

**APPENDIX 2: Data of EMI test**

**Conducted Emission**

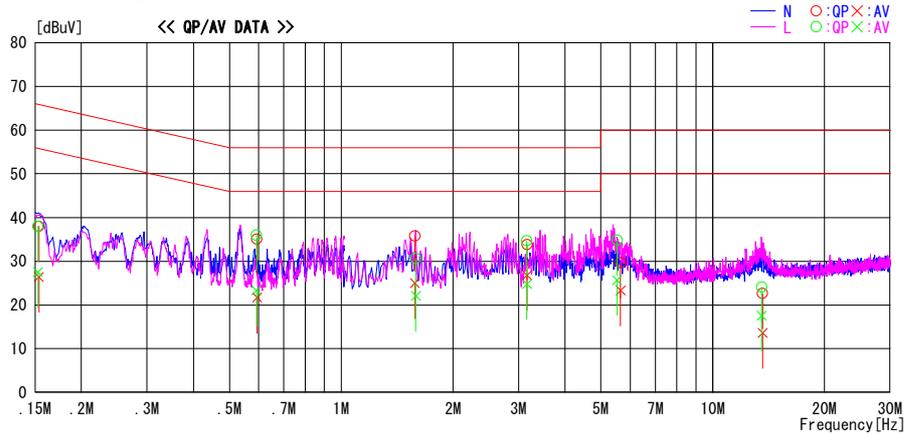
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber

Report No. : 31CE0252-HO-01  
Temp./Humi. : 21deg. C. / 40%  
Engineer : Tomohisa Nakagawa

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

LIMIT : FCC15.207 QP  
FCC15.207 AV

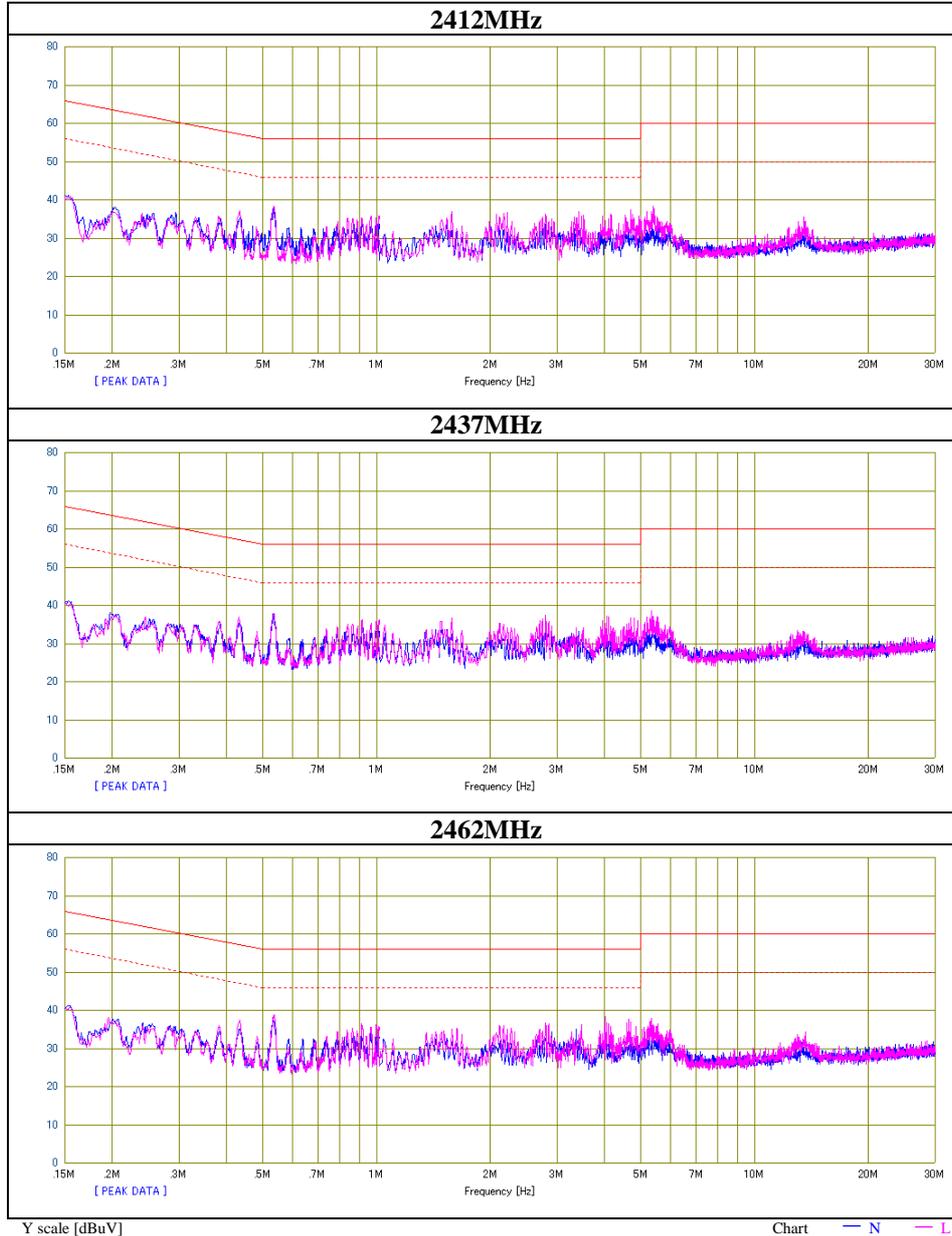


Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15348	24.8	13.2	13.2	38.0	26.4	65.8	55.8	27.8	29.4	N	
0.59305	21.7	8.3	13.4	35.1	21.7	56.0	46.0	20.9	24.3	N	
1.57862	22.4	11.6	13.4	35.8	25.0	56.0	46.0	20.2	21.0	N	
3.16398	20.1	13.1	13.7	33.8	26.8	56.0	46.0	22.2	19.2	N	
5.64539	15.4	9.0	14.3	29.7	23.3	60.0	50.0	30.3	26.7	N	
13.61916	7.0	-2.0	15.6	22.6	13.6	60.0	50.0	37.4	36.4	N	
0.15261	24.8	14.3	13.2	38.0	27.5	65.9	55.9	27.9	28.4	L	
0.59160	22.6	9.9	13.4	36.0	23.3	56.0	46.0	20.0	22.7	L	
1.58769	17.2	8.7	13.4	30.6	22.1	56.0	46.0	25.4	23.9	L	
3.15883	21.0	11.1	13.7	34.7	24.8	56.0	46.0	21.3	21.2	L	
5.52750	20.6	11.5	14.2	34.8	25.7	60.0	50.0	25.2	24.3	L	
13.54130	8.5	2.0	15.6	24.1	17.6	60.0	50.0	35.9	32.4	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.4 Semi Anechoic Chamber
Report No.	31CE0252-HO-01
Date	11/07/2010
Temperature/ Humidity	21 deg.C./ 40%
Engineer	Tomohisa Nakagawa
Mode	11b Tx



## Conducted Emission

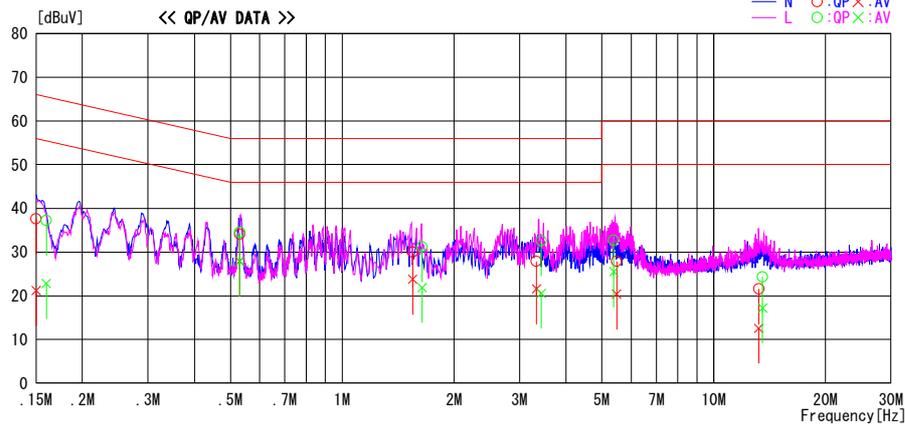
### DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber

Report No. : 31CE0252-HO-01  
Temp./Humi. : 21deg.C. / 40%  
Engineer : Tomohisa Nakagawa

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

LIMIT : FCC15.207 QP  
FCC15.207 AV

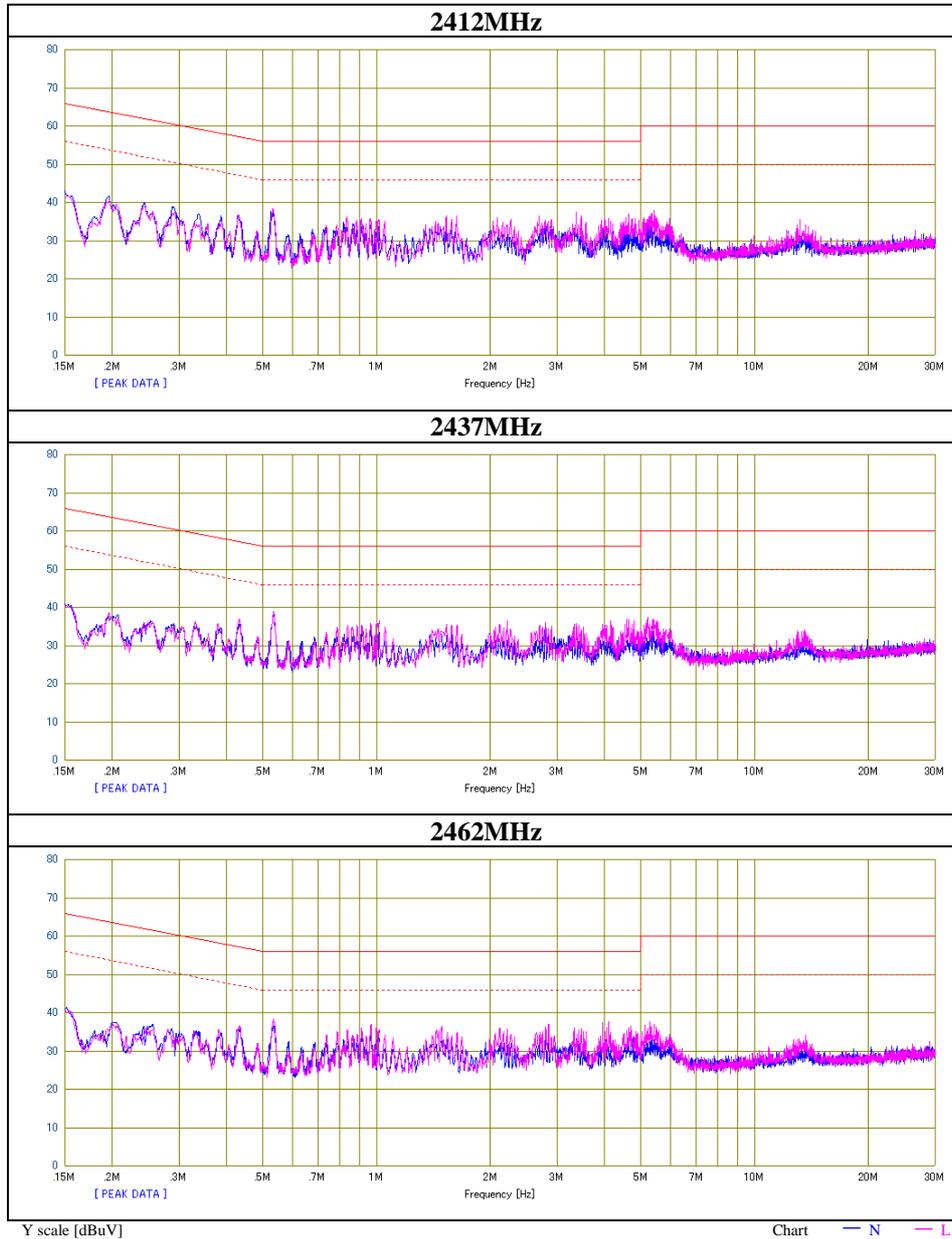


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	24.4	8.0	13.2	37.6	21.2	66.0	56.0	28.4	34.8	N	
0.52983	20.7	14.5	13.4	34.1	27.9	56.0	46.0	21.9	18.1	N	
1.54850	16.6	10.4	13.4	30.0	23.8	56.0	46.0	26.0	22.2	N	
3.33145	14.2	7.9	13.7	27.9	21.6	56.0	46.0	28.1	24.4	N	
5.48230	13.7	6.2	14.2	27.9	20.4	60.0	50.0	32.1	29.6	N	
13.21816	6.0	-3.0	15.6	21.6	12.6	60.0	50.0	38.4	37.4	N	
0.15973	24.1	9.6	13.2	37.3	22.8	65.5	55.5	28.2	32.7	L	
0.53002	21.1	14.5	13.4	34.5	27.9	56.0	46.0	21.5	18.1	L	
1.64020	17.8	8.5	13.4	31.2	21.9	56.0	46.0	24.8	24.1	L	
3.43412	18.9	6.9	13.7	32.6	20.6	56.0	46.0	23.4	25.4	L	
5.37916	18.5	11.3	14.2	32.7	25.5	60.0	50.0	27.3	24.5	L	
13.52830	8.7	1.6	15.6	24.3	17.2	60.0	50.0	35.7	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.4 Semi Anechoic Chamber
Report No.	31CE0252-HO-01
Date	11/07/2010
Temperature/ Humidity	21 deg.C./ 40%
Engineer	Tomohisa Nakagawa
Mode	11g Tx



### 6dB Bandwidth

Test place Head Office EMC Lab. No.6 Measurement Room  
Report No. 31CE0252-HO-01  
Date 11/05/2010  
Temperature/ Humidity 21 deg.C./ 46%  
Engineer Hisayoshi Sato  
Mode 11b/g Tx

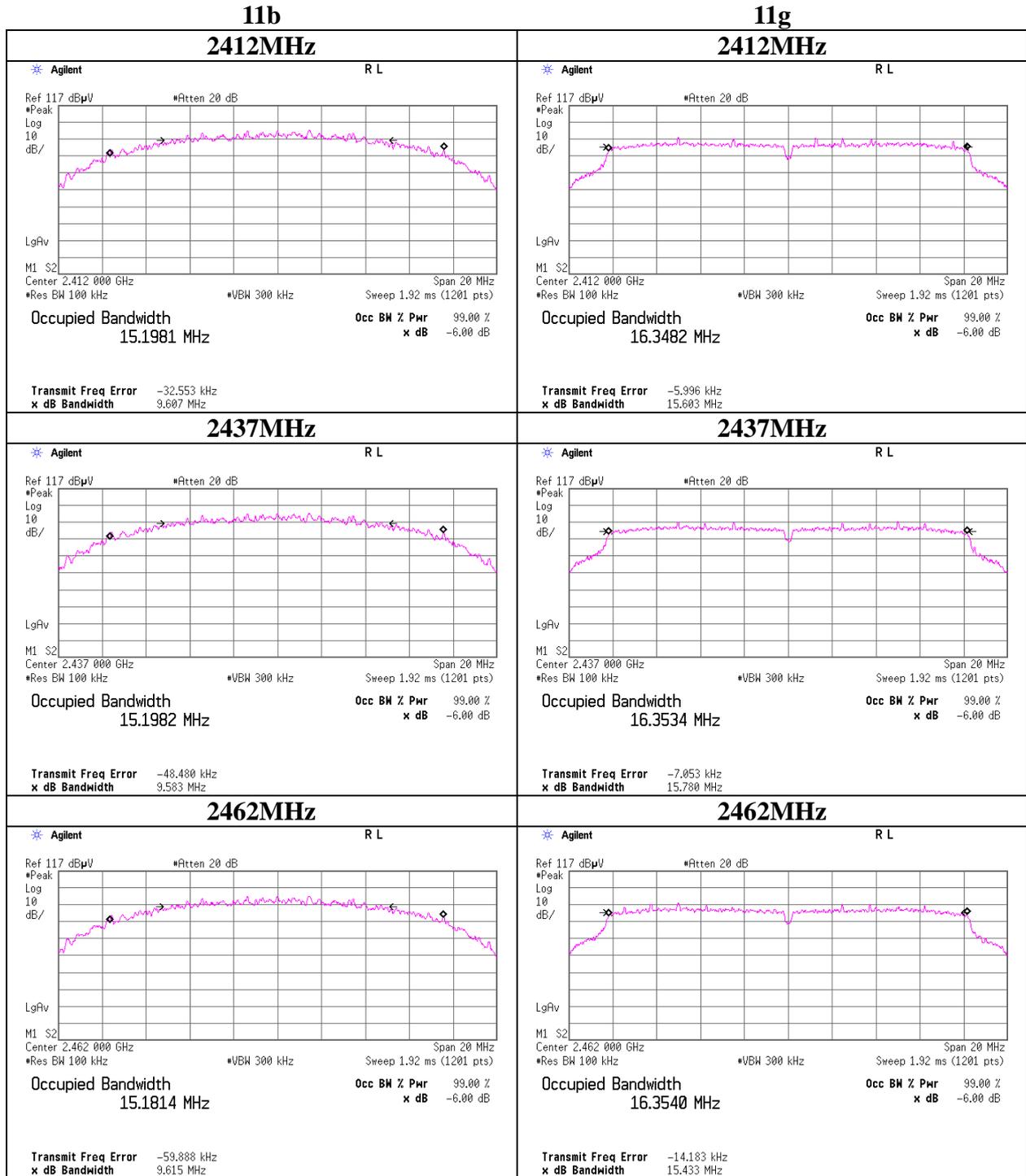
11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	9.607	>500
2437	9.583	>500
2462	9.615	>500

11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	15.603	>500
2437	15.780	>500
2462	15.433	>500

**6dB Bandwidth**



### Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 Measurement Room  
Report No. 31CE0252-HO-01  
Date 11/05/2010  
Temperature/ Humidity 21 deg.C./ 46%  
Engineer Hisayoshi Sato  
Mode 11b Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	6.45	2.67	10.08	19.20	83.08	30.00	1000	10.81
2437	6.63	2.51	10.08	19.22	83.50	30.00	1000	10.78
2462	6.33	2.44	10.08	18.85	76.67	30.00	1000	11.15

Sample Calculation:

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

2437MHz

Rate [Mbps]	Reading [dBm]	Remark
1	6.31	
2	6.54	
5.5	6.12	
11	6.63	*

\*: Worst Rate

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

### Maximum Peak Output Power

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	31CE0252-HO-01
Date	11/05/2010
Temperature/ Humidity	21 deg.C./ 46%
Engineer	Hisayoshi Sato
Mode	11g Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	11.50	2.67	10.08	24.25	265.77	30.00	1000	5.76
2437	11.44	2.51	10.08	24.03	252.76	30.00	1000	5.97
2462	11.14	2.44	10.08	23.66	232.09	30.00	1000	6.34

Sample Calculation:

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

2437MHz

Rate [Mbps]	Reading [dBm]	Remark
6	11.44	*
9	10.95	
12	10.79	
18	11.24	
24	11.40	
36	11.25	
48	11.23	
54	11.22	

\*: Worst Rate

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









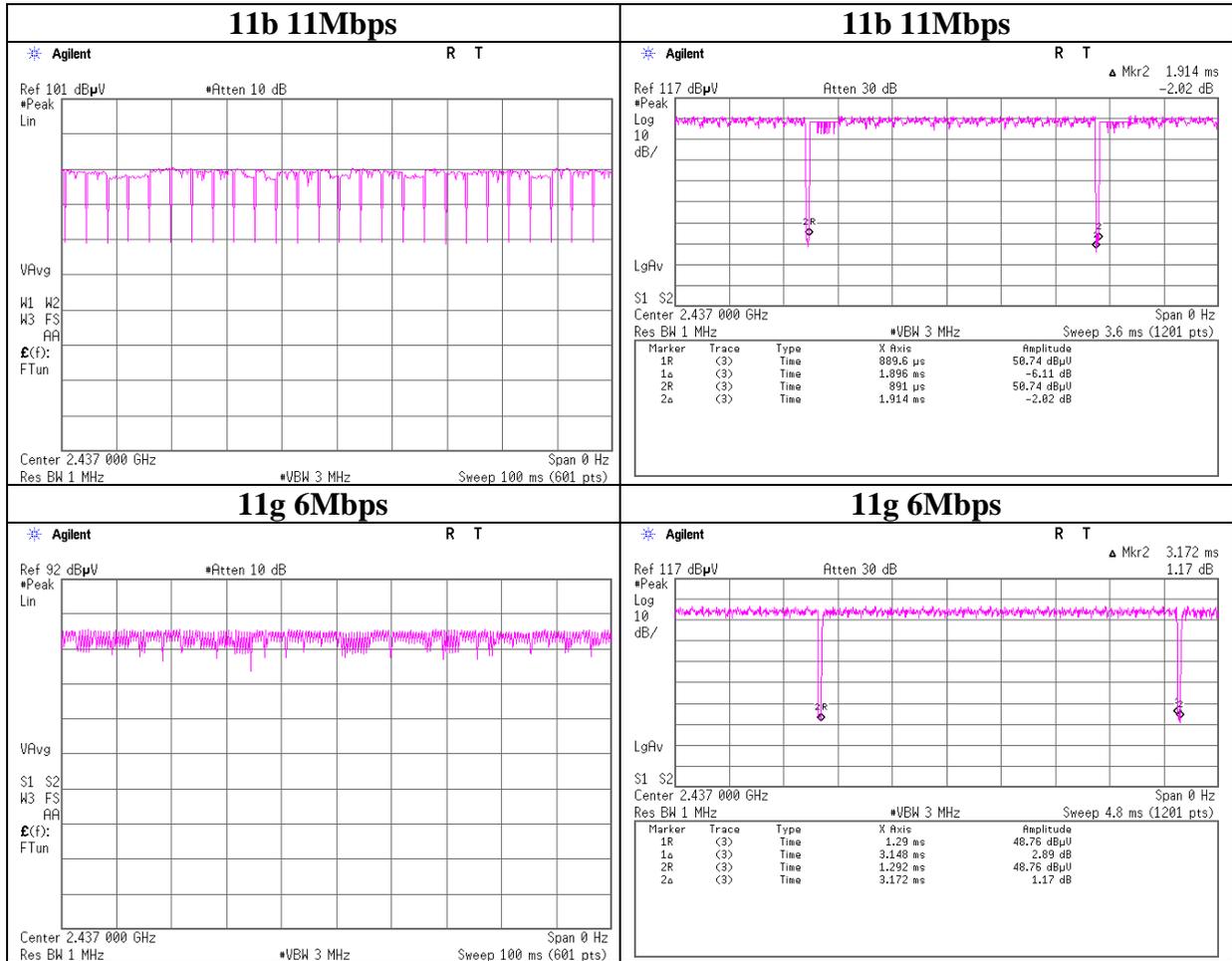






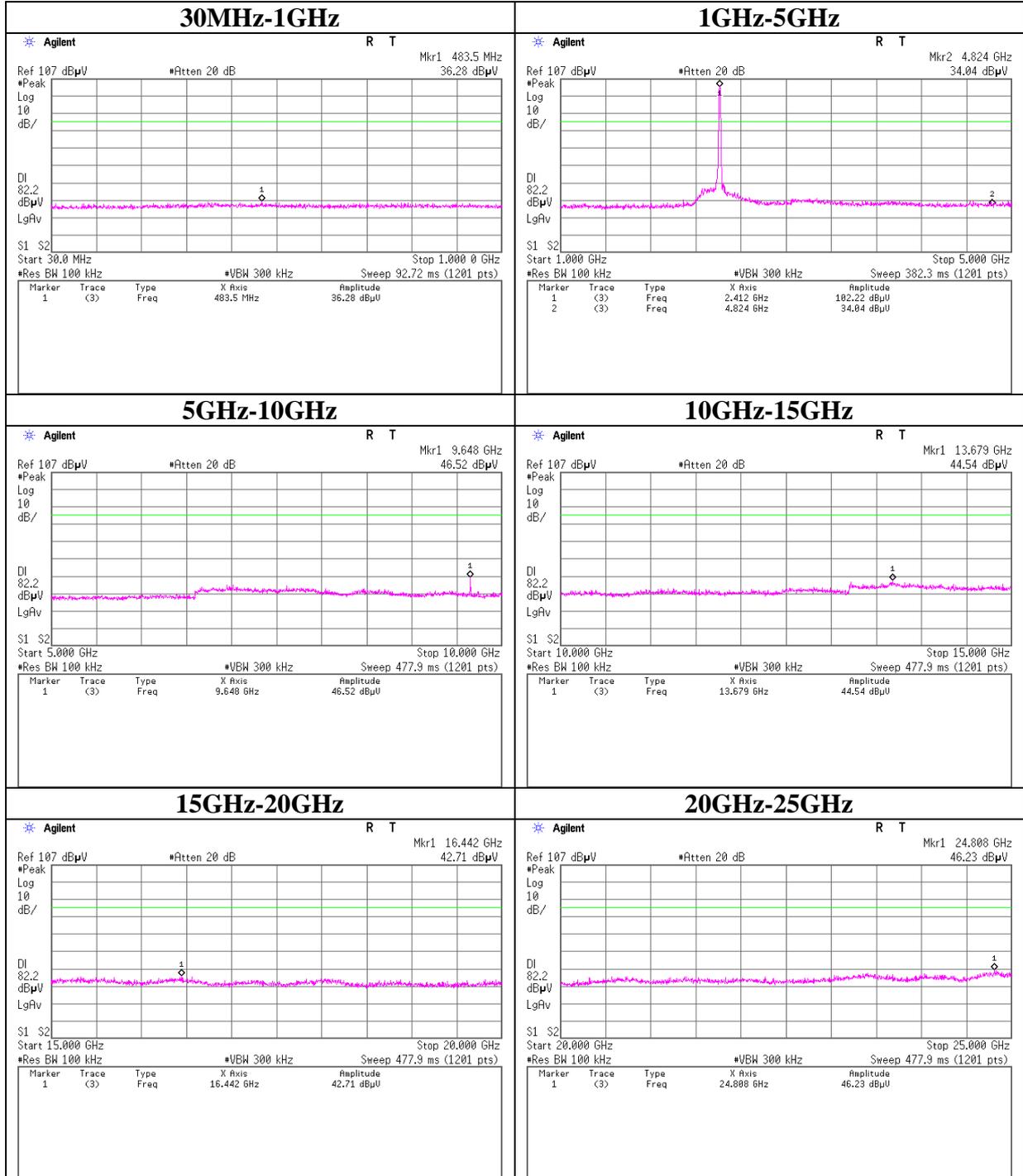


**The tested burst timing**



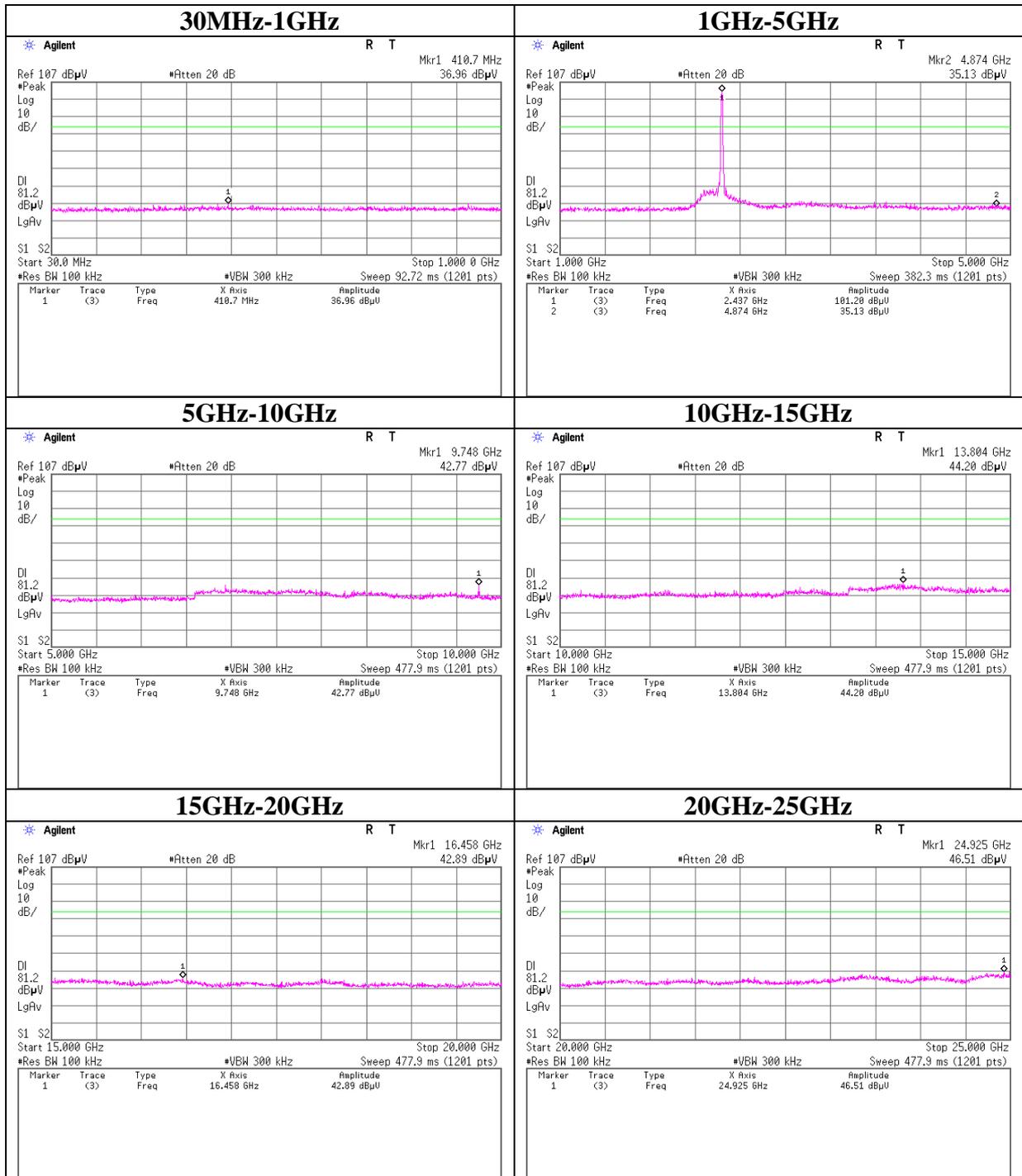
**Conducted Spurious Emission**

**11b Tx 2412MHz**



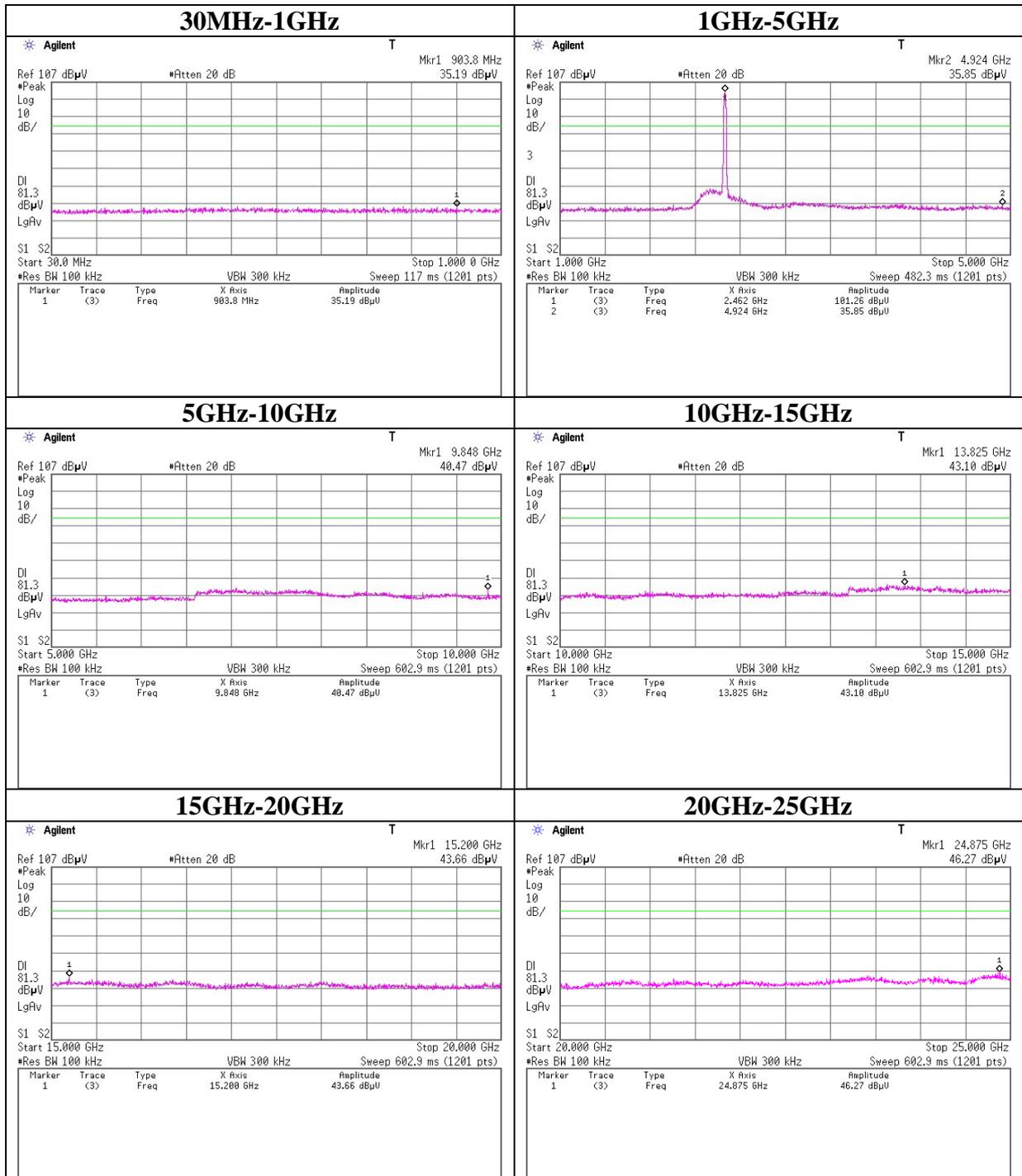
## Conducted Spurious Emission

### 11b Tx 2437MHz



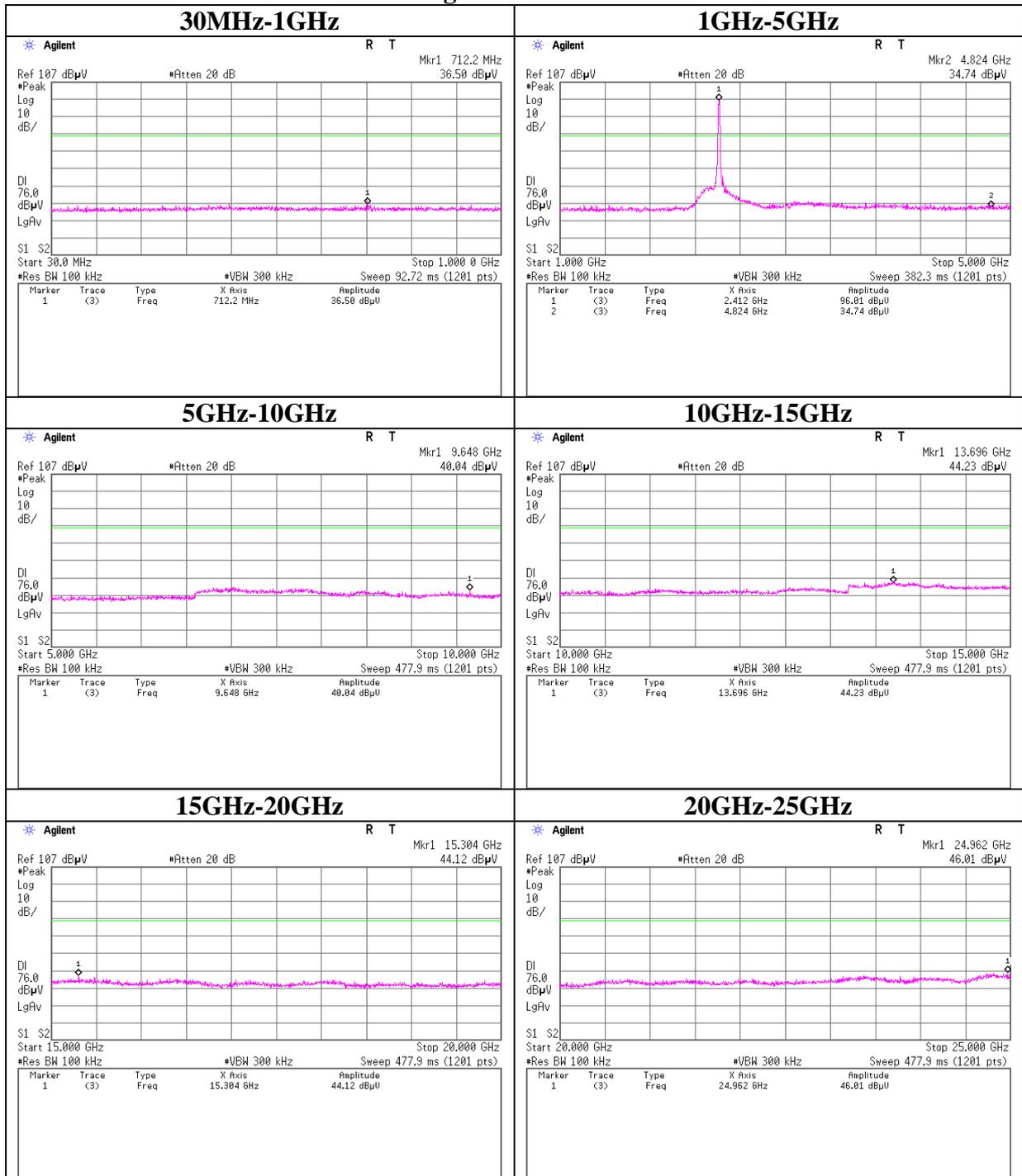
## Conducted Spurious Emission

### 11b Tx 2462MHz



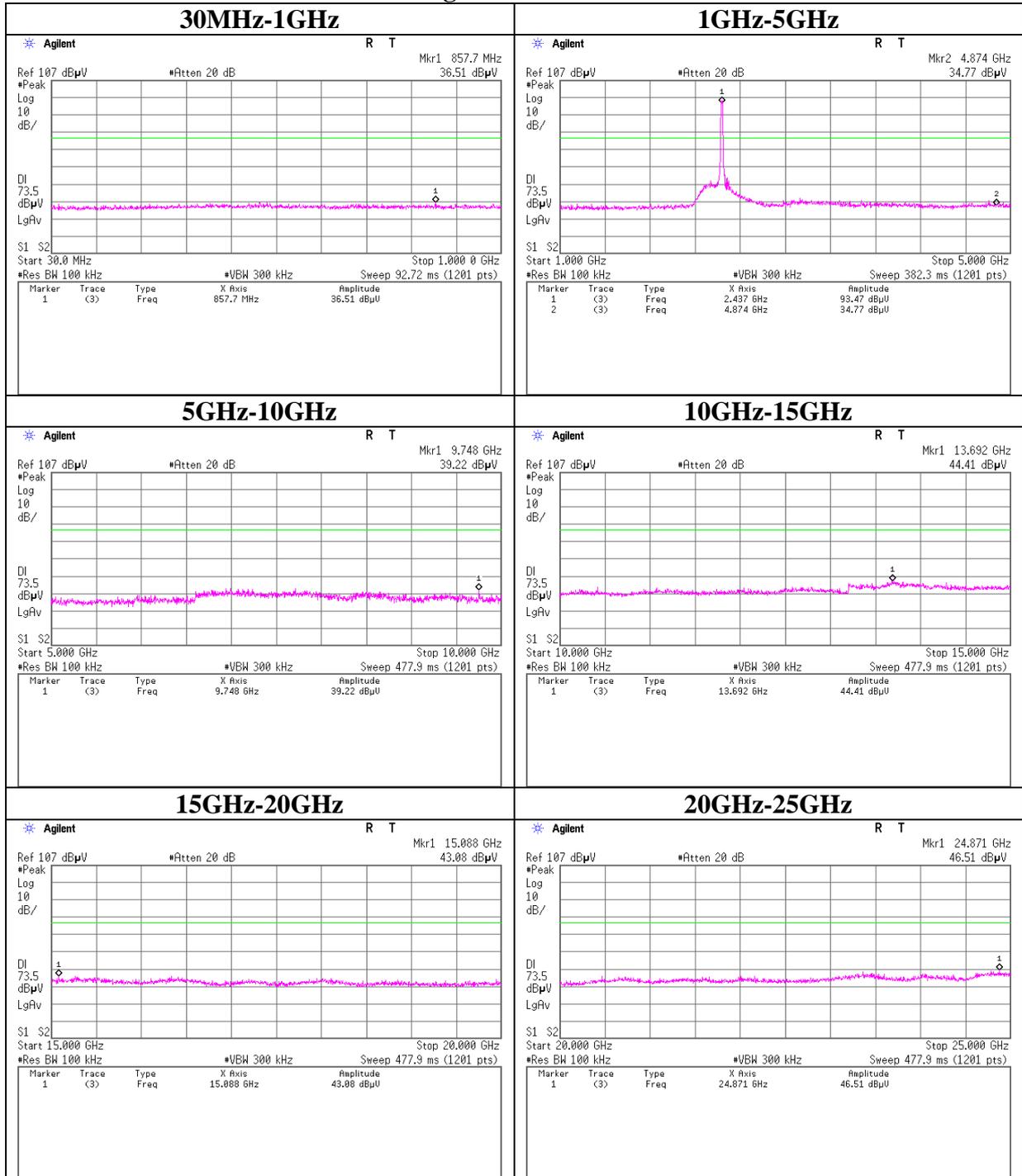
## Conducted Spurious Emission

### 11g Tx 2412MHz



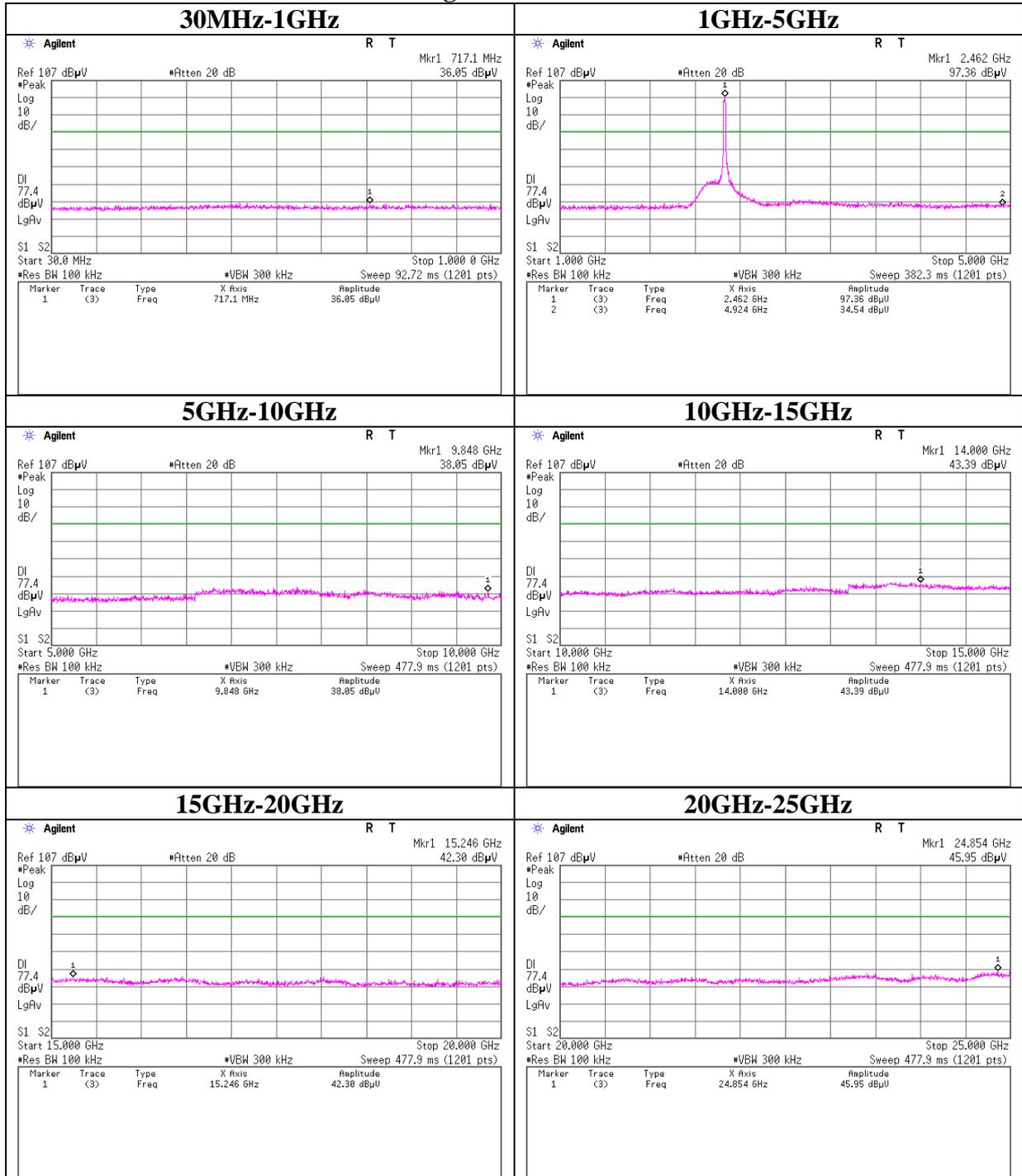
## Conducted Spurious Emission

### 11g Tx 2437MHz



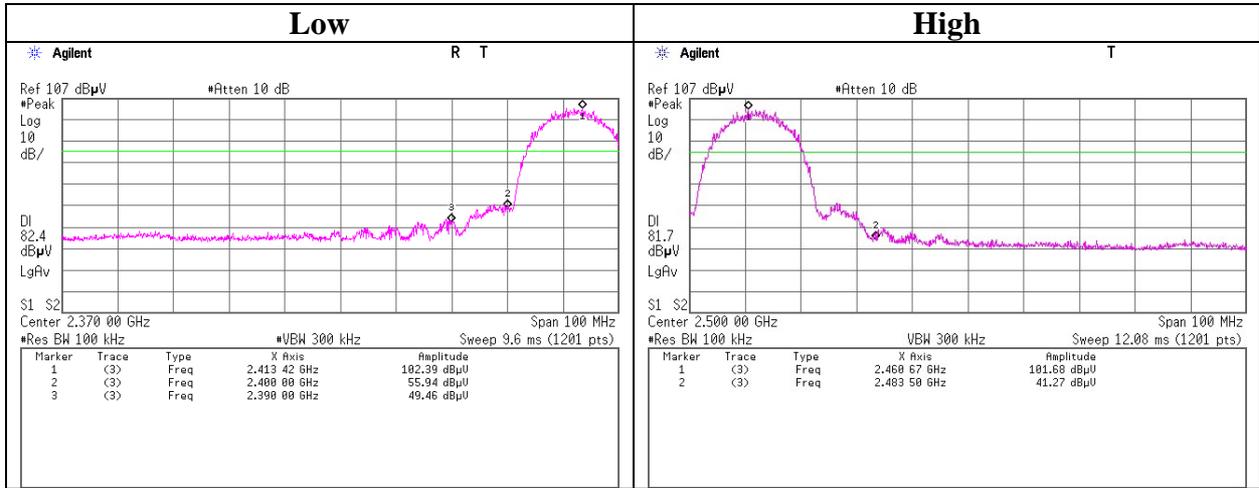
## Conducted Spurious Emission

### 11g Tx 2462MHz

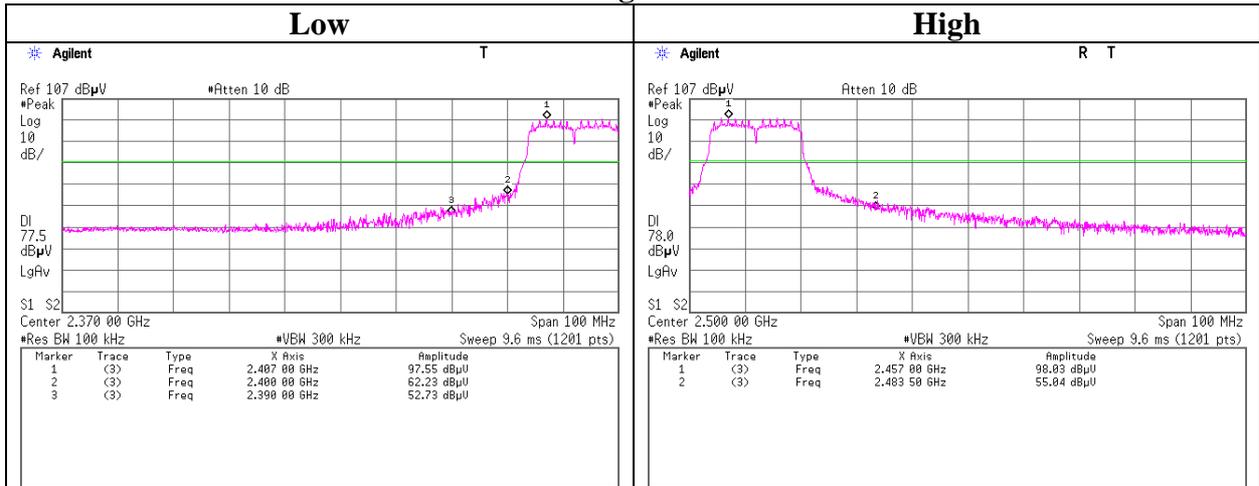


## Conducted Emission Band Edge compliance

### 11b Tx



### 11g Tx



### Power Density

Test place                      Head Office EMC Lab. No.6 Measurement Room  
Report No.                      31CE0252-HO-01  
Date                              11/05/2010  
Temperature/ Humidity        21 deg.C./ 46%  
Engineer                        Hisayoshi Sato  
Mode                              11b/g Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-5.15	2.67	10.08	7.60	8.00	0.41
2437.00	-4.98	2.51	10.08	7.61	8.00	0.39
2462.00	-5.20	2.44	10.08	7.32	8.00	0.68

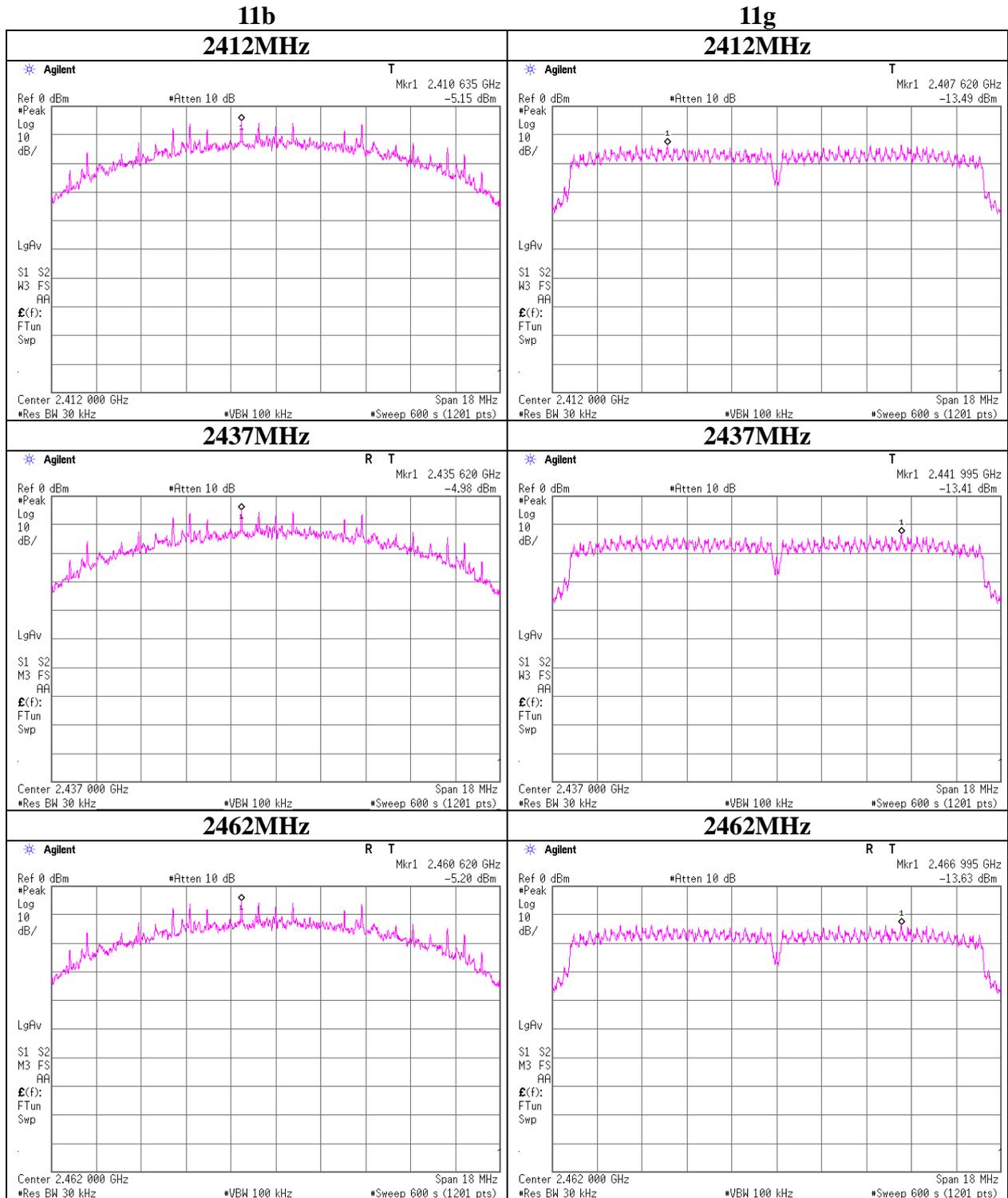
11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-13.49	2.67	10.08	-0.74	8.00	8.75
2437.00	-13.41	2.51	10.08	-0.82	8.00	8.82
2462.00	-13.63	2.44	10.08	-1.11	8.00	9.11

Sample Calculation:

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

**Power Density**



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

#### **EMI test equipment (1/2)**

<b>Control No.</b>	<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Serial No</b>	<b>Test Item</b>	<b>Calibration Date * Interval(month)</b>
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2010/05/19 * 12
MCC-66	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	28636/2	AT	2010/04/27 * 12
MAT-20	Attenuator(10dB)(above1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2010/01/26 * 12
MCC-66	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	28636/2	AT	2010/04/27 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT/RE	2010/02/03 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2010/09/10 * 12
MPM-11	Dual Power Meter	Agilent	E4419B	MY45102060	AT	2010/07/30 * 12
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	-
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	BBHA91703 07	RE	2010/06/29 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2009/12/15 * 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

**EMI test equipment (2/2)**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE/CE	2010/10/27 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE	2010/02/04 * 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)/sucoform1 41-PE(1m)/RFM- E121(Switcher)	-/04178	CE	2010/07/21 * 12

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

**All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.**

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

**Test Item: CE: Conducted Emission**

**RE: Radiated Emission**

**AT: Antenna Terminal Conducted test**

---

**UL Japan, Inc.**

**Head Office EMC Lab.**

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

**Telephone : +81 596 24 8116**

**Facsimile : +81 596 24 8124**