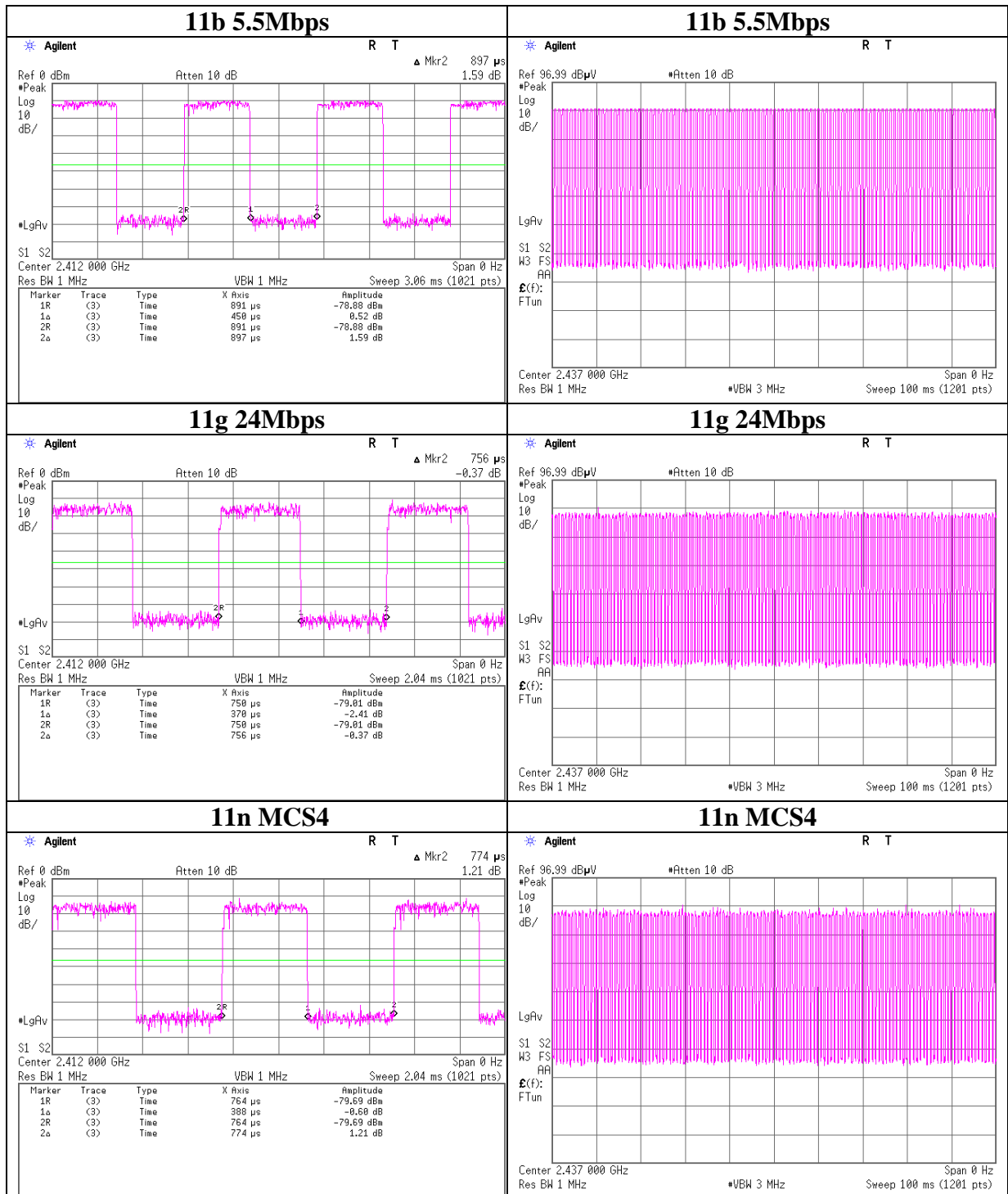
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*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.

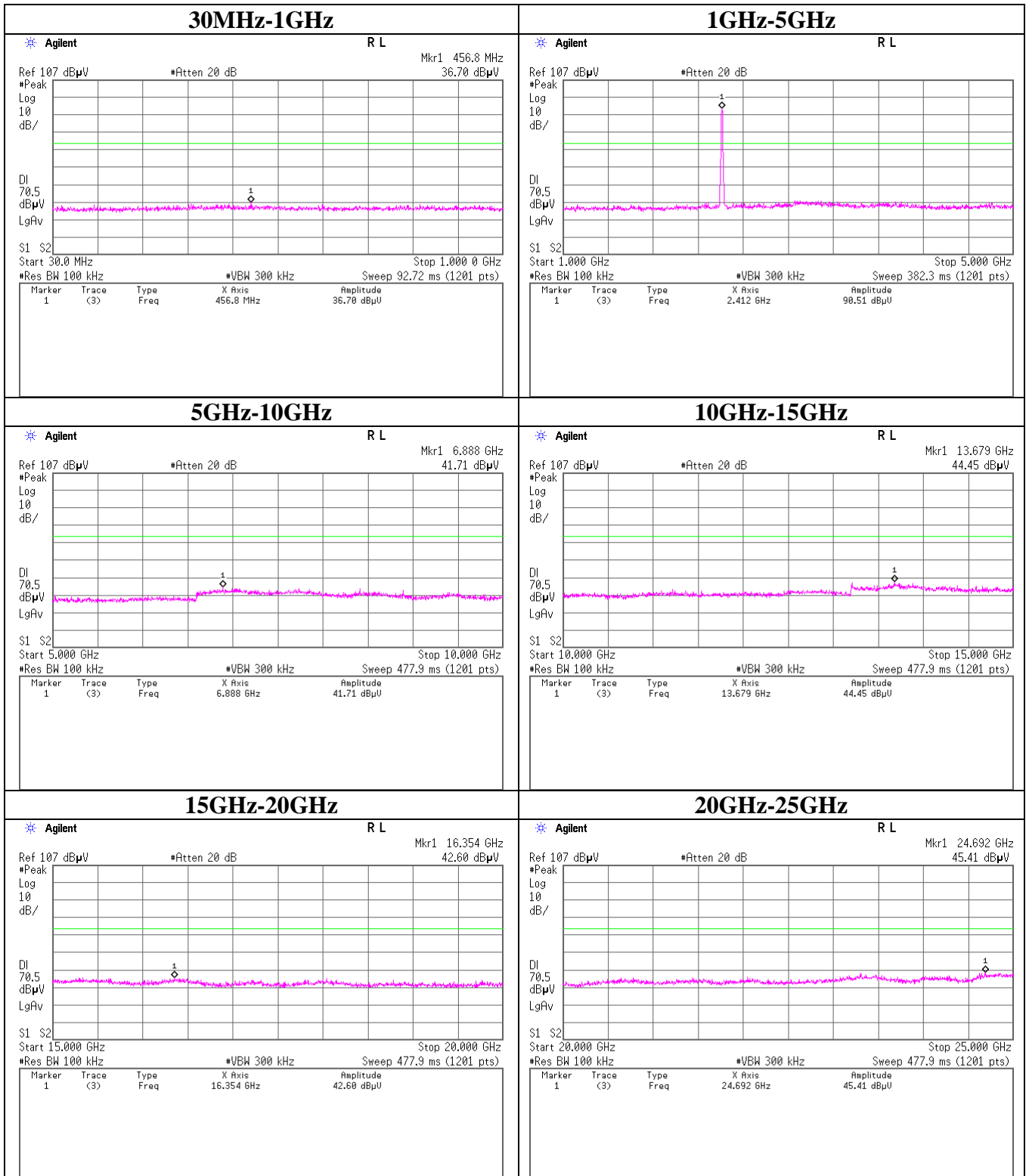
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

The tested burst timing



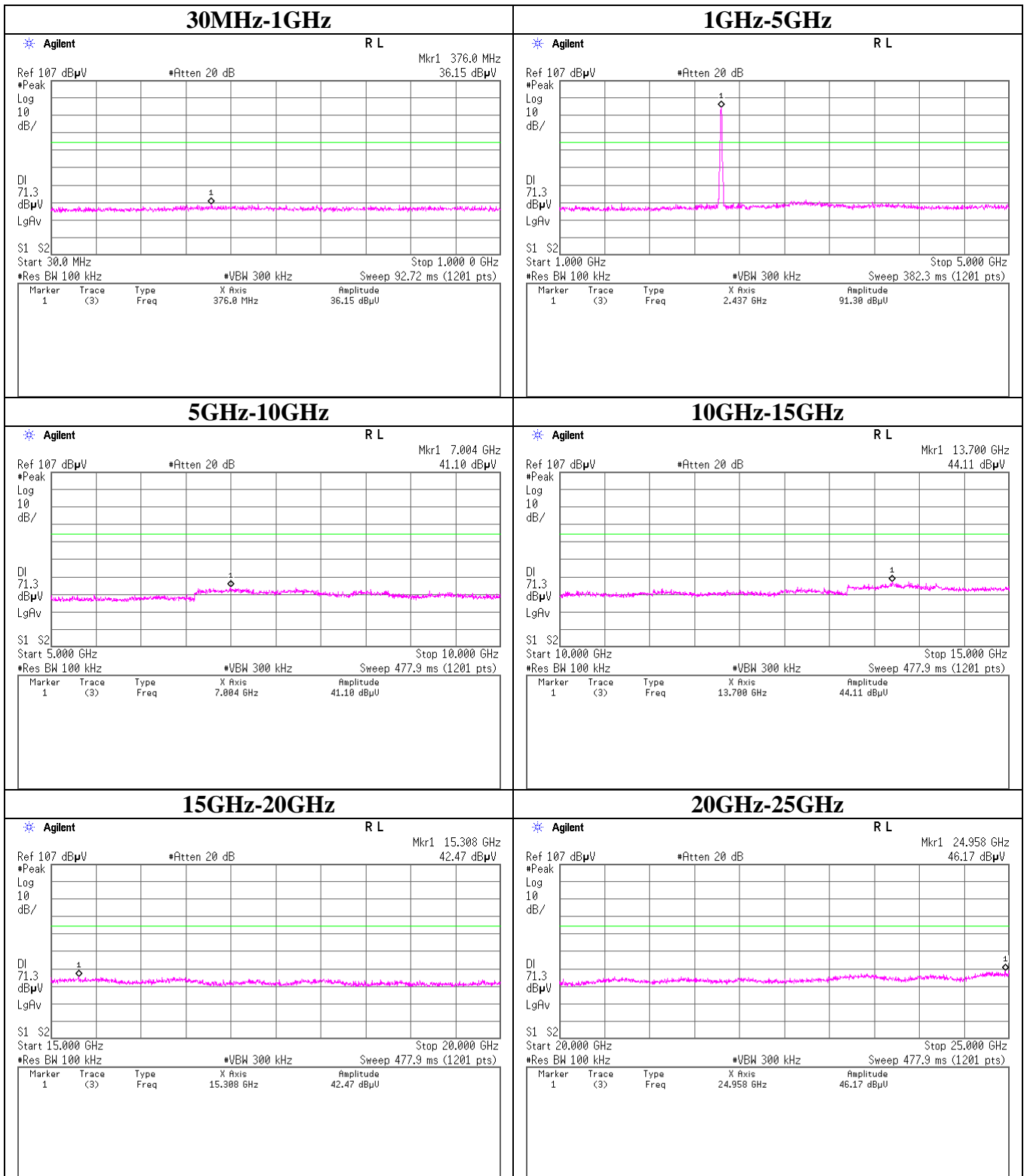
Conducted Spurious Emission

11b Tx 2412MHz



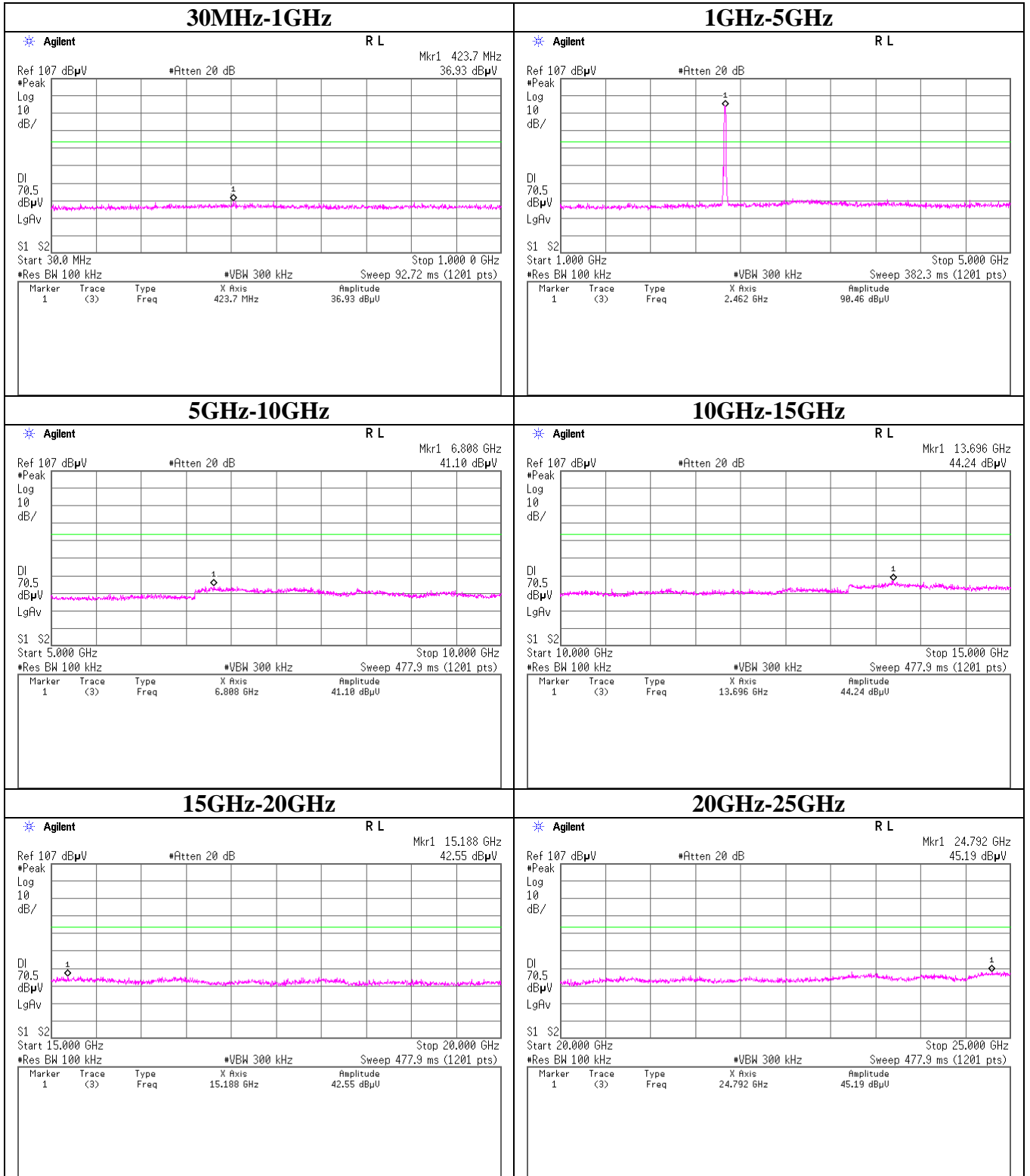
Conducted Spurious Emission

11b Tx 2437MHz



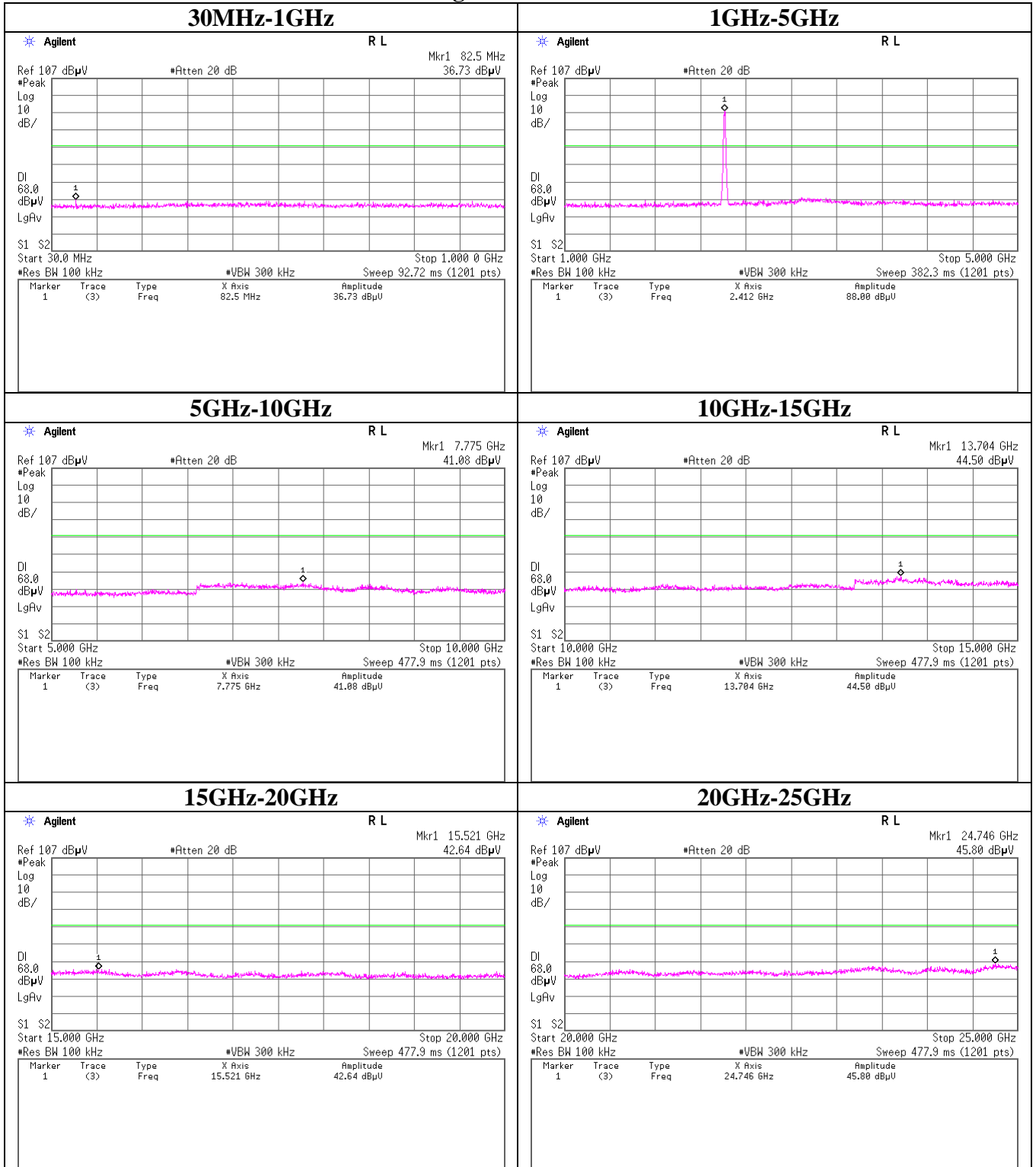
Conducted Spurious Emission

11b Tx 2462MHz



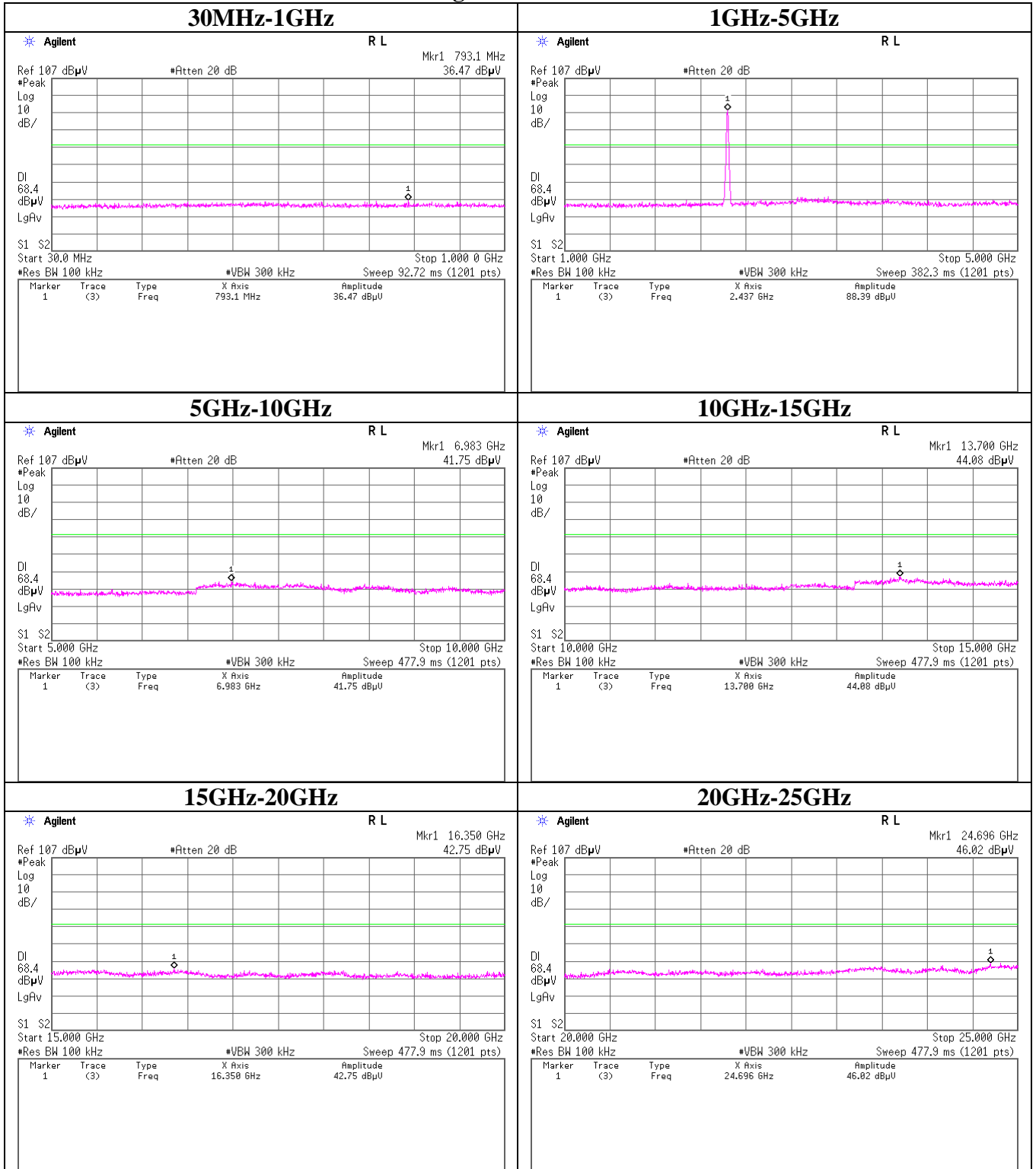
Conducted Spurious Emission

11g Tx 2412MHz



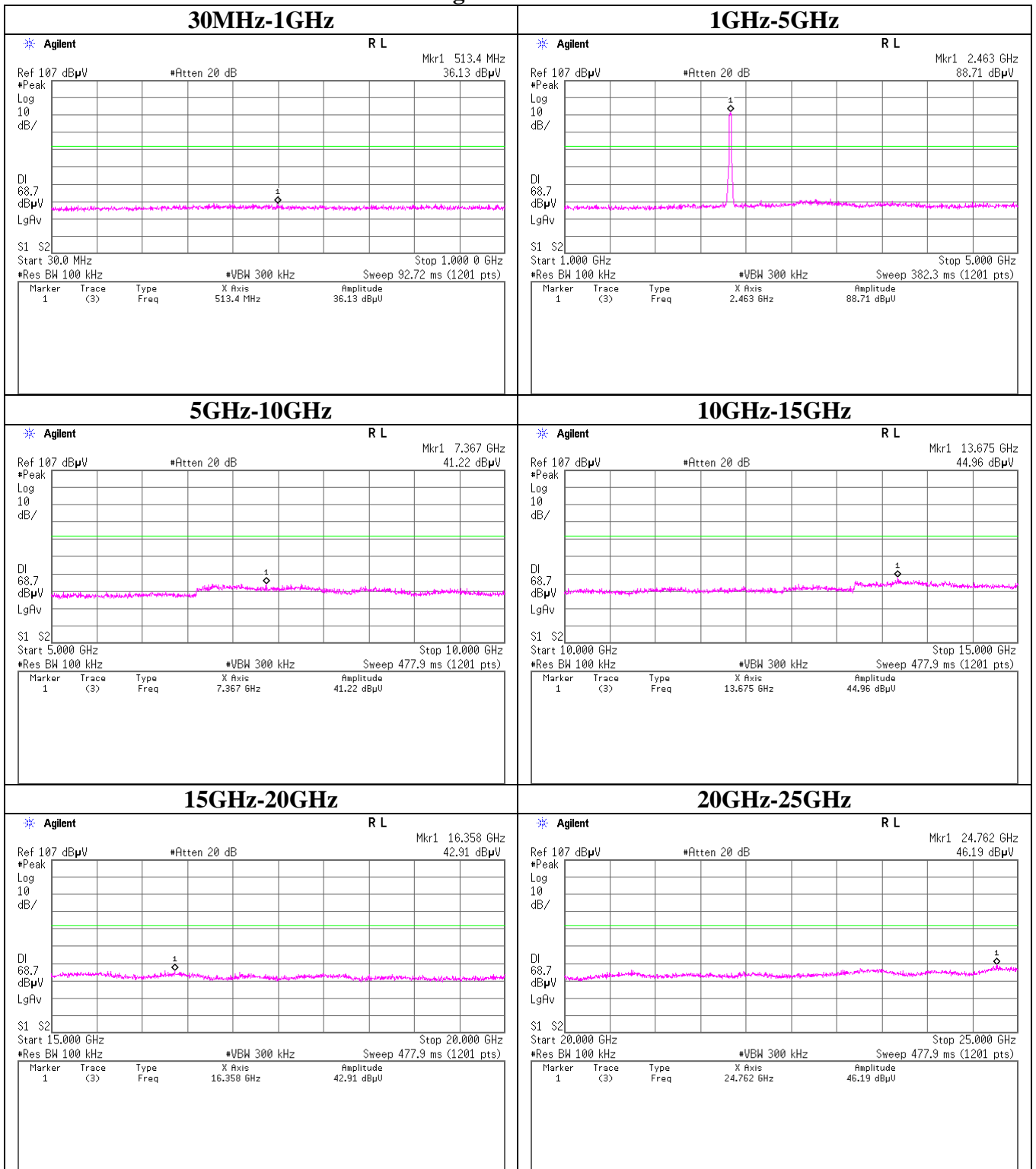
Conducted Spurious Emission

11g Tx 2437MHz



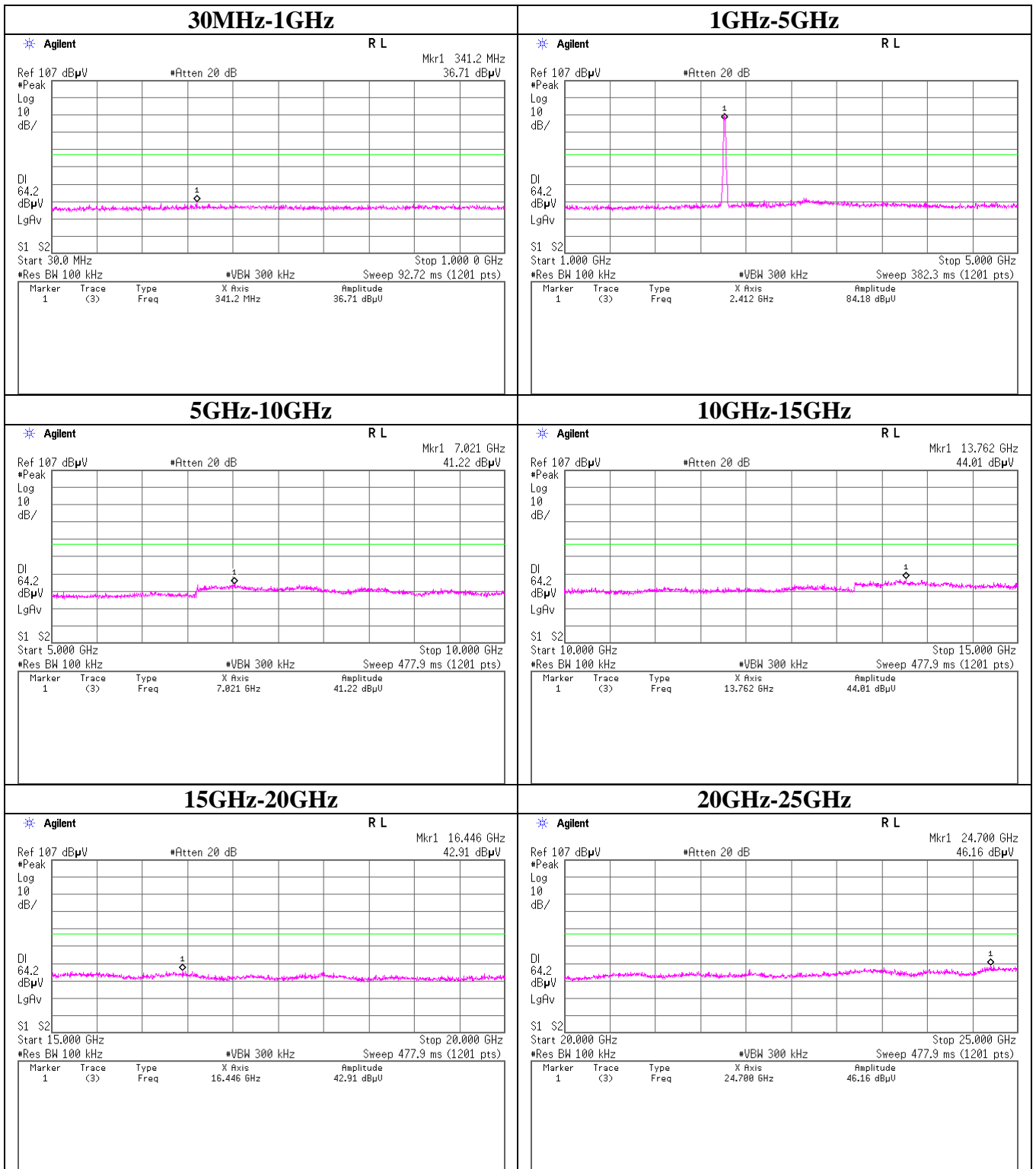
Conducted Spurious Emission

11g Tx 2462MHz



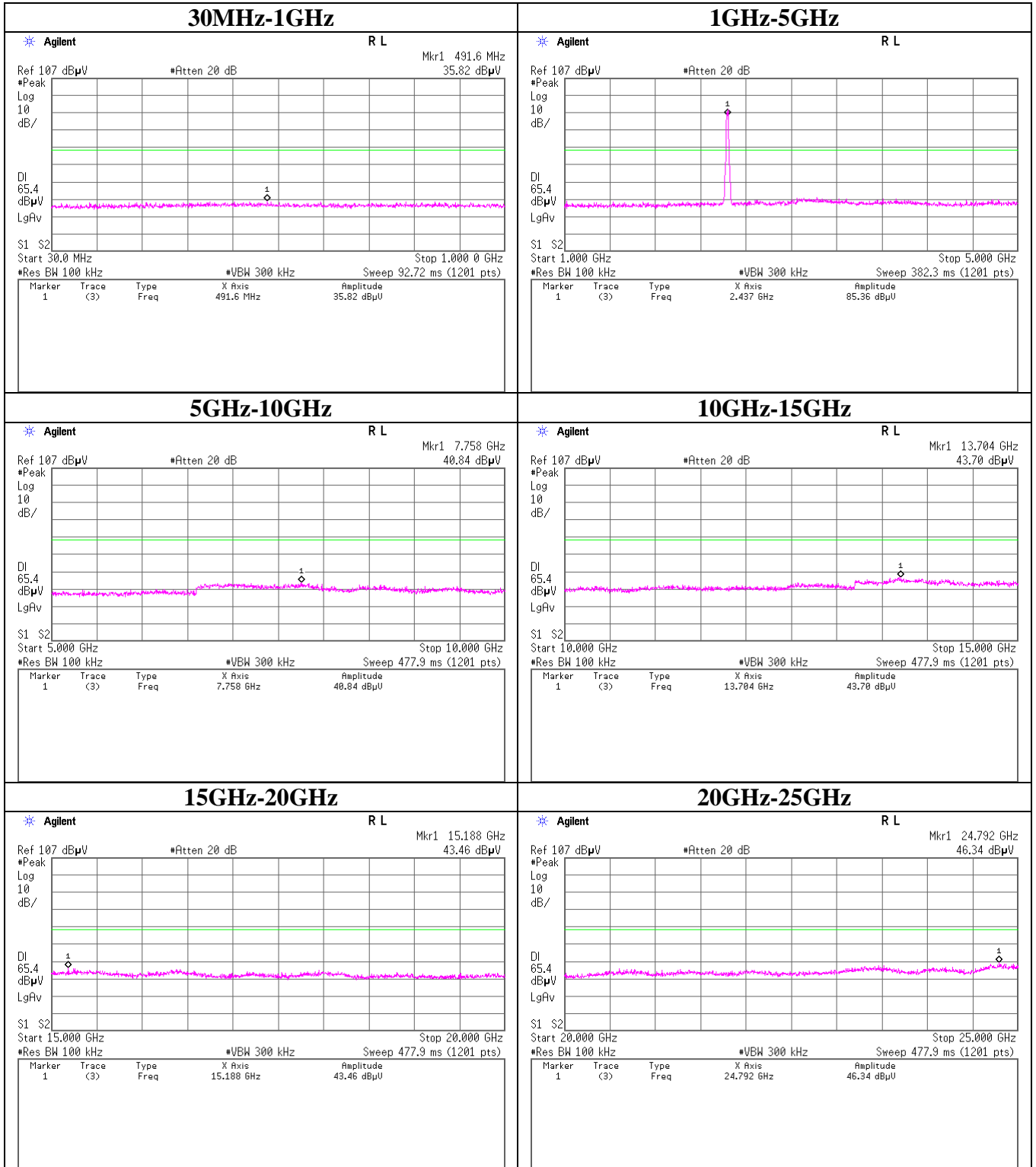
Conducted Spurious Emission

11n-20 Tx 2412MHz



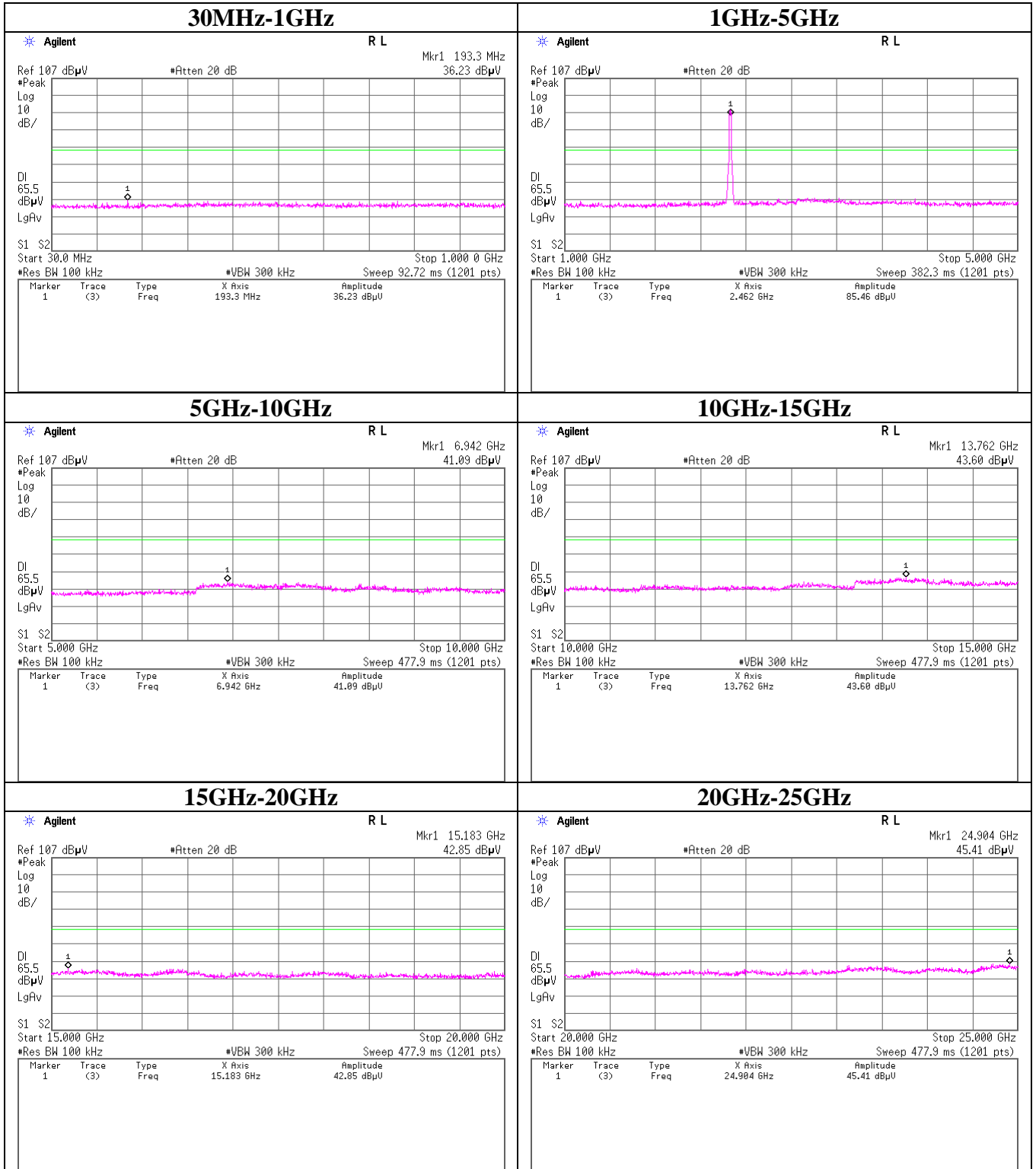
Conducted Spurious Emission

11n-20 Tx 2437MHz



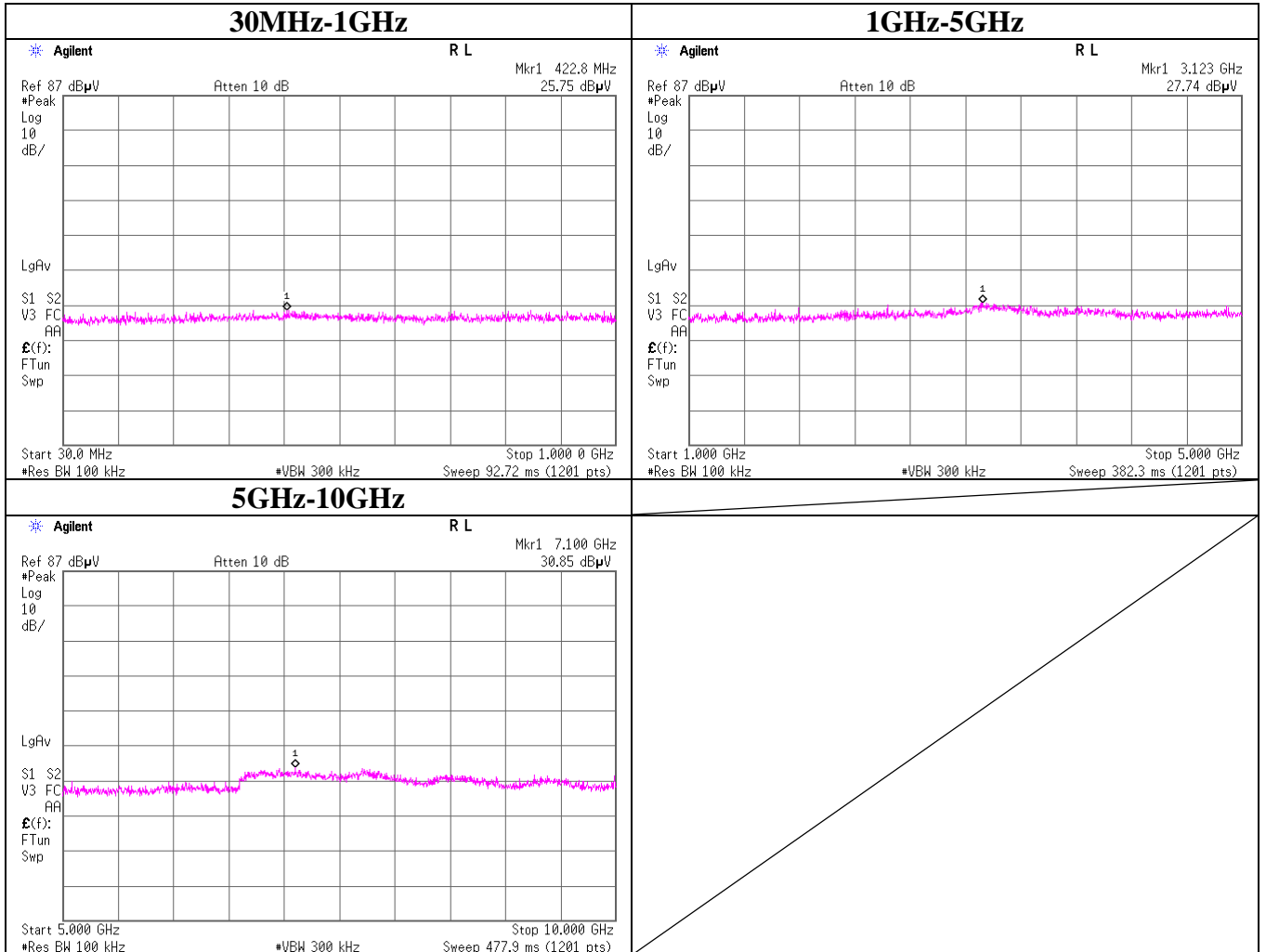
Conducted Spurious Emission

11n-20 Tx 2462MHz



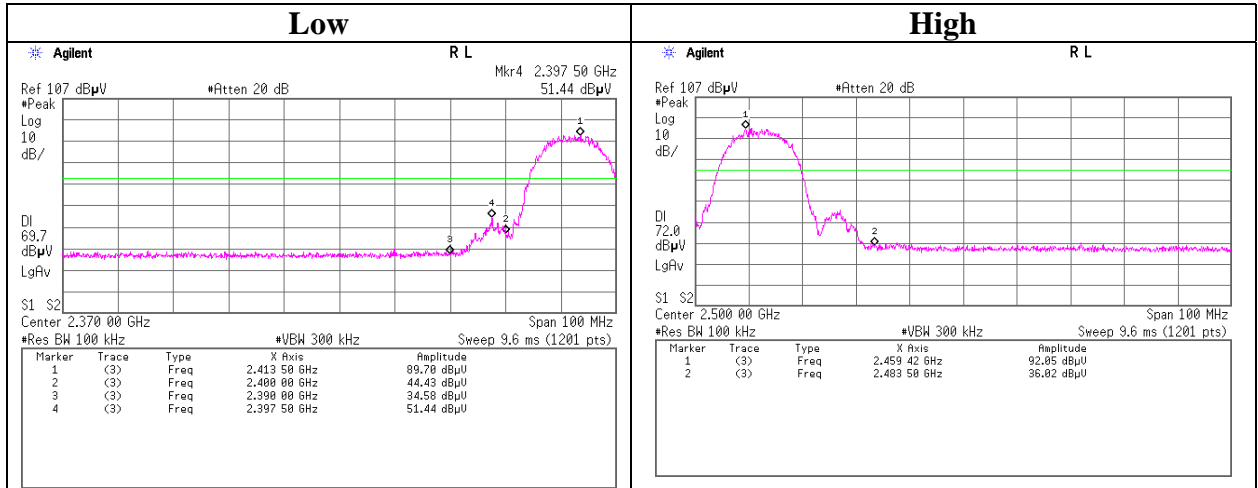
Conducted Spurious Emission

Rx 2437MHz

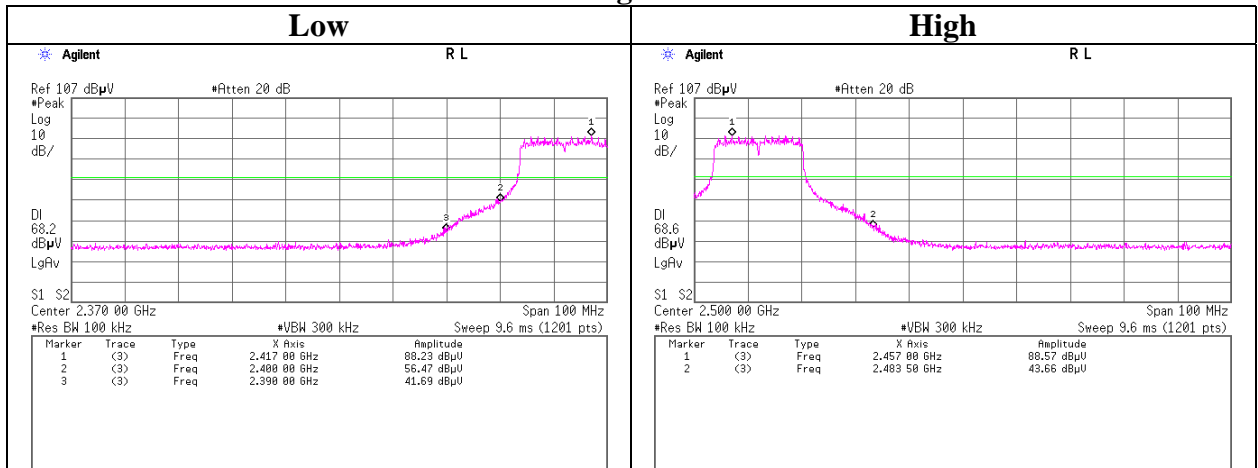


Conducted Emission Band Edge compliance

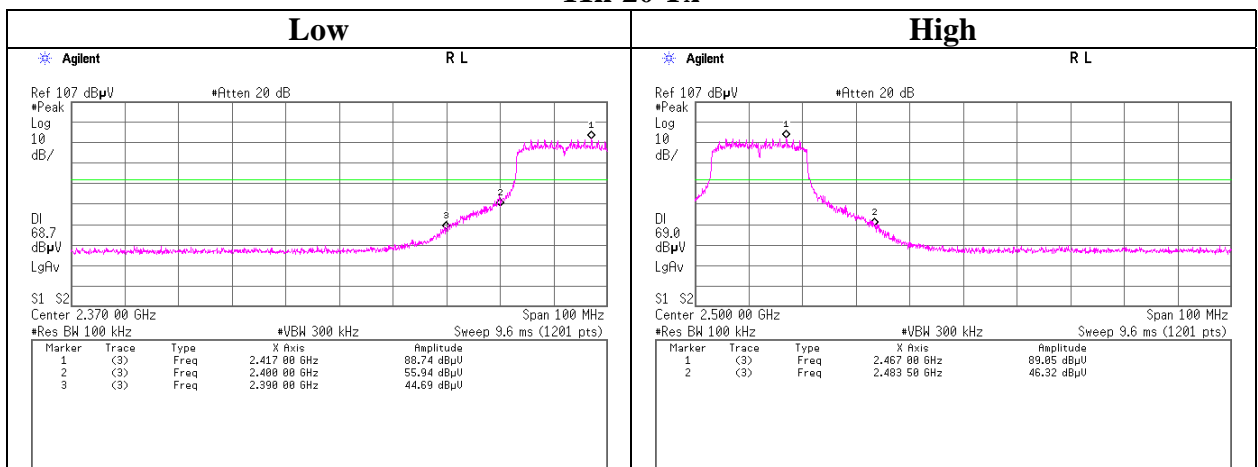
11b Tx



11g Tx



11n-20 Tx



Power Density

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 31CE0169-HO-02
Date 02/16/2011
Temperature/ Humidity 21 deg.C./ 31%
Engineer Keisuke Kawamura
Mode 11b Tx, 11g Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-11.31	0.97	9.97	-0.37	8.00	8.37
2437.00	-10.12	0.98	9.97	0.83	8.00	7.17
2462.00	-10.48	0.98	9.97	0.47	8.00	7.53

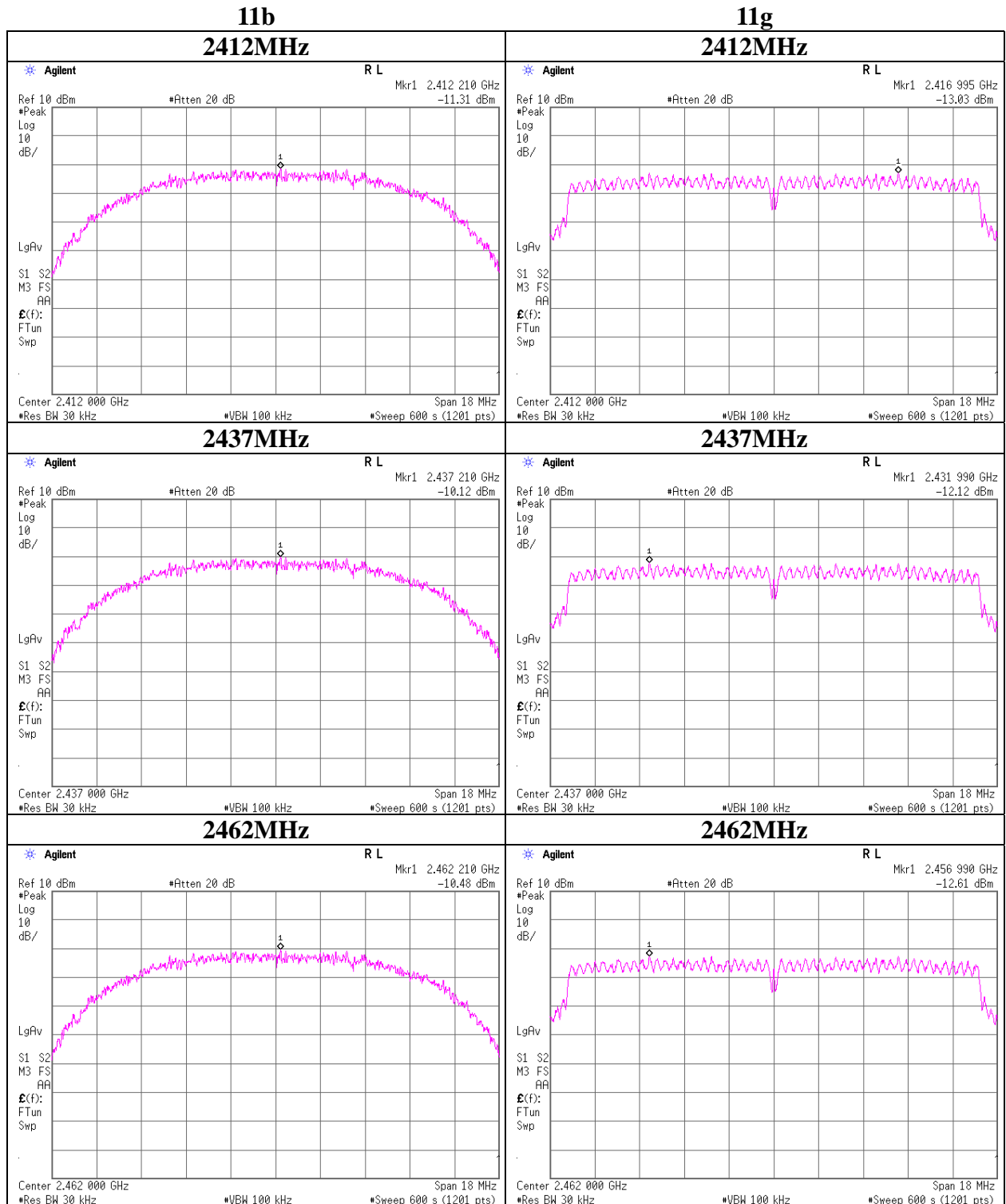
11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-13.03	0.97	9.97	-2.09	8.00	10.09
2437.00	-12.12	0.98	9.97	-1.17	8.00	9.17
2462.00	-12.61	0.98	9.97	-1.66	8.00	9.66

Sample Calculation:

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

Power Density



Power Density

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 31CE0169-HO-02
Date 02/16/2011
Temperature/ Humidity 21 deg.C./ 31%
Engineer Keisuke Kawamura
Mode 11n-20 Tx

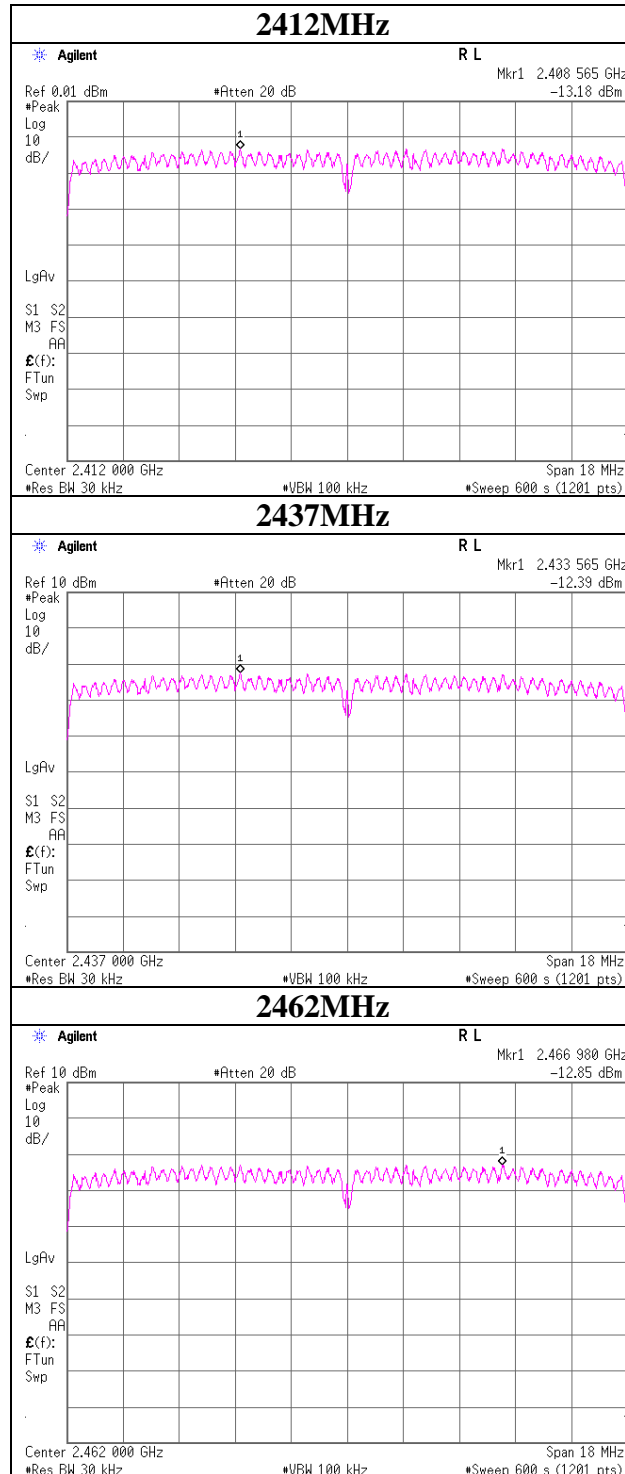
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
2412.00	-13.18	0.97	9.97	-2.24	0.60	8.00	10.24
2437.00	-12.39	0.98	9.97	-1.44	0.72	8.00	9.44
2462.00	-12.85	0.98	9.97	-1.90	0.65	8.00	9.90

Sample Calculation:

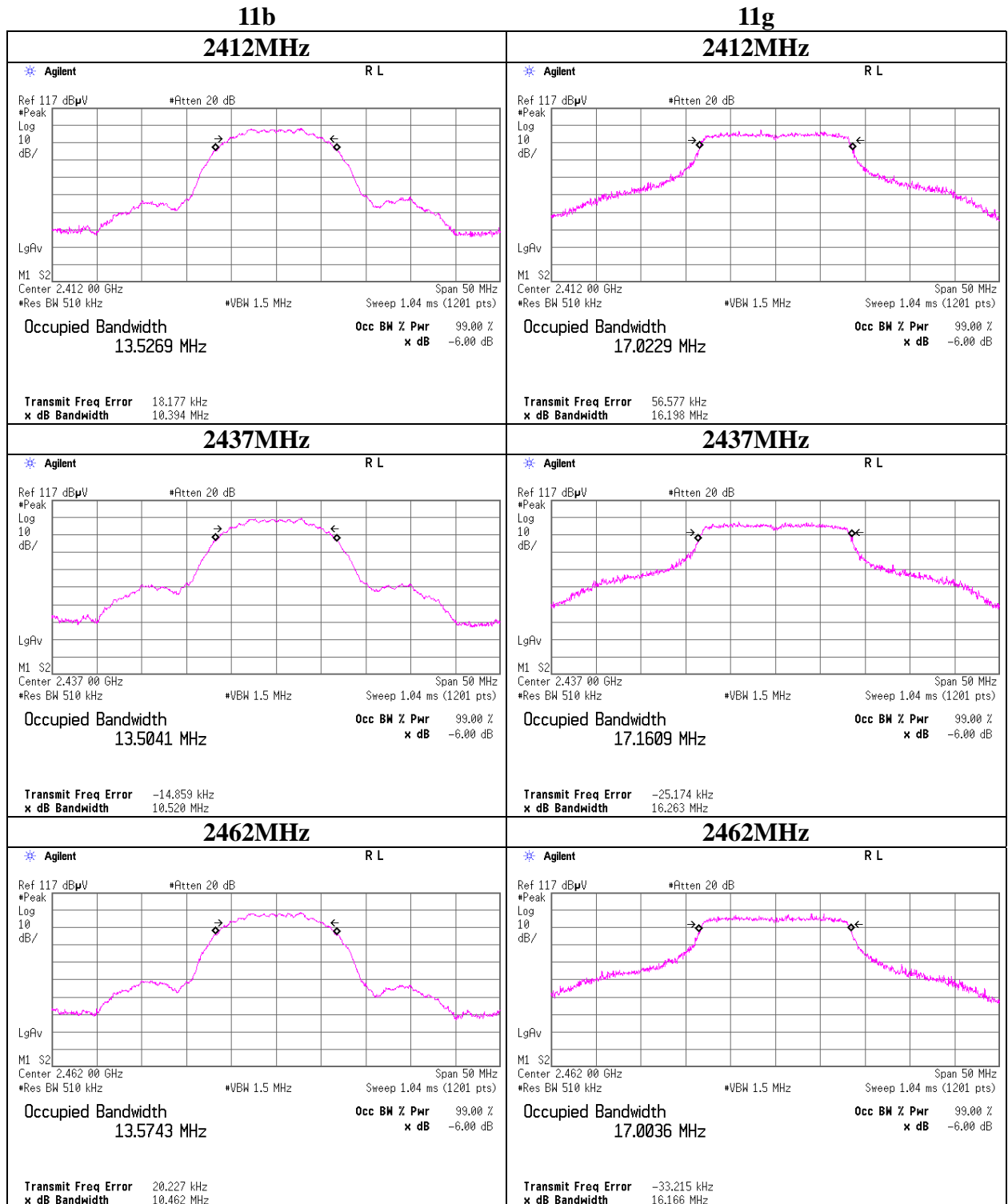
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

Power Density

11n-20



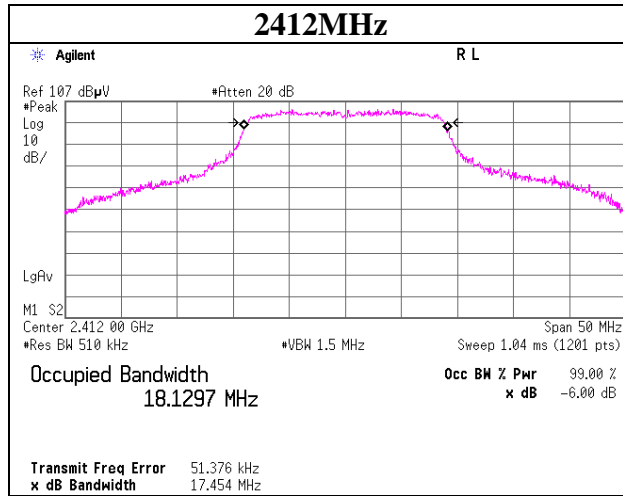
99% Occupied Bandwidth



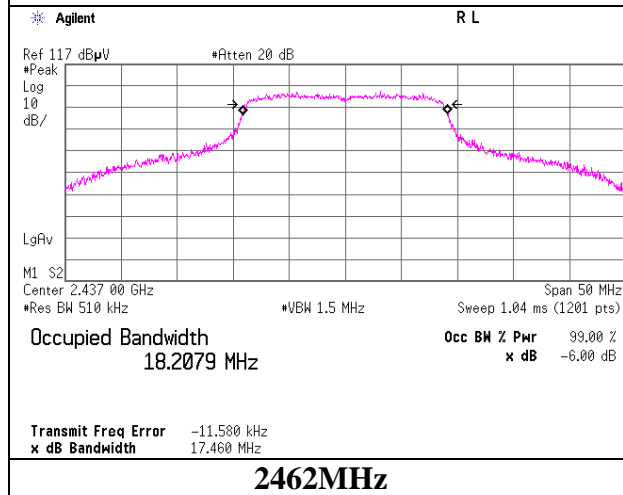
99% Occupied Bandwidth

11n-20

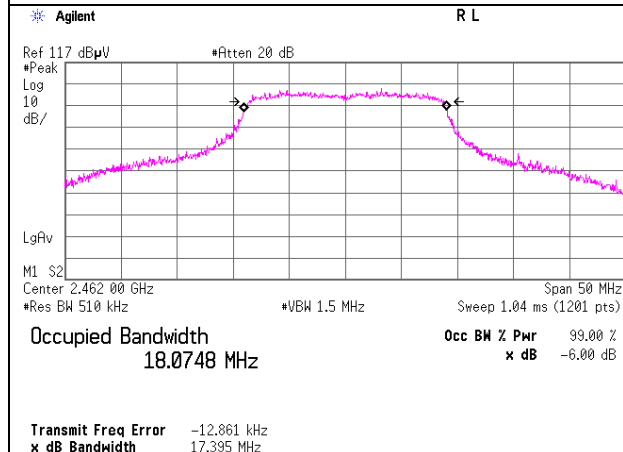
2412MHz



2437MHz



2462MHz



APPENDIX 3: Test instruments

EMI test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2010/02/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2010/02/09 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE/AT	2010/02/03 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2010/08/08 * 12
MCC-57	Microwave Cable	Suhner	SUCOFLEX104	267195/4(0.6m) / 292411(5m)	RE	2010/11/26 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2010/03/16 * 12
MCC-114	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	290212/4	AT	2010/08/05 * 12
MAT-21	Attenuator(20dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-120	901247	AT	2011/01/06 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE/CE	2010/09/01 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE/CE	2010/02/09 * 12
MJM-05	Measure	PROMART	SEN1955	-	RE/CE	-
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2011/01/16 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2010/09/30 * 12
MHA-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2011/01/16 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2010/05/19 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2010/11/30 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2010/04/19 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA9103200 8	RE	2010/10/11 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2010/10/11 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2010/02/22 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2010/11/05 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2010/09/09 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(AE)	2010/02/04 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2010/02/05 * 12

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EMI test equipment (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MTA-31	Terminator	TME	CT-01	-	CE	2011/01/05 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	CE	2010/02/22 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2010/02/04 * 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
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2010/05/19 * 12
MAT-24	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71389	AT	2010/06/14 * 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**