APPENDIX 2: Data of EMI test

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

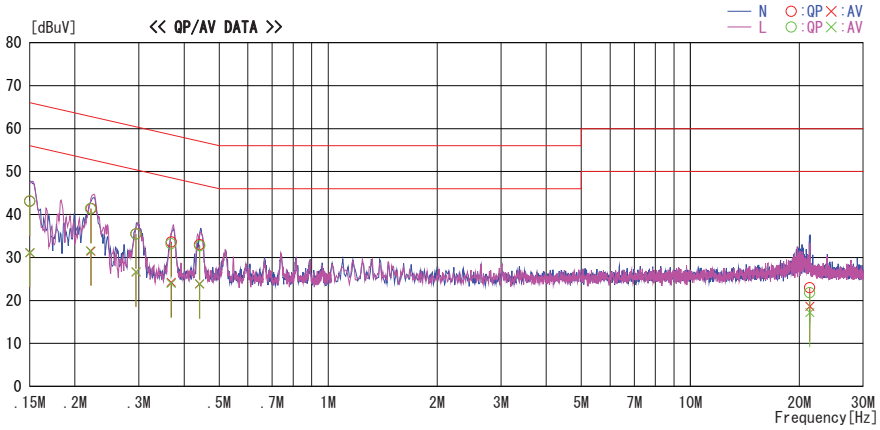
UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2011/06/21

Report No. : 31EE0033-HO-01

Temp./Humi. : 21deg. C / 65% RH
Engineer : Keisuke Kawamura

Mode / Remarks : Tx 11b, 11Mbps, 2437MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



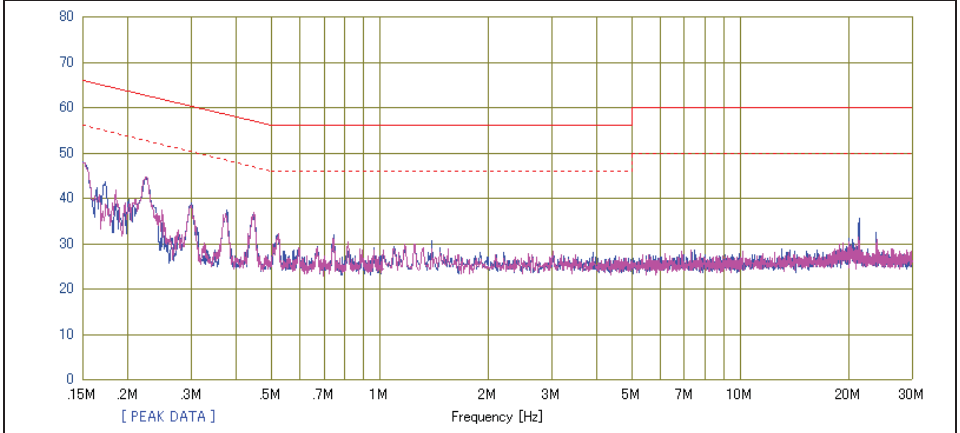
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15011	30.0	18.0	13.1	43.1	31.1	66.0	56.0	22.9	24.9	N	
0.22149	28.1	18.2	13.3	41.4	31.5	62.8	52.8	21.4	21.3	N	
0.29483	22.2	13.3	13.3	35.5	26.6	60.4	50.4	24.9	23.8	N	
0.36869	20.3	10.9	13.3	33.6	24.2	58.5	48.5	24.9	24.3	N	
0.44133	19.7	10.6	13.3	33.0	23.9	57.0	47.0	24.0	23.1	N	
21.37008	8.4	4.0	14.6	23.0	18.6	60.0	50.0	37.0	31.4	N	
0.15011	30.1	18.1	13.1	43.2	31.2	66.0	56.0	22.8	24.8	L	
0.22049	28.1	18.3	13.3	41.4	31.6	62.8	52.8	21.4	21.2	L	
0.29483	22.2	13.3	13.3	35.5	26.6	60.4	50.4	24.9	23.8	L	
0.36829	19.9	10.7	13.3	33.2	24.0	58.5	48.5	25.3	24.5	L	
0.44203	19.4	10.5	13.3	32.7	23.8	57.0	47.0	24.3	23.2	L	
21.37088	7.2	2.6	14.6	21.8	17.2	60.0	50.0	38.2	32.8	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.

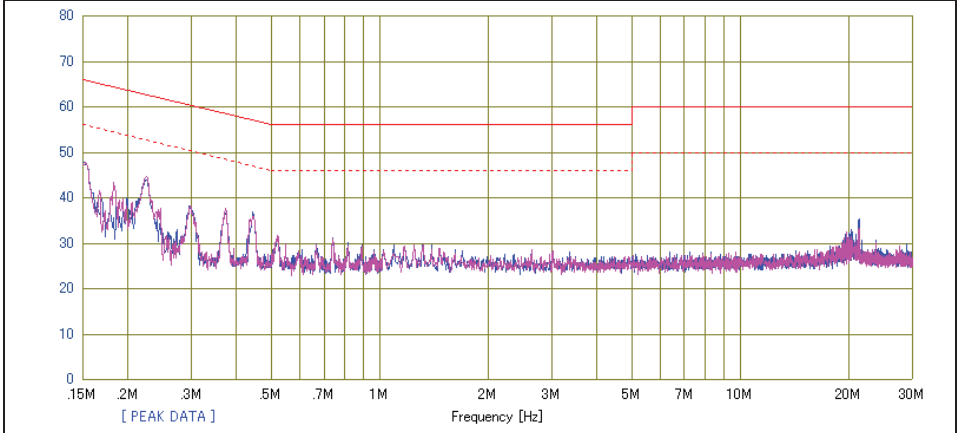
Conducted Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	31EE0033-HO-01
Date	06/21/2011
Temperature/ Humidity	21 deg.C / 65% RH
Engineer	Keisuke Kawamura
Mode	11b Tx

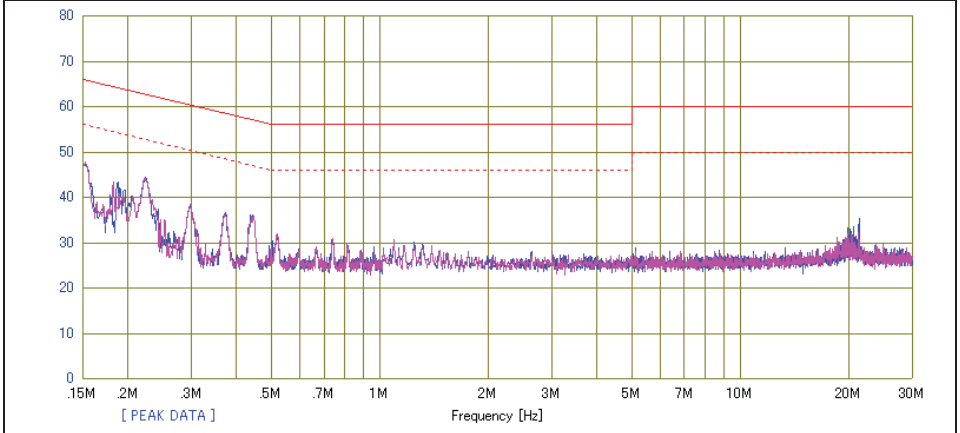
2412MHz



2437MHz



2462MHz



Y scale [dBuV] Chart — N — L

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Conducted Emission

DATA OF CONDUCTED EMISSION TEST

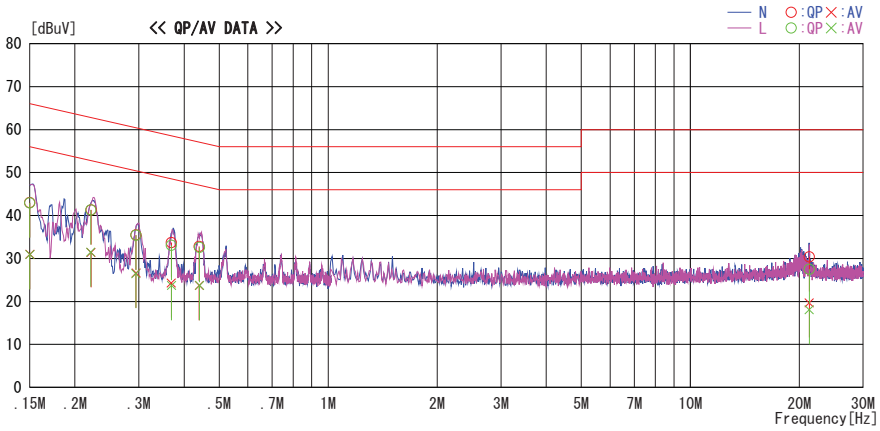
UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2011/06/21

Report No. : 31EE0033-HO-01

Temp./Humi. : 21deg. C / 65% RH
Engineer : Keisuke Kawamura

Mode / Remarks : Tx 11g, 36Mbps, 2437MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



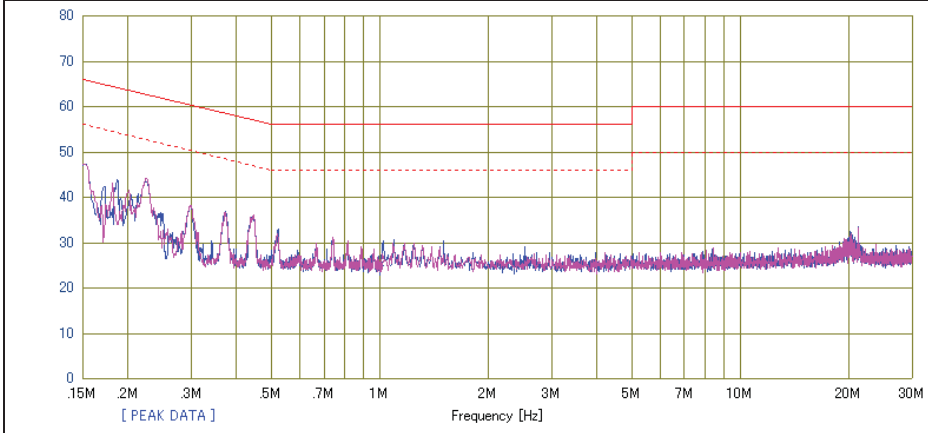
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15011	29.9	17.9	13.1	43.0	31.0	66.0	56.0	23.0	25.0	N	
0.22155	28.0	18.1	13.3	41.3	31.4	62.8	52.8	21.5	21.4	N	
0.29463	22.2	13.3	13.3	35.5	26.6	60.4	50.4	24.9	23.8	N	
0.36875	20.4	11.0	13.3	33.7	24.3	58.5	48.5	24.8	24.2	N	
0.44058	19.5	10.4	13.3	32.8	23.7	57.1	47.1	24.3	23.4	N	
21.29833	15.8	5.1	14.6	30.4	19.7	60.0	50.0	29.6	30.3	N	
0.15011	29.8	17.8	13.1	42.9	30.9	66.0	56.0	23.1	25.1	L	
0.22102	28.0	18.2	13.3	41.3	31.5	62.8	52.8	21.5	21.3	L	
0.29446	22.1	13.2	13.3	35.4	26.5	60.4	50.4	25.0	23.9	L	
0.36928	19.8	10.4	13.3	33.1	23.7	58.5	48.5	25.4	24.8	L	
0.44132	19.3	10.4	13.3	32.6	23.7	57.0	47.0	24.4	23.3	L	
21.29833	12.9	3.5	14.6	27.5	18.1	60.0	50.0	32.5	31.9	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.

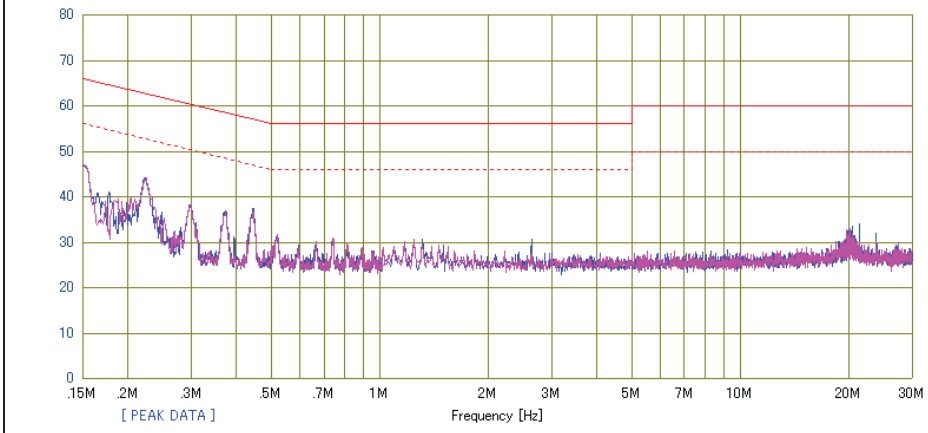
Conducted Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	31EE0033-HO-01
Date	06/21/2011
Temperature/ Humidity	21 deg.C / 65% RH
Engineer	Keisuke Kawamura
Mode	11g Tx

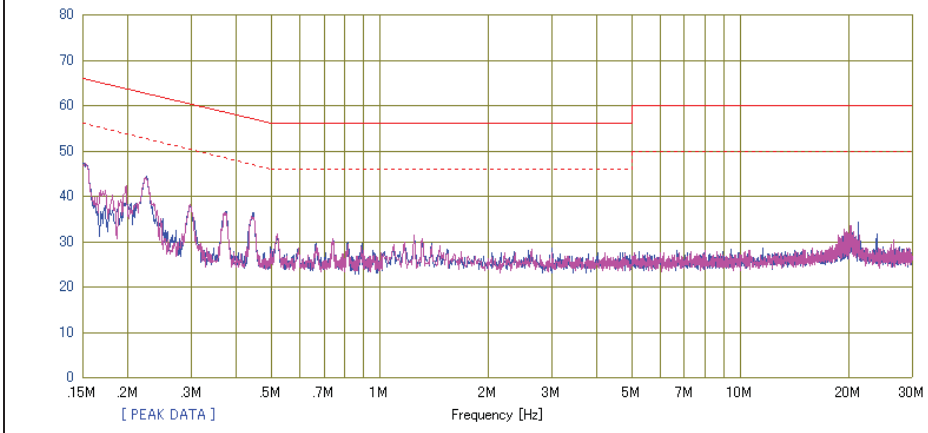
2412MHz



2437MHz



2462MHz



Y scale [dBuV] Chart — N — L

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6dB Bandwidth

Test place	Head Office EMC Lab. No.7 Measurement Room
Report No.	31EE0033-HO-01
Date	04/19/2011
Temperature/ Humidity	23deg. C / 35% RH
Engineer	Takumi Shimada
Mode	Tx

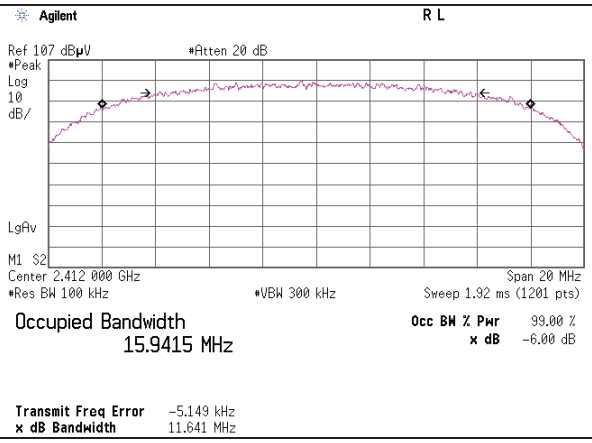
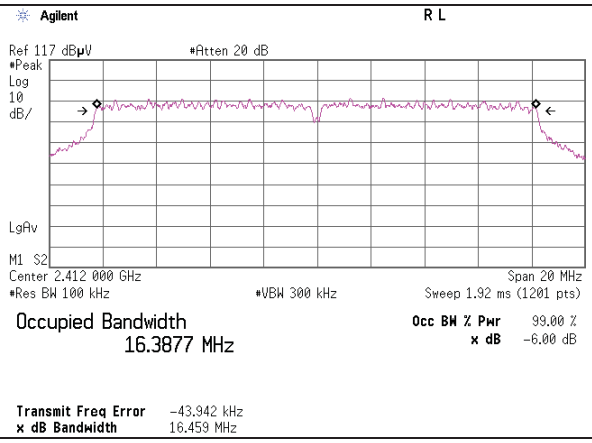
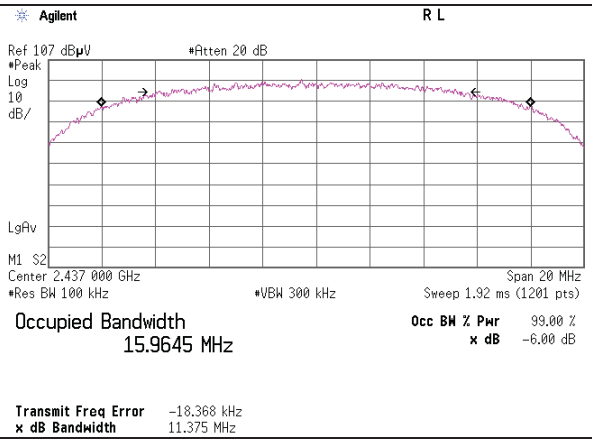
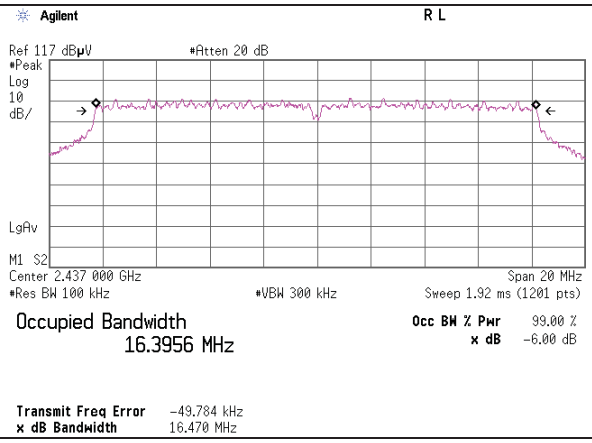
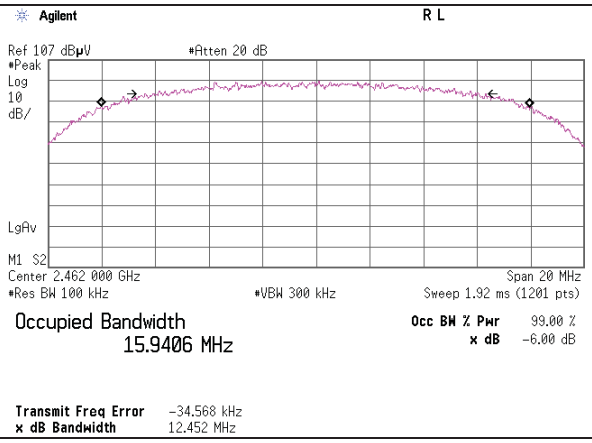
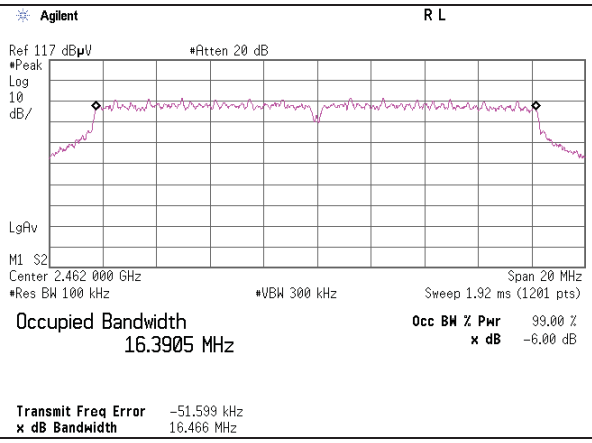
11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	11.641	>500
2437	11.375	>500
2462	12.452	>500

11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.459	>500
2437	16.470	>500
2462	16.466	>500

6dB Bandwidth

11b	11g
2412MHz	**2412MHz**
	
2437MHz	**2437MHz**
	
2462MHz	**2462MHz**
	

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Maximum Peak Output Power

Test place	Head Office EMC Lab. No.7 Measurement Room
Report No.	31EE0033-HO-01
Date	04/19/2011
Temperature/ Humidity	23deg. C / 35% RH
Engineer	Takumi Shimada
Mode	11b, 11g Tx

11b Tx

Freq.	Reading	Cable Loss	Atten.	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	1.97	2.21	9.97	14.15	26.00	30.00	1000	15.85
2437	2.31	2.22	9.97	14.50	28.18	30.00	1000	15.50
2462	2.01	2.23	9.97	14.21	26.36	30.00	1000	15.79

11g Tx

Freq.	Reading	Cable Loss	Atten.	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	12.03	2.21	9.97	24.21	263.63	30.00	1000	5.79
2437	11.96	2.22	9.97	24.15	260.02	30.00	1000	5.85
2462	11.85	2.23	9.97	24.05	254.10	30.00	1000	5.95

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Worst rate check

11b, 2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	2.14	
2	2.30	
5.5	2.10	
11	2.31	*

*: Worst Rate

11g, 2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	11.67	
9	11.53	
12	11.86	
18	11.77	
24	11.65	
36	11.96	*
48	11.48	
54	11.14	

*: Worst Rate

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 1 Semi Anechoic Chamber		
Report No.	31EE0033-HO-01		
Date	05/30/2011	06/09/2011	06/20/2011
Temperature/ Humidity	24 deg.C / 61% RH	24 deg.C / 52% RH	21 deg.C / 63% RH
Engineer	Hisayoshi Sato (1-10GHz)	Satofumi Matsuyama (10-26.5GHz)	Kazuya Yoshioka (below 1GHz)
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	293.524	QP	41.6	19.4	8.7	27.7	42.0	46.0	4.0	
Hori	338.680	QP	47.3	15.9	9.0	27.9	44.3	46.0	1.7	
Hori	383.836	QP	39.9	16.9	9.3	28.2	37.9	46.0	8.1	
Hori	428.996	QP	41.1	17.5	9.4	28.5	39.5	46.0	6.5	
Hori	533.327	QP	39.6	18.5	9.9	28.8	39.2	46.0	6.8	
Hori	880.572	QP	34.3	22.0	11.2	28.0	39.5	46.0	6.5	
Hori	925.725	QP	34.0	22.4	11.4	27.9	39.9	46.0	6.1	
Hori	2390.000	PK	75.4	26.9	2.6	36.3	68.6	73.9	5.3	
Hori	2400.000	PK	81.2	26.9	2.6	36.3	74.4	-	-	See 20dBc Data Sheet
Hori	4824.000	PK	41.2	31.4	5.3	31.3	46.6	73.9	27.3	
Hori	7236.000	PK	42.5	35.5	5.8	31.6	52.2	73.9	21.7	
Hori	9648.000	PK	44.5	38.4	6.5	31.9	57.5	-	-	See 20dBc Data Sheet
Hori	24120.000	PK	47.3	39.7	-1.0	35.4	50.6	73.9	23.3	
Hori	2390.000	AV	44.1	26.9	2.6	36.3	37.3	53.9	16.6	
Hori	2400.000	AV	62.6	26.9	2.6	36.3	55.8	-	-	See 20dBc Data Sheet
Hori	4824.000	AV	28.7	31.4	5.3	31.3	34.1	53.9	19.8	
Hori	7236.000	AV	31.4	35.5	5.8	31.6	41.1	53.9	12.8	
Hori	9648.000	AV	33.7	38.4	6.5	31.9	46.7	-	-	See 20dBc Data Sheet
Hori	24120.000	AV	35.4	39.7	-1.0	35.4	38.7	53.9	15.2	
Vert	293.524	QP	41.7	19.4	8.7	27.7	42.1	46.0	3.9	
Vert	338.679	QP	41.7	15.9	9.0	27.9	38.7	46.0	7.3	
Vert	383.836	QP	41.6	16.9	9.3	28.2	39.6	46.0	6.4	
Vert	428.994	QP	39.5	17.5	9.4	28.5	37.9	46.0	8.1	
Vert	533.322	QP	42.7	18.5	9.9	28.8	42.3	46.0	3.7	
Vert	880.573	QP	32.6	22.0	11.2	28.0	37.8	46.0	8.2	
Vert	925.730	QP	34.4	22.4	11.4	27.9	40.3	46.0	5.7	
Vert	2390.000	PK	73.6	26.9	2.6	36.3	66.8	73.9	7.1	
Vert	2400.000	PK	81.0	26.9	2.6	36.3	74.2	-	-	See 20dBc Data Sheet
Vert	4824.000	PK	43.1	31.4	5.3	31.3	48.5	73.9	25.4	
Vert	7236.000	PK	43.0	35.5	5.8	31.6	52.7	73.9	21.2	
Vert	9648.000	PK	45.2	38.4	6.5	31.9	58.2	-	-	See 20dBc Data Sheet
Vert	24120.000	PK	47.0	39.7	-1.0	35.4	50.3	73.9	23.6	
Vert	2390.000	AV	41.8	26.9	2.6	36.3	35.0	53.9	18.9	
Vert	2400.000	AV	58.9	26.9	2.6	36.3	52.1	-	-	See 20dBc Data Sheet
Vert	4824.000	AV	30.2	31.4	5.3	31.3	35.6	53.9	18.3	
Vert	7236.000	AV	30.7	35.5	5.8	31.6	40.4	53.9	13.5	
Vert	9648.000	AV	37.1	38.4	6.5	31.9	50.1	-	-	See 20dBc Data Sheet
Vert	24120.000	AV	35.4	39.7	-1.0	35.4	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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	31EE0033-HO-01
Date	05/30/2011
Temperature/ Humidity	24 deg.C / 61% RH
Engineer	Hisayoshi Sato (1-10GHz)
Mode	11b Tx 2412MHz

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	105.2	26.9	2.6	36.3	98.4	-	-	Carrier
Hori	2400.000	PK	64.9	26.9	2.6	36.3	58.1	78.4	20.3	
Hori	9648.000	PK	37.7	38.4	6.5	31.9	50.7	78.4	27.7	
Vert	2412.000	PK	106.2	26.9	2.6	36.3	99.4	-	-	Carrier
Vert	2400.000	PK	65.3	26.9	2.6	36.3	58.5	79.4	20.9	
Vert	9648.000	PK	39.7	38.4	6.5	31.9	52.7	79.4	26.7	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 1 Semi Anechoic Chamber		
Report No.	31EE0033-HO-01		
Date	05/29/2011	06/09/2011	06/20/2011
Temperature/ Humidity	23 deg.C / 68% RH	24 deg.C / 52% RH	21 deg.C / 63% RH
Engineer	Tomohisa Nakagawa (1-10GHz)	Satofumi Matsuyama (10-26.5GHz)	Kazuya Yoshioka (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	293.524	QP	41.9	19.4	8.7	27.7	42.3	46.0	3.7	
Hori	338.684	QP	47.2	15.9	9.0	27.9	44.2	46.0	1.8	
Hori	383.840	QP	40.8	16.9	9.3	28.2	38.8	46.0	7.2	
Hori	428.997	QP	41.2	17.5	9.4	28.5	39.6	46.0	6.4	
Hori	533.327	QP	40.1	18.5	9.9	28.8	39.7	46.0	6.3	
Hori	880.571	QP	35.1	22.0	11.2	28.0	40.3	46.0	5.7	
Hori	925.727	QP	35.6	22.4	11.4	27.9	41.5	46.0	4.5	
Hori	4874.000	PK	40.1	31.5	4.7	31.3	45.0	73.9	28.9	
Hori	7311.000	PK	41.7	35.6	5.8	31.6	51.5	73.9	22.4	
Hori	9748.000	PK	43.5	38.5	6.4	31.8	56.6	73.9	17.3	
Hori	24370.000	PK	47.6	39.9	-1.0	35.4	51.1	73.9	22.8	
Hori	4874.000	AV	28.5	31.5	4.7	31.3	33.4	53.9	20.5	
Hori	7311.000	AV	29.6	35.6	5.8	31.6	39.4	53.9	14.5	
Hori	9748.000	AV	35.3	38.5	6.4	31.8	48.4	53.9	5.5	
Hori	24370.000	AV	35.6	39.9	-1.0	35.4	39.1	53.9	14.8	
Vert	293.524	QP	42.9	19.4	8.7	27.7	43.3	46.0	2.7	
Vert	338.680	QP	41.1	15.9	9.0	27.9	38.1	46.0	7.9	
Vert	383.839	QP	42.1	16.9	9.3	28.2	40.1	46.0	5.9	
Vert	428.997	QP	40.0	17.5	9.4	28.5	38.4	46.0	7.6	
Vert	533.327	QP	42.7	18.5	9.9	28.8	42.3	46.0	3.7	
Vert	880.577	QP	31.6	22.0	11.2	28.0	36.8	46.0	9.2	
Vert	925.731	QP	32.8	22.4	11.4	27.9	38.7	46.0	7.3	
Vert	4874.000	PK	41.6	31.5	4.7	31.3	46.5	73.9	27.4	
Vert	7311.000	PK	41.5	35.6	5.8	31.6	51.3	73.9	22.6	
Vert	9748.000	PK	45.1	38.5	6.4	31.8	58.2	73.9	15.7	
Vert	24370.000	PK	47.4	39.9	-1.0	35.4	50.9	73.9	23.0	
Vert	4874.000	AV	28.6	31.5	4.7	31.3	33.5	53.9	20.4	
Vert	7311.000	AV	29.7	35.6	5.8	31.6	39.5	53.9	14.4	
Vert	9748.000	AV	39.2	38.5	6.4	31.8	52.3	53.9	1.6	
Vert	24370.000	AV	35.6	39.9	-1.0	35.4	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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 1 Semi Anechoic Chamber		
Report No.	31EE0033-HO-01		
Date	05/30/2011	06/09/2011	06/20/2011
Temperature/ Humidity	24 deg.C / 61% RH	24 deg.C / 52% RH	21 deg.C / 63% RH
Engineer	Hisayoshi Sato (1-10GHz)	Satofumi Matsuyama (10-26.5GHz)	Kazuya Yoshioka (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	293.523	QP	42.0	19.4	8.7	27.7	42.4	46.0	3.6	
Hori	338.682	QP	47.0	15.9	9.0	27.9	44.0	46.0	2.0	
Hori	383.837	QP	40.7	16.9	9.3	28.2	38.7	46.0	7.3	
Hori	428.995	QP	41.3	17.5	9.4	28.5	39.7	46.0	6.3	
Hori	533.331	QP	40.1	18.5	9.9	28.8	39.7	46.0	6.3	
Hori	880.570	QP	35.1	22.0	11.2	28.0	40.3	46.0	5.7	
Hori	925.731	QP	35.3	22.4	11.4	27.9	41.2	46.0	4.8	
Hori	2483.500	PK	73.6	26.9	2.7	36.3	66.9	73.9	7.0	
Hori	4924.000	PK	42.1	31.6	5.3	31.3	47.7	73.9	26.2	
Hori	7386.000	PK	42.8	35.7	5.9	31.6	52.8	73.9	21.1	
Hori	9848.000	PK	44.1	38.6	6.7	31.8	57.6	-	-	See 20dBc Data Sheet
Hori	24620.000	PK	46.7	40.0	-1.0	35.5	50.2	73.9	23.7	
Hori	2483.500	AV	43.5	26.9	2.7	36.3	36.8	53.9	17.1	
Hori	4924.000	AV	29.1	31.6	5.3	31.3	34.7	53.9	19.2	
Hori	7386.000	AV	31.8	35.7	5.9	31.6	41.8	53.9	12.1	
Hori	9848.000	AV	33.4	38.6	6.7	31.8	46.9	-	-	See 20dBc Data Sheet
Hori	24620.000	AV	35.7	40.0	-1.0	35.5	39.2	53.9	14.7	
Vert	293.524	QP	41.4	19.4	8.7	27.7	41.8	46.0	4.2	
Vert	338.684	QP	40.4	15.9	9.0	27.9	37.4	46.0	8.6	
Vert	383.838	QP	41.8	16.9	9.3	28.2	39.8	46.0	6.2	
Vert	428.998	QP	39.9	17.5	9.4	28.5	38.3	46.0	7.7	
Vert	533.329	QP	42.8	18.5	9.9	28.8	42.4	46.0	3.6	
Vert	880.575	QP	32.4	22.0	11.2	28.0	37.6	46.0	8.4	
Vert	925.731	QP	33.7	22.4	11.4	27.9	39.6	46.0	6.4	
Vert	2483.500	PK	74.0	26.9	2.7	36.3	67.3	73.9	6.6	
Vert	4924.000	PK	43.3	31.6	5.3	31.3	48.9	73.9	25.0	
Vert	7386.000	PK	42.7	35.7	5.9	31.6	52.7	73.9	21.2	
Vert	9848.000	PK	45.4	38.6	6.7	31.8	58.9	-	-	See 20dBc Data Sheet
Vert	24620.000	PK	46.8	40.0	-1.0	35.5	50.3	73.9	23.6	
Vert	2483.500	AV	43.8	26.9	2.7	36.3	37.1	53.9	16.8	
Vert	4924.000	AV	29.8	31.6	5.3	31.3	35.4	53.9	18.5	
Vert	7386.000	AV	30.1	35.7	5.9	31.6	40.1	53.9	13.8	
Vert	9848.000	AV	37.5	38.6	6.7	31.8	51.0	-	-	See 20dBc Data Sheet
Vert	24620.000	AV	35.7	40.0	-1.0	35.5	39.2	53.9	14.7	

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.	31EE0033-HO-01
Date	05/30/2011
Temperature/ Humidity	24 deg.C./ 61%
Engineer	Hisayoshi Sato
	(1-10GHz)
Mode	11b Tx 2462MHz

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2462.000	PK	106.4	26.9	2.6	36.3	99.6	-	-	Carrier
Hori	9848.000	PK	37.5	38.6	6.7	31.8	51.0	79.6	28.6	
Vert	2462.000	PK	104.3	26.9	2.6	36.3	97.5	-	-	Carrier
Vert	9848.000	PK	39.5	38.6	6.7	31.8	53.0	77.5	24.5	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 1 Semi Anechoic Chamber		
Report No.	31EE0033-HO-01		
Date	05/30/2011	06/09/2011	06/20/2011
Temperature/ Humidity	24 deg.C / 61% RH	24 deg.C / 52% RH	21 deg.C / 63% RH
Engineer	Hisayoshi Sato (1-10GHz)	Satofumi Matsuyama (10-26.5GHz)	Kazuya Yoshioka (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	293.526	QP	41.7	19.4	8.7	27.7	42.1	46.0	3.9	
Hori	338.681	QP	46.5	15.9	9.0	27.9	43.5	46.0	2.5	
Hori	383.837	QP	40.5	16.9	9.3	28.2	38.5	46.0	7.5	
Hori	428.997	QP	41.7	17.5	9.4	28.5	40.1	46.0	5.9	
Hori	533.330	QP	40.3	18.5	9.9	28.8	39.9	46.0	6.1	
Hori	880.571	QP	35.1	22.0	11.2	28.0	40.3	46.0	5.7	
Hori	925.731	QP	35.4	22.4	11.4	27.9	41.3	46.0	4.7	
Hori	2390.000	PK	68.2	26.9	2.6	36.3	61.4	73.9	12.5	
Hori	2400.000	PK	76.4	26.9	2.6	36.3	69.6	-	-	See 20dBc Data Sheet
Hori	4824.000	PK	41.5	31.4	5.3	31.3	46.9	73.9	27.0	
Hori	7236.000	PK	41.9	35.5	5.8	31.6	51.6	73.9	22.3	
Hori	9648.000	PK	42.5	38.4	6.5	31.9	55.5	73.9	18.4	
Hori	24120.000	PK	46.9	39.7	-1.0	35.4	50.2	73.9	23.7	
Hori	2390.000	AV	48.3	26.9	2.6	36.3	41.5	53.9	12.4	
Hori	2400.000	AV	57.5	26.9	2.6	36.3	50.7	-	-	See 20dBc Data Sheet
Hori	4824.000	AV	28.7	31.4	5.3	31.3	34.1	53.9	19.8	
Hori	7236.000	AV	30.1	35.5	5.8	31.6	39.8	53.9	14.1	
Hori	9648.000	AV	30.2	38.4	6.5	31.9	43.2	53.9	10.7	
Hori	24120.000	AV	35.5	39.7	-1.0	35.4	38.8	53.9	15.1	
Vert	293.523	QP	40.8	19.4	8.7	27.7	41.2	46.0	4.8	
Vert	338.680	QP	40.2	15.9	9.0	27.9	37.2	46.0	8.8	
Vert	383.842	QP	41.7	16.9	9.3	28.2	39.7	46.0	6.3	
Vert	428.997	QP	39.9	17.5	9.4	28.5	38.3	46.0	7.7	
Vert	533.325	QP	42.8	18.5	9.9	28.8	42.4	46.0	3.6	
Vert	880.577	QP	32.8	22.0	11.2	28.0	38.0	46.0	8.0	
Vert	925.730	QP	33.6	22.4	11.4	27.9	39.5	46.0	6.5	
Vert	2390.000	PK	70.1	26.9	2.6	36.3	63.3	73.9	10.6	
Vert	2400.000	PK	77.2	26.9	2.6	36.3	70.4	-	-	See 20dBc Data Sheet
Vert	4824.000	PK	40.5	31.4	5.3	31.3	45.9	73.9	28.0	
Vert	7236.000	PK	43.1	35.5	5.8	31.6	52.8	73.9	21.1	
Vert	9648.000	PK	41.7	38.4	6.5	31.9	54.7	73.9	19.2	
Vert	24120.000	PK	46.8	39.7	-1.0	35.4	50.1	73.9	23.8	
Vert	2390.000	AV	49.6	26.9	2.6	36.3	42.8	53.9	11.1	
Vert	2400.000	AV	58.4	26.9	2.6	36.3	51.6	-	-	See 20dBc Data Sheet
Vert	4824.000	AV	28.7	31.4	5.3	31.3	34.1	53.9	19.8	
Vert	7236.000	AV	29.9	35.5	5.8	31.6	39.6	53.9	14.3	
Vert	9648.000	AV	30.5	38.4	6.5	31.9	43.5	53.9	10.4	
Vert	24120.000	AV	35.5	39.7	-1.0	35.4	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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	31EE0033-HO-01
Date	05/30/2011
Temperature/ Humidity	24 deg.C / 61% RH
Engineer	Hisayoshi Sato (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	103.2	26.9	2.6	36.3	96.4	-	-	Carrier
Hori	2400.000	PK	64.0	26.9	2.6	36.3	57.2	76.4	19.2	
Vert	2412.000	PK	103.4	26.9	2.6	36.3	96.6	-	-	Carrier
Vert	2400.000	PK	65.6	26.9	2.6	36.3	58.8	76.6	17.8	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 1 Semi Anechoic Chamber		
Report No.	31EE0033-HO-01		
Date	05/29/2011	06/09/2011	06/20/2011
Temperature/ Humidity	23 deg.C / 68% RH	24 deg.C / 52% RH	21 deg.C / 63% RH
Engineer	Tomohisa Nakagawa (1-10GHz)	Satofumi Matsuyama (10-26.5GHz)	Kazuya Yoshioka (below 1GHz)
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	293.523	QP	42.2	19.4	8.7	27.7	42.6	46.0	3.4	
Hori	338.683	QP	46.2	15.9	9.0	27.9	43.2	46.0	2.8	
Hori	383.839	QP	40.5	16.9	9.3	28.2	38.5	46.0	7.5	
Hori	428.998	QP	41.0	17.5	9.4	28.5	39.4	46.0	6.6	
Hori	533.331	QP	39.8	18.5	9.9	28.8	39.4	46.0	6.6	
Hori	880.576	QP	34.2	22.0	11.2	28.0	39.4	46.0	6.6	
Hori	925.729	QP	34.6	22.4	11.4	27.9	40.5	46.0	5.5	
Hori	4874.000	PK	41.8	31.5	4.7	31.3	46.7	73.9	27.2	
Hori	7311.000	PK	41.5	35.6	5.8	31.6	51.3	73.9	22.6	
Hori	9748.000	PK	42.3	38.5	6.4	31.8	55.4	73.9	18.5	
Hori	24370.000	PK	47.0	39.9	-1.0	35.4	50.5	73.9	23.4	
Hori	4874.000	AV	28.5	31.5	4.7	31.3	33.4	53.9	20.5	
Hori	7311.000	AV	29.7	35.6	5.8	31.6	39.5	53.9	14.4	
Hori	9748.000	AV	29.7	38.5	6.4	31.8	42.8	53.9	11.1	
Hori	24370.000	AV	35.7	39.9	-1.0	35.4	39.2	53.9	14.7	
Vert	293.524	QP	41.0	19.4	8.7	27.7	41.4	46.0	4.6	
Vert	338.680	QP	39.7	15.9	9.0	27.9	36.7	46.0	9.3	
Vert	383.840	QP	41.6	16.9	9.3	28.2	39.6	46.0	6.4	
Vert	428.996	QP	40.0	17.5	9.4	28.5	38.4	46.0	7.6	
Vert	533.326	QP	42.9	18.5	9.9	28.8	42.5	46.0	3.5	
Vert	880.573	QP	32.9	22.0	11.2	28.0	38.1	46.0	7.9	
Vert	925.726	QP	33.3	22.4	11.4	27.9	39.2	46.0	6.8	
Vert	4874.000	PK	40.8	31.5	4.7	31.3	45.7	73.9	28.2	
Vert	7311.000	PK	42.7	35.6	5.8	31.6	52.5	73.9	21.4	
Vert	9748.000	PK	41.5	38.5	6.4	31.8	54.6	73.9	19.3	
Vert	24370.000	PK	46.9	39.9	-1.0	35.4	50.4	73.9	23.5	
Vert	4874.000	AV	28.9	31.5	4.7	31.3	33.8	53.9	20.1	
Vert	7311.000	AV	29.7	35.6	5.8	31.6	39.5	53.9	14.4	
Vert	9748.000	AV	30.7	38.5	6.4	31.8	43.8	53.9	10.1	
Vert	24370.000	AV	35.7	39.9	-1.0	35.4	39.2	53.9	14.7	

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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 1 Semi Anechoic Chamber		
Report No.	31EE0033-HO-01		
Date	05/30/2011	06/09/2011	06/20/2011
Temperature/ Humidity	24 deg.C / 61% RH	24 deg.C / 52% RH	21 deg.C / 63% RH
Engineer	Hisayoshi Sato (1-10GHz)	Satofumi Matsuyama (10-26.5GHz)	Kazuya Yoshioka (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	293.527	QP	42.3	19.4	8.7	27.7	42.7	46.0	3.3	
Hori	338.684	QP	46.0	15.9	9.0	27.9	43.0	46.0	3.0	
Hori	383.840	QP	40.2	16.9	9.3	28.2	38.2	46.0	7.8	
Hori	428.997	QP	41.2	17.5	9.4	28.5	39.6	46.0	6.4	
Hori	533.330	QP	39.8	18.5	9.9	28.8	39.4	46.0	6.6	
Hori	880.567	QP	35.0	22.0	11.2	28.0	40.2	46.0	5.8	
Hori	925.730	QP	35.1	22.4	11.4	27.9	41.0	46.0	5.0	
Hori	2483.500	PK	70.6	26.9	2.7	36.3	63.9	73.9	10.0	
Hori	4924.000	PK	41.4	31.6	5.3	31.3	47.0	73.9	26.9	
Hori	7386.000	PK	41.2	35.7	5.9	31.6	51.2	73.9	22.7	
Hori	9848.000	PK	42.0	38.6	6.7	31.8	55.5	73.9	18.4	
Hori	24620.000	PK	46.6	40.0	-1.0	35.5	50.1	73.9	23.8	
Hori	2483.500	AV	52.1	26.9	2.7	36.3	45.4	53.9	8.5	
Hori	4924.000	AV	28.2	31.6	5.3	31.3	33.8	53.9	20.1	
Hori	7386.000	AV	29.5	35.7	5.9	31.6	39.5	53.9	14.4	
Hori	9848.000	AV	29.4	38.6	6.7	31.8	42.9	53.9	11.0	
Hori	24620.000	AV	32.7	40.0	-1.0	35.5	36.2	53.9	17.7	
Vert	293.525	QP	41.4	19.4	8.7	27.7	41.8	46.0	4.2	
Vert	338.679	QP	40.9	15.9	9.0	27.9	37.9	46.0	8.1	
Vert	383.839	QP	41.6	16.9	9.3	28.2	39.6	46.0	6.4	
Vert	428.997	QP	39.7	17.5	9.4	28.5	38.1	46.0	7.9	
Vert	533.325	QP	42.9	18.5	9.9	28.8	42.5	46.0	3.5	
Vert	880.569	QP	32.9	22.0	11.2	28.0	38.1	46.0	7.9	
Vert	925.727	QP	33.5	22.4	11.4	27.9	39.4	46.0	6.6	
Vert	2483.500	PK	67.6	26.9	2.7	36.3	60.9	73.9	13.0	
Vert	4924.000	PK	40.5	31.6	5.3	31.3	46.1	73.9	27.8	
Vert	7386.000	PK	42.4	35.7	5.9	31.6	52.4	73.9	21.5	
Vert	9848.000	PK	41.2	38.6	6.7	31.8	54.7	73.9	19.2	
Vert	24620.000	PK	46.7	40.0	-1.0	35.5	50.2	73.9	23.7	
Vert	2483.500	AV	49.4	26.9	2.7	36.3	42.7	53.9	11.2	
Vert	4924.000	AV	28.6	31.6	5.3	31.3	34.2	53.9	19.7	
Vert	7386.000	AV	29.5	35.7	5.9	31.6	39.5	53.9	14.4	
Vert	9848.000	AV	30.1	38.6	6.7	31.8	43.6	53.9	10.3	
Vert	24620.000	AV	32.7	40.0	-1.0	35.5	36.2	53.9	17.7	

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).

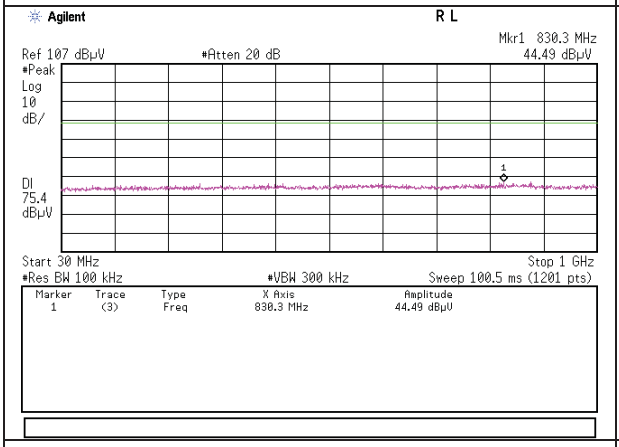
*The 10th harmonic was not seen so the result was its base noise level.

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

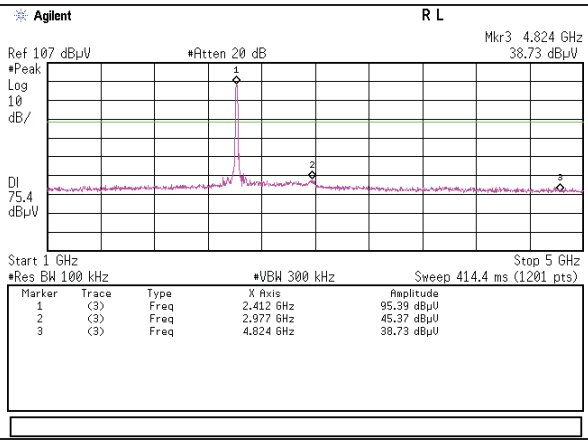
Conducted Spurious Emission

11b Tx 2412MHz

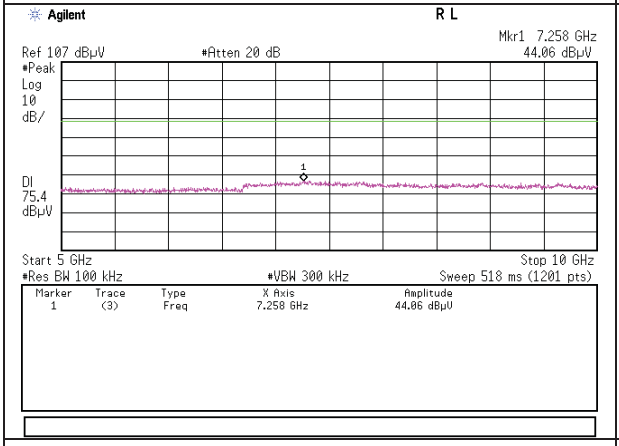
30MHz-1GHz



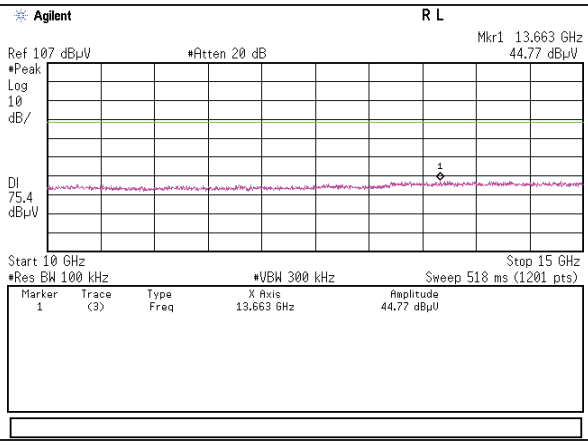
1GHz-5GHz



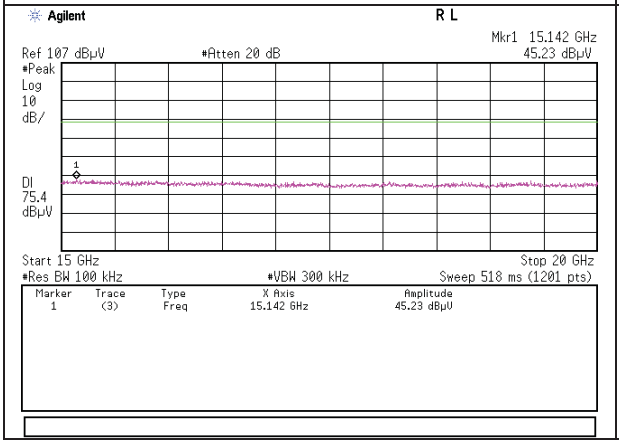
5GHz-10GHz



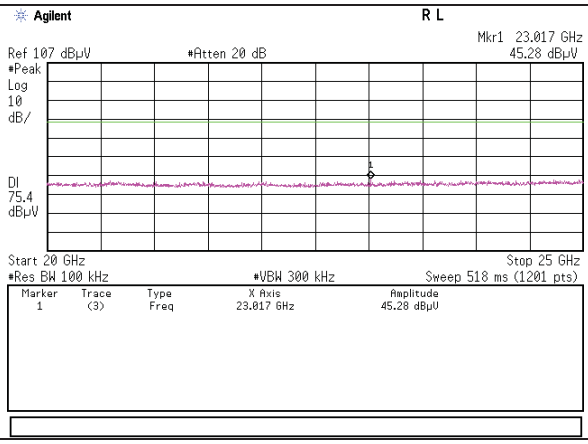
10GHz-15GHz



15GHz-20GHz



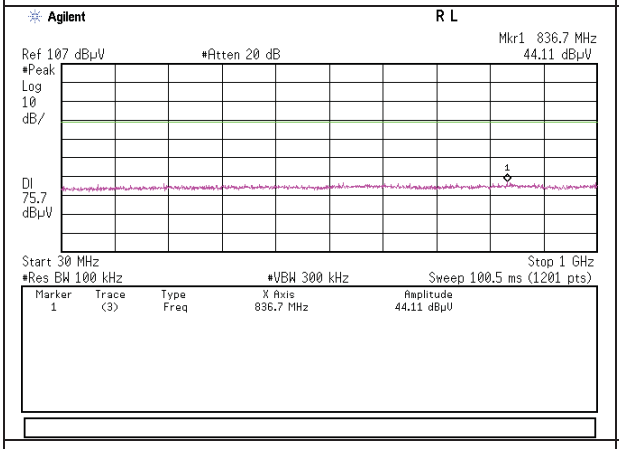
20GHz-25GHz



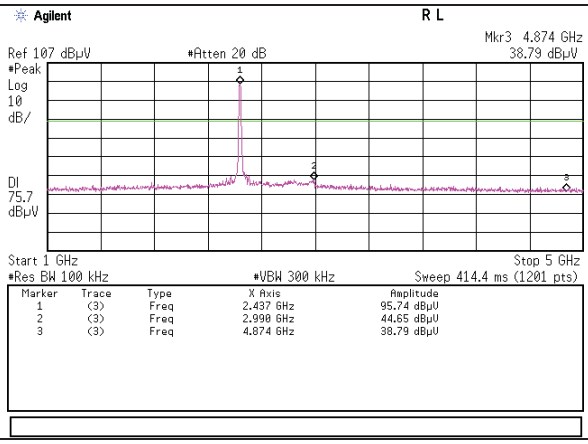
Conducted Spurious Emission

11b Tx 2437MHz

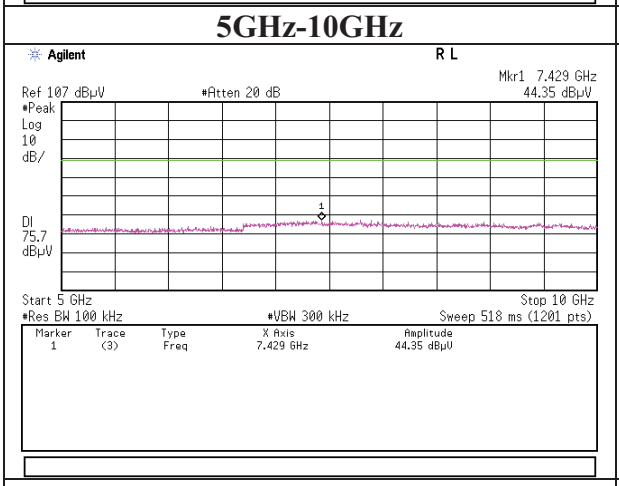
30MHz-1GHz



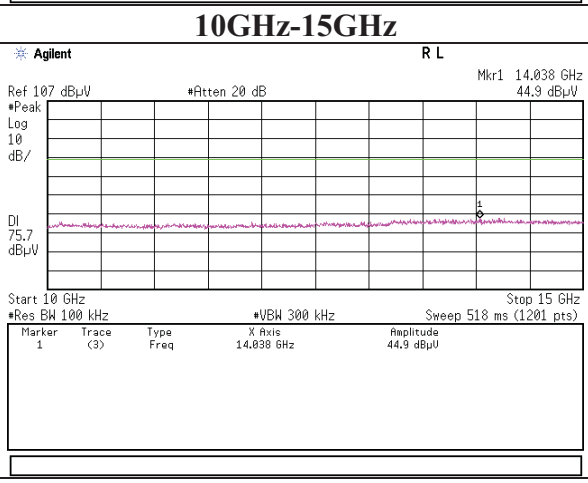
1GHz-5GHz



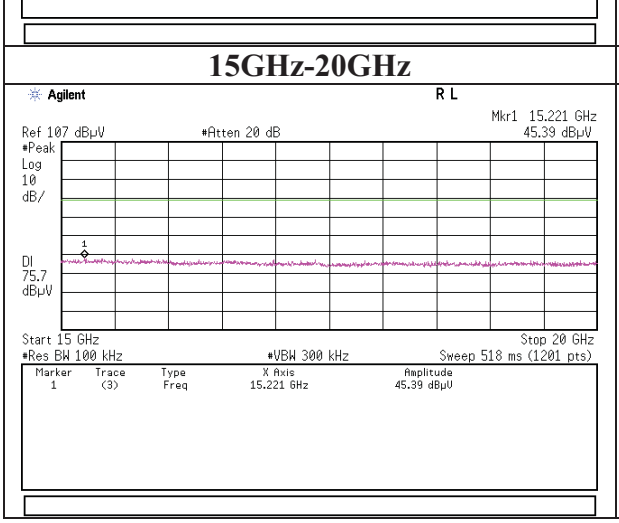
5GHz-10GHz



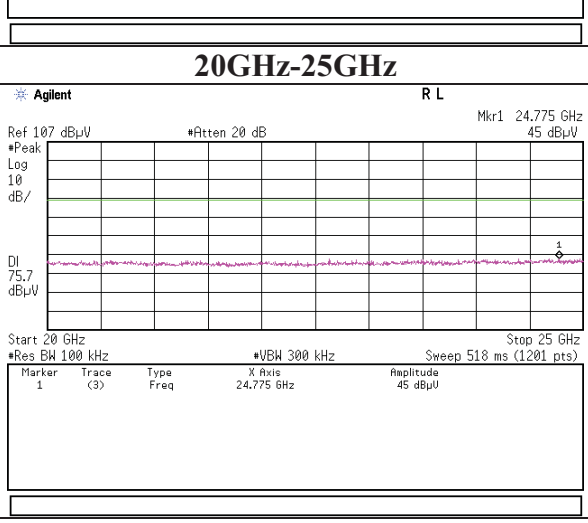
10GHz-15GHz



15GHz-20GHz



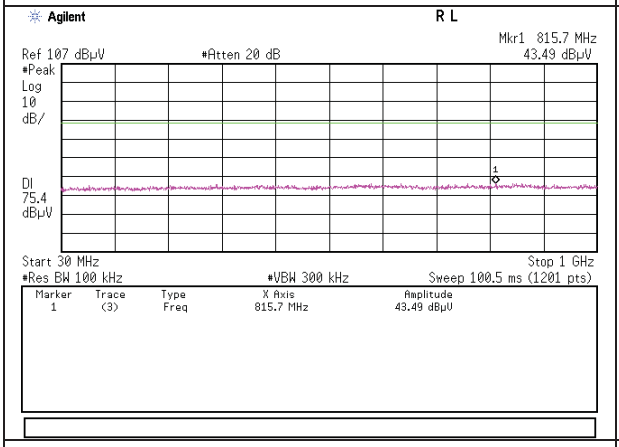
20GHz-25GHz



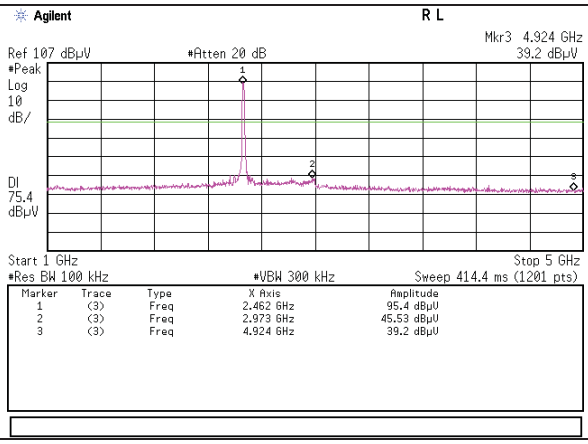
Conducted Spurious Emission

11b Tx 2462MHz

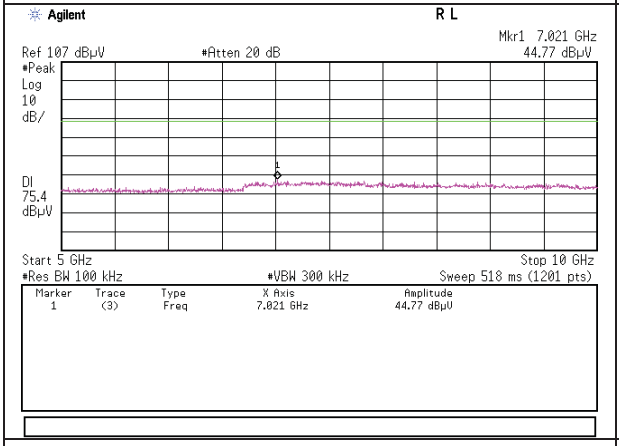
30MHz-1GHz



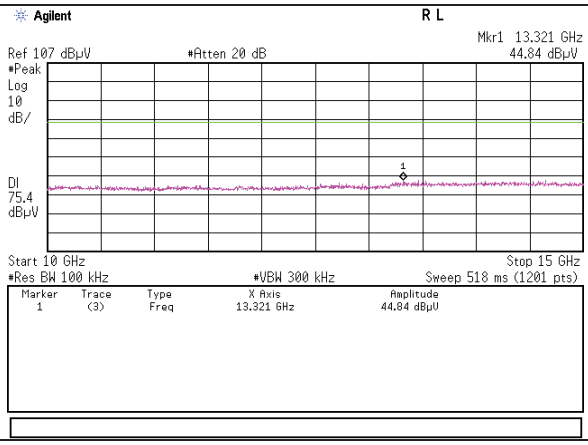
1GHz-5GHz



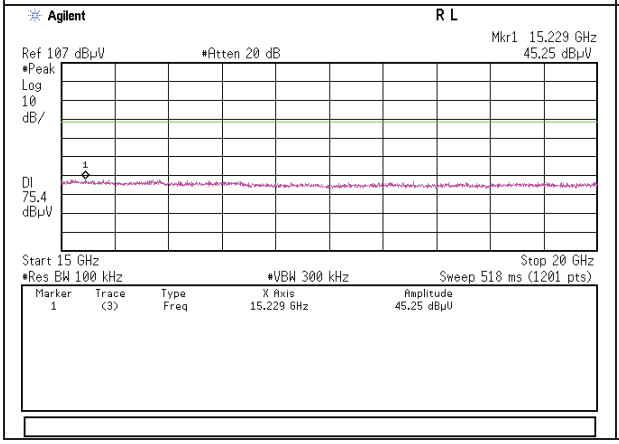
5GHz-10GHz



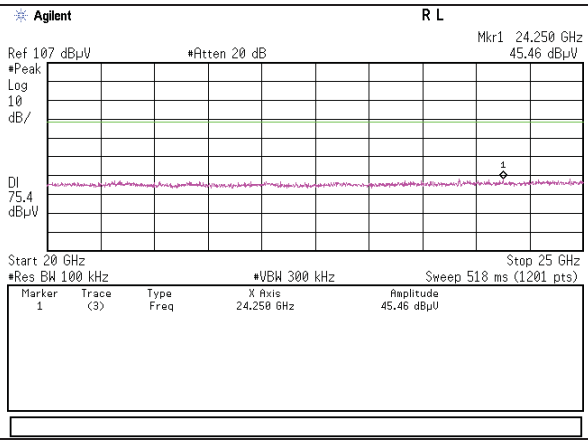
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



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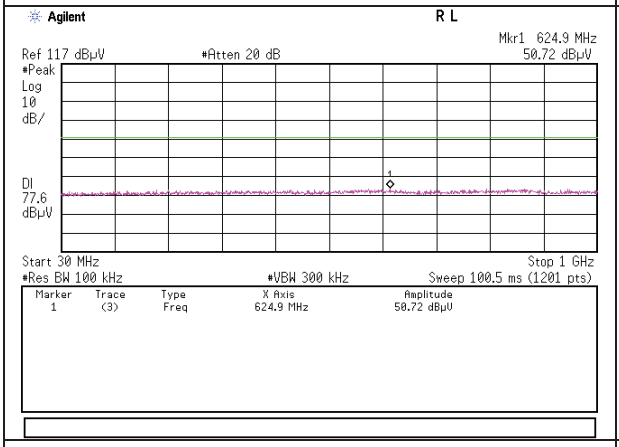
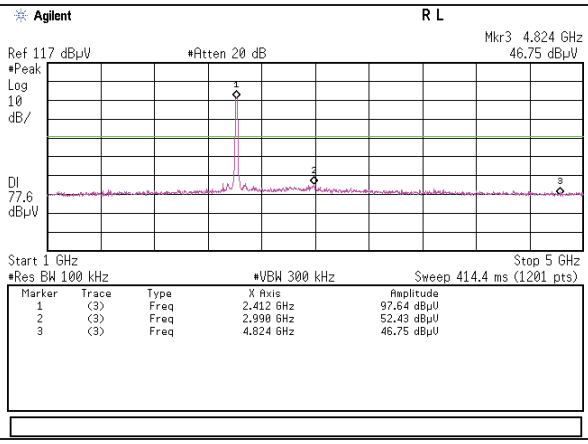
Conducted Spurious Emission

11g Tx 2412MHz

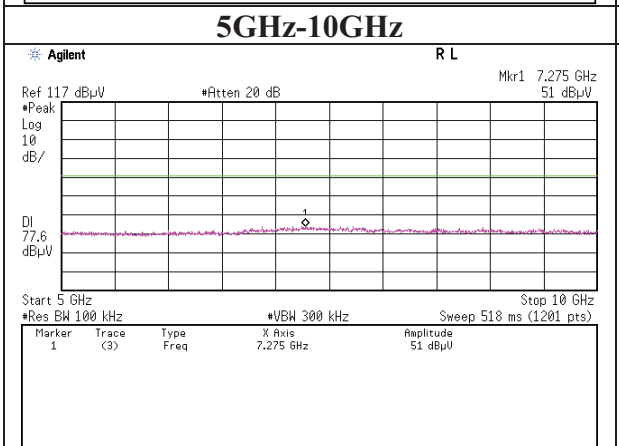
30MHz-1GHz



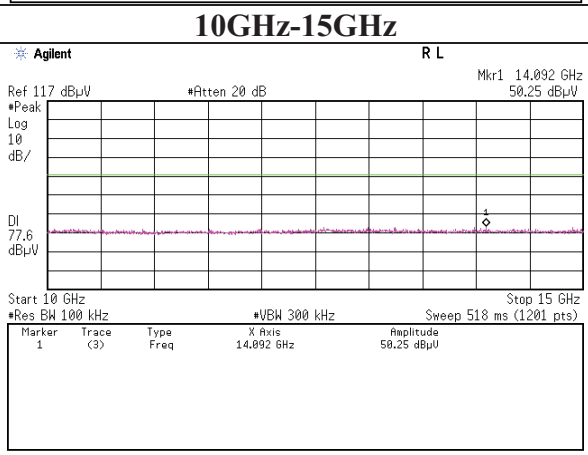
1GHz-5GHz



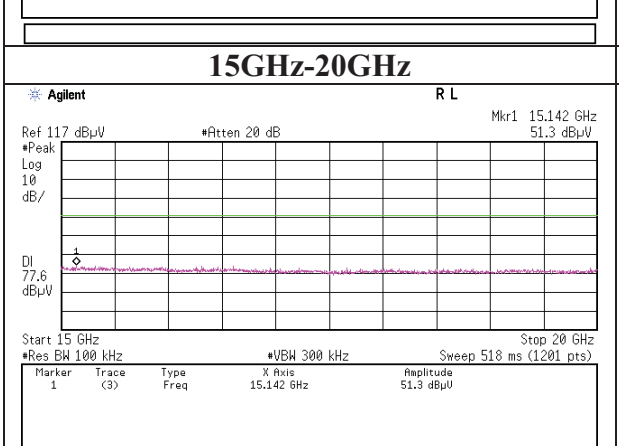
5GHz-10GHz



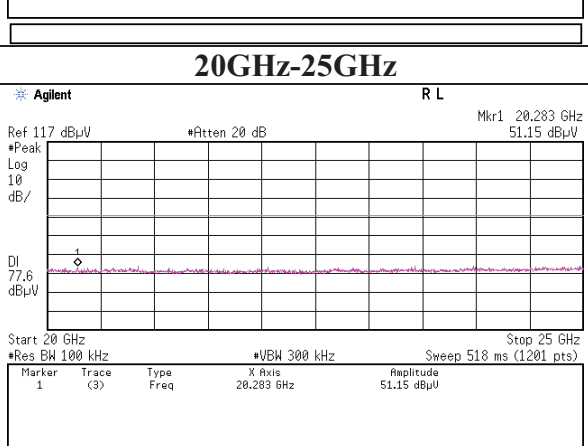
10GHz-15GHz



15GHz-20GHz



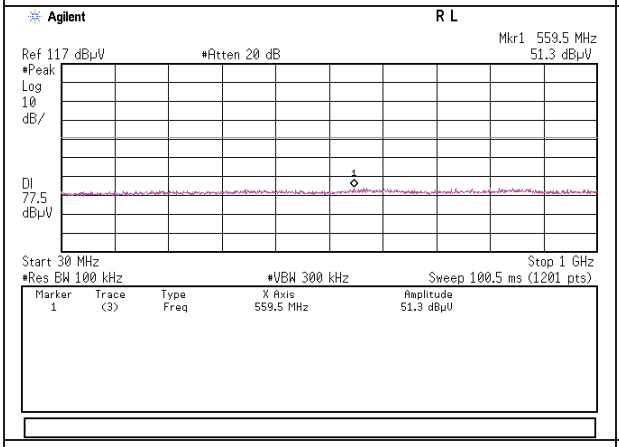
20GHz-25GHz



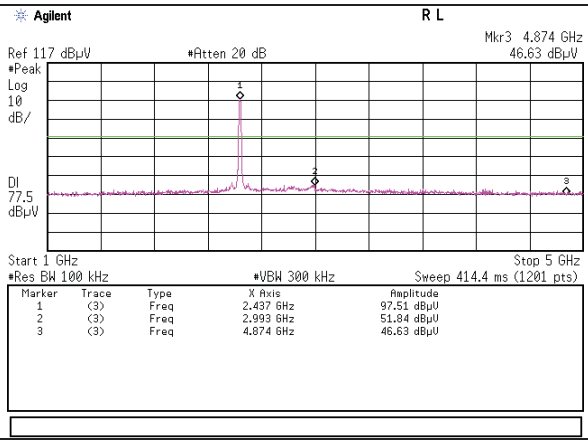
Conducted Spurious Emission

11g Tx 2437MHz

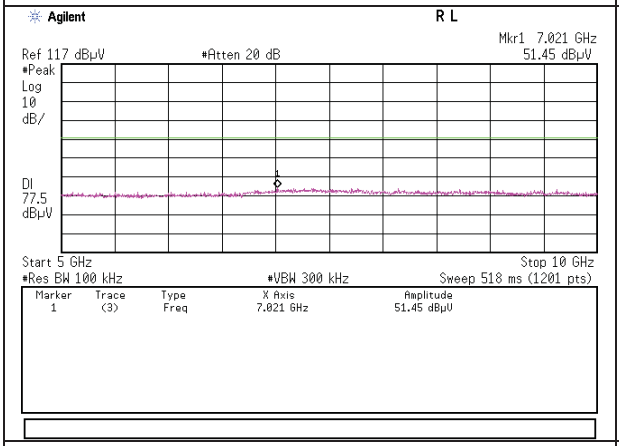
30MHz-1GHz



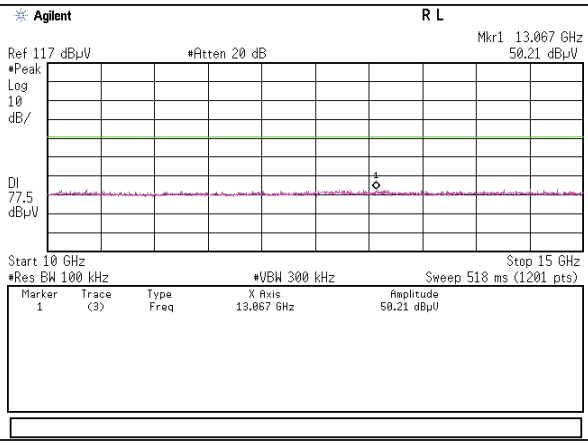
1GHz-5GHz



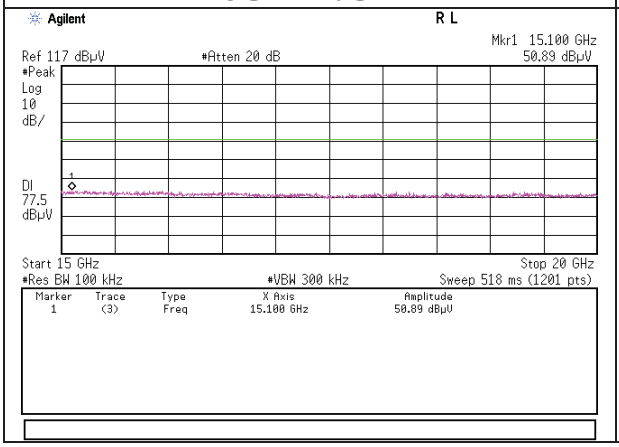
5GHz-10GHz



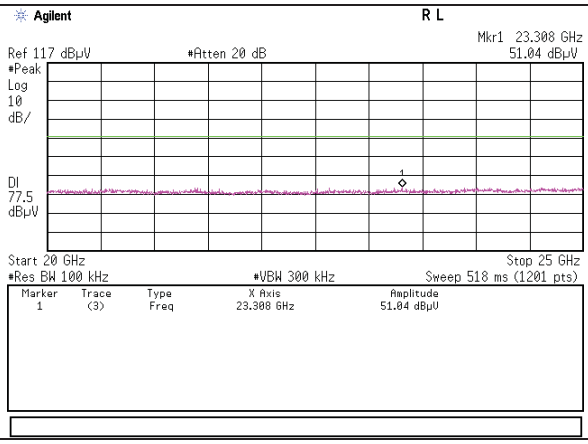
10GHz-15GHz



15GHz-20GHz



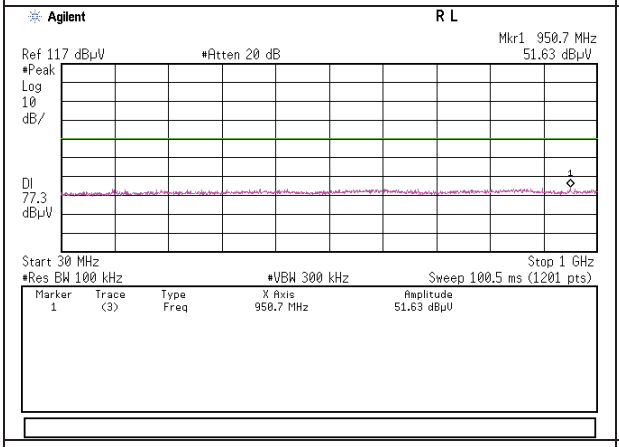
20GHz-25GHz



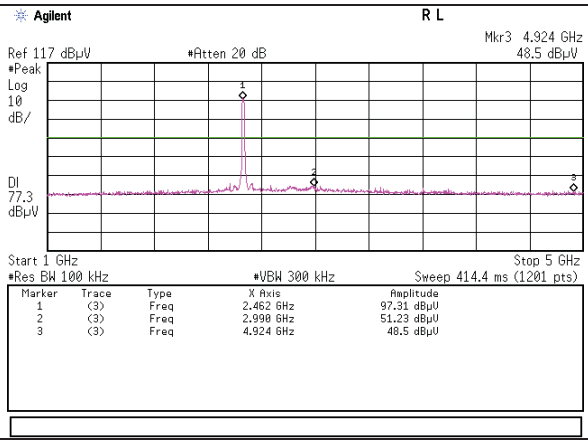
Conducted Spurious Emission

11g Tx 2462MHz

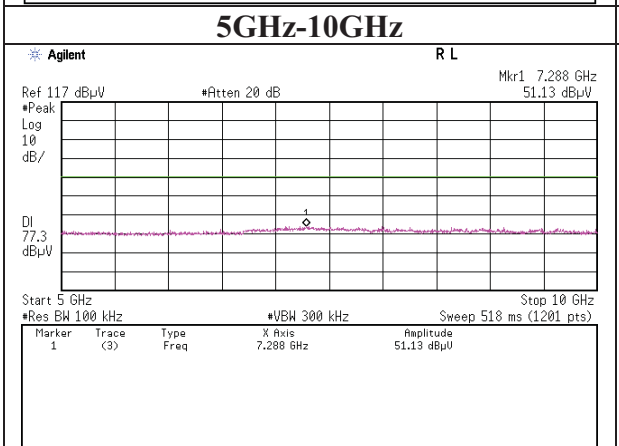
30MHz-1GHz



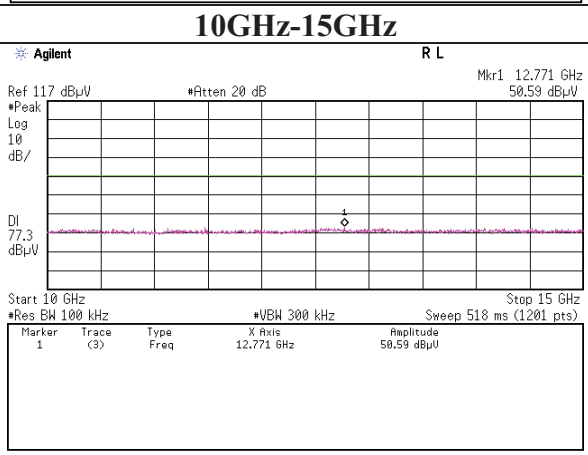
1GHz-5GHz



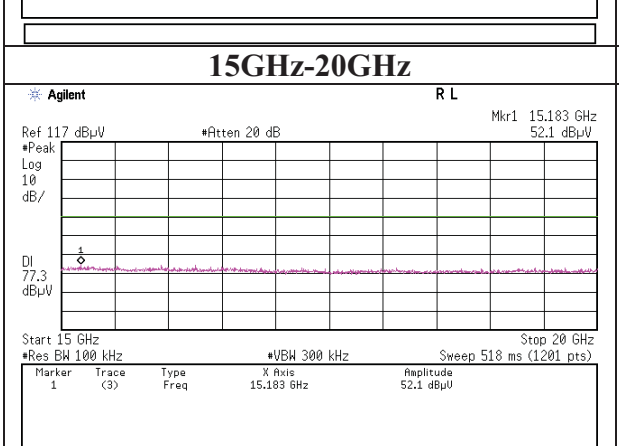
5GHz-10GHz



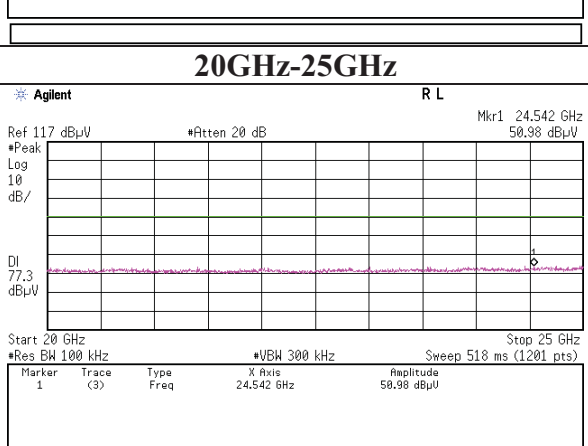
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



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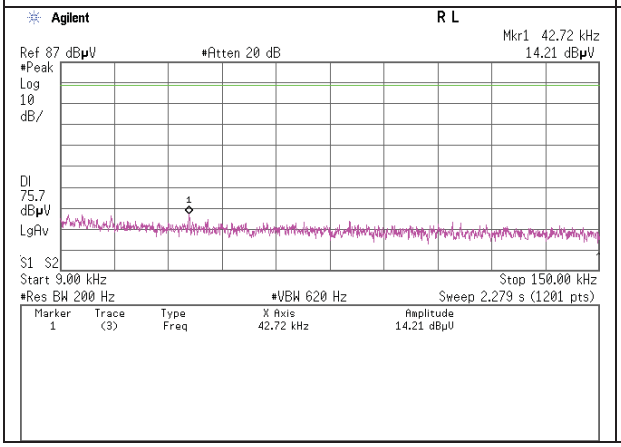
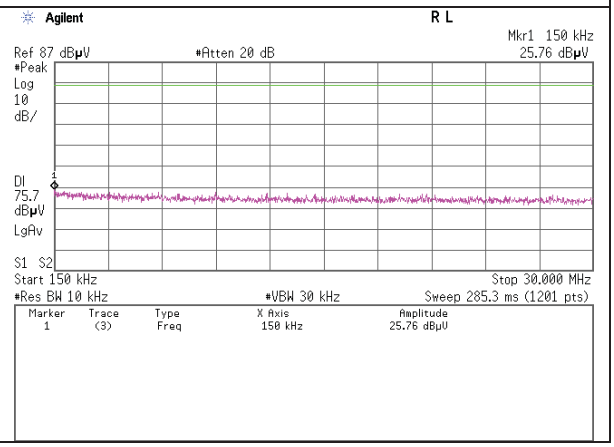
Conducted Spurious Emission(below 30MHz)

Tx 11b, 2437MHz

9kHz-150kHz

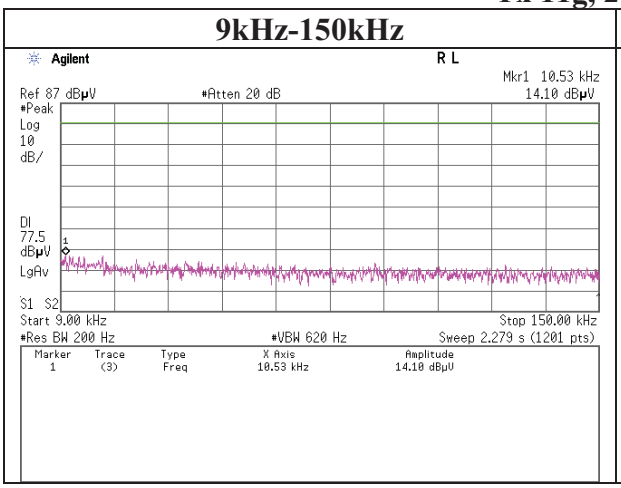


150kHz-30MHz

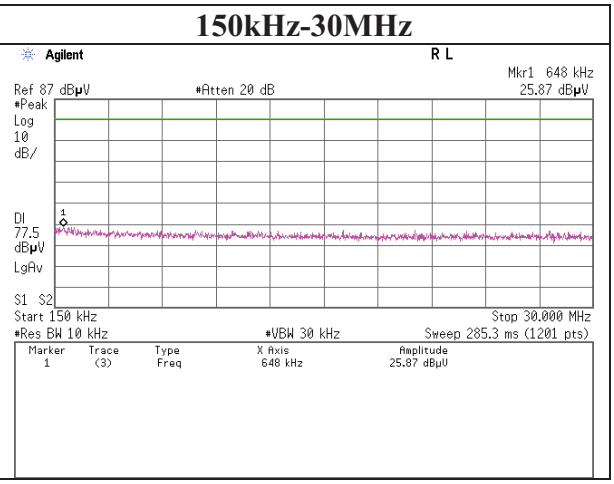


Tx 11g, 2437MHz

9kHz-150kHz



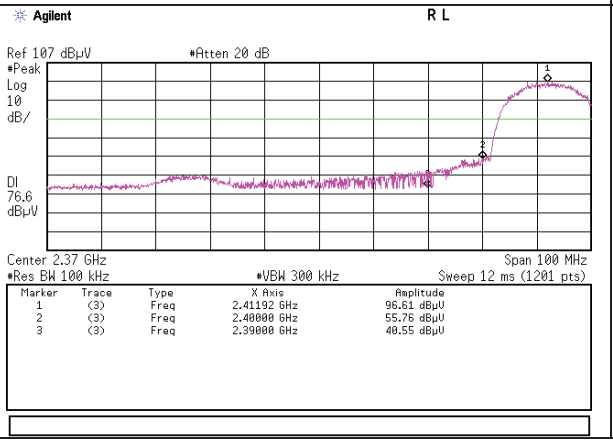
150kHz-30MHz



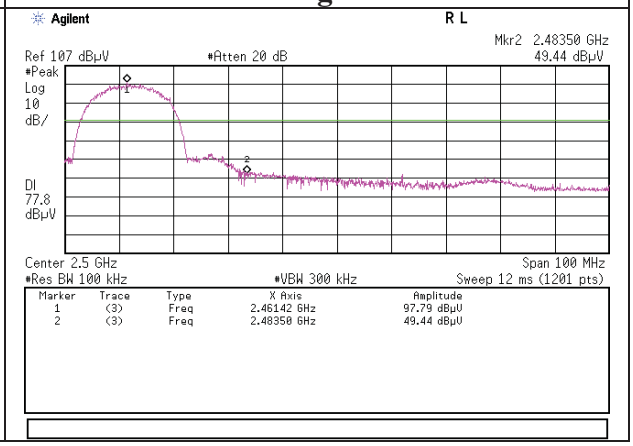
Conducted Emission Band Edge compliance

11b Tx

Low

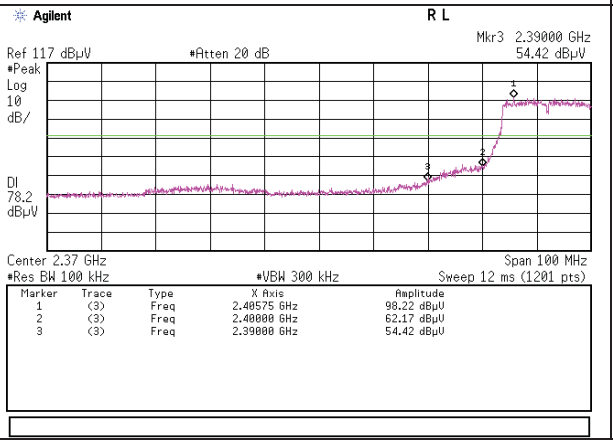


High

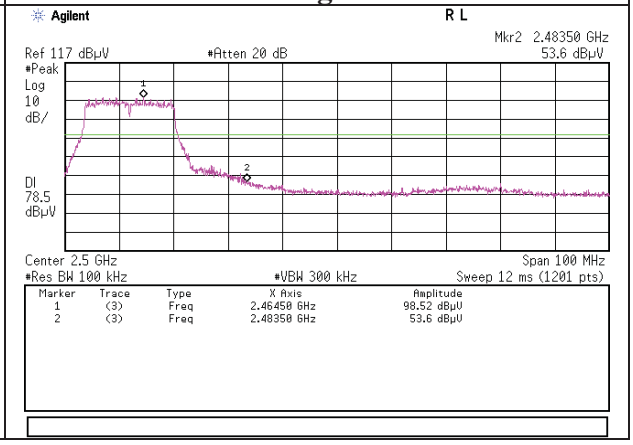


11g Tx

Low



High



Power Density

Test place	Head Office EMC Lab. No.7 Measurement Room
Report No.	31EE0033-HO-01
Date	04/19/2011
Temperature/ Humidity	23deg. C / 35% RH
Engineer	Takumi Shimada
Mode	11b Tx, 11g Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-11.64	2.21	9.97	0.54	8.00	7.46
2437.00	-11.50	2.22	9.97	0.69	8.00	7.31
2462.00	-11.38	2.23	9.97	0.82	8.00	7.18

11g

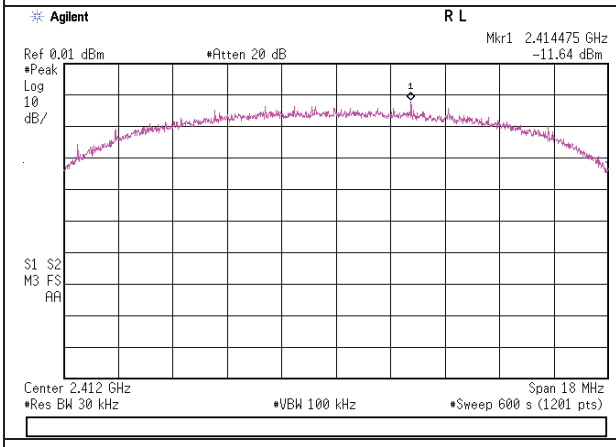
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-11.19	2.21	9.97	0.99	8.00	7.01
2437.00	-12.12	2.22	9.97	0.07	8.00	7.93
2462.00	-12.15	2.23	9.97	0.05	8.00	7.95

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

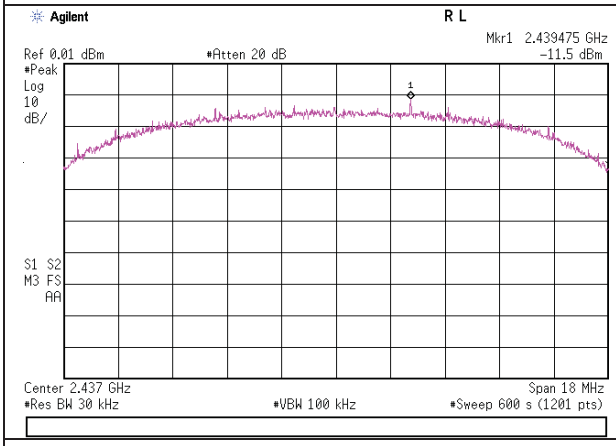
Power Density

11b

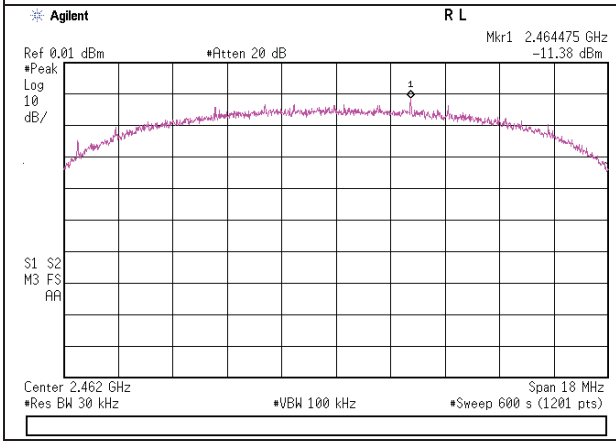
2412MHz



2437MHz

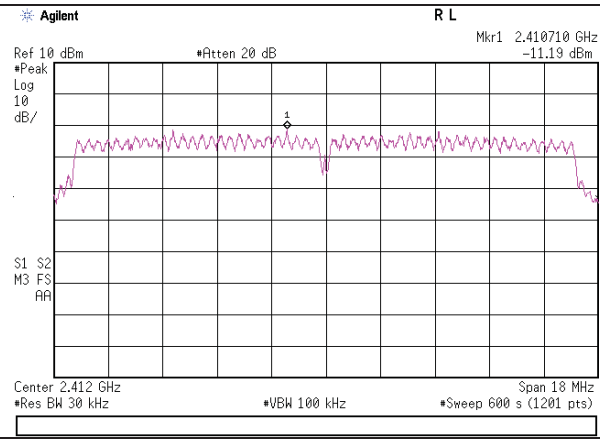


2462MHz

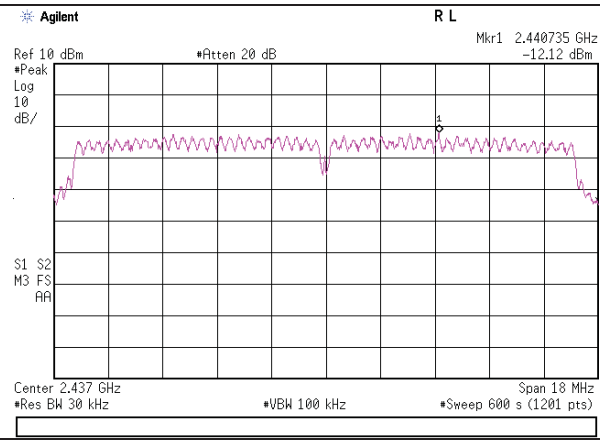


11g

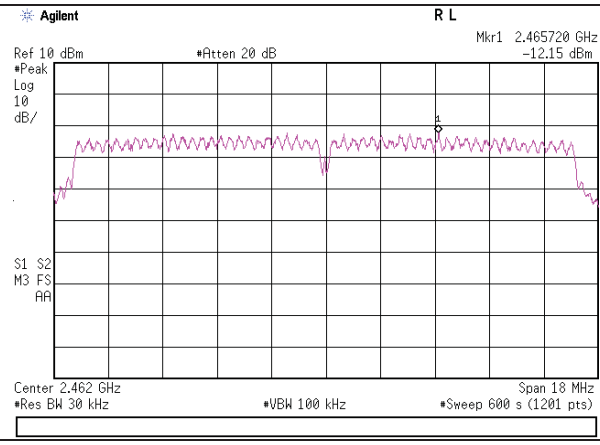
2412MHz



2437MHz



2462MHz



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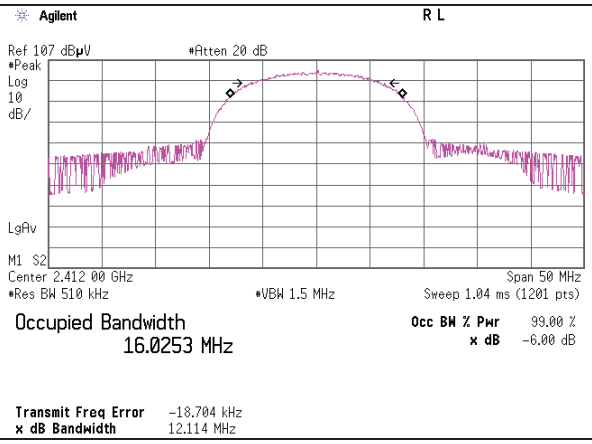
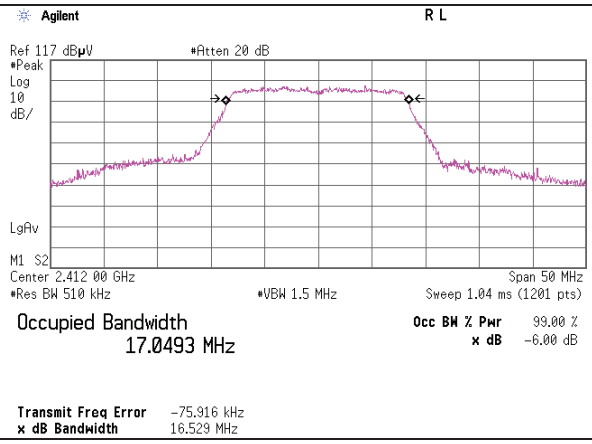
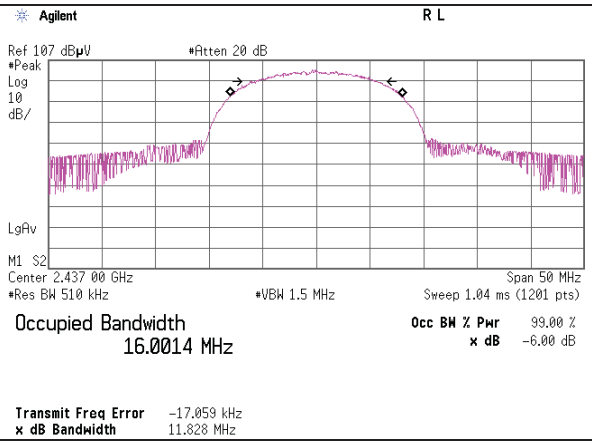
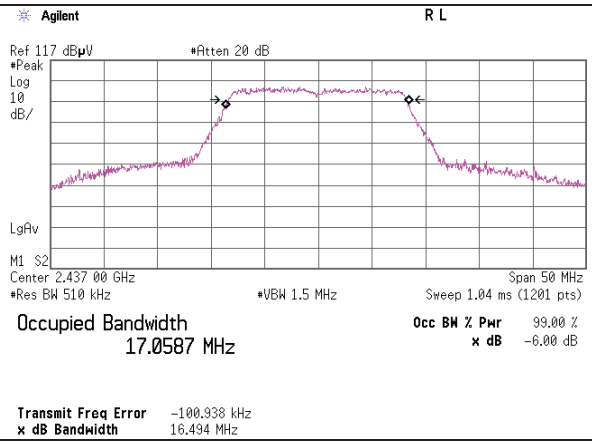
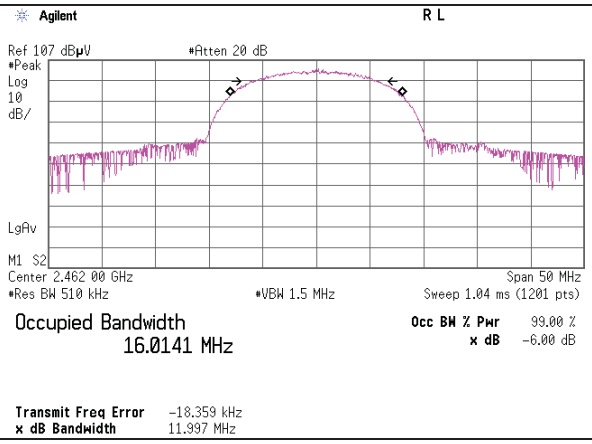
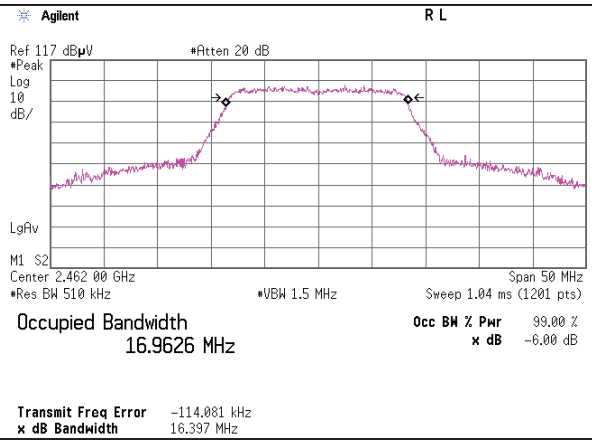
99%Occupied Bandwidth

11b	11g
2412MHz	**2412MHz**
	
2437MHz	**2437MHz**
	
2462MHz	**2462MHz**
	

APPENDIX 3: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-06	Spectrum Analyzer	Agilent	E4407B	MY45107638	AT	2011/04/15 * 12
MOS-04	Digital Humidity Indicator	N.T	NT-1800	MOS04	AT	2011/02/23 * 12
MCC-66	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28636/2	AT	2010/04/27 * 12 *1)
MCC-35	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2010/09/29 * 12
MAT-24	Attenuator(10dB)(above1GHz)	Agilent	8493C	71389	AT	2010/06/14 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE	2010/07/02 * 12
MOS-01	Digital Humidity Indicator	N.T	NT-1800	MOS01	RE	2011/02/23 * 12
MJM-01	Measure	KDS	ES19-55	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	100084	RE	2010/12/07 * 12
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2011/06/19 * 12
MCC-18	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX 104	148048-143(1m) / 292410(5m)	RE	2010/09/30 * 12
MPA-01	Pre Amplifier	Agilent	8449B	3008A01671	RE	2011/02/24 * 12
MHF-18	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCA	7002	RE	2010/09/21 * 12
MCC-56	Microwave Cable	Suhner	SUCOFLEX104	270875/4(1m) / 284655(5m)	RE	2011/03/02 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2010/09/01 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2011/02/23 * 12
MJM-05	Measure	PROMART	SEN1955	-	RE	
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE/AT	2010/11/30 * 12
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
MCC-77	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278942/4	RE	2010/12/02 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2011/04/15 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2010/10/11 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2010/10/11 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2011/02/18 * 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
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	CE	2011/02/22 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	CE	2011/02/23 * 12
MJM-15	Measure	KOMELON	KMC-36	-	CE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	CE	2010/11/18 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	CE	2010/08/23 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2011/02/22 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2011/01/05 * 12
MCC-112	Coaxial cable	Fujikura/Suhner /TSJ	5D-2W(10m)/SFM141(3m)/ sucoform141-PE(1m)/ 421-010(1.5m)/RFM-E321(Switcher)	-/00640	CE	2010/07/23 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2011/02/22 * 12

***1) This test equipment was used for the tests before the expiration date of the calibration.**

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 test
RE: Radiated Emission test
AT: Antenna Terminal Conducted test

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