APPENDIX 2: Data of EMI test

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

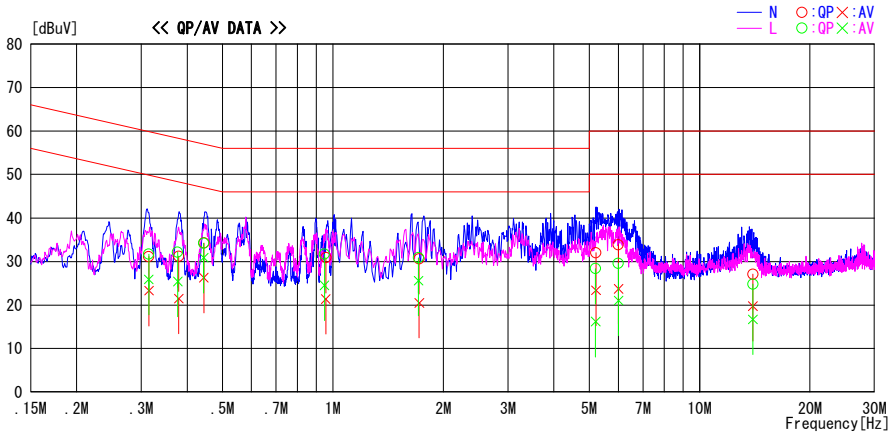
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2010/11/10

Report No. : 31CE0252-HO-01

Temp./Humi. : 21deg.C. / 38%
Engineer : Motoya Imura

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

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.31481	17.7	9.9	13.4	31.1	23.3	59.8	49.8	28.7	26.5	N	
0.37986	17.8	8.1	13.4	31.2	21.5	58.3	48.3	27.1	26.8	N	
0.44484	20.9	12.9	13.4	34.3	26.3	57.0	47.0	22.7	20.7	N	
0.95661	17.5	8.0	13.4	30.9	21.4	56.0	46.0	25.1	24.6	N	
1.71830	17.2	7.1	13.4	30.6	20.5	56.0	46.0	25.4	25.5	N	
5.21567	17.9	9.3	14.1	32.0	23.4	60.0	50.0	28.0	26.6	N	
6.00410	19.6	9.4	14.3	33.9	23.7	60.0	50.0	26.1	26.3	N	
13.96952	11.4	4.1	15.7	27.1	19.8	60.0	50.0	32.9	30.2	N	
0.31442	18.3	12.5	13.4	31.7	25.9	59.9	49.9	28.2	24.0	L	
0.37761	18.8	12.0	13.4	32.2	25.4	58.3	48.3	26.1	22.9	L	
0.44419	20.8	17.5	13.4	34.2	30.9	57.0	47.0	22.8	16.1	L	
0.94816	18.3	11.1	13.4	31.7	24.5	56.0	46.0	24.3	21.5	L	
1.71050	17.5	12.2	13.4	30.9	25.6	56.0	46.0	25.1	20.4	L	
5.20157	14.3	2.1	14.1	28.4	16.2	60.0	50.0	31.6	33.8	L	
6.00501	15.3	6.8	14.3	29.6	21.1	60.0	50.0	30.4	28.9	L	
13.96652	9.1	1.0	15.7	24.8	16.7	60.0	50.0	35.2	33.3	L	

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

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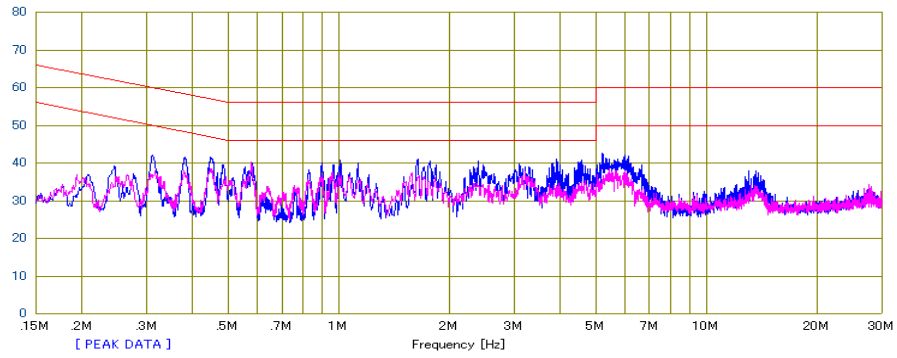
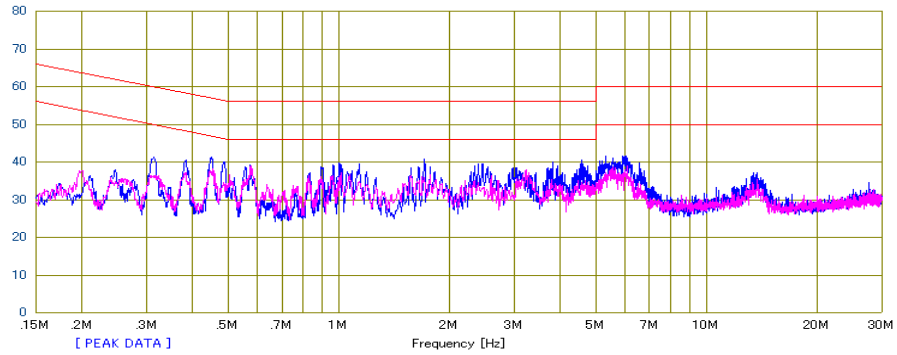
Conducted Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	31CE0252-HO-01
Date	11/10/2010
Temperature/ Humidity	21 deg.C./ 38%
Engineer	Motoya Imura
Mode	11b Tx

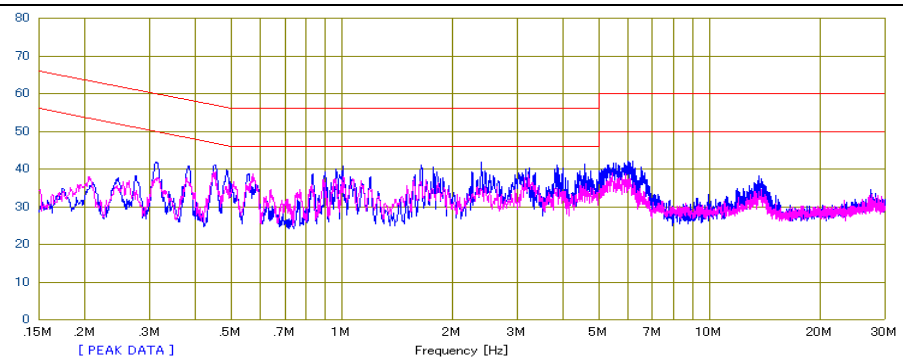
2412MHz



2437MHz



2462MHz



Y scale [dBuV] Chart — N — L

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Conducted Emission

DATA OF CONDUCTED EMISSION TEST

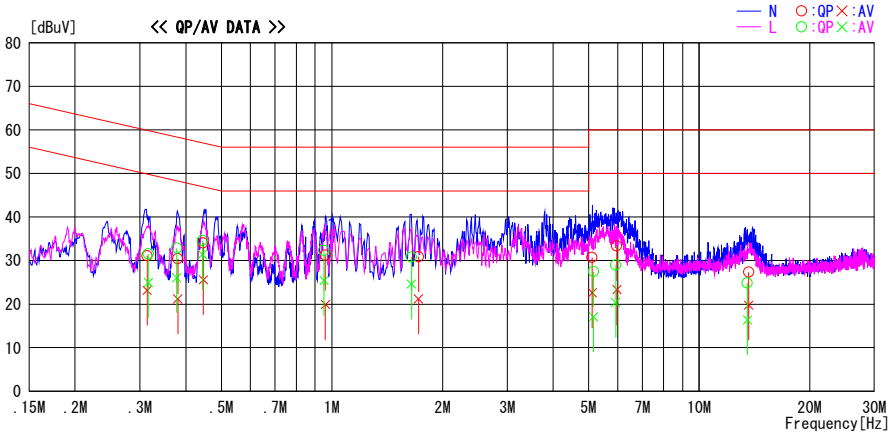
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2010/11/10

Report No. : 31CE0252-HO-01

Temp./Humi. : 21deg.C. / 38%
Engineer : Motoya Imura

Mode / Remarks : Tx 11g 2412MHz, 6Mbps

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.31402	17.7	9.8	13.4	31.1	23.2	59.9	49.9	28.8	26.7	N	
0.38051	17.0	7.8	13.4	30.4	21.2	58.3	48.3	27.9	27.1	N	
0.44629	20.6	12.2	13.4	34.0	25.6	56.9	46.9	22.9	21.3	N	
0.95967	17.8	6.5	13.4	31.2	19.9	56.0	46.0	24.8	26.1	N	
1.72120	17.5	7.8	13.4	30.9	21.2	56.0	46.0	25.1	24.8	N	
5.11426	16.6	8.5	14.1	30.7	22.6	60.0	50.0	29.3	27.4	N	
5.96420	19.1	9.0	14.3	33.4	23.3	60.0	50.0	26.6	26.7	N	
13.63820	11.7	4.2	15.6	27.3	19.8	60.0	50.0	32.7	30.2	N	
0.31620	18.1	11.5	13.4	31.5	24.9	59.8	49.8	28.3	24.9	L	
0.37762	19.4	12.7	13.4	32.8	26.1	58.3	48.3	25.5	22.2	L	
0.44362	21.2	18.0	13.4	34.6	31.4	57.0	47.0	22.4	15.6	L	
0.95168	18.9	12.0	13.4	32.3	25.4	56.0	46.0	23.7	20.6	L	
1.64650	17.4	11.2	13.4	30.8	24.6	56.0	46.0	25.2	21.4	L	
5.15159	13.4	3.0	14.1	27.5	17.1	60.0	50.0	32.5	32.9	L	
5.92240	14.6	6.1	14.3	28.9	20.4	60.0	50.0	31.1	29.6	L	
13.52456	9.2	0.8	15.6	24.8	16.4	60.0	50.0	35.2	33.6	L	

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

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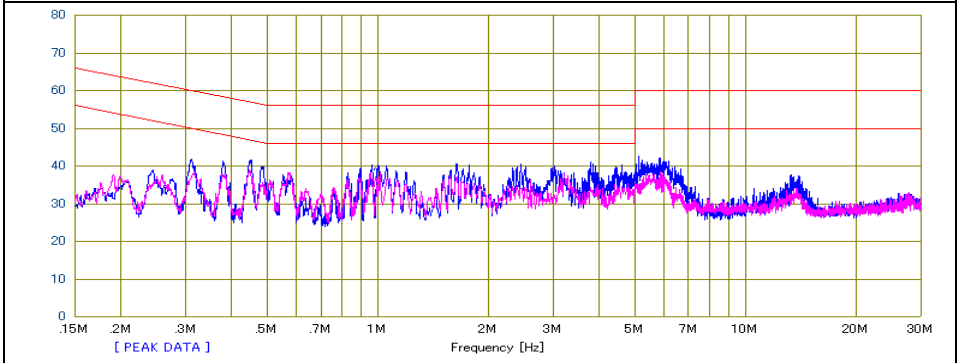
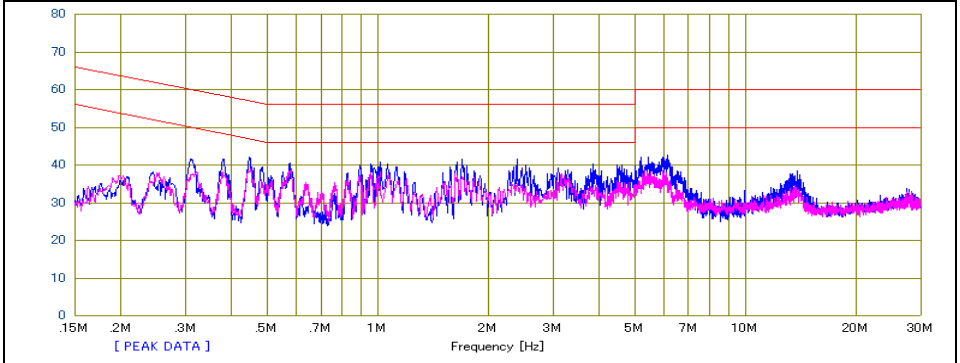
Conducted Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	31CE0252-HO-01
Date	11/10/2010
Temperature/ Humidity	21 deg.C./ 38%
Engineer	Motoya Imura
Mode	11g Tx

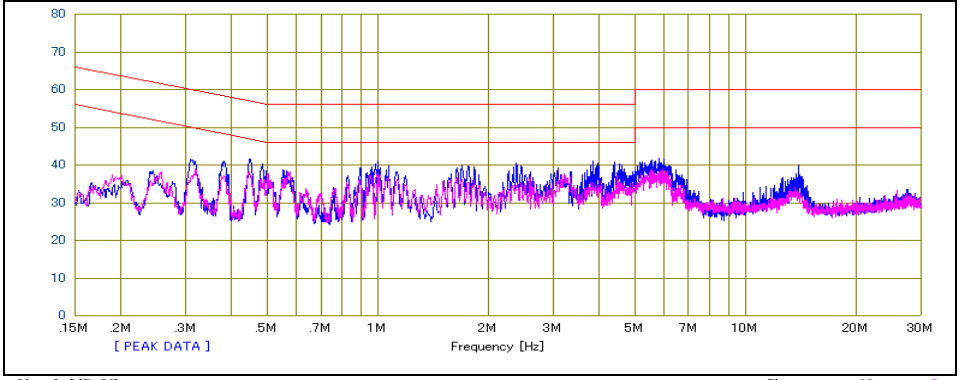
2412MHz



2437MHz



2462MHz



Y scale [dBuV] Chart — N — L

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6dB Bandwidth

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	31CE0252-HO-01
Date	11/11/2010
Temperature/ Humidity	25 deg.C./ 32%
Engineer	Takeshi Choda
Mode	11b Tx, 11g Tx

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	9.608	>500
2437	9.574	>500
2462	9.574	>500

11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	15.882	>500
2437	15.873	>500
2462	15.848	>500

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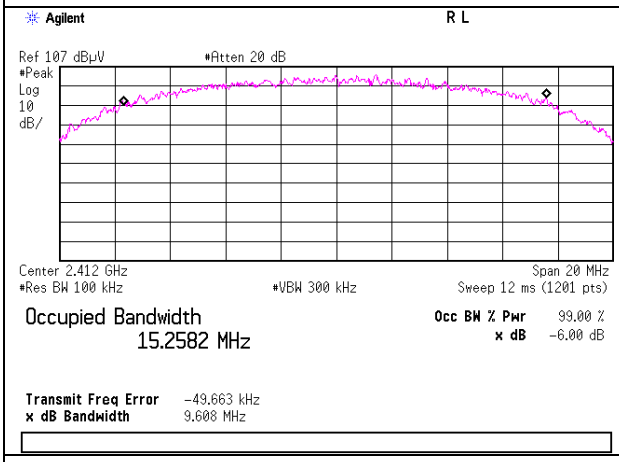
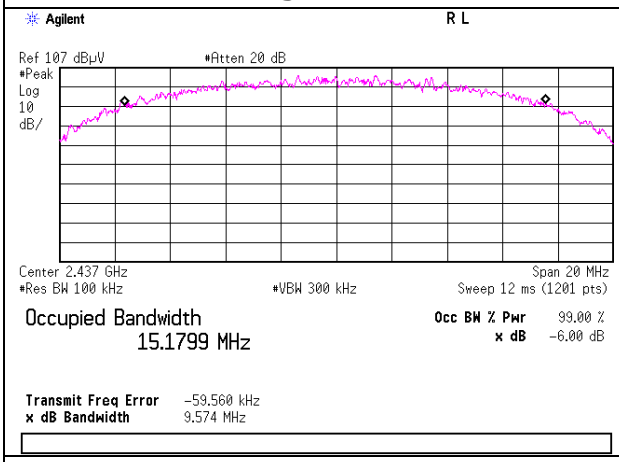
6dB Bandwidth

11b

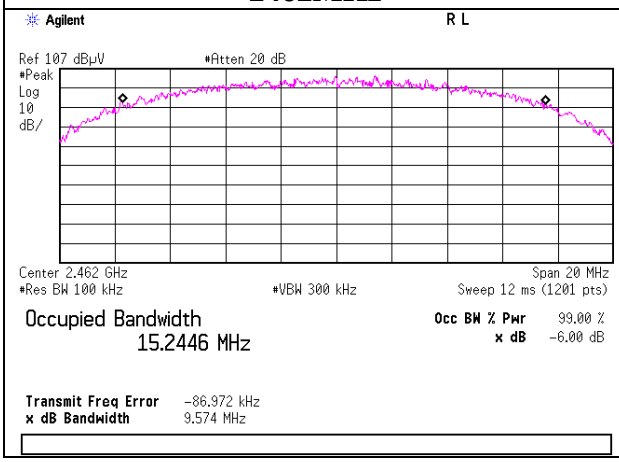
2412MHz



2437MHz

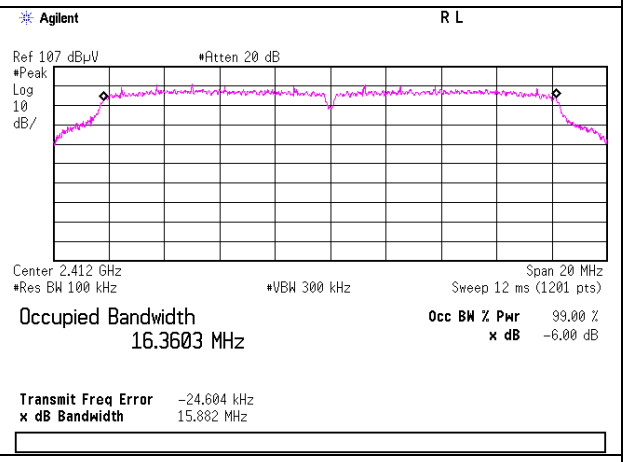


2462MHz

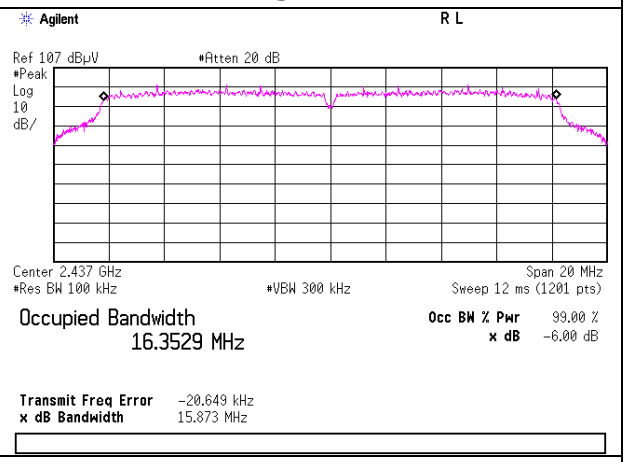


11g

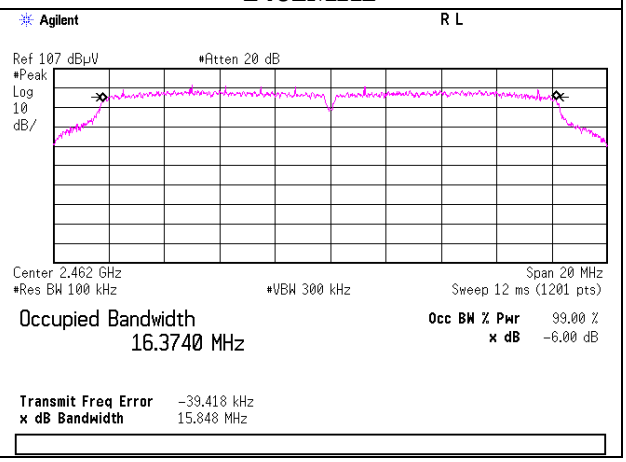
2412Hz



2437MHz



2462MHz



Maximum Peak Output Power

Test place	Head Office EMC Lab. No.4 Measurement Room
Report No.	31CE0252-HO-01
Date	11/09/2010
Temperature/ Humidity	22 deg.C./ 43%
Engineer	Takumi Shimada
Mode	11b Tx

Freq.	Reading	Cable Loss	Atten.	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	6.43	1.72	10.08	18.23	66.47	30.00	1000	11.77
2437	6.55	1.73	10.08	18.36	68.49	30.00	1000	11.64
2462	6.78	1.73	10.08	18.59	72.23	30.00	1000	11.41

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

2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	6.18	
2	6.51	
5.5	6.44	
11	6.55	*

*: Worst Rate
All comparizon were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place	Head Office EMC Lab. No.4 Measurement Room
Report No.	31CE0252-HO-01
Date	11/09/2010
Temperature/ Humidity	22 deg.C./ 43%
Engineer	Takumi Shimada
Mode	11g Tx

Freq.	Reading	Cable Loss	Atten.	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	11.21	1.72	10.08	23.01	199.80	30.00	1000	6.99
2437	11.24	1.73	10.08	23.05	201.65	30.00	1000	6.95
2462	11.25	1.73	10.08	23.06	202.16	30.00	1000	6.94

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

2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	11.24	*
9	11.02	
12	10.84	
18	10.83	
24	11.08	
36	11.01	
48	11.10	
54	10.96	

*: Worst Rate
All comparison were carried out on same frequency and measurement factors.

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	31CE0252-HO-01	
Date	11/09/2010	11/10/2010
Temperature/ Humidity	22 deg.C./ 33%	21 deg.C./ 31%
Engineer	Hisayoshi Sato	Takumi Shimada
	(1-10GHz)	(The other Frequency)
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	78.001	QP	28.5	6.6	7.7	32.1	10.7	40.0	29.3	
Hori	181.994	QP	24.3	16.2	8.8	31.9	17.4	43.5	26.1	
Hori	286.010	QP	23.5	18.9	9.6	31.9	20.1	46.0	25.9	
Hori	361.020	QP	31.0	16.9	10.1	31.9	26.1	46.0	19.9	
Hori	432.009	QP	34.7	18.1	10.5	31.9	31.4	46.0	14.6	
Hori	540.001	QP	28.9	19.5	11.1	32.0	27.5	46.0	18.5	
Hori	2390.000	PK	67.5	27.2	2.9	32.1	65.5	73.9	8.4	
Hori	2400.000	PK	74.6	27.2	2.9	32.1	72.6	-	-	See 20dBc Data Sheet
Hori	4824.000	PK	37.9	30.9	5.4	31.4	42.8	73.9	31.1	
Hori	7236.000	PK	38.7	35.8	5.9	32.3	48.1	73.9	25.8	
Hori	9648.000	PK	42.8	37.8	6.9	33.0	54.5	73.9	19.4	
Hori	24120.000	PK	47.1	37.9	-1.2	31.6	52.2	73.9	21.7	
Hori	2390.000	AV	43.3	27.2	2.9	32.1	41.3	53.9	12.6	
Hori	2400.000	AV	54.4	27.2	2.9	32.1	52.4	-	-	See 20dBc Data Sheet
Hori	4824.000	AV	28.1	30.9	5.4	31.4	33.0	53.9	20.9	
Hori	7236.000	AV	29.1	35.8	4.3	32.3	36.9	53.9	17.0	
Hori	9648.000	AV	33.5	37.8	6.9	33.0	45.2	53.9	8.7	
Hori	24120.000	AV	35.4	37.9	-1.2	31.6	40.5	53.9	13.4	
Vert	78.003	QP	38.4	6.6	7.7	32.1	20.6	40.0	19.4	
Vert	182.000	QP	27.7	16.2	8.8	31.9	20.8	43.5	22.7	
Vert	286.004	QP	26.9	18.9	9.6	31.9	23.5	46.0	22.5	
Vert	361.000	QP	25.6	16.9	10.1	31.9	20.7	46.0	25.3	
Vert	432.003	QP	35.7	18.1	10.5	31.9	32.4	46.0	13.6	
Vert	540.000	QP	27.4	19.5	11.1	32.0	26.0	46.0	20.0	
Vert	2390.000	PK	59.2	27.2	2.9	32.1	57.2	73.9	16.7	
Vert	2400.000	PK	67.1	27.2	2.9	32.1	65.1	-	-	See 20dBc Data Sheet
Vert	4824.000	PK	39.3	30.9	5.4	31.4	44.2	73.9	29.7	
Vert	7236.000	PK	40.8	35.8	5.9	32.3	50.2	73.9	23.7	
Vert	9648.000	PK	44.1	37.8	6.9	33.0	55.8	73.9	18.1	
Vert	24120.000	PK	47.2	37.9	-1.2	31.6	52.3	73.9	21.6	
Vert	2390.000	AV	37.2	27.2	2.9	32.1	35.2	53.9	18.7	
Vert	2400.000	AV	46.9	27.2	2.9	32.1	44.9	-	-	See 20dBc Data Sheet
Vert	4824.000	AV	30.4	30.9	5.4	31.4	35.3	53.9	18.6	
Vert	7236.000	AV	32.2	35.8	5.9	32.3	41.6	53.9	12.3	
Vert	9648.000	AV	36.6	37.8	6.9	33.0	48.3	53.9	5.6	
Vert	24120.000	AV	35.3	37.9	-1.2	31.6	40.4	53.9	13.5	

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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	31CE0252-HO-01
Date	11/09/2010
Temperature/ Humidity	22 deg.C./ 33%
Engineer	Hisayoshi Sato
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	107.6	27.2	2.9	32.1	105.6	-	-	Carrier
Hori	2400.000	PK	57.4	27.2	2.9	32.1	55.4	85.6	30.2	
Vert	2412.000	PK	100.3	27.2	2.9	32.1	98.3	-	-	Carrier
Vert	2400.000	PK	49.5	27.2	2.9	32.1	47.5	78.3	30.8	

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

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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	31CE0252-HO-01	
Date	11/09/2010	11/10/2010
Temperature/ Humidity	22 deg.C./ 33%	21 deg.C./ 31%
Engineer	Hisayoshi Sato	Takumi Shimada
	(1-10GHz)	(The other Frequency)
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	78.002	QP	28.7	6.6	7.7	32.1	10.9	40.0	29.1	
Hori	182.000	QP	24.7	16.2	8.8	31.9	17.8	43.5	25.7	
Hori	286.040	QP	23.9	18.9	9.6	31.9	20.5	46.0	25.5	
Hori	361.000	QP	31.8	16.9	10.1	31.9	26.9	46.0	19.1	
Hori	432.001	QP	34.8	18.1	10.5	31.9	31.5	46.0	14.5	
Hori	540.003	QP	28.7	19.5	11.1	32.0	27.3	46.0	18.7	
Hori	4874.000	PK	38.1	31.0	5.3	31.4	43.0	73.9	30.9	
Hori	7311.000	PK	38.2	35.9	5.9	32.4	47.6	73.9	26.3	
Hori	9748.000	PK	41.5	38.0	7.1	33.0	53.6	73.9	20.3	
Hori	24370.000	PK	46.9	37.9	-1.1	31.6	52.1	73.9	21.8	
Hori	4874.000	AV	27.3	31.0	5.3	31.4	32.2	53.9	21.7	
Hori	7311.000	AV	27.7	35.9	5.9	32.4	37.1	53.9	16.8	
Hori	9748.000	AV	33.1	38.0	7.1	33.0	45.2	53.9	8.7	
Hori	24370.000	AV	34.7	37.9	-1.1	31.6	39.9	53.9	14.0	
Vert	78.003	QP	38.7	6.6	7.7	32.1	20.9	40.0	19.1	
Vert	182.001	QP	28.0	16.2	8.8	31.9	21.1	43.5	22.4	
Vert	286.002	QP	26.7	18.9	9.6	31.9	23.3	46.0	22.7	
Vert	361.001	QP	25.9	16.9	10.1	31.9	21.0	46.0	25.0	
Vert	432.002	QP	35.2	18.1	10.5	31.9	31.9	46.0	14.1	
Vert	540.003	QP	27.6	19.5	11.1	32.0	26.2	46.0	19.8	
Vert	4874.000	PK	40.9	31.0	5.3	31.4	45.8	73.9	28.1	
Vert	7311.000	PK	37.0	35.9	5.9	32.4	46.4	73.9	27.5	
Vert	9748.000	PK	41.8	38.0	7.1	33.0	53.9	73.9	20.0	
Vert	24370.000	PK	47.0	37.9	-1.1	31.6	52.2	73.9	21.7	
Vert	4874.000	AV	27.5	31.0	5.3	31.4	32.4	53.9	21.5	
Vert	7311.000	AV	27.9	35.9	5.9	32.4	37.3	53.9	16.6	
Vert	9748.000	AV	35.1	38.0	7.1	33.0	47.2	53.9	6.7	
Vert	24370.000	AV	34.7	37.9	-1.1	31.6	39.9	53.9	14.0	

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

*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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	31CE0252-HO-01	
Date	11/09/2010	11/10/2010
Temperature/ Humidity	22 deg.C./ 33%	21 deg.C./ 31%
Engineer	Hisayoshi Sato	Takumi Shimada
	(1-10GHz)	(The other Frequency)
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	78.000	QP	29.0	6.6	7.7	32.1	11.2	40.0	28.8	
Hori	182.001	QP	24.6	16.2	8.8	31.9	17.7	43.5	25.8	
Hori	286.010	QP	28.4	18.9	9.6	31.9	25.0	46.0	21.0	
Hori	361.001	QP	30.7	16.9	10.1	31.9	25.8	46.0	20.2	
Hori	432.000	QP	34.4	18.1	10.5	31.9	31.1	46.0	14.9	
Hori	540.003	QP	28.4	19.5	11.1	32.0	27.0	46.0	19.0	
Hori	2483.500	PK	64.7	27.2	2.9	32.1	62.7	73.9	11.2	
Hori	4924.000	PK	37.6	31.2	5.4	31.4	42.8	73.9	31.1	
Hori	7386.000	PK	39.3	36.0	5.9	32.4	48.8	73.9	25.1	
Hori	9848.000	PK	40.2	38.1	7.1	33.0	52.4	73.9	21.5	
Hori	24620.000	PK	47.8	37.9	-1.1	31.5	53.1	73.9	20.8	
Hori	2483.500	AV	48.1	27.2	2.9	32.1	46.1	53.9	7.8	
Hori	4924.000	AV	24.5	31.2	5.4	31.4	29.7	53.9	24.2	
Hori	7386.000	AV	27.4	36.0	5.9	32.4	36.9	53.9	17.0	
Hori	9848.000	AV	28.6	38.1	7.1	33.0	40.8	53.9	13.1	
Hori	24620.000	AV	36.0	37.9	-1.1	31.5	41.3	53.9	12.6	
Vert	78.001	QP	38.2	6.6	7.7	32.1	20.4	40.0	19.6	
Vert	182.000	QP	28.2	16.2	8.8	31.9	21.3	43.5	22.2	
Vert	286.002	QP	26.9	18.9	9.6	31.9	23.5	46.0	22.5	
Vert	361.002	QP	25.4	16.9	10.1	31.9	20.5	46.0	25.5	
Vert	432.001	QP	35.0	18.1	10.5	31.9	31.7	46.0	14.3	
Vert	540.007	QP	26.9	19.5	11.1	32.0	25.5	46.0	20.5	
Vert	2483.500	PK	62.2	27.2	2.9	32.1	60.2	73.9	13.7	
Vert	4924.000	PK	36.2	31.2	5.4	31.4	41.4	73.9	32.5	
Vert	7386.000	PK	39.6	36.0	5.9	32.4	49.1	73.9	24.8	
Vert	9848.000	PK	43.0	38.1	7.1	33.0	55.2	73.9	18.7	
Vert	24620.000	PK	48.0	37.9	-1.1	31.5	53.3	73.9	20.6	
Vert	2483.500	AV	37.9	27.2	2.9	32.1	35.9	53.9	18.0	
Vert	4924.000	AV	27.5	31.2	5.4	31.4	32.7	53.9	21.2	
Vert	7386.000	AV	29.7	36.0	5.9	32.4	39.2	53.9	14.7	
Vert	9848.000	AV	33.9	38.1	7.1	33.0	46.1	53.9	7.8	
Vert	24620.000	AV	36.0	37.9	-1.1	31.5	41.3	53.9	12.6	

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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	31CE0252-HO-01	
Date	11/09/2010	11/10/2010
Temperature/ Humidity	22 deg.C./ 33%	21 deg.C./ 31%
Engineer	Hisayoshi Sato	Takumi Shimada
	(1-10GHz)	(The other Frequency)
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	78.002	QP	28.8	6.6	7.7	32.1	11.0	40.0	29.0	
Hori	182.001	QP	24.5	16.2	8.8	31.9	17.6	43.5	25.9	
Hori	286.010	QP	27.3	18.9	9.6	31.9	23.9	46.0	22.1	
Hori	361.020	QP	30.9	16.9	10.1	31.9	26.0	46.0	20.0	
Hori	432.003	QP	34.4	18.1	10.5	31.9	31.1	46.0	14.9	
Hori	540.001	QP	28.1	19.5	11.1	32.0	26.7	46.0	19.3	
Hori	2390.000	PK	74.1	27.2	2.9	32.1	72.1	73.9	1.8	
Hori	2400.000	PK	78.5	27.2	2.9	32.1	76.5	-	-	See 20dBc Data Sheet
Hori	4824.000	PK	37.6	30.9	5.4	31.4	42.5	73.9	31.4	
Hori	7236.000	PK	39.9	35.8	5.9	32.3	49.3	73.9	24.6	
Hori	9648.000	PK	42.0	37.8	6.9	33.0	53.7	73.9	20.2	
Hori	24120.000	PK	46.7	37.9	-1.2	31.6	51.8	73.9	22.1	
Hori	2390.000	AV	49.5	27.2	2.9	32.1	47.5	53.9	6.4	
Hori	2400.000	AV	56.9	27.2	2.9	32.1	54.9	-	-	See 20dBc Data Sheet
Hori	4824.000	AV	24.9	30.9	5.4	31.4	29.8	53.9	24.1	
Hori	7236.000	AV	27.8	35.8	5.9	32.3	37.2	53.9	16.7	
Hori	9648.000	AV	32.1	37.8	6.9	33.0	43.8	53.9	10.1	
Hori	24120.000	AV	34.8	37.9	-1.2	31.6	39.9	53.9	14.0	
Vert	78.003	QP	38.3	6.6	7.7	32.1	20.5	40.0	19.5	
Vert	182.003	QP	28.0	16.2	8.8	31.9	21.1	43.5	22.4	
Vert	286.002	QP	26.7	18.9	9.6	31.9	23.3	46.0	22.7	
Vert	361.000	QP	25.3	16.9	10.1	31.9	20.4	46.0	25.6	
Vert	432.001	QP	35.1	18.1	10.5	31.9	31.8	46.0	14.2	
Vert	540.000	QP	27.0	19.5	11.1	32.0	25.6	46.0	20.4	
Vert	2390.000	PK	65.1	27.2	2.9	32.1	63.1	73.9	10.8	
Vert	2400.000	PK	74.0	27.2	2.9	32.1	72.0	-	-	See 20dBc Data Sheet
Vert	4824.000	PK	36.3	30.9	5.4	31.4	41.2	73.9	32.7	
Vert	7236.000	PK	39.1	35.8	5.9	32.3	48.5	73.9	25.4	
Vert	9648.000	PK	42.0	37.8	6.9	33.0	53.7	73.9	20.2	
Vert	24120.000	PK	47.5	37.9	-1.2	31.6	52.6	73.9	21.3	
Vert	2390.000	AV	42.5	27.2	2.9	32.1	40.5	53.9	13.4	
Vert	2400.000	AV	50.7	27.2	2.9	32.1	48.7	-	-	See 20dBc Data Sheet
Vert	4824.000	AV	27.0	30.9	5.4	31.4	31.9	53.9	22.0	
Vert	7236.000	AV	29.1	35.8	5.9	32.3	38.5	53.9	15.4	
Vert	9648.000	AV	33.3	37.8	6.9	33.0	45.0	53.9	8.9	
Vert	24120.000	AV	34.9	37.9	-1.2	31.6	40.0	53.9	13.9	

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.4 Semi Anechoic Chamber
Report No.	31CE0252-HO-01
Date	11/09/2010
Temperature/ Humidity	22 deg.C./ 33%
Engineer	Hisayoshi Sato
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	102.2	27.2	2.9	32.1	100.2	-	-	Carrier
Hori	2400.000	PK	66.4	27.2	2.9	32.1	64.4	80.2	15.8	
Vert	2412.000	PK	94.4	27.2	2.9	32.1	92.4	-	-	Carrier
Vert	2400.000	PK	58.7	27.2	2.9	32.1	56.7	72.4	15.7	

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

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.	31CE0252-HO-01	
Date	11/09/2010	11/10/2010
Temperature/ Humidity	22 deg.C./ 33%	21 deg.C./ 31%
Engineer	Hisayoshi Sato	Takumi Shimada
	(1-10GHz)	(The other Frequency)
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	78.000	QP	28.1	6.6	7.7	32.1	10.3	40.0	29.7	
Hori	182.002	QP	24.2	16.2	8.8	31.9	17.3	43.5	26.2	
Hori	286.020	QP	26.7	18.9	9.6	31.9	23.3	46.0	22.7	
Hori	361.002	QP	31.0	16.9	10.1	31.9	26.1	46.0	19.9	
Hori	432.000	QP	36.6	18.1	10.5	31.9	33.3	46.0	12.7	
Hori	540.003	QP	27.8	19.5	11.1	32.0	26.4	46.0	19.6	
Hori	4874.000	PK	38.3	31.0	5.3	31.4	43.2	73.9	30.7	
Hori	7311.000	PK	38.6	35.9	5.9	32.4	48.0	73.9	25.9	
Hori	9748.000	PK	41.5	38.0	7.1	33.0	53.6	73.9	20.3	
Hori	24370.000	PK	46.2	37.9	-1.1	31.6	51.4	73.9	22.5	
Hori	4874.000	AV	27.6	31.0	5.3	31.4	32.5	53.9	21.4	
Hori	7311.000	AV	27.9	35.9	5.9	32.4	37.3	53.9	16.6	
Hori	9748.000	AV	27.3	38.0	7.1	33.0	39.4	53.9	14.5	
Hori	24370.000	AV	34.3	37.9	-1.1	31.6	39.5	53.9	14.4	
Vert	78.001	QP	37.8	6.6	7.7	32.1	20.0	40.0	20.0	
Vert	182.003	QP	28.7	16.2	8.8	31.9	21.8	43.5	21.7	
Vert	286.001	QP	27.0	18.9	9.6	31.9	23.6	46.0	22.4	
Vert	361.001	QP	24.9	16.9	10.1	31.9	20.0	46.0	26.0	
Vert	432.001	QP	35.2	18.1	10.5	31.9	31.9	46.0	14.1	
Vert	540.000	QP	27.2	19.5	11.1	32.0	25.8	46.0	20.2	
Vert	4874.000	PK	39.8	31.0	5.3	31.4	44.7	73.9	29.2	
Vert	7311.000	PK	37.1	35.9	5.9	32.4	46.5	73.9	27.4	
Vert	9748.000	PK	41.7	38.0	7.1	33.0	53.8	73.9	20.1	
Vert	24370.000	PK	46.8	37.9	-1.1	31.6	52.0	73.9	21.9	
Vert	4874.000	AV	27.6	31.0	5.3	31.4	32.5	53.9	21.4	
Vert	7311.000	AV	27.4	35.9	5.9	32.4	36.8	53.9	17.1	
Vert	9748.000	AV	32.2	38.0	7.1	33.0	44.3	53.9	9.6	
Vert	24370.000	AV	34.3	37.9	-1.1	31.6	39.5	53.9	14.4	

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

*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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	31CE0252-HO-01	
Date	11/09/2010	11/10/2010
Temperature/ Humidity	22 deg.C./ 33%	21 deg.C./ 31%
Engineer	Hisayoshi Sato	Takumi Shimada
	(1-10GHz)	(The other Frequency)
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	78.000	QP	29.0	6.6	7.7	32.1	11.2	40.0	28.8	
Hori	182.002	QP	24.0	16.2	8.8	31.9	17.1	43.5	26.4	
Hori	286.001	QP	27.2	18.9	9.6	31.9	23.8	46.0	22.2	
Hori	361.001	QP	29.0	16.9	10.1	31.9	24.1	46.0	21.9	
Hori	432.001	QP	36.2	18.1	10.5	31.9	32.9	46.0	13.1	
Hori	540.001	QP	27.2	19.5	11.1	32.0	25.8	46.0	20.2	
Hori	2483.500	PK	74.7	27.2	2.9	32.1	72.7	73.9	1.2	
Hori	4924.000	PK	37.8	31.2	5.4	31.4	43.0	73.9	30.9	
Hori	7386.000	PK	39.7	36.0	5.9	32.4	49.2	73.9	24.7	
Hori	9848.000	PK	37.8	38.1	7.1	33.0	50.0	73.9	23.9	
Hori	24620.000	PK	46.8	37.9	-1.1	31.5	52.1	73.9	21.8	
Hori	2483.500	AV	48.1	27.2	2.9	32.1	46.1	53.9	7.8	
Hori	4924.000	AV	24.7	31.2	5.4	31.4	29.9	53.9	24.0	
Hori	7386.000	AV	27.6	36.0	5.9	32.4	37.1	53.9	16.8	
Hori	9848.000	AV	27.6	38.1	7.1	33.0	39.8	53.9	14.1	
Hori	24620.000	AV	36.0	37.9	-1.1	31.5	41.3	53.9	12.6	
Vert	78.000	QP	38.3	6.6	7.7	32.1	20.5	40.0	19.5	
Vert	182.004	QP	28.7	16.2	8.8	31.9	21.8	43.5	21.7	
Vert	286.001	QP	26.7	18.9	9.6	31.9	23.3	46.0	22.7	
Vert	361.012	QP	25.0	16.9	10.1	31.9	20.1	46.0	25.9	
Vert	432.010	QP	35.1	18.1	10.5	31.9	31.8	46.0	14.2	
Vert	540.001	QP	27.0	19.5	11.1	32.0	25.6	46.0	20.4	
Vert	2483.500	PK	72.1	27.2	2.9	32.1	70.1	73.9	3.8	
Vert	4924.000	PK	36.6	31.2	5.4	31.4	41.8	73.9	32.1	
Vert	7386.000	PK	39.4	36.0	5.9	32.4	48.9	73.9	25.0	
Vert	9848.000	PK	41.0	38.1	7.1	33.0	53.2	73.9	20.7	
Vert	24620.000	PK	47.2	37.9	-1.1	31.5	52.5	73.9	21.4	
Vert	2483.500	AV	44.6	27.2	2.9	32.1	42.6	53.9	11.3	
Vert	4924.000	AV	27.4	31.2	5.4	31.4	32.6	53.9	21.3	
Vert	7386.000	AV	29.5	36.0	5.9	32.4	39.0	53.9	14.9	
Vert	9848.000	AV	33.1	38.1	7.1	33.0	45.3	53.9	8.6	
Vert	24620.000	AV	36.0	37.9	-1.1	31.5	41.3	53.9	12.6	

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

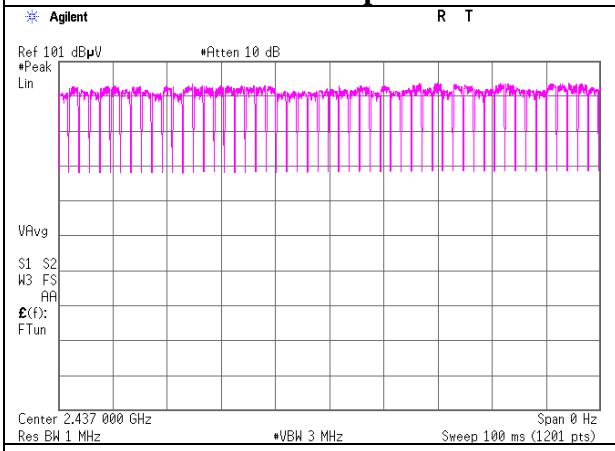
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

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

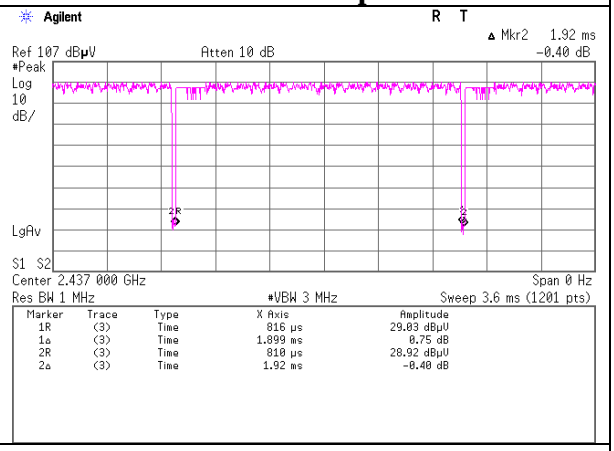
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

The tested burst timing

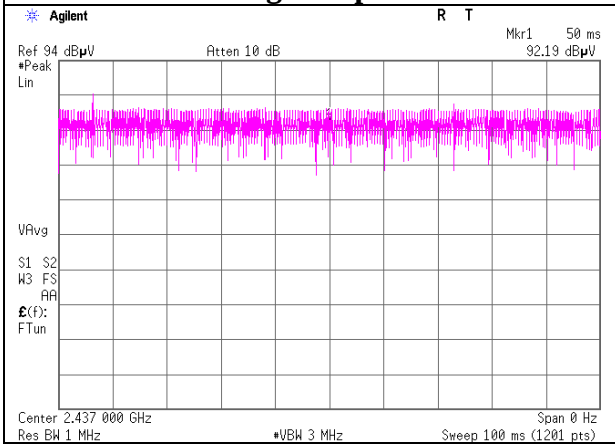
11b 11Mbps



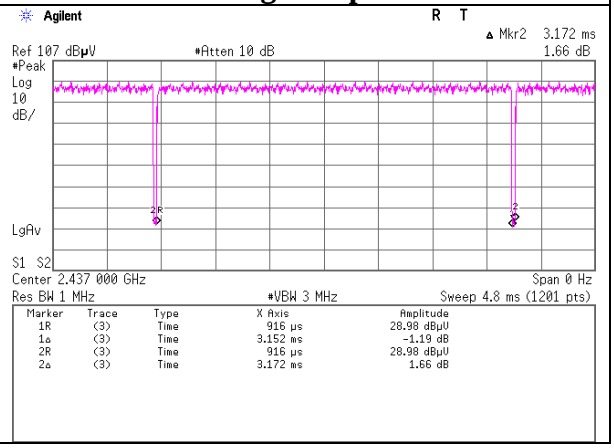
11b 11Mbps



11g 6Mbps



11g 6Mbps



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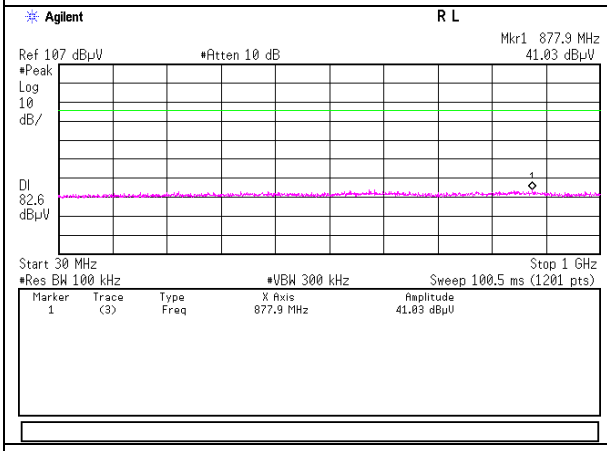
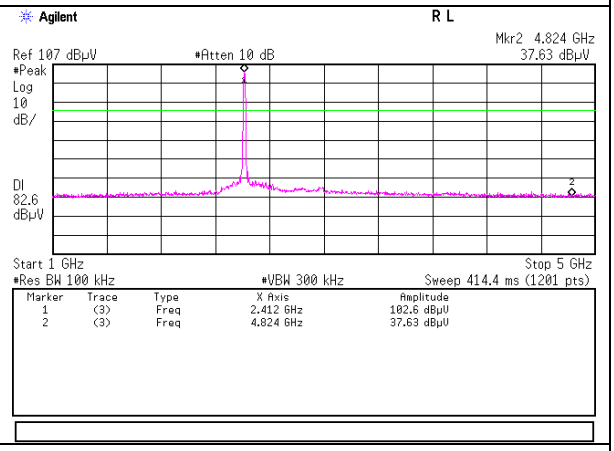
Conducted Spurious Emission

11b Tx 2412MHz

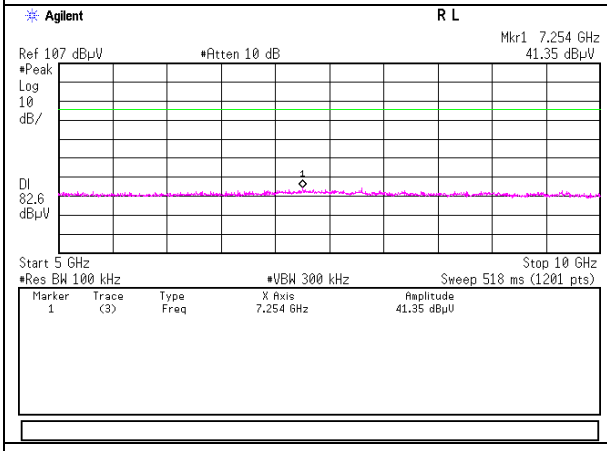
30MHz-1GHz



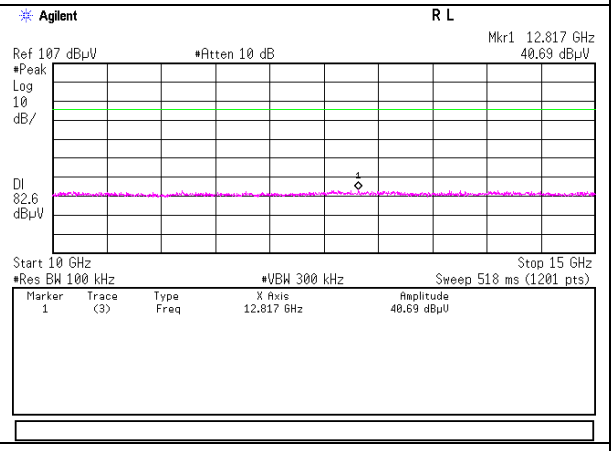
1GHz-5GHz



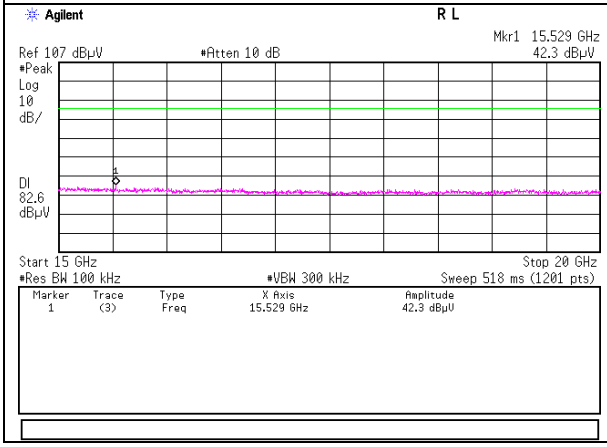
5GHz-10GHz



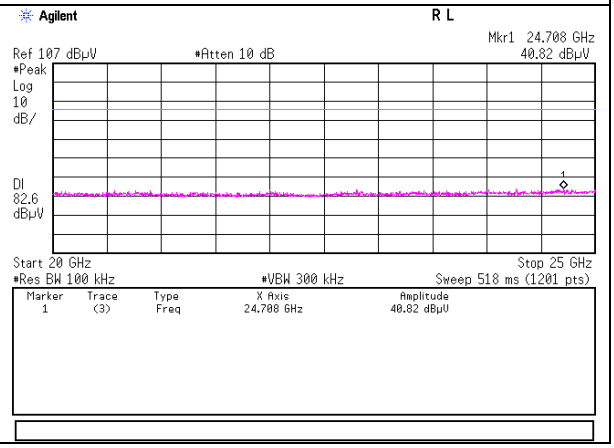
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



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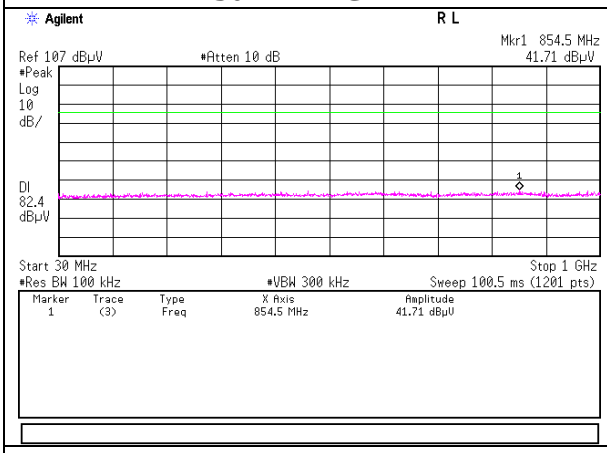
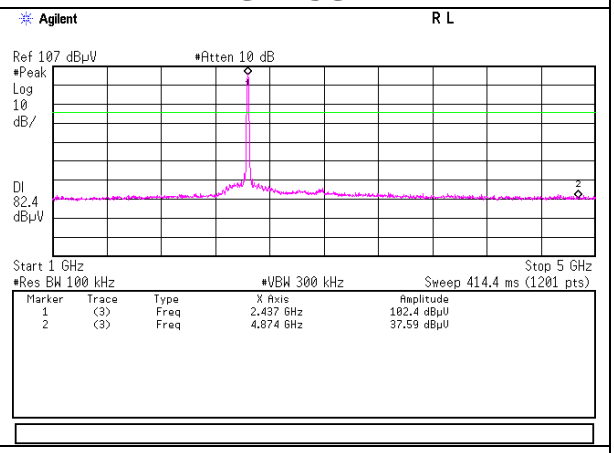
Conducted Spurious Emission

11b Tx 2437MHz

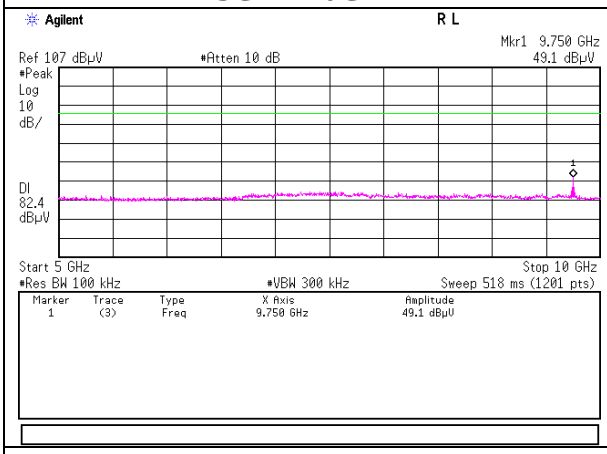
30MHz-1GHz



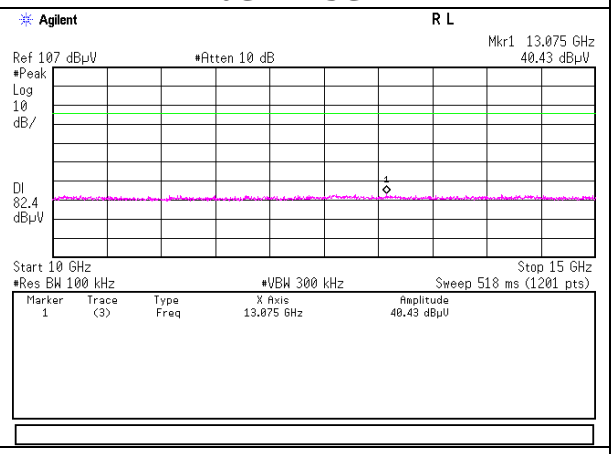
1GHz-5GHz



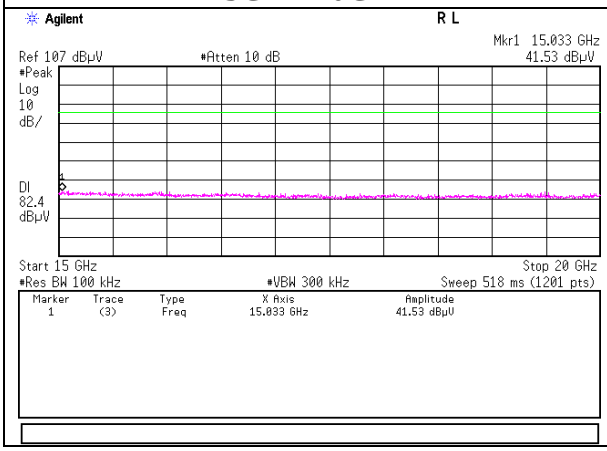
5GHz-10GHz



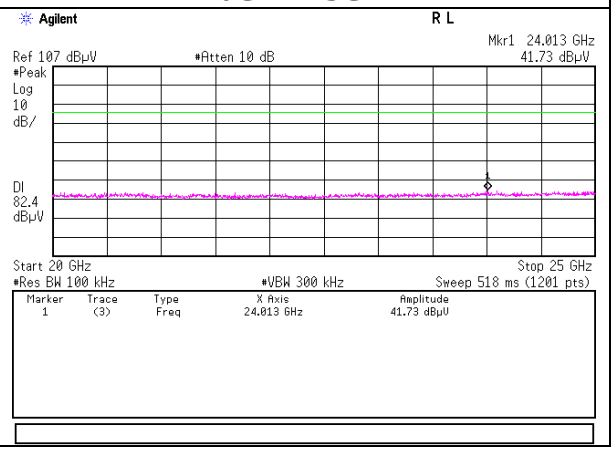
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



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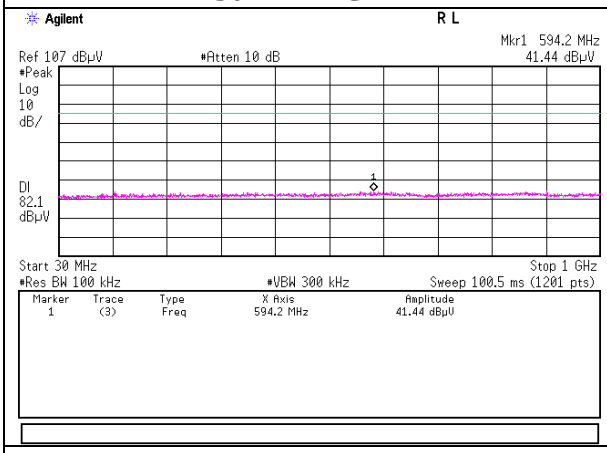
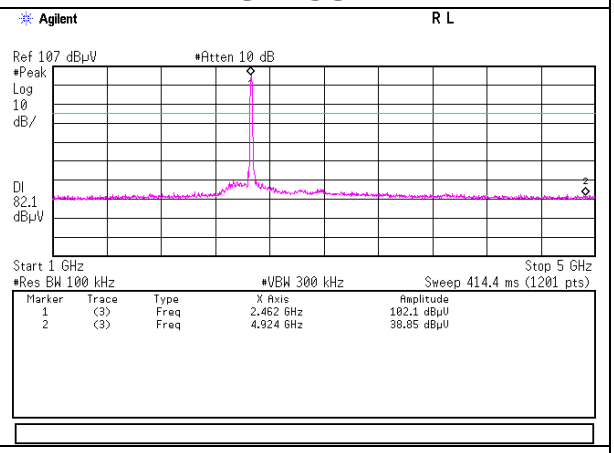
Conducted Spurious Emission

11b Tx 2462MHz

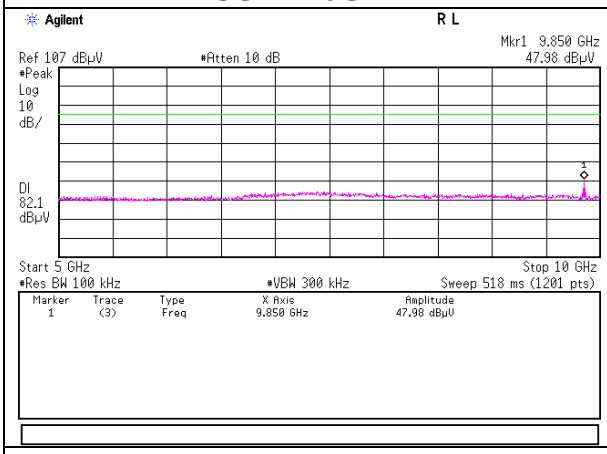
30MHz-1GHz



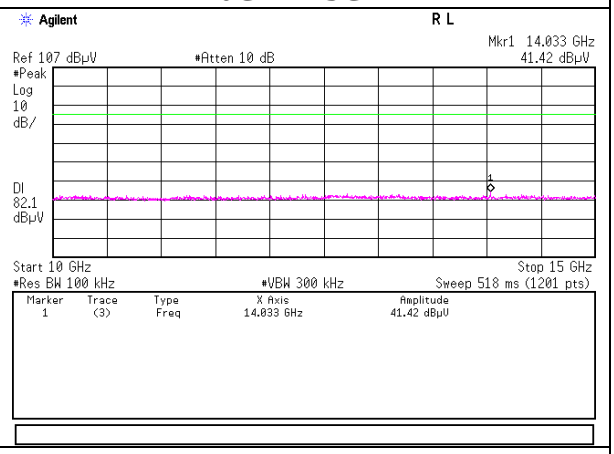
1GHz-5GHz



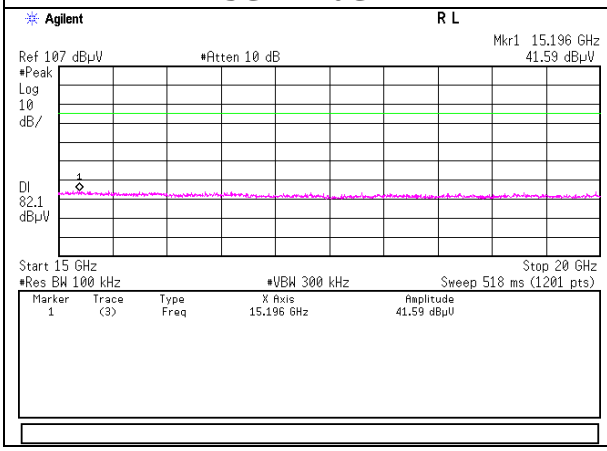
5GHz-10GHz



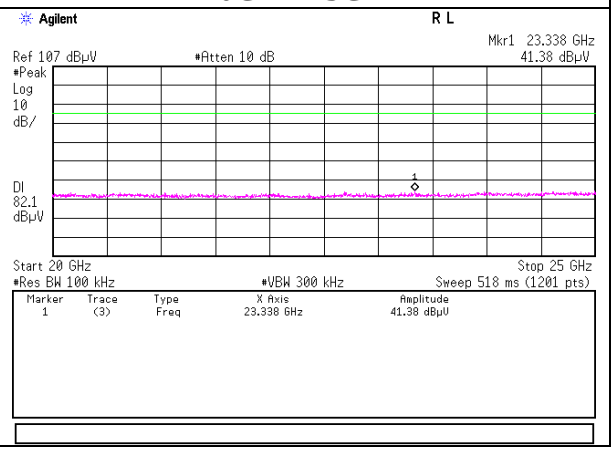
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



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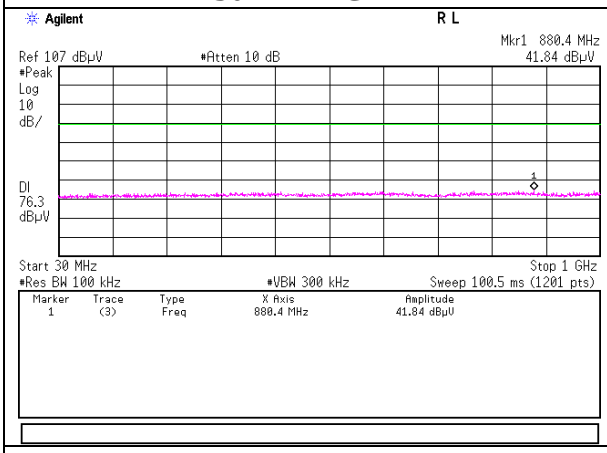
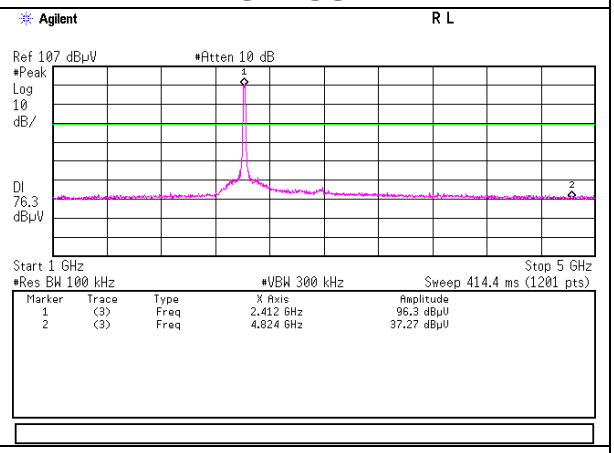
Conducted Spurious Emission

11g Tx 2412MHz

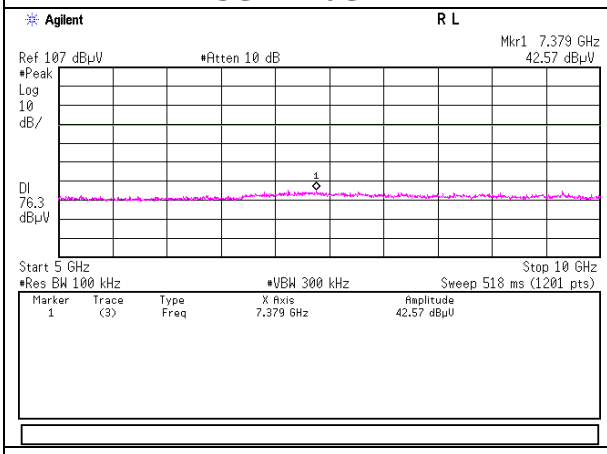
30MHz-1GHz



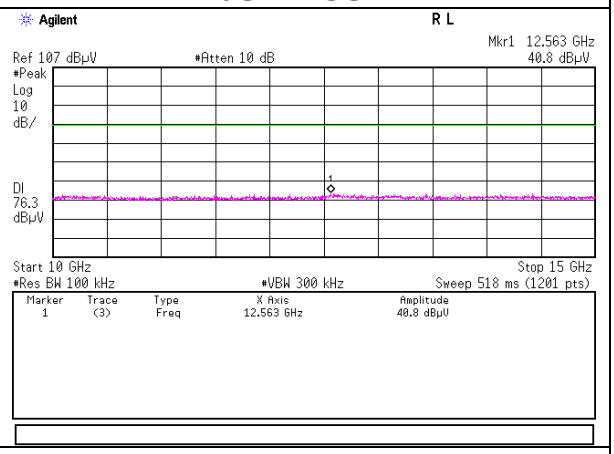
1GHz-5GHz



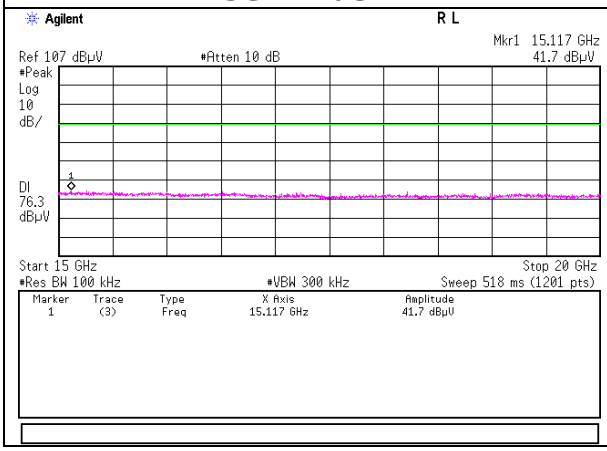
5GHz-10GHz



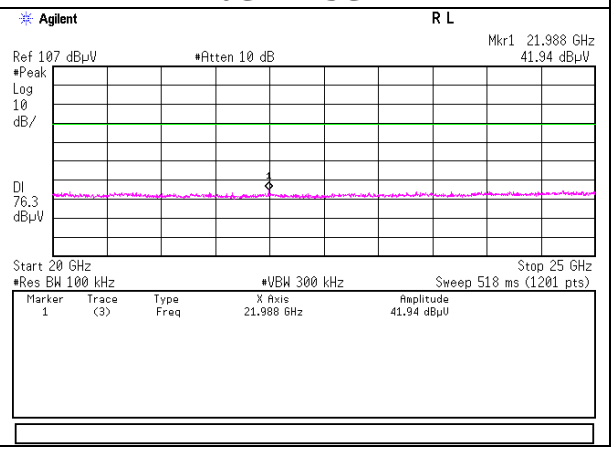
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



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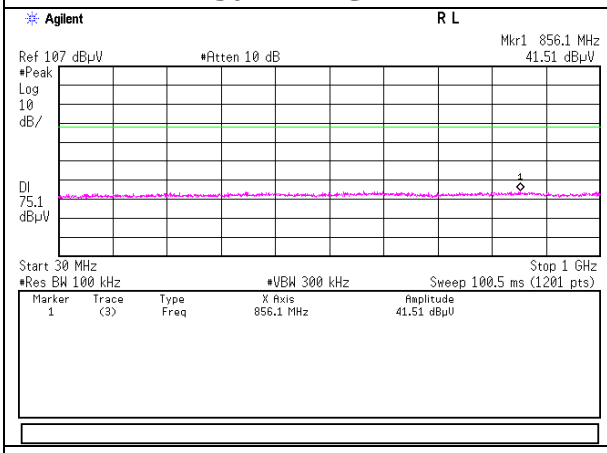
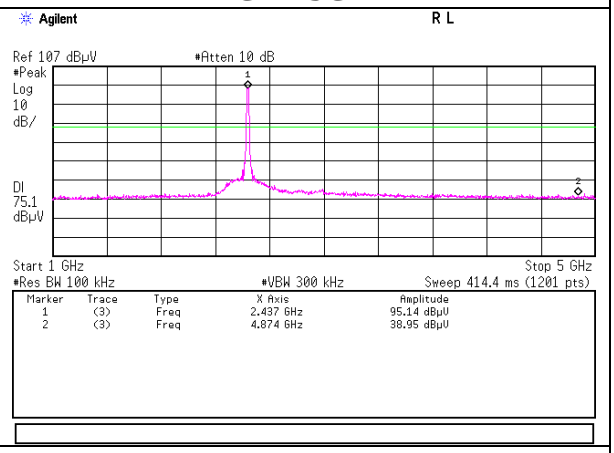
Conducted Spurious Emission

11g Tx 2437MHz

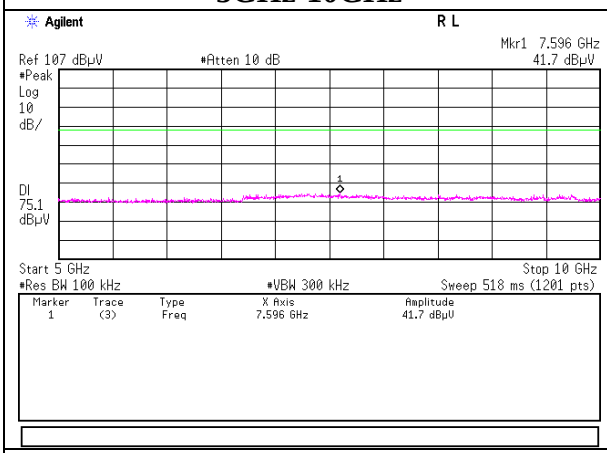
30MHz-1GHz



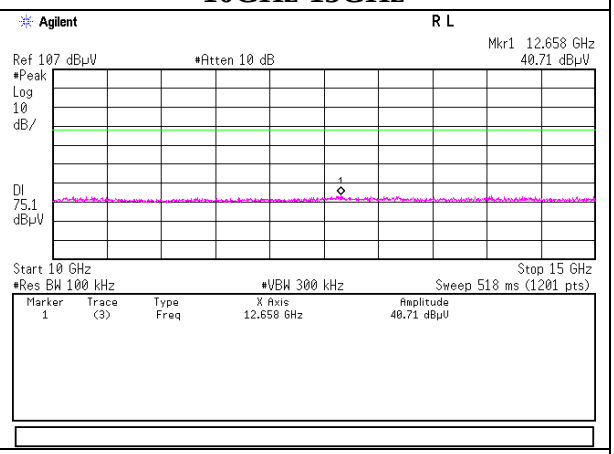
1GHz-5GHz



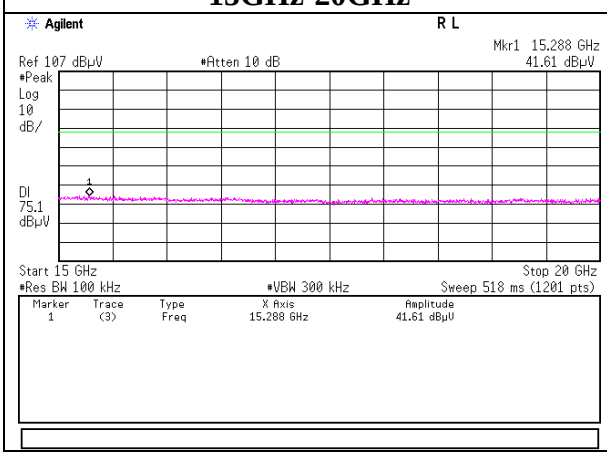
5GHz-10GHz



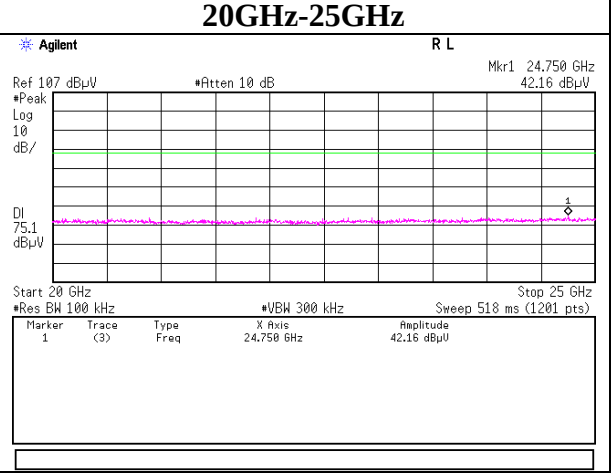
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



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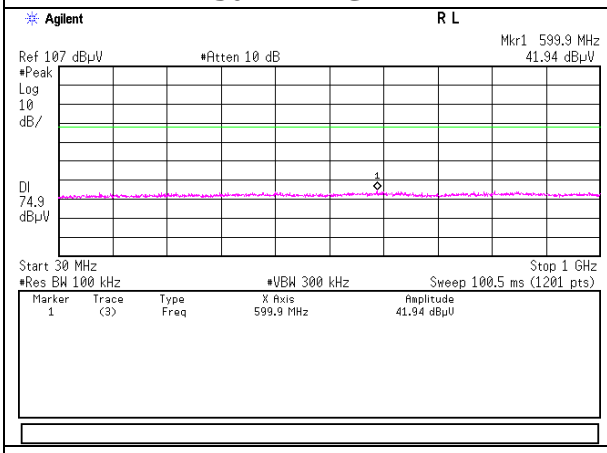
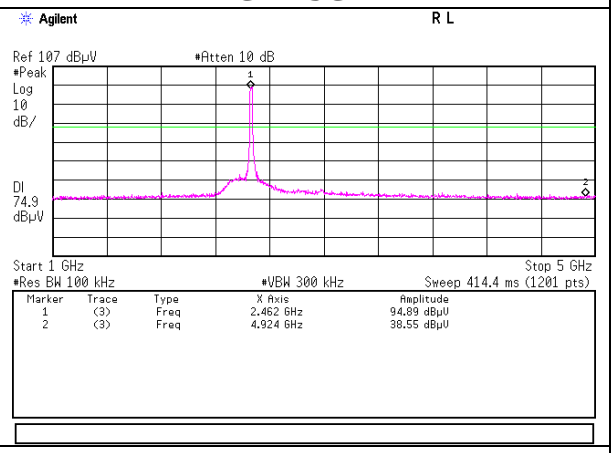
Conducted Spurious Emission

11g Tx 2462MHz

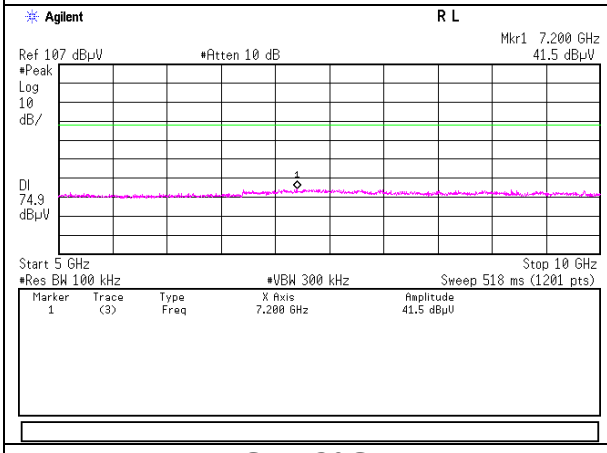
30MHz-1GHz



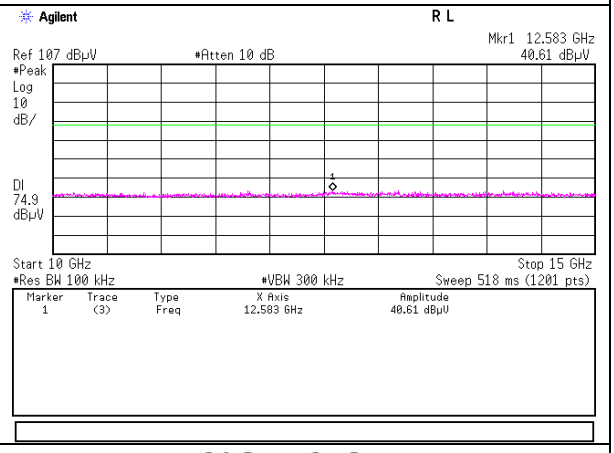
1GHz-5GHz



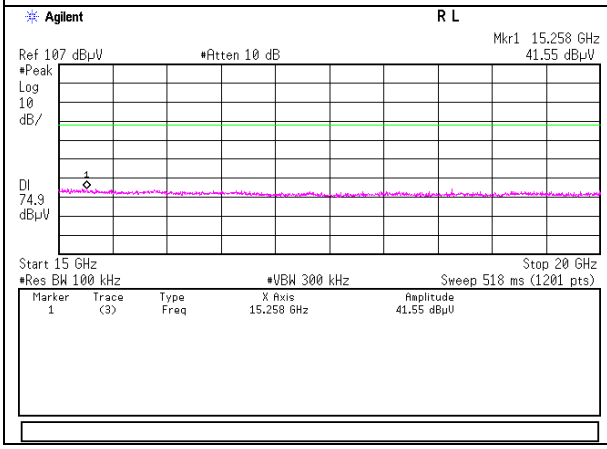
5GHz-10GHz



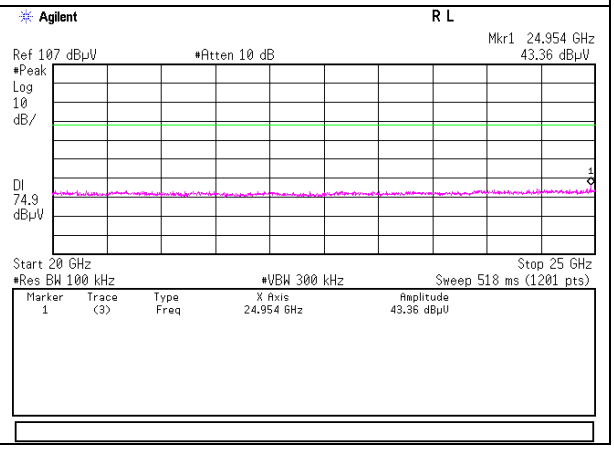
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



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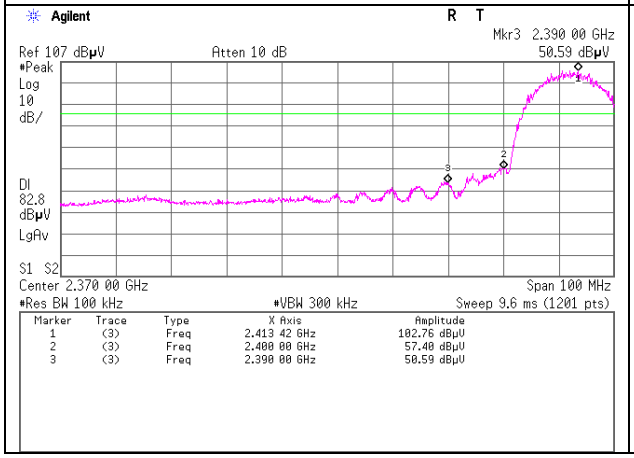
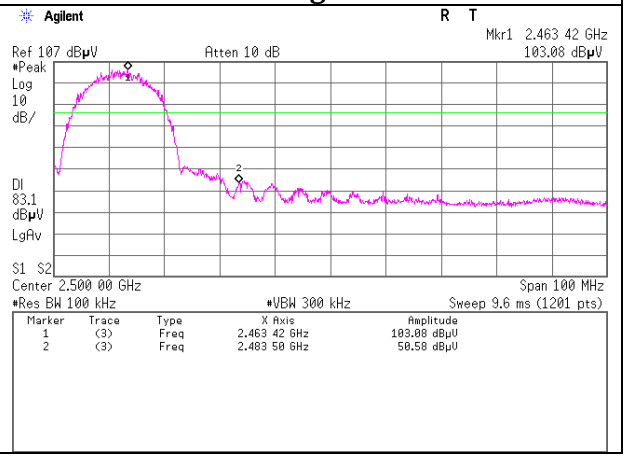
Conducted Emission Band Edge compliance

11b Tx

Low

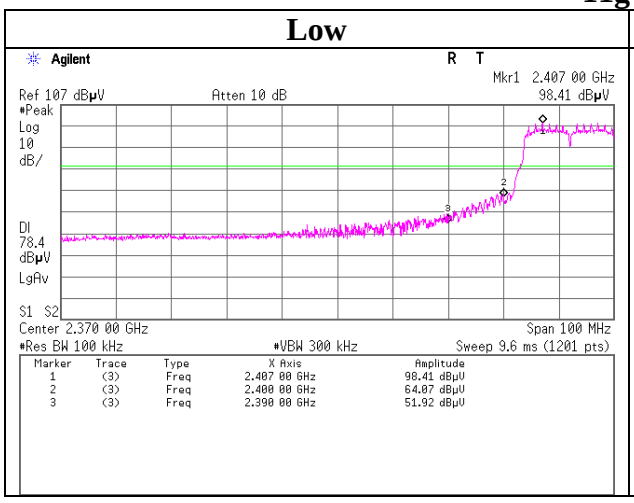


High

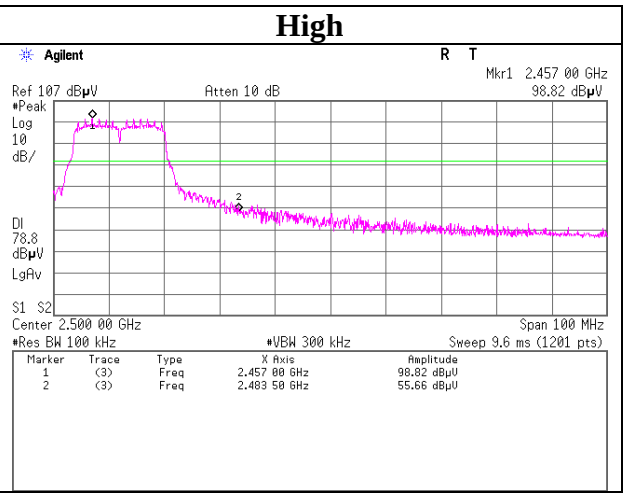


11g Tx

Low



High



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Power Density

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	31CE0252-HO-01
Date	11/11/2010
Temperature/ Humidity	25 deg.C./ 32%
Engineer	Takeshi Choda
Mode	11b Tx, 11g Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-4.29	1.30	10.08	7.08	8.00	0.92
2437.00	-3.94	1.31	10.08	7.45	8.00	0.55
2462.00	-3.81	1.31	10.08	7.57	8.00	0.43

11g

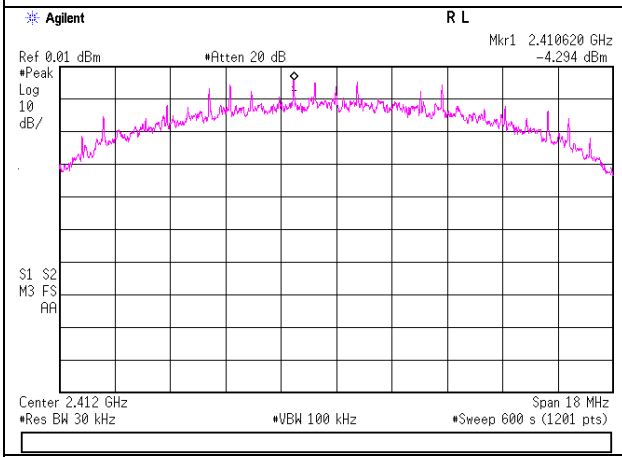
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-13.42	1.30	10.08	-2.04	8.00	10.04
2437.00	-13.21	1.31	10.08	-1.82	8.00	9.82
2462.00	-12.69	1.31	10.08	-1.30	8.00	9.30

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

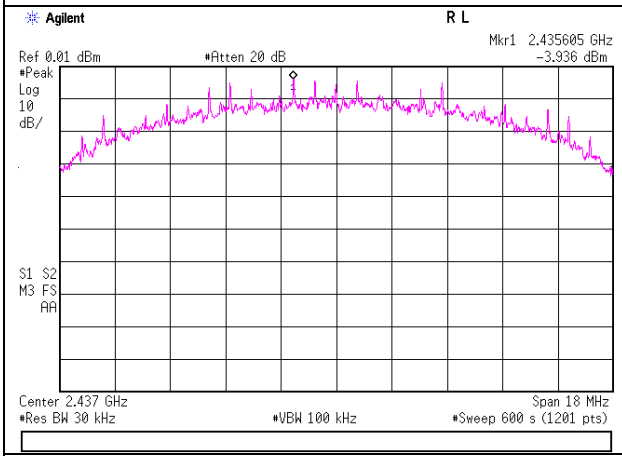
Power Density

11b

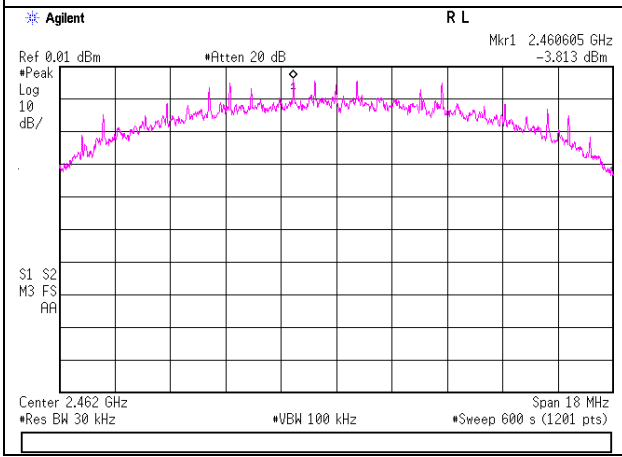
2412MHz



2437MHz

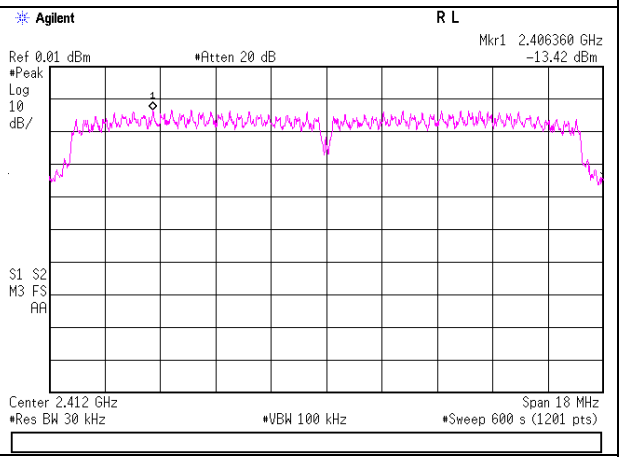


2462MHz

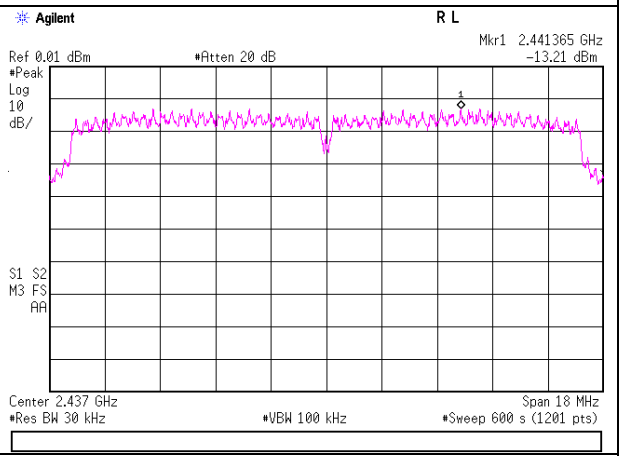


11g

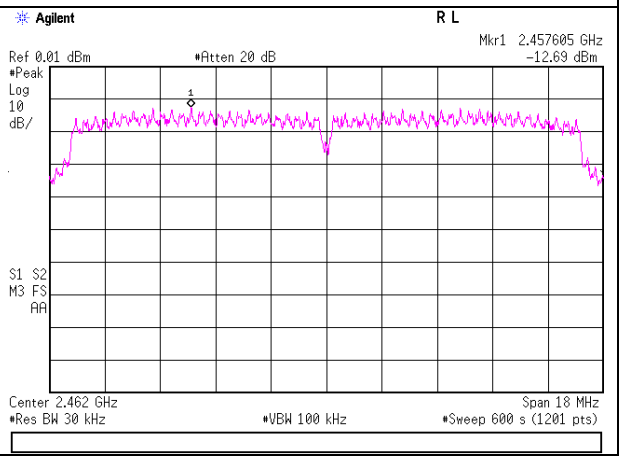
2412MHz



2437MHz



2462MHz



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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)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2010/02/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2010/02/09 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
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	246769(1m) / 292411(5m)	RE	2009/11/17 * 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	2009/12/19 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2010/06/29 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE/CE	2009/12/15 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE/CE	2010/10/27 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2010/10/11 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2010/10/11 * 12
MCC-50	Coaxial cable	UL Japan	-	-	RE	2010/03/18 * 12
MAT-51	Attenuator(6dB)	Weinschel	2	AS3557	RE	2010/01/20 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2010/03/05 * 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
MCC-66	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	28636/2	AT	2010/04/27 * 12
MAT-20	Attenuator(10dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2010/01/26 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE	2010/02/04 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2010/01/20 * 12
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2010/02/04 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/sucoform141-PE(1m)/RFM-E121(Switcher)	-/04178	CE	2010/07/21 * 12
MSA-06	Spectrum Analyzer	Agilent	E4407B	MY45107638	AT	2010/04/07 * 12
MCC-115	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	290211/4	AT	2010/08/05 * 12
MOS-04	Digital Humidity Indicator	N.T	NT-1800	MOS04	AT	2010/02/09 * 12

The expiration date of the calibration is the end of the expired month.
All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

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

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

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