

APPENDIX 2: Data of EMI test

6dB Bandwidth

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	30LE0087-HO-02
Date	12/08/2010
Temperature/ Humidity	23 deg.C / 30% RH
Engineer	Takeshi Choda
Mode	Tx

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	13.047	>500
2437	13.042	>500
2462	13.050	>500

11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.526	>500
2437	16.504	>500
2462	16.463	>500

6dB Bandwidth



Maximum Peak Output Power

Test place : Head Office EMC Lab. No.6 Measurement Room
Report No. : 30LE0087-HO-02
Date : 12/08/2010
Temperature/ Humidity : 23 deg.C / 30% RH
Engineer : Takeshi Choda
Mode : 11b / 11g Tx

IEEE 802.11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	3.03	0.30	10.00	13.33	21.53	30.00	1000	16.67
2437	3.25	0.30	10.00	13.55	22.65	30.00	1000	16.45
2462	3.91	0.30	10.00	14.21	26.36	30.00	1000	15.79

Sample Calculation:

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

Tx 2437MHz

Rate [Mbps]	Reading [dBm]	Remark
1	3.25	*
2	3.22	
5.5	2.97	
11	3.14	

*: Worst Rate

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

IEEE 802.11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	8.71	0.30	10.00	19.01	79.62	30.00	1000	10.99
2437	7.71	0.30	10.00	18.01	63.24	30.00	1000	11.99
2462	8.14	0.30	10.00	18.44	69.82	30.00	1000	11.56

Sample Calculation:

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

Tx 2437MHz

Rate [Mbps]	Reading [dBm]	Remark
6	7.71	*
9	7.50	
12	7.34	
18	7.22	
24	7.16	
36	7.36	
48	7.28	
54	7.22	

*: Worst Rate

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber		
Report No.	30LE0087-HO-02		
Date	12/24/2010	01/05/2011	01/06/2011
Temperature/ Humidity	23 deg.C / 68% RH	22 deg.C / 38% RH	20 deg.C / 38% RH
Engineer	Takeshi Choda	Takumi Shimada	Takumi Shimada
	(1-10GHz)	(10-26.5GHz)	(30-1000MHz)
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	180.000	QP	30.8	15.8	8.9	32.1	23.4	43.5	20.1	
Hori	340.002	QP	34.8	16.2	10.2	31.8	29.4	46.0	16.6	
Hori	360.001	QP	36.7	16.6	10.3	31.8	31.8	46.0	14.2	
Hori	400.001	QP	33.1	17.4	10.6	31.9	29.2	46.0	16.8	
Hori	440.002	QP	30.0	17.7	10.8	31.9	26.6	46.0	19.4	
Hori	800.002	QP	27.5	21.8	12.8	31.4	30.7	46.0	15.3	
Hori	2273.000	PK	45.6	27.2	3.0	32.2	43.6	73.9	30.3	
Hori	2390.000	PK	49.6	27.2	3.0	32.1	47.7	73.9	26.2	
Hori	2397.500	PK	61.3	27.2	3.1	32.1	59.5	-	-	- See 20dBc Data Sheet
Hori	2400.000	PK	57.4	27.2	3.1	32.1	55.6	-	-	- See 20dBc Data Sheet
Hori	2570.000	PK	51.9	27.3	3.1	32.0	50.3	73.9	23.6	
Hori	4824.000	PK	43.9	30.9	5.8	31.4	49.2	73.9	24.7	
Hori	7236.000	PK	41.7	35.8	6.3	32.3	51.5	73.9	22.4	
Hori	9648.000	PK	43.0	37.8	7.2	33.0	55.0	73.9	18.9	
Hori	24120.000	PK	47.2	37.9	-0.9	31.6	52.6	73.9	21.3	
Hori	2273.000	AV	35.8	27.2	3.0	32.2	33.8	53.9	20.1	
Hori	2390.000	AV	40.5	27.2	3.0	32.1	38.6	53.9	15.3	
Hori	2397.500	AV	57.1	27.2	3.1	32.1	55.3	-	-	- See 20dBc Data Sheet
Hori	2400.000	AV	50.1	27.2	3.1	32.1	48.3	-	-	- See 20dBc Data Sheet
Hori	2570.000	AV	45.2	27.3	3.1	32.0	43.6	53.9	10.3	
Hori	4824.000	AV	33.2	30.9	5.8	31.4	38.5	53.9	15.4	
Hori	7236.000	AV	30.0	35.8	6.3	32.3	39.8	53.9	14.1	
Hori	9648.000	AV	30.0	37.8	7.2	33.0	42.0	53.9	11.9	
Hori	24120.000	AV	33.4	37.9	-0.9	31.6	38.8	53.9	15.1	
Vert	180.000	QP	24.7	15.8	8.9	32.1	17.3	43.5	26.2	
Vert	340.002	QP	32.4	16.2	10.2	31.8	27.0	46.0	19.0	
Vert	360.001	QP	34.6	16.6	10.3	31.8	29.7	46.0	16.3	
Vert	400.001	QP	33.4	17.4	10.6	31.9	29.5	46.0	16.5	
Vert	440.002	QP	31.3	17.7	10.8	31.9	27.9	46.0	18.1	
Vert	800.003	QP	27.1	21.8	12.8	31.4	30.3	46.0	15.7	
Vert	2273.000	PK	44.8	27.2	3.0	32.2	42.8	73.9	31.1	
Vert	2390.000	PK	45.3	27.2	3.0	32.1	43.4	73.9	30.5	
Vert	2397.500	PK	56.2	27.2	3.1	32.1	54.4	-	-	- See 20dBc Data Sheet
Vert	2400.000	PK	53.5	27.2	3.1	32.1	51.7	-	-	- See 20dBc Data Sheet
Vert	2570.000	PK	47.3	27.3	3.1	32.0	45.7	73.9	28.2	
Vert	4824.000	PK	42.7	30.9	5.8	31.4	48.0	73.9	25.9	
Vert	7236.000	PK	42.1	35.8	6.3	32.3	51.9	73.9	22.0	
Vert	9648.000	PK	42.4	37.8	7.2	33.0	54.4	73.9	19.5	
Vert	24120.000	PK	47.8	37.9	-0.9	31.6	53.2	73.9	20.7	
Vert	2273.000	AV	34.1	27.2	3.0	32.2	32.1	53.9	21.8	
Vert	2390.000	AV	33.3	27.2	3.0	32.1	31.4	53.9	22.5	
Vert	2397.500	AV	50.8	27.2	3.1	32.1	49.0	-	-	- See 20dBc Data Sheet
Vert	2400.000	AV	44.3	27.2	3.1	32.1	42.5	-	-	- See 20dBc Data Sheet
Vert	2570.000	AV	37.8	27.3	3.1	32.0	36.2	53.9	17.7	
Vert	4824.000	AV	31.2	30.9	5.8	31.4	36.5	53.9	17.4	
Vert	7236.000	AV	30.1	35.8	6.3	32.3	39.9	53.9	14.0	
Vert	9648.000	AV	30.3	37.8	7.2	33.0	42.3	53.9	11.6	
Vert	24120.000	AV	33.4	37.9	-0.9	31.6	38.8	53.9	15.1	

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

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. 30LE0087-HO-02
Date 12/24/2010
Temperature/ Humidity 23 deg.C / 68% RH
Engineer Takeshi Choda
 (1-10GHz)
Mode 11b Tx 2412MHz

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	2412.000	PK	98.9	27.2	3.1	32.1	97.1	-	-	Carrier
Hori	2397.500	PK	54.4	27.2	3.1	32.1	52.6	77.1	24.5	
Hori	2400.000	PK	51.0	27.2	3.1	32.1	49.2	77.1	27.9	
Vert	2412.000	PK	93.8	27.2	3.1	32.1	92.0	-	-	Carrier
Vert	2397.500	PK	50.0	27.2	3.1	32.1	48.2	72.0	23.8	
Vert	2400.000	PK	44.3	27.2	3.1	32.1	42.5	72.0	29.5	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber		
Report No.	30LE0087-HO-02		
Date	12/24/2010	01/05/2011	01/06/2011
Temperature/ Humidity	23 deg.C / 68% RH	22 deg.C / 38% RH	20 deg.C / 38% RH
Engineer	Takeshi Choda	Takumi Shimada	Takumi Shimada
	(1-10GHz)	(10-26.5GHz)	(30-1000MHz)
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	180.000	QP	31.1	15.8	8.9	32.1	23.7	43.5	19.8	
Hori	340.000	QP	34.8	16.2	10.2	31.8	29.4	46.0	16.6	
Hori	360.001	QP	36.1	16.6	10.3	31.8	31.2	46.0	14.8	
Hori	400.001	QP	32.8	17.4	10.6	31.9	28.9	46.0	17.1	
Hori	440.001	QP	29.7	17.7	10.8	31.9	26.3	46.0	19.7	
Hori	800.002	QP	27.3	21.8	12.8	31.4	30.5	46.0	15.5	
Hori	2277.000	PK	50.9	27.2	3.0	32.2	48.9	73.9	25.0	
Hori	2600.000	PK	49.4	27.3	3.2	32.0	47.9	73.9	26.0	
Hori	4874.000	PK	42.9	31.0	5.7	31.4	48.2	73.9	25.7	
Hori	7311.000	PK	42.9	35.9	6.4	32.4	52.8	73.9	21.1	
Hori	9748.000	PK	43.4	38.0	7.3	33.0	55.7	73.9	18.2	
Hori	24370.000	PK	46.8	37.9	-0.9	31.6	52.2	73.9	21.7	
Hori	2277.000	AV	42.1	27.2	3.0	32.2	40.1	53.9	13.8	
Hori	2600.000	AV	41.6	27.3	3.2	32.0	40.1	53.9	13.8	
Hori	4874.000	AV	32.2	31.0	5.7	31.4	37.5	53.9	16.4	
Hori	7311.000	AV	30.2	35.9	6.4	32.4	40.1	53.9	13.8	
Hori	9748.000	AV	30.4	38.0	7.3	33.0	42.7	53.9	11.2	
Hori	24370.000	AV	33.3	37.9	-0.9	31.6	38.7	53.9	15.2	
Vert	180.000	QP	24.2	15.8	8.9	32.1	16.8	43.5	26.7	
Vert	340.002	QP	32.6	16.2	10.2	31.8	27.2	46.0	18.8	
Vert	360.001	QP	34.2	16.6	10.3	31.8	29.3	46.0	16.7	
Vert	400.000	QP	33.0	17.4	10.6	31.9	29.1	46.0	16.9	
Vert	440.002	QP	31.0	17.7	10.8	31.9	27.6	46.0	18.4	
Vert	800.001	QP	26.7	21.8	12.8	31.4	29.9	46.0	16.1	
Vert	2277.000	PK	45.2	27.2	3.0	32.2	43.2	73.9	30.7	
Vert	2600.000	PK	46.1	27.3	3.2	32.0	44.6	73.9	29.3	
Vert	4874.000	PK	42.6	31.0	5.7	31.4	47.9	73.9	26.0	
Vert	7311.000	PK	41.8	35.9	6.4	32.4	51.7	73.9	22.2	
Vert	9748.000	PK	42.8	38.0	7.3	33.0	55.1	73.9	18.8	
Vert	24370.000	PK	47.1	37.9	-0.9	31.6	52.5	73.9	21.4	
Vert	2277.000	AV	35.0	27.2	3.0	32.2	33.0	53.9	20.9	
Vert	2600.000	AV	37.3	27.3	3.2	32.0	35.8	53.9	18.1	
Vert	4874.000	AV	31.3	31.0	5.7	31.4	36.6	53.9	17.3	
Vert	7311.000	AV	30.1	35.9	6.4	32.4	40.0	53.9	13.9	
Vert	9748.000	AV	30.1	38.0	7.3	33.0	42.4	53.9	11.5	
Vert	24370.000	AV	33.3	37.9	-0.9	31.6	38.7	53.9	15.2	

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

Test place	Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber		
Report No.	30LE0087-HO-02		
Date	12/24/2010	01/05/2011	01/06/2011
Temperature/ Humidity	23 deg.C / 68% RH	22 deg.C / 38% RH	20 deg.C / 38% RH
Engineer	Takeshi Choda	Takumi Shimada	Takumi Shimada
	(1-10GHz)	(10-26.5GHz)	(30-1000MHz)
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	180.000	QP	31.3	15.8	8.9	32.1	23.9	43.5	19.6	
Hori	340.000	QP	34.7	16.2	10.2	31.8	29.3	46.0	16.7	
Hori	360.001	QP	36.3	16.6	10.3	31.8	31.4	46.0	14.6	
Hori	400.001	QP	33.0	17.4	10.6	31.9	29.1	46.0	16.9	
Hori	440.000	QP	29.8	17.7	10.8	31.9	26.4	46.0	19.6	
Hori	800.001	QP	27.6	21.8	12.8	31.4	30.8	46.0	15.2	
Hori	2303.000	PK	48.4	27.2	3.0	32.2	46.4	73.9	27.5	
Hori	2483.500	PK	47.6	27.2	3.1	32.1	45.8	73.9	28.1	
Hori	2485.000	PK	48.5	27.2	3.1	32.1	46.7	73.9	27.2	
Hori	2620.000	PK	45.5	27.4	3.2	32.0	44.1	73.9	29.8	
Hori	4924.000	PK	42.3	31.2	5.7	31.4	47.8	73.9	26.1	
Hori	7386.000	PK	42.3	36.0	6.4	32.4	52.3	73.9	21.6	
Hori	9848.000	PK	42.9	38.1	7.4	33.0	55.4	73.9	18.5	
Hori	24620.000	PK	46.9	37.9	-0.9	31.5	52.4	73.9	21.5	
Hori	2303.000	AV	39.6	27.2	3.0	32.2	37.6	53.9	16.3	
Hori	2483.500	AV	34.8	27.2	3.1	32.1	33.0	53.9	20.9	
Hori	2485.000	AV	35.5	27.2	3.1	32.1	33.7	53.9	20.2	
Hori	2620.000	AV	37.2	27.4	3.2	32.0	35.8	53.9	18.1	
Hori	4924.000	AV	30.4	31.2	5.7	31.4	35.9	53.9	18.0	
Hori	7386.000	AV	30.3	36.0	6.4	32.4	40.3	53.9	13.6	
Hori	9848.000	AV	30.3	38.1	7.4	33.0	42.8	53.9	11.1	
Hori	24620.000	AV	33.5	37.9	-0.9	31.5	39.0	53.9	14.9	
Vert	180.000	QP	24.5	15.8	8.9	32.1	17.1	43.5	26.4	
Vert	340.001	QP	32.3	16.2	10.2	31.8	26.9	46.0	19.1	
Vert	360.001	QP	34.4	16.6	10.3	31.8	29.5	46.0	16.5	
Vert	400.000	QP	33.1	17.4	10.6	31.9	29.2	46.0	16.8	
Vert	440.000	QP	30.9	17.7	10.8	31.9	27.5	46.0	18.5	
Vert	800.001	QP	26.8	21.8	12.8	31.4	30.0	46.0	16.0	
Vert	2303.000	PK	47.8	27.2	3.0	32.2	45.8	73.9	28.1	
Vert	2483.500	PK	44.7	27.2	3.1	32.1	42.9	73.9	31.0	
Vert	2485.000	PK	44.0	27.2	3.1	32.1	42.2	73.9	31.7	
Vert	2620.000	PK	46.2	27.4	3.2	32.0	44.8	73.9	29.1	
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Vert	2483.500	AV	32.4	27.2	3.1	32.1	30.6	53.9	23.3	
Vert	2485.000	AV	32.2	27.2	3.1	32.1	30.4	53.9	23.5	
Vert	2620.000	AV	38.3	27.4	3.2	32.0	36.9	53.9	17.0	
Vert	4924.000	AV	29.8	31.2	5.7	31.4	35.3	53.9	18.6	
Vert	7386.000	AV	30.6	36.0	6.4	32.4	40.6	53.9	13.3	
Vert	9848.000	AV	30.4	38.1	7.4	33.0	42.9	53.9	11.0	
Vert	24620.000	AV	33.5	37.9	-0.9	31.5	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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber		
Report No.	30LE0087-HO-02		
Date	01/05/2011	01/05/2011	01/06/2011
Temperature/ Humidity	22 deg.C / 38 % RH	22 deg.C / 38% RH	20 deg.C / 38% RH
Engineer	Takumi Shimada	Takumi Shimada	Takumi Shimada
	(1-10GHz)	(10-26.5GHz)	(30-1000MHz)
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	180.001	QP	31.1	15.8	8.9	32.1	23.7	43.5	19.8	
Hori	340.000	QP	34.5	16.2	10.2	31.8	29.1	46.0	16.9	
Hori	360.001	QP	36.5	16.6	10.3	31.8	31.6	46.0	14.4	
Hori	400.001	QP	33.1	17.4	10.6	31.9	29.2	46.0	16.8	
Hori	440.001	QP	30.0	17.7	10.8	31.9	26.6	46.0	19.4	
Hori	800.001	QP	27.3	21.8	12.8	31.4	30.5	46.0	15.5	
Hori	2273.000	PK	46.0	27.2	3.0	32.2	44.0	73.9	29.9	
Hori	2390.000	PK	66.9	27.2	3.0	32.1	65.0	73.9	8.9	
Hori	2399.170	PK	74.7	27.2	3.1	32.1	72.9	-	-	- See 20dBc Data Sheet
Hori	2400.000	PK	79.3	27.2	3.1	32.1	77.5	-	-	- See 20dBc Data Sheet
Hori	2573.000	PK	50.1	27.3	3.1	32.0	48.5	73.9	25.5	
Hori	4824.000	PK	42.6	30.9	5.8	31.4	47.9	73.9	26.0	
Hori	7236.000	PK	43.3	35.8	6.3	32.3	53.1	73.9	20.8	
Hori	9648.000	PK	43.2	37.8	7.2	33.0	55.2	73.9	18.7	
Hori	24120.000	PK	46.9	37.9	-0.9	31.6	52.3	73.9	21.6	
Hori	2273.000	AV	34.6	27.2	3.0	32.2	32.6	53.9	21.3	
Hori	2390.000	AV	42.7	27.2	3.0	32.1	40.8	53.9	13.1	
Hori	2399.170	AV	54.1	27.2	3.1	32.1	52.3	-	-	- See 20dBc Data Sheet
Hori	2400.000	AV	55.2	27.2	3.1	32.1	53.4	-	-	- See 20dBc Data Sheet
Hori	2573.000	AV	39.5	27.3	3.1	32.0	37.9	53.9	16.0	
Hori	4824.000	AV	29.2	30.9	5.8	31.4	34.5	53.9	19.4	
Hori	7236.000	AV	30.2	35.8	6.3	32.3	40.0	53.9	13.9	
Hori	9648.000	AV	30.2	37.8	7.2	33.0	42.2	53.9	11.7	
Hori	24120.000	AV	33.3	37.9	-0.9	31.6	38.7	53.9	15.2	
Vert	180.001	QP	24.7	15.8	8.9	32.1	17.3	43.5	26.2	
Vert	340.001	QP	32.2	16.2	10.2	31.8	26.8	46.0	19.2	
Vert	360.000	QP	34.4	16.6	10.3	31.8	29.5	46.0	16.5	
Vert	400.001	QP	33.3	17.4	10.6	31.9	29.4	46.0	16.6	
Vert	440.000	QP	30.8	17.7	10.8	31.9	27.4	46.0	18.6	
Vert	800.001	QP	26.4	21.8	12.8	31.4	29.6	46.0	16.4	
Vert	2273.000	PK	43.5	27.2	3.0	32.2	41.5	73.9	32.4	
Vert	2390.000	PK	54.7	27.2	3.0	32.1	52.8	73.9	21.1	
Vert	2399.170	PK	68.6	27.2	3.1	32.1	66.8	-	-	- See 20dBc Data Sheet
Vert	2400.000	PK	70.4	27.2	3.1	32.1	68.6	-	-	- See 20dBc Data Sheet
Vert	2573.000	PK	45.7	27.3	3.1	32.0	44.1	73.9	29.8	
Vert	4824.000	PK	41.7	30.9	5.8	31.4	47.0	73.9	26.9	
Vert	7236.000	PK	43.4	35.8	6.3	32.3	53.2	73.9	20.7	
Vert	9648.000	PK	43.7	37.8	7.2	33.0	55.7	73.9	18.2	
Vert	24120.000	PK	46.8	37.9	-0.9	31.6	52.2	73.9	21.7	
Vert	2273.000	AV	30.3	27.2	3.0	32.2	28.3	53.9	25.6	
Vert	2390.000	AV	34.7	27.2	3.0	32.1	32.8	53.9	21.1	
Vert	2399.170	AV	45.0	27.2	3.1	32.1	43.2	-	-	- See 20dBc Data Sheet
Vert	2400.000	AV	45.9	27.2	3.1	32.1	44.1	-	-	- See 20dBc Data Sheet
Vert	2573.000	AV	30.5	27.3	3.1	32.0	28.9	53.9	25.0	
Vert	4824.000	AV	29.4	30.9	5.8	31.4	34.7	53.9	19.2	
Vert	7236.000	AV	30.1	35.8	6.3	32.3	39.9	53.9	14.0	
Vert	9648.000	AV	30.1	37.8	7.2	33.0	42.1	53.9	11.8	
Vert	24120.000	AV	33.3	37.9	-0.9	31.6	38.7	53.9	15.2	

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. 30LE0087-HO-02
Date 01/05/2011
Temperature/ Humidity 22 deg.C / 38 % RH
Engineer Takumi Shimada
 (1-10GHz)
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	95.9	27.2	3.1	32.1	94.1	-	-	Carrier
Hori	2399.170	PK	59.1	27.2	3.1	32.1	57.3	74.1	16.8	
Hori	2400.000	PK	60.0	27.2	3.1	32.1	58.2	74.1	15.9	
Vert	2412.000	PK	86.7	27.2	3.1	32.1	84.9	-	-	Carrier
Vert	2399.170	PK	50.6	27.2	3.1	32.1	48.8	64.9	16.1	
Vert	2400.000	PK	51.0	27.2	3.1	32.1	49.2	64.9	15.7	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber		
Report No.	30LE0087-HO-02		
Date	01/05/2011	01/05/2011	01/06/2011
Temperature/ Humidity	22 deg.C / 38 % RH	22 deg.C / 38% RH	20 deg.C / 38% RH
Engineer	Takumi Shimada	Takumi Shimada	Takumi Shimada
	(1-10GHz)	(10-26.5GHz)	(30-1000MHz)
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	180.000	QP	31.3	15.8	8.9	32.1	23.9	43.5	19.6	
Hori	340.001	QP	34.3	16.2	10.2	31.8	28.9	46.0	17.1	
Hori	360.002	QP	36.1	16.6	10.3	31.8	31.2	46.0	14.8	
Hori	400.001	QP	32.9	17.4	10.6	31.9	29.0	46.0	17.0	
Hori	440.001	QP	29.9	17.7	10.8	31.9	26.5	46.0	19.5	
Hori	800.001	QP	27.3	21.8	12.8	31.4	30.5	46.0	15.5	
Hori	2310.000	PK	45.9	27.2	3.0	32.2	43.9	73.9	30.0	
Hori	2484.000	PK	49.5	27.2	3.1	32.1	47.7	73.9	26.2	
Hori	4874.000	PK	42.4	31.0	5.7	31.4	47.7	73.9	26.2	
Hori	7311.000	PK	44.2	35.9	6.4	32.4	54.1	73.9	19.8	
Hori	9748.000	PK	43.7	38.0	7.3	33.0	56.0	73.9	18.0	
Hori	24370.000	PK	46.7	37.9	-0.9	31.6	52.1	73.9	21.8	
Hori	2310.000	AV	33.0	27.2	3.0	32.2	31.0	53.9	22.9	
Hori	2484.000	AV	36.8	27.2	3.1	32.1	35.0	53.9	18.9	
Hori	4874.000	AV	29.8	31.0	5.7	31.4	35.1	53.9	18.8	
Hori	7311.000	AV	30.1	35.9	6.4	32.4	40.0	53.9	13.9	
Hori	9748.000	AV	30.2	38.0	7.3	33.0	42.5	53.9	11.4	
Hori	24370.000	AV	33.3	37.9	-0.9	31.6	38.7	53.9	15.2	
Vert	180.001	QP	24.6	15.8	8.9	32.1	17.2	43.5	26.3	
Vert	340.001	QP	32.6	16.2	10.2	31.8	27.2	46.0	18.8	
Vert	360.000	QP	34.5	16.6	10.3	31.8	29.6	46.0	16.4	
Vert	400.002	QP	33.1	17.4	10.6	31.9	29.2	46.0	16.8	
Vert	440.002	QP	30.7	17.7	10.8	31.9	27.3	46.0	18.7	
Vert	800.001	QP	26.6	21.8	12.8	31.4	29.8	46.0	16.2	
Vert	2310.000	PK	43.0	27.2	3.0	32.2	41.0	73.9	32.9	
Vert	2484.000	PK	44.1	27.2	3.1	32.1	42.3	73.9	31.6	
Vert	4874.000	PK	42.7	31.0	5.7	31.4	48.0	73.9	25.9	
Vert	7311.000	PK	42.6	35.9	6.4	32.4	52.5	73.9	21.4	
Vert	9748.000	PK	44.1	38.0	7.3	33.0	56.4	73.9	17.5	
Vert	24370.000	PK	46.8	37.9	-0.9	31.6	52.2	73.9	21.7	
Vert	2310.000	AV	30.4	27.2	3.0	32.2	28.4	53.9	25.5	
Vert	2484.000	AV	31.3	27.2	3.1	32.1	29.5	53.9	24.5	
Vert	4874.000	AV	29.9	31.0	5.7	31.4	35.2	53.9	18.7	
Vert	7311.000	AV	30.1	35.9	6.4	32.4	40.0	53.9	14.0	
Vert	9748.000	AV	30.5	38.0	7.3	33.0	42.8	53.9	11.2	
Vert	24370.000	AV	33.2	37.9	-0.9	31.6	38.6	53.9	15.3	

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).

*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

Test place	Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber		
Report No.	30LE0087-HO-02		
Date	01/05/2011	01/05/2011	01/06/2011
Temperature/ Humidity	22 deg.C / 38 % RH	22 deg.C / 38% RH	20 deg.C / 38% RH
Engineer	Takumi Shimada	Takumi Shimada	Takumi Shimada
	(1-10GHz)	(10-26.5GHz)	(30-1000MHz)
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	180.000	QP	31.0	15.8	8.9	32.1	23.6	43.5	19.9	
Hori	340.002	QP	34.0	16.2	10.2	31.8	28.6	46.0	17.4	
Hori	360.002	QP	35.8	16.6	10.3	31.8	30.9	46.0	15.1	
Hori	400.000	QP	32.6	17.4	10.6	31.9	28.7	46.0	17.3	
Hori	440.001	QP	30.1	17.7	10.8	31.9	26.7	46.0	19.3	
Hori	800.002	QP	27.2	21.8	12.8	31.4	30.4	46.0	15.6	
Hori	2293.000	PK	45.7	27.2	3.0	32.2	43.7	73.9	30.2	
Hori	2483.500	PK	64.3	27.2	3.1	32.1	62.5	73.9	11.4	
Hori	2510.000	PK	48.8	27.2	3.1	32.1	47.0	73.9	26.9	
Hori	4924.000	PK	42.5	31.2	5.7	31.4	48.0	73.9	25.9	
Hori	7386.000	PK	43.4	36.0	6.4	32.4	53.4	73.9	20.5	
Hori	9848.000	PK	43.3	38.1	7.4	33.0	55.8	73.9	18.2	
Hori	24620.000	PK	46.6	37.9	-0.9	31.5	52.1	73.9	21.8	
Hori	2293.000	AV	33.5	27.2	3.0	32.2	31.5	53.9	22.4	
Hori	2483.500	AV	39.6	27.2	3.1	32.1	37.8	53.9	16.1	
Hori	2510.000	AV	37.0	27.2	3.1	32.1	35.2	53.9	18.7	
Hori	4924.000	AV	29.4	31.2	5.7	31.4	34.9	53.9	19.0	
Hori	7386.000	AV	30.4	36.0	6.4	32.4	40.4	53.9	13.5	
Hori	9848.000	AV	30.1	38.1	7.4	33.0	42.6	53.9	11.3	
Hori	24620.000	AV	33.6	37.9	-0.9	31.5	39.1	53.9	14.8	
Vert	180.001	QP	24.3	15.8	8.9	32.1	16.9	43.5	26.6	
Vert	340.001	QP	32.9	16.2	10.2	31.8	27.5	46.0	18.5	
Vert	360.001	QP	34.5	16.6	10.3	31.8	29.6	46.0	16.4	
Vert	400.001	QP	33.1	17.4	10.6	31.9	29.2	46.0	16.8	
Vert	440.000	QP	30.9	17.7	10.8	31.9	27.5	46.0	18.5	
Vert	800.001	QP	26.3	21.8	12.8	31.4	29.5	46.0	16.5	
Vert	2293.000	PK	45.8	27.2	3.0	32.2	43.8	73.9	30.1	
Vert	2483.500	PK	52.4	27.2	3.1	32.1	50.6	73.9	23.3	
Vert	2510.000	PK	43.5	27.2	3.1	32.1	41.7	73.9	32.2	
Vert	4924.000	PK	41.7	31.2	5.7	31.4	47.2	73.9	26.7	
Vert	7386.000	PK	43.4	36.0	6.4	32.4	53.4	73.9	20.5	
Vert	9848.000	PK	43.5	38.1	7.4	33.0	56.0	73.9	17.9	
Vert	24620.000	PK	46.9	37.9	-0.9	31.5	52.4	73.9	21.5	
Vert	2293.000	AV	32.9	27.2	3.0	32.2	30.9	53.9	23.0	
Vert	2483.500	AV	32.8	27.2	3.1	32.1	31.0	53.9	23.0	
Vert	2510.000	AV	30.3	27.2	3.1	32.1	28.5	53.9	25.4	
Vert	4924.000	AV	29.0	31.2	5.7	31.4	34.5	53.9	19.4	
Vert	7386.000	AV	30.3	36.0	6.4	32.4	40.3	53.9	13.6	
Vert	9848.000	AV	30.1	38.1	7.4	33.0	42.6	53.9	11.3	
Vert	24620.000	AV	33.6	37.9	-0.9	31.5	39.1	53.9	14.8	

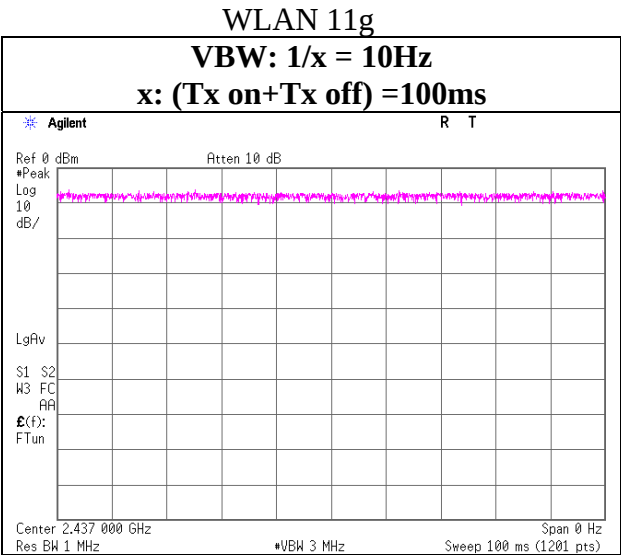
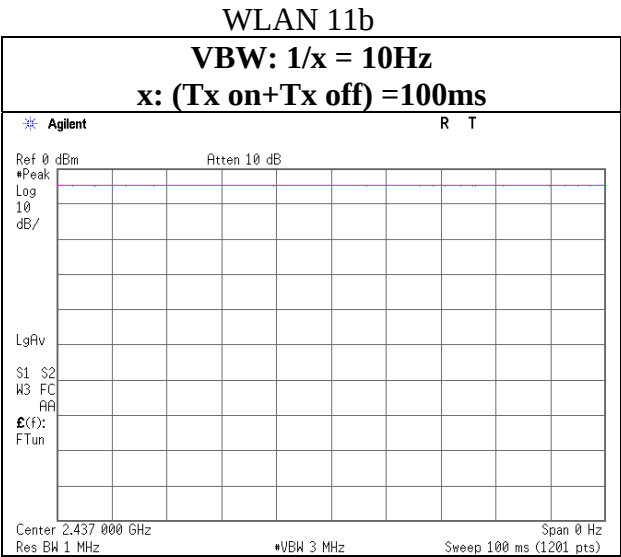
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*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.

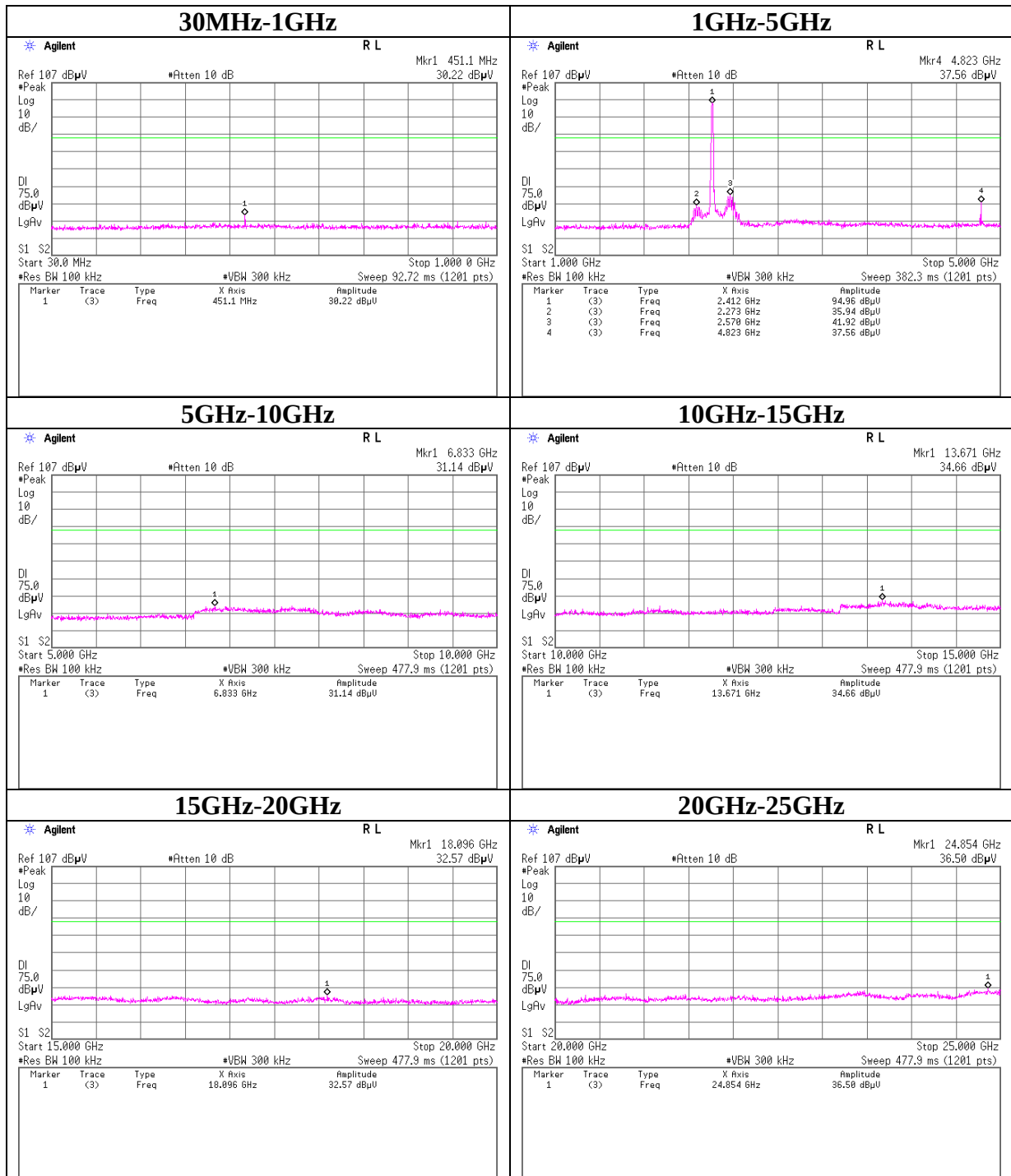
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

VBW (AV) Calculation



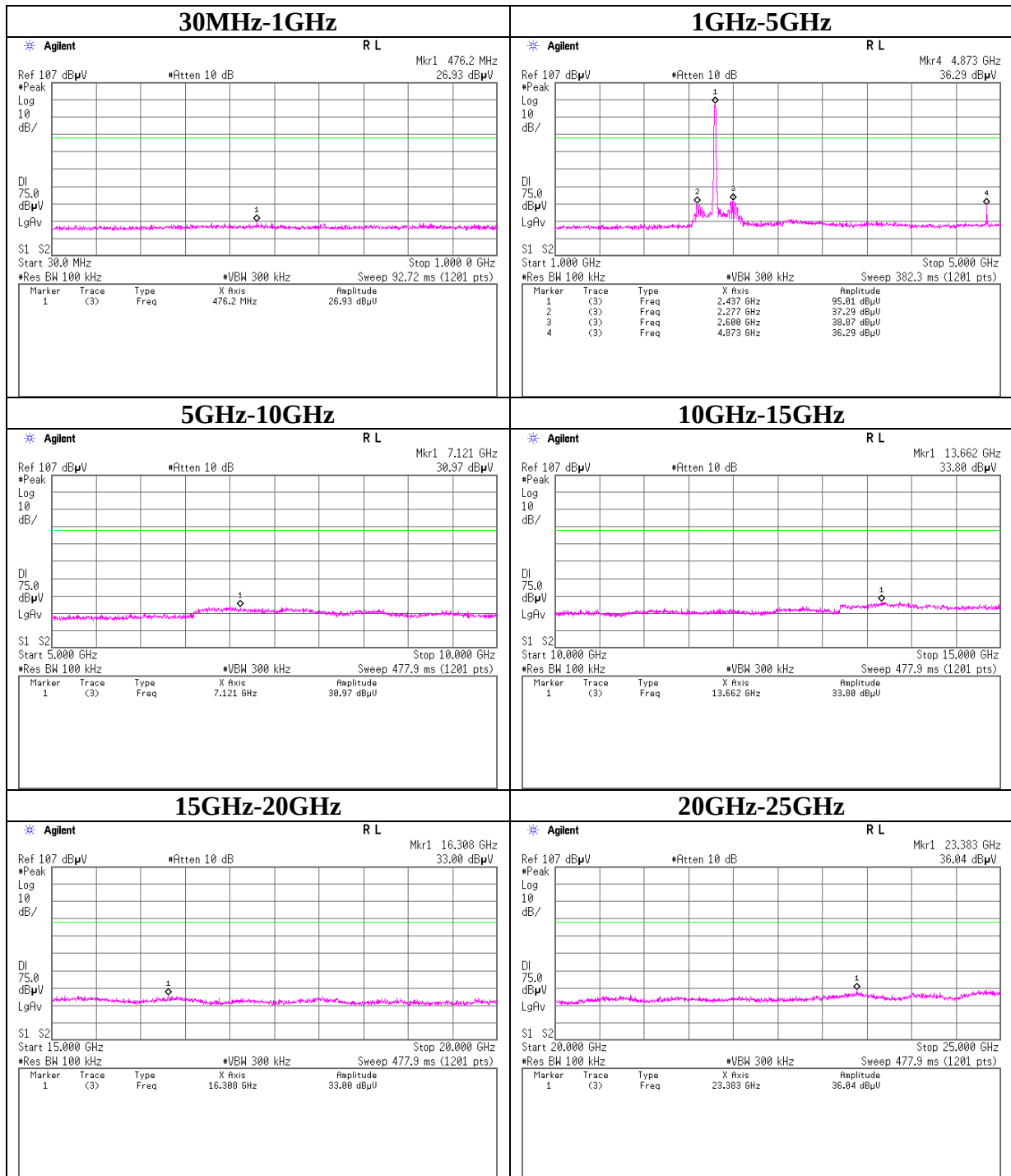
Conducted Spurious Emission

11b Tx 2412MHz



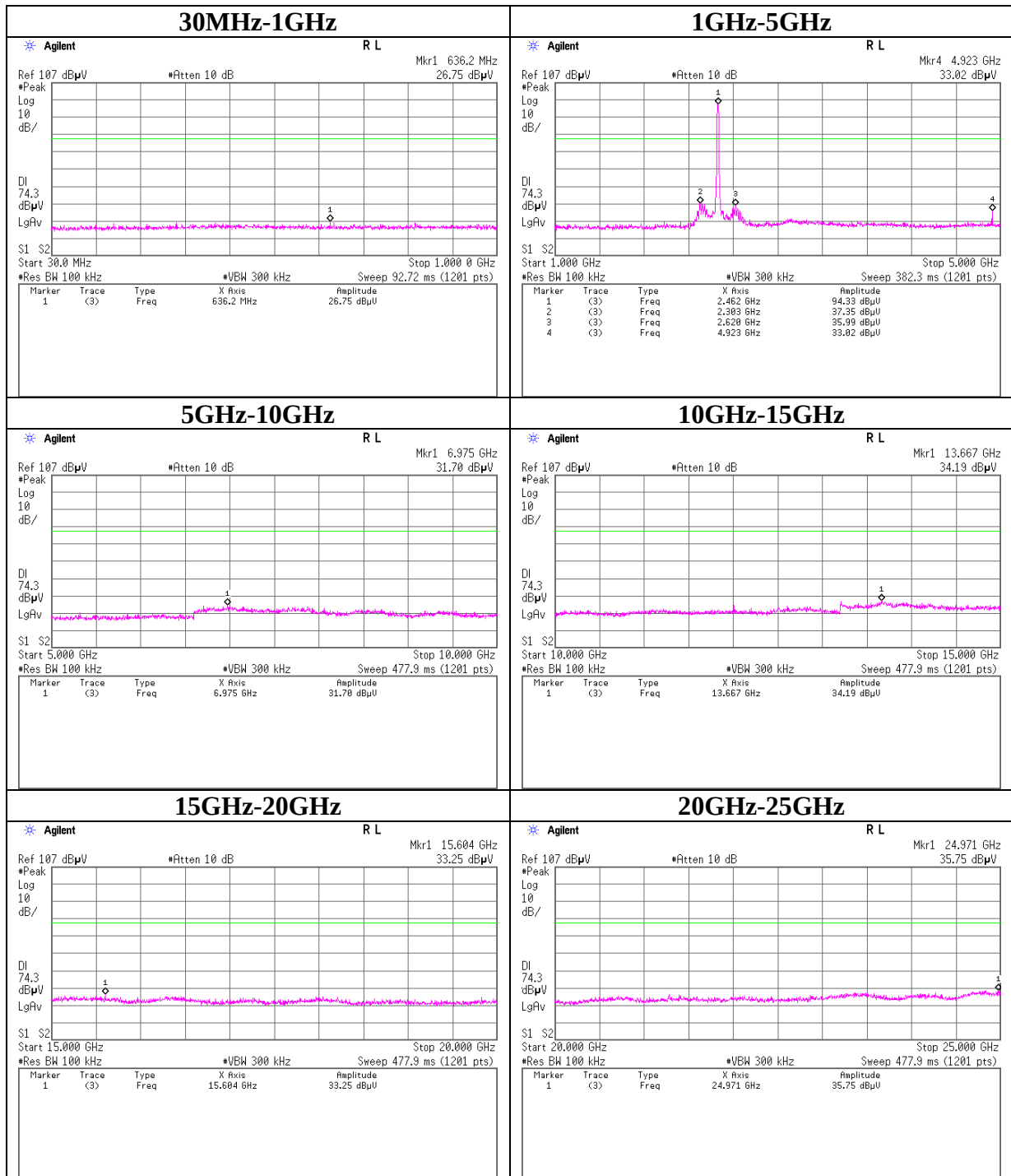
Conducted Spurious Emission

11b Tx 2437MHz



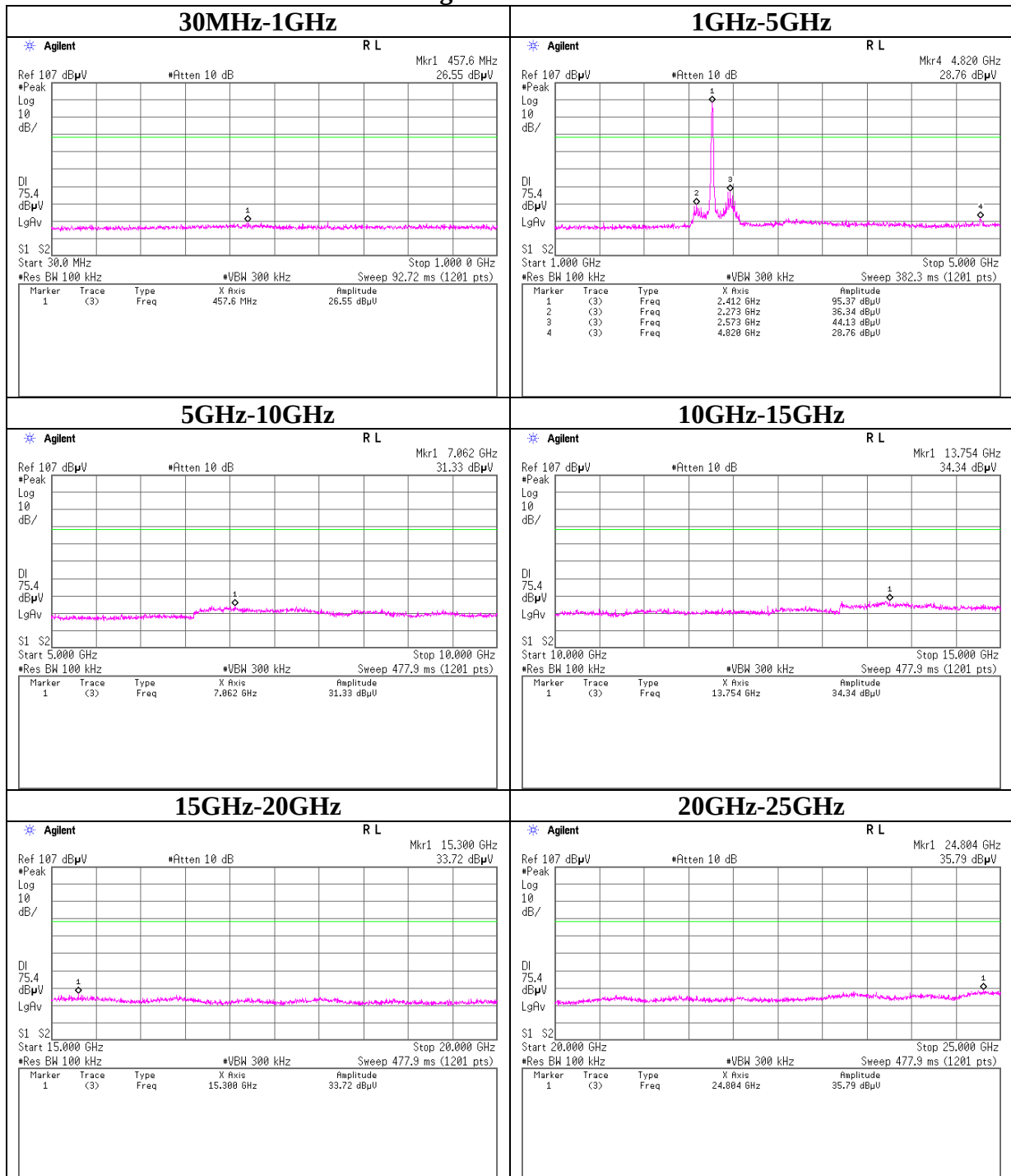
Conducted Spurious Emission

11b Tx 2462MHz



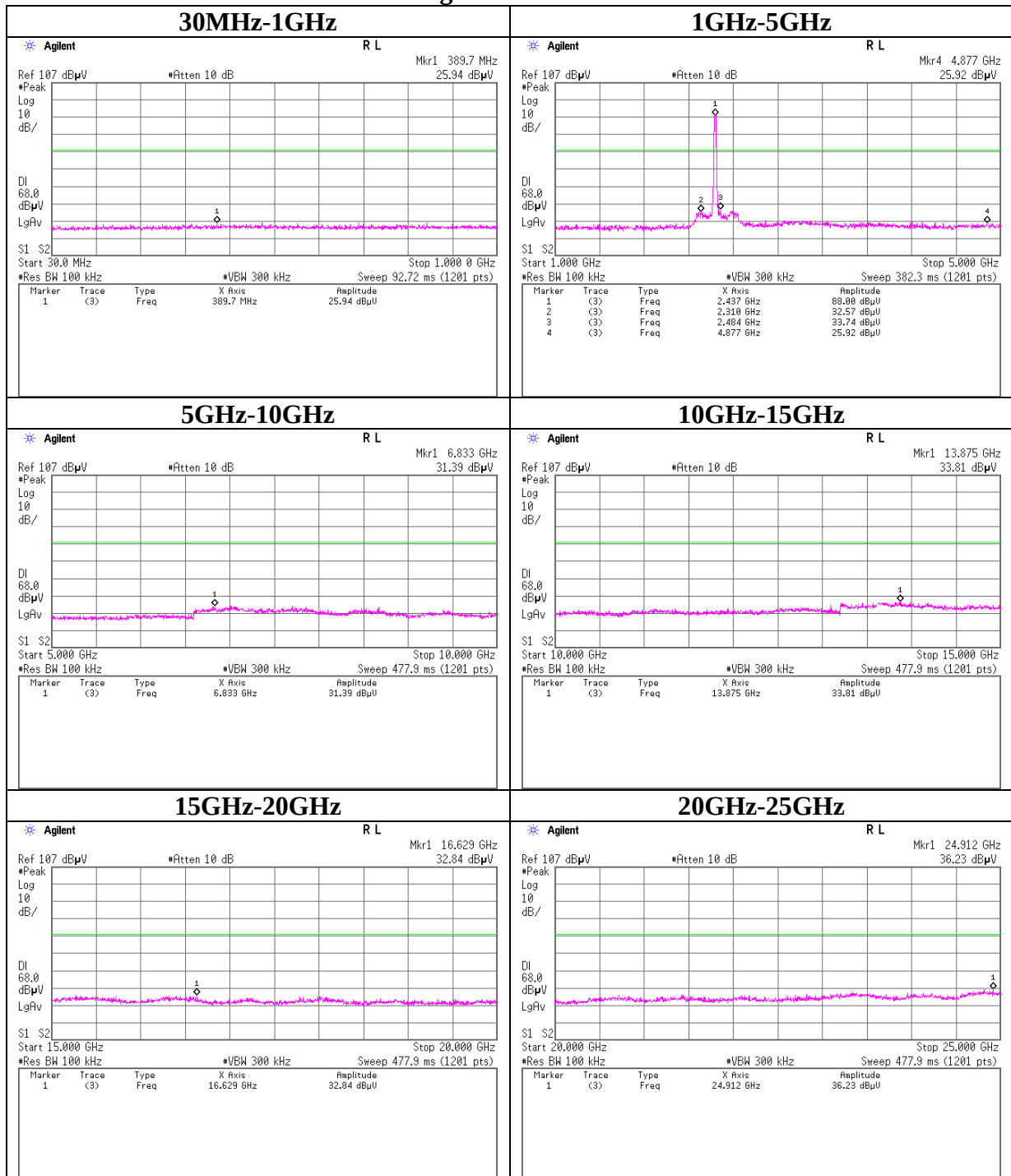
Conducted Spurious Emission

11g Tx 2412MHz



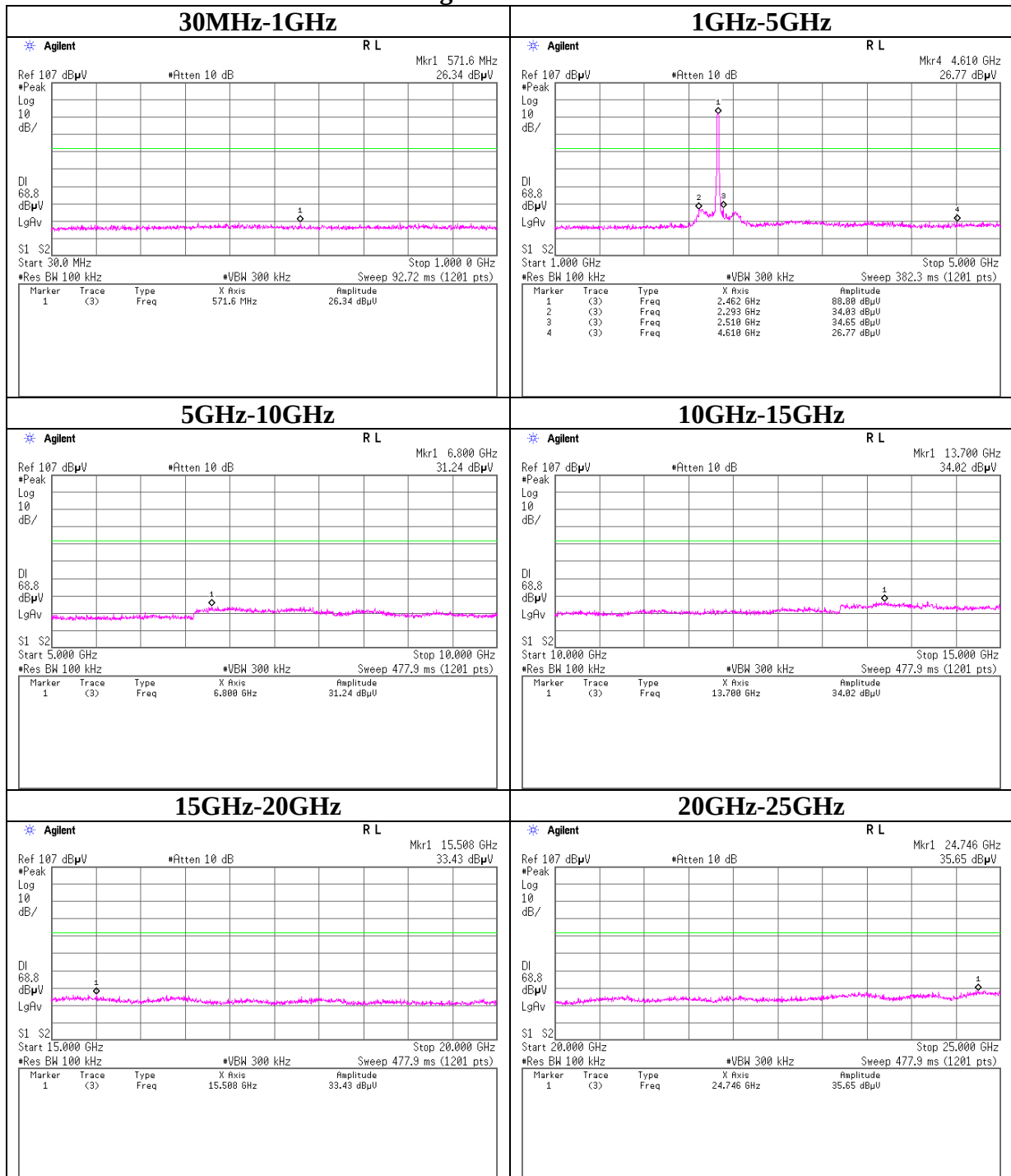
Conducted Spurious Emission

11g Tx 2437MHz



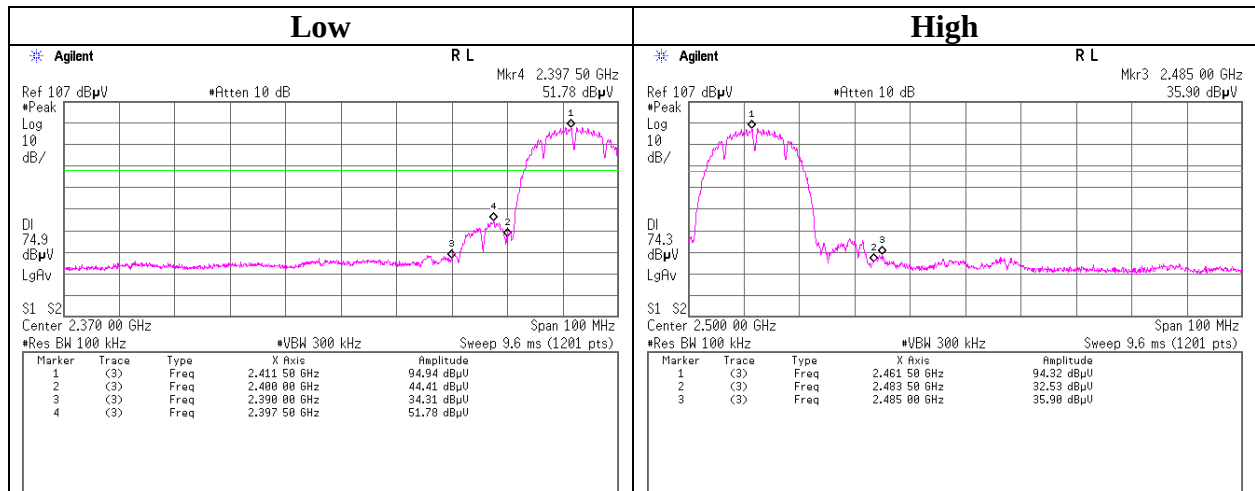
Conducted Spurious Emission

11g Tx 2462MHz

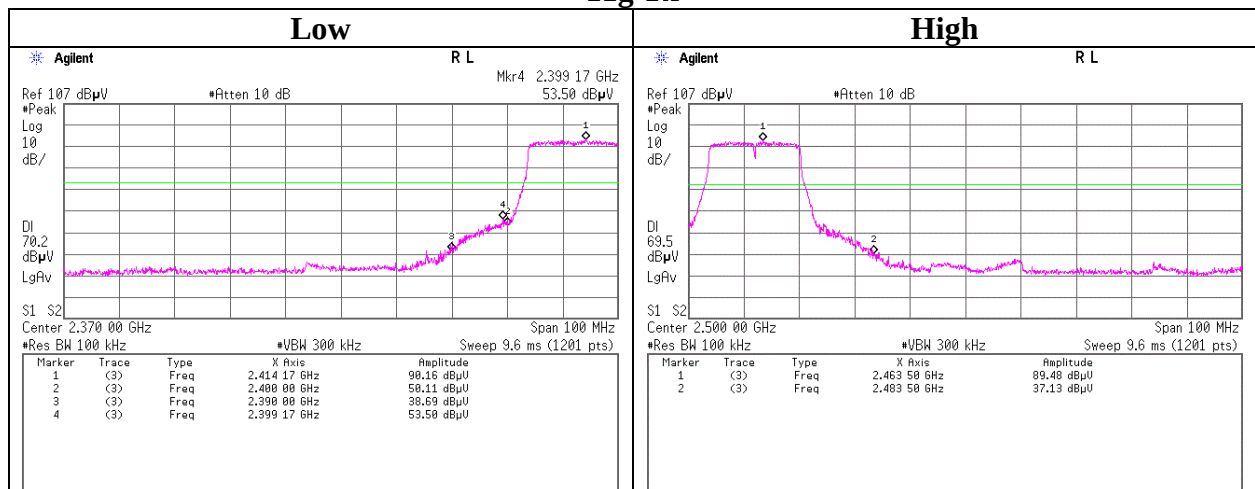


Conducted Emission Band Edge compliance

11b Tx

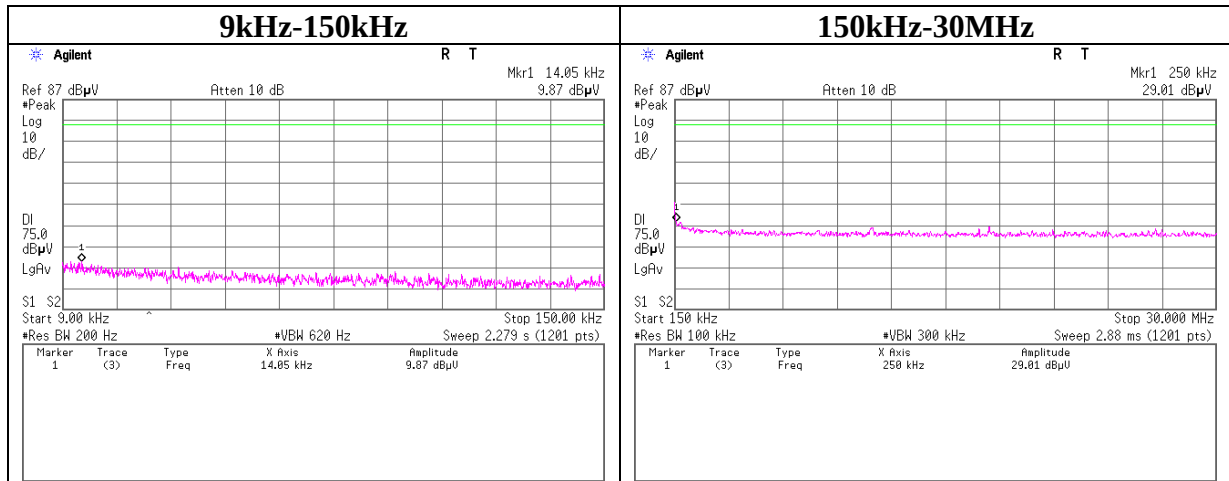


11g Tx

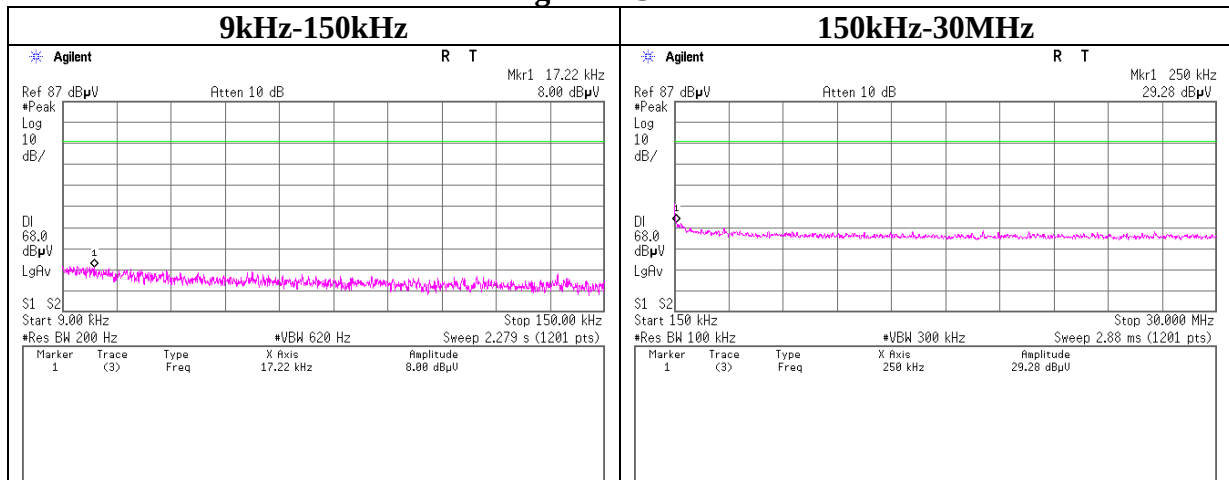


Conducted Spurious Emission(below 30MHz)

11b Tx 2437MHz



11g Tx 2437MHz



*Test was performed with the representative channel (Mid channel) after it was confirmed that there was no difference in the data due to the channel.

Power Density

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 30LE0087-HO-02
Date 12/08/2010
Temperature/ Humidity 23 deg.C / 30% RH
Engineer Takeshi Choda
Mode 11b / 11g Tx

11b

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-18.25	1.27	10.00	-6.98	8.00	14.98
2437.00	-18.37	1.28	10.00	-7.09	8.00	15.09
2462.00	-18.61	1.28	10.00	-7.33	8.00	15.33

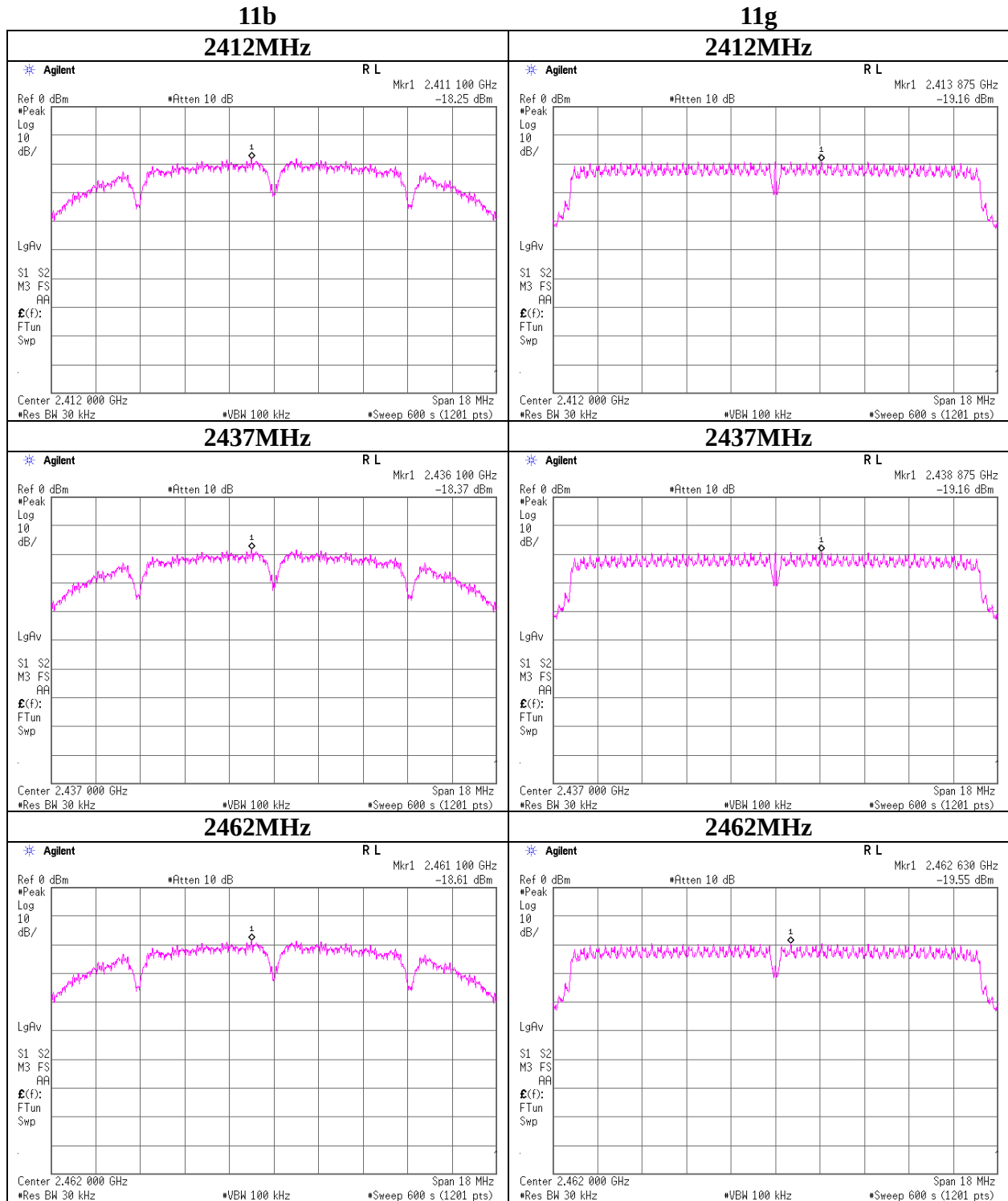
11g

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-19.16	1.27	10.00	-7.89	8.00	15.89
2437.00	-19.16	1.28	10.00	-7.88	8.00	15.88
2462.00	-19.55	1.28	10.00	-8.27	8.00	16.27

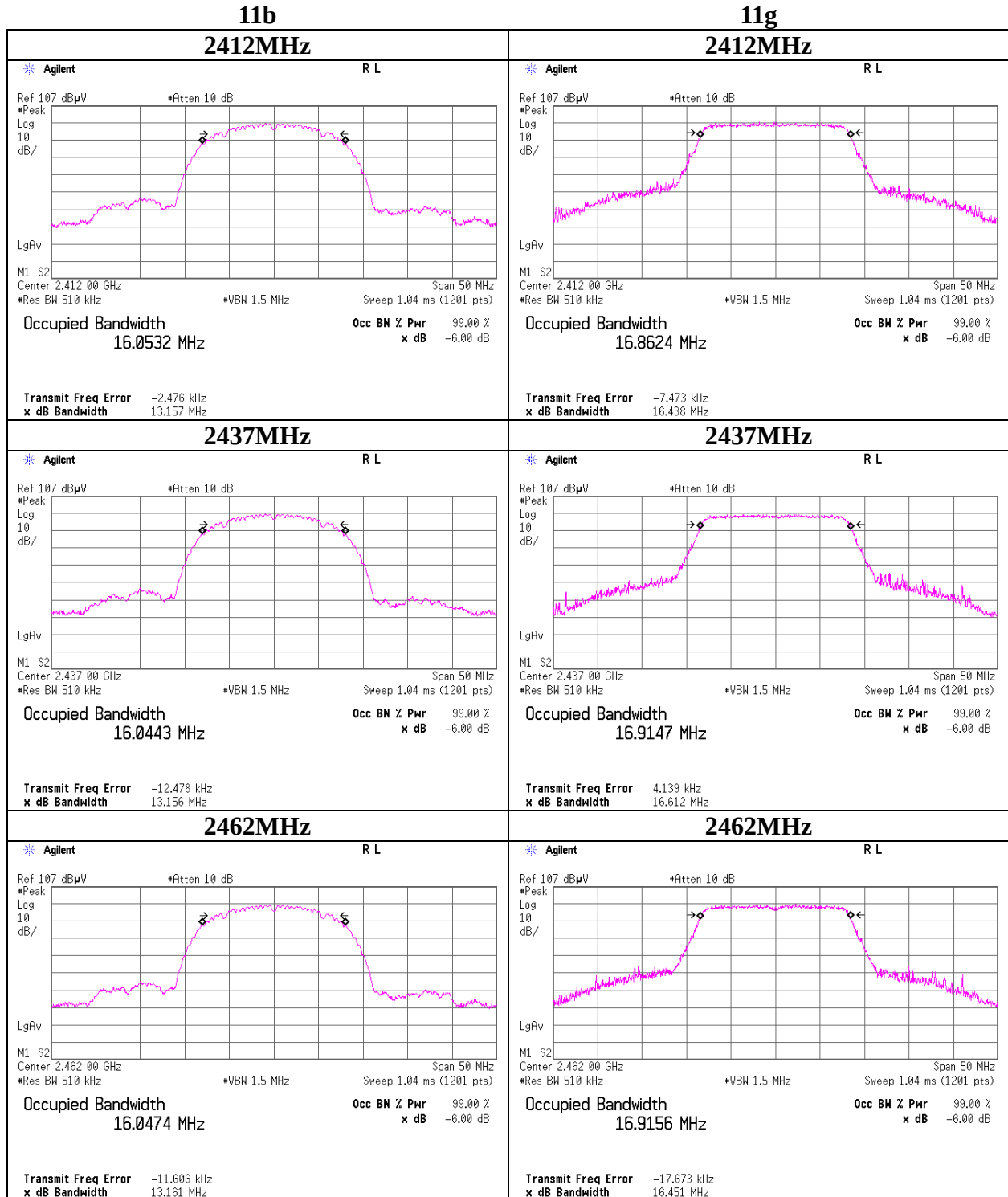
Sample Calculation:

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

Power Density



99%Occupied Bandwidth



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	2010/05/19 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2010/02/03 * 12
MCC-114	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	290212/4	AT	2010/08/05 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2010/03/01 * 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
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-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2010/11/18 * 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
MHF-20	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCC	607	RE	2010/09/21 * 12
MCC-79	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278923/4	RE	2010/12/02 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA917030 7	RE	2010/06/29 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2010/02/01 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2010/02/09 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	-
MSA-09	Spectrum Analyzer	Advantest	R3273	95090115	RE	2010/11/18 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	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	2010/03/23 * 12

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

All equipment is calibrated with valid calibrations. Each measurement data 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: RE: Radiated Emission, AT: Antenna Terminal Conducted test

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