

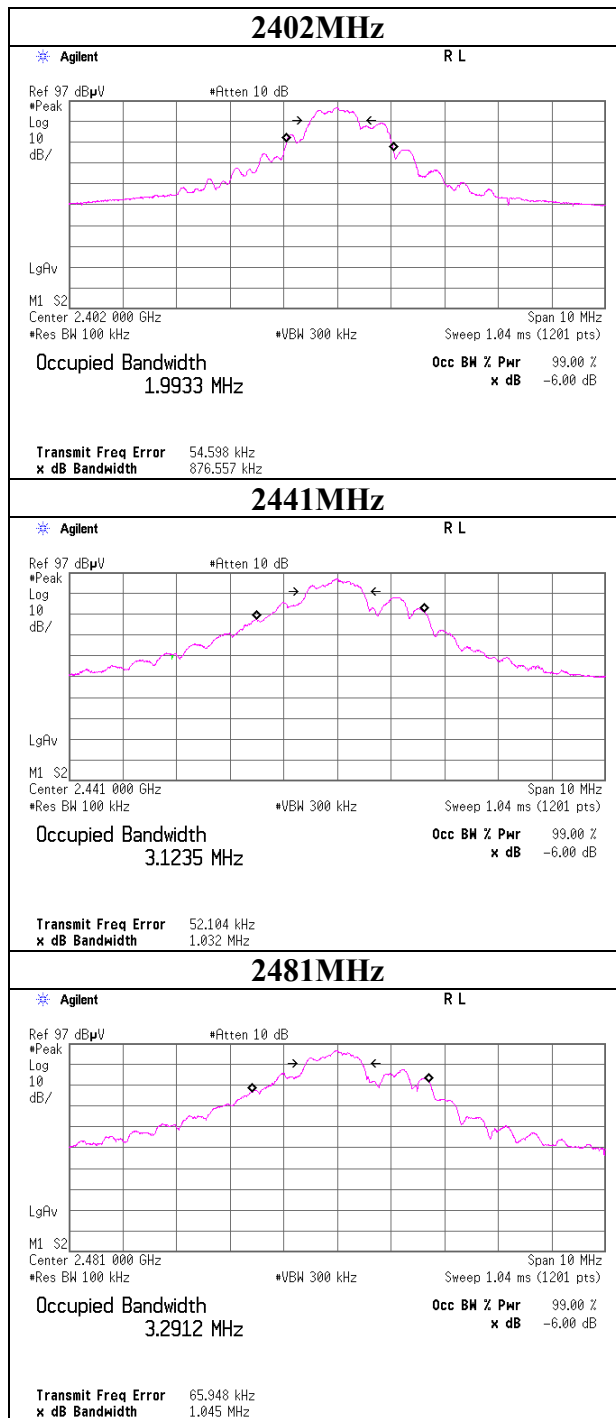
APPENDIX 2: Data of EMI test

6dB Bandwidth

Test place Head Office EMC Lab. No.4 Measurement Room
Report No. 30GE0004-HO-01
Date 02/06/2010
Temperature/ Humidity 23 deg.C./ 32%
Engineer Satofumi Matsuyama
Mode Tx

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2402	0.876	>500
2441	1.032	>500
2481	1.045	>500

6dB Bandwidth



Maximum Peak Output Power

Test place : Head Office EMC Lab. No.4 Measurement Room
Report No. : 30GE0004-HO-01
Date : 02/04/2010
Temperature/ Humidity : 20 deg.C./ 39%
Engineer : Satofumi Matsuyama
Mode : Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2402.0	-14.23	1.50	10.02	-2.71	0.54	30.00	1000	32.71
2441.0	-13.58	1.50	10.02	-2.06	0.62	30.00	1000	32.06
2481.0	-13.67	1.50	10.02	-2.15	0.61	30.00	1000	32.15

Sample Calculation:

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber		
Report No.	30GE0004-HO-01		
Date	02/04/2010	02/04/2010	02/04/2010
Temperature/ Humidity	20 deg.C./ 39%	20 deg.C./ 39%	20 deg.C./ 39%
Engineer	Kazuya Yoshioka	Satofumi Matsuyama	Kazuya Yoshioka
	(30-1000MHz)	(1-10GHz)	(10-26.5GHz)
Mode	Tx, 2402MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	31.989	QP	22.8	16.6	7.0	32.2	14.2	40.0	25.8	
Hori	63.991	QP	22.7	7.3	7.5	32.0	5.5	40.0	34.5	
Hori	96.009	QP	22.5	9.3	7.9	32.1	7.6	43.5	35.9	
Hori	128.000	QP	22.5	13.6	8.3	32.1	12.3	43.5	31.2	
Hori	640.031	QP	22.5	20.9	11.7	32.1	23.0	46.0	23.0	
Hori	800.022	QP	22.3	23.1	12.5	31.7	26.2	46.0	19.8	
Hori	2390.000	PK	53.5	26.7	2.9	32.7	50.4	73.9	23.5	
Hori	2400.000	PK	70.6	26.7	2.9	32.7	67.5	73.9	6.4	
Hori	4804.000	PK	46.7	30.8	5.3	31.9	50.9	73.9	23.0	
Hori	7206.000	PK	43.5	35.9	5.7	32.6	52.5	73.9	21.4	
Hori	9608.000	PK	43.3	37.9	6.8	33.4	54.6	73.9	19.3	
Hori	24020.000	PK	45.9	38.1	-1.2	32.5	50.3	73.9	23.6	
Hori	2390.000	AV	31.6	26.7	2.9	32.7	28.5	53.9	25.4	
Hori	2400.000	AV	41.4	26.7	2.9	32.7	38.3	53.9	15.6	
Hori	4804.000	AV	36.9	30.8	5.3	31.9	41.1	53.9	12.8	
Hori	7206.000	AV	32.5	35.9	5.7	32.6	41.5	53.9	12.4	
Hori	9608.000	AV	30.1	37.9	6.8	33.4	41.4	53.9	12.5	
Hori	24020.000	AV	34.8	38.1	-1.2	32.5	39.2	53.9	14.7	
Vert	31.986	QP	22.8	16.6	7.0	32.2	14.2	40.0	25.8	
Vert	64.007	QP	22.7	7.3	7.5	32.0	5.5	40.0	34.5	
Vert	96.020	QP	22.5	9.3	7.9	32.1	7.6	43.5	35.9	
Vert	128.000	QP	22.6	13.6	8.3	32.1	12.4	43.5	31.1	
Vert	640.017	QP	22.4	20.9	11.7	32.1	22.9	46.0	23.1	
Vert	800.006	QP	22.4	23.1	12.5	31.7	26.3	46.0	19.7	
Vert	2390.000	PK	50.8	26.7	2.9	32.7	47.7	73.9	26.2	
Vert	2400.000	PK	65.8	26.7	2.9	32.7	62.7	73.9	11.2	
Vert	4804.000	PK	46.3	30.8	5.3	31.9	50.5	73.9	23.4	
Vert	7206.000	PK	44.9	35.9	5.7	32.6	53.9	73.9	20.0	
Vert	9608.000	PK	43.0	37.9	6.8	33.4	54.3	73.9	19.6	
Vert	24020.000	PK	46.5	38.1	-1.2	32.5	50.9	73.9	23.0	
Vert	2390.000	AV	31.5	26.7	2.9	32.7	28.4	53.9	25.5	
Vert	2400.000	AV	37.7	26.7	2.9	32.7	34.6	53.9	19.3	
Vert	4804.000	AV	37.3	30.8	5.3	31.9	41.5	53.9	12.4	
Vert	7206.000	AV	34.3	35.9	5.7	32.6	43.3	53.9	10.6	
Vert	9608.000	AV	30.3	37.9	6.8	33.4	41.6	53.9	12.3	
Vert	24020.000	AV	34.8	38.1	-1.2	32.5	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 4th harmonic and over were 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.4 Semi Anechoic Chamber
Report No. : 30GE0004-HO-01
Date : 02/04/2010
Temperature/ Humidity : 20 deg.C./ 39%
Engineer : Kazuya Yoshioka

Mode : Tx, 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	31.990	QP	22.8	16.6	7.0	32.2	14.2	40.0	25.8	
Hori	64.020	QP	22.7	7.3	7.5	32.0	5.5	40.0	34.5	
Hori	96.011	QP	22.3	9.3	7.9	32.1	7.4	43.5	36.1	
Hori	128.023	QP	22.5	13.6	8.3	32.1	12.3	43.5	31.2	
Hori	639.975	QP	22.5	20.9	11.7	32.1	23.0	46.0	23.0	
Hori	800.021	QP	22.4	23.1	12.5	31.7	26.3	46.0	19.7	
Hori	4882.000	PK	43.8	31.1	5.3	31.9	48.3	73.9	25.6	
Hori	7323.000	PK	41.0	36.1	5.7	32.6	50.2	73.9	23.7	
Hori	9764.000	PK	41.2	38.1	6.9	33.4	52.8	73.9	21.1	
Hori	24410.000	PK	44.2	38.3	-1.1	32.3	49.1	73.9	24.8	
Hori	4882.000	AV	34.9	31.1	5.3	31.9	39.4	53.9	14.5	
Hori	7323.000	AV	30.8	36.1	5.7	32.6	40.0	53.9	13.9	
Hori	9764.000	AV	30.2	38.1	6.9	33.4	41.8	53.9	12.1	
Hori	24410.000	AV	33.6	38.3	-1.1	32.3	38.5	53.9	15.4	
Vert	32.021	QP	22.8	16.6	7.0	32.2	14.2	40.0	25.8	
Vert	63.990	QP	22.7	7.3	7.5	32.0	5.5	40.0	34.5	
Vert	95.981	QP	22.4	9.3	7.9	32.1	7.5	43.5	36.0	
Vert	128.008	QP	22.5	13.6	8.3	32.1	12.3	43.5	31.2	
Vert	639.982	QP	22.5	20.9	11.7	32.1	23.0	46.0	23.0	
Vert	800.020	QP	22.4	23.1	12.5	31.7	26.3	46.0	19.7	
Vert	4882.000	PK	47.5	31.1	5.3	31.9	52.0	73.9	21.9	
Vert	7323.000	PK	46.1	36.1	5.7	32.6	55.3	73.9	18.6	
Vert	9764.000	PK	41.2	38.1	6.9	33.4	52.8	73.9	21.2	
Vert	24410.000	PK	44.8	38.3	-1.1	32.3	49.7	73.9	24.2	
Vert	4882.000	AV	38.9	31.1	5.3	31.9	43.4	53.9	10.5	
Vert	7323.000	AV	36.1	36.1	5.7	32.6	45.3	53.9	8.6	
Vert	9764.000	AV	30.2	38.1	6.9	33.4	41.8	53.9	12.1	
Vert	24410.000	AV	33.6	38.3	-1.1	32.3	38.5	53.9	15.4	

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 4th harmonic and over were 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.4 Semi Anechoic Chamber
Report No. 30GE0004-HO-01
Date 02/04/2010 02/04/2010 02/04/2010
Temperature/ Humidity 20 deg.C./ 39% 20 deg.C./ 39% 20 deg.C./ 39%
Engineer Kazuya Yoshioka Satofumi Matsuyama Kazuya Yoshioka
Mode Tx, 2481MHz (30-1000MHz) (1-10GHz) (10-26.5GHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	32.024	QP	22.8	16.6	7.0	32.2	14.2	40.0	25.8	
Hori	63.975	QP	22.8	7.3	7.5	32.0	5.6	40.0	34.4	
Hori	96.009	QP	22.3	9.3	7.9	32.1	7.4	43.5	36.1	
Hori	128.015	QP	22.6	13.6	8.3	32.1	12.4	43.5	31.1	
Hori	640.003	QP	22.5	20.9	11.7	32.1	23.0	46.0	23.0	
Hori	800.019	QP	22.3	23.1	12.5	31.7	26.2	46.0	19.8	
Hori	2483.500	PK	67.8	26.9	2.9	32.7	64.9	73.9	9.0	
Hori	4962.000	PK	45.2	31.3	5.4	31.9	50.0	73.9	23.9	
Hori	7443.000	PK	43.6	36.3	5.7	32.7	52.9	73.9	21.0	
Hori	9924.000	PK	42.9	38.3	7.1	33.5	54.8	73.9	19.1	
Hori	24810.000	PK	47.7	38.4	-1.0	32.2	52.9	73.9	21.0	
Hori	2483.500	AV	37.4	26.9	2.9	32.7	34.5	53.9	19.4	
Hori	4962.000	AV	36.6	31.3	5.4	31.9	41.4	53.9	12.5	
Hori	7443.000	AV	33.0	36.3	5.7	32.7	42.3	53.9	11.6	
Hori	9924.000	AV	30.8	38.3	7.1	33.5	42.7	53.9	11.2	
Hori	24810.000	AV	36.3	38.4	-1.0	32.2	41.5	53.9	12.4	
Vert	31.975	QP	22.8	16.6	7.0	32.2	14.2	40.0	25.8	
Vert	64.011	QP	22.8	7.3	7.5	32.0	5.6	40.0	34.4	
Vert	96.018	QP	22.4	9.3	7.9	32.1	7.5	43.5	36.0	
Vert	128.025	QP	22.5	13.6	8.3	32.1	12.3	43.5	31.2	
Vert	639.995	QP	22.5	20.9	11.7	32.1	23.0	46.0	23.0	
Vert	800.007	QP	22.4	23.1	12.5	31.7	26.3	46.0	19.7	
Vert	2483.500	PK	62.8	26.9	2.9	32.7	59.9	73.9	14.0	
Vert	4962.000	PK	47.3	31.3	5.4	31.9	52.1	73.9	21.8	
Vert	7443.000	PK	45.6	36.3	5.7	32.7	54.9	73.9	19.0	
Vert	9924.000	PK	42.7	38.3	7.1	33.5	54.6	73.9	19.3	
Vert	24810.000	PK	47.6	38.4	-1.0	32.2	52.8	73.9	21.1	
Vert	2483.500	AV	36.7	26.9	2.9	32.7	33.8	53.9	20.1	
Vert	4962.000	AV	39.0	31.3	5.4	31.9	43.8	53.9	10.1	
Vert	7443.000	AV	34.5	36.3	5.7	32.7	43.8	53.9	10.1	
Vert	9924.000	AV	30.9	38.3	7.1	33.5	42.8	53.9	11.1	
Vert	24810.000	AV	36.3	38.4	-1.0	32.2	41.5	53.9	12.4	

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 4th harmonic and over were 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.4 Semi Anechoic Chamber
Report No. : 30GE0004-HO-01
Date : 02/04/2010
Temperature/ Humidity : 20 deg.C./ 39%
Engineer : Kazuya Yoshioka

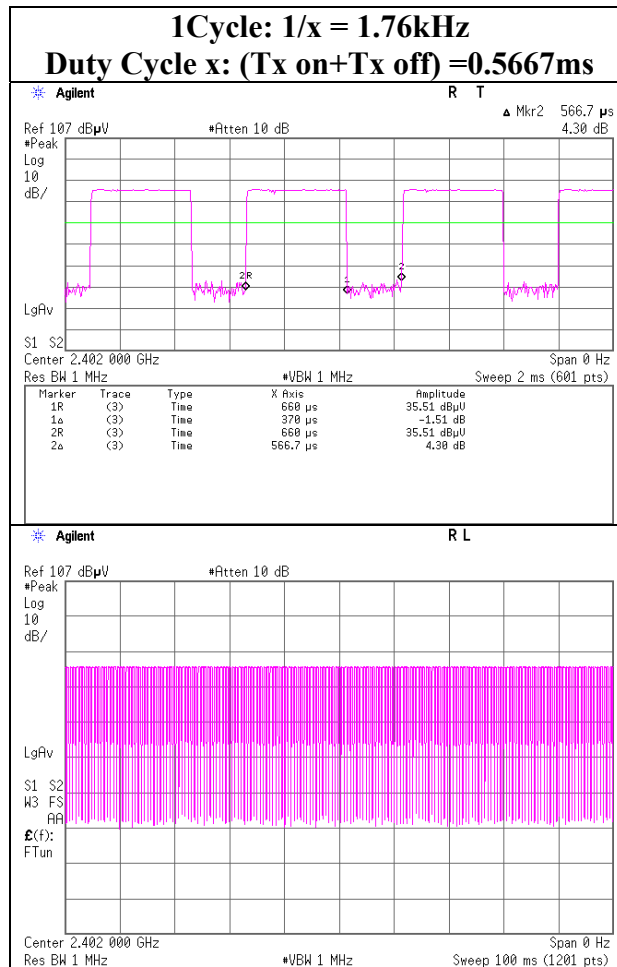
Mode : Rx, 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	32.018	QP	22.8	16.6	7.0	32.2	14.2	40.0	25.8	
Hori	63.998	QP	22.7	7.3	7.5	32.0	5.5	40.0	34.5	
Hori	96.012	QP	22.4	9.3	7.9	32.1	7.5	43.5	36.0	
Hori	128.009	QP	22.5	13.6	8.3	32.1	12.3	43.5	31.2	
Hori	639.999	QP	22.5	20.9	11.7	32.1	23.0	46.0	23.0	
Hori	799.990	QP	22.4	23.1	12.5	31.7	26.3	46.0	19.7	
Hori	2441.000	PK	42.4	26.8	2.9	32.7	39.4	73.9	34.5	
Hori	2441.000	AV	29.8	26.8	2.9	32.7	26.8	53.9	27.1	
Vert	31.983	QP	22.8	16.6	7.0	32.2	14.2	40.0	25.8	
Vert	63.978	QP	22.7	7.3	7.5	32.0	5.5	40.0	34.5	
Vert	95.993	QP	22.4	9.3	7.9	32.1	7.5	43.5	36.0	
Vert	128.000	QP	22.6	13.6	8.3	32.1	12.4	43.5	31.1	
Vert	640.001	QP	22.5	20.9	11.7	32.1	23.0	46.0	23.0	
Vert	799.996	QP	22.4	23.1	12.5	31.7	26.3	46.0	19.7	
Vert	2441.000	PK	43.3	26.8	2.9	32.7	40.3	73.9	33.6	
Vert	2441.000	AV	29.8	26.8	2.9	32.7	26.8	53.9	27.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter)- Gain(Amplifier)

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

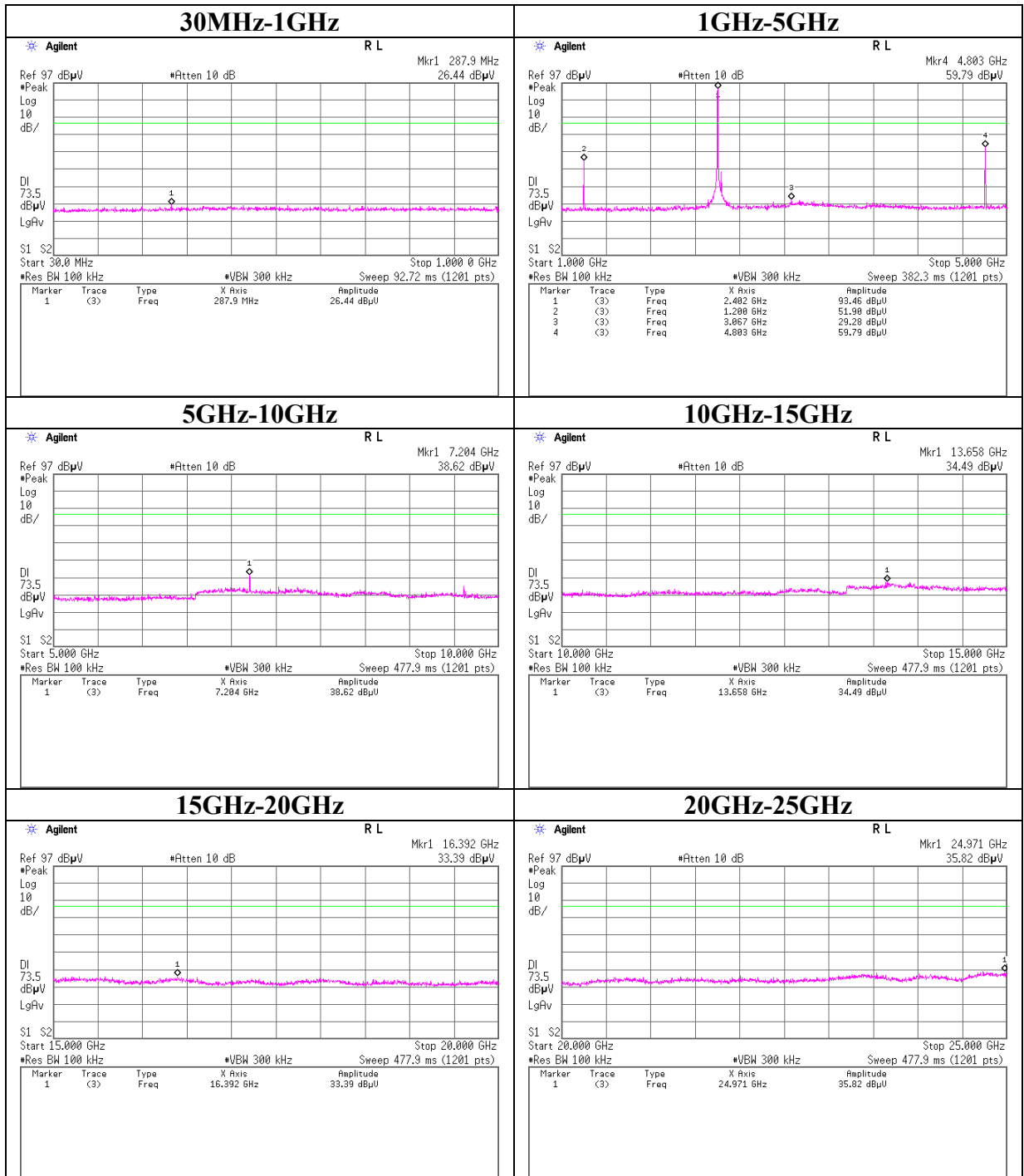
VBW (AV) Calculation



The test was performed with Burst transmission.
 The above chart shows the maximum ON time and the minimum OFF time.

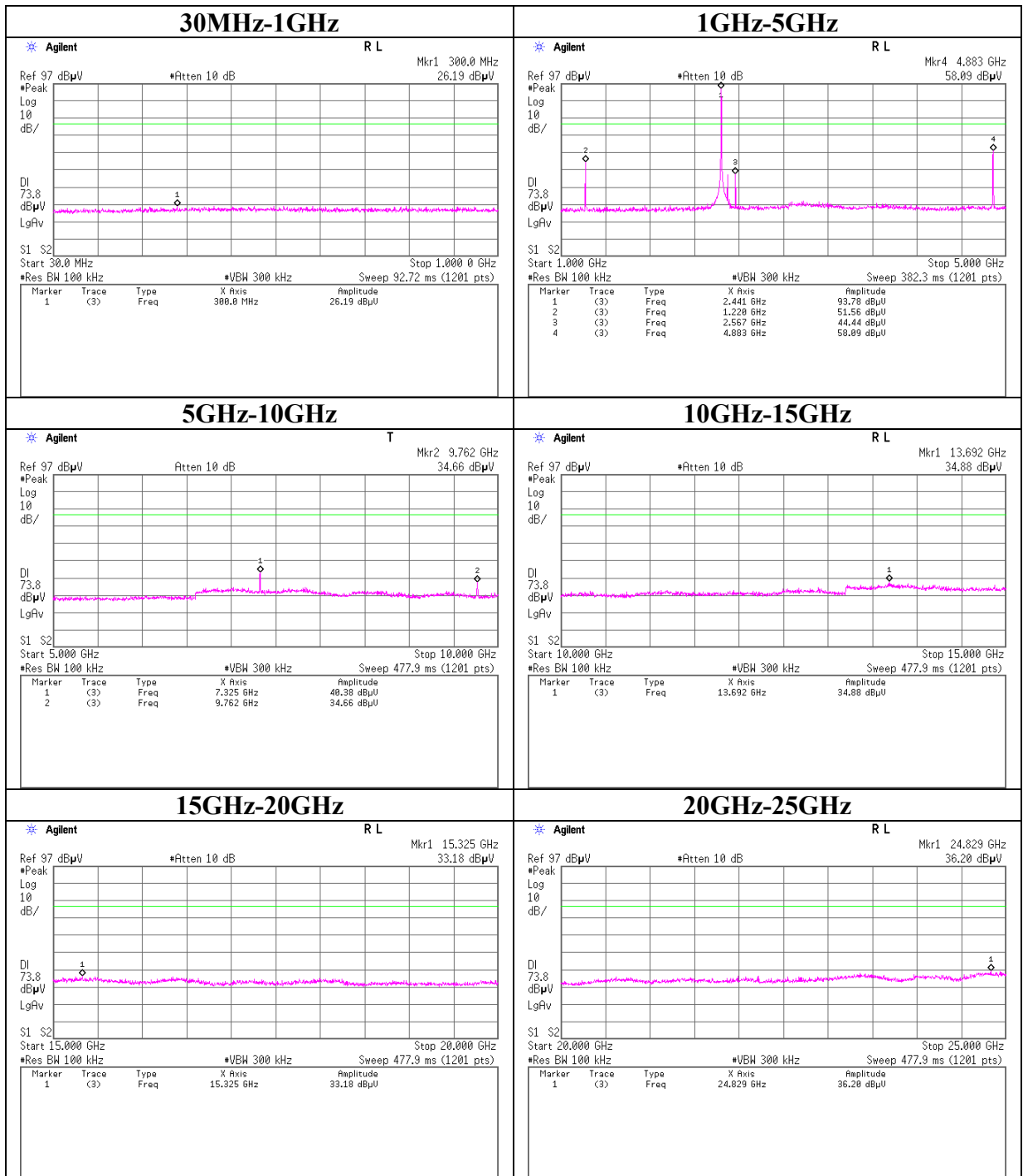
Conducted Spurious Emission

Tx 2402MHz



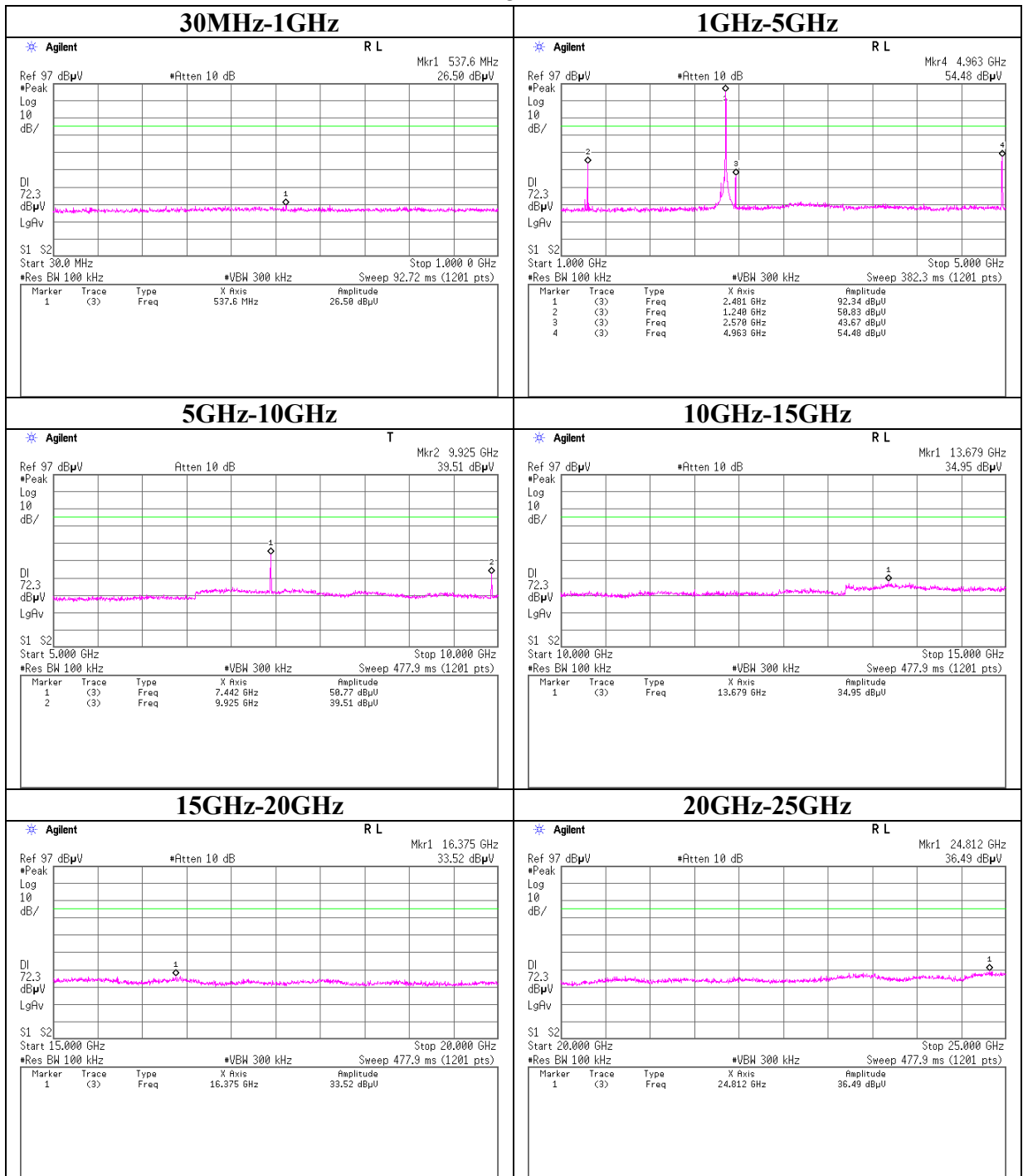
Conducted Spurious Emission

Tx 2441MHz



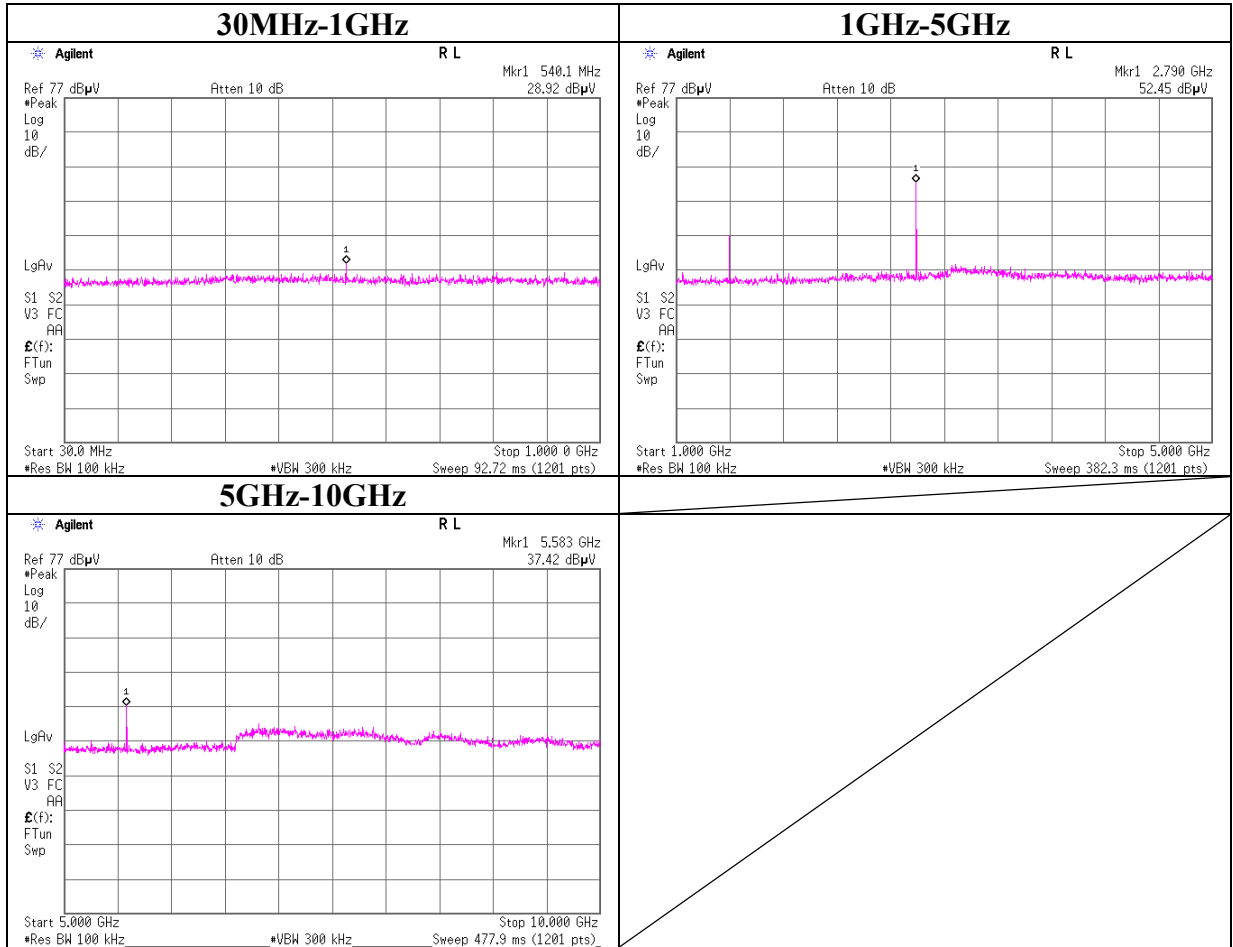
Conducted Spurious Emission

Tx 2481MHz

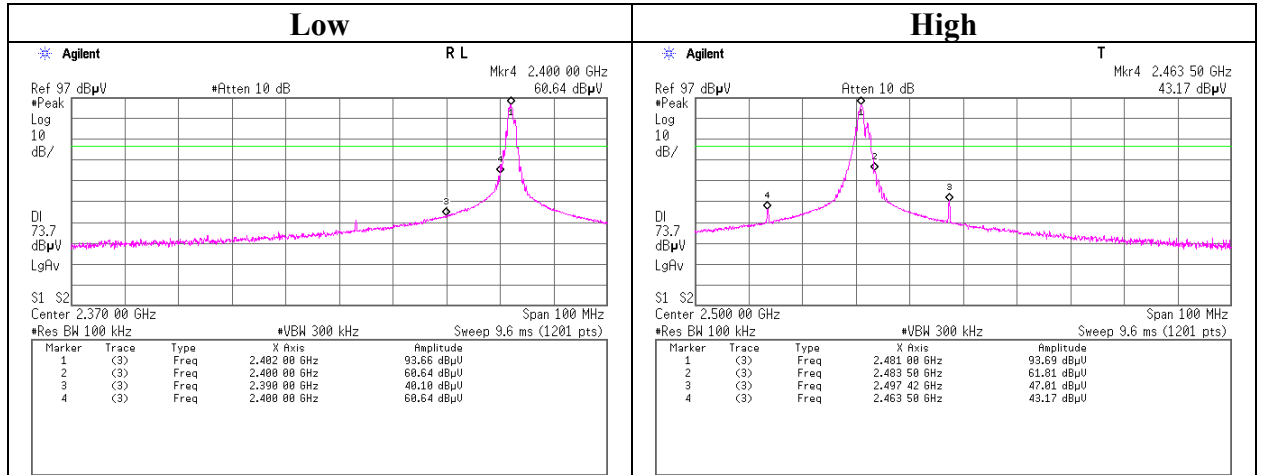


Conducted Spurious Emission

Rx 2441MHz



Conducted Emission Band Edge compliance



Power Density

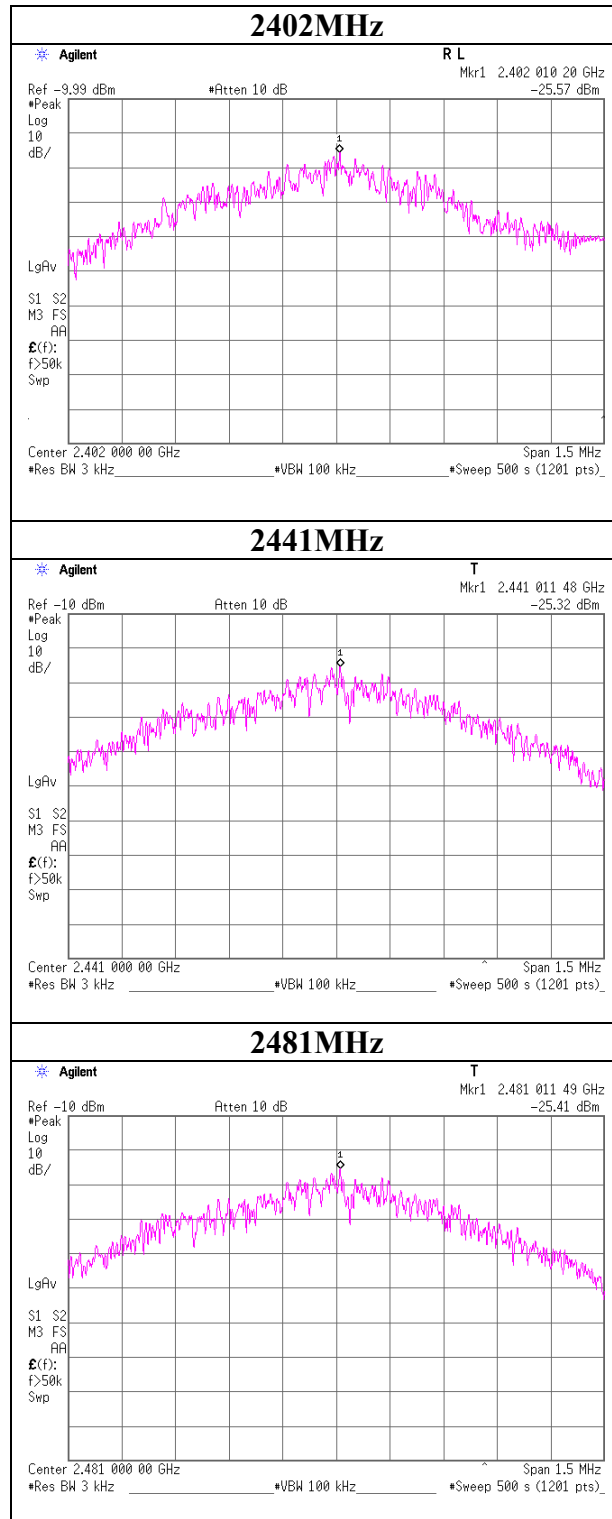
Test place Head Office EMC Lab. No.4 Measurement Room
Report No. 30GE0004-HO-01
Date 02/06/2010
Temperature/ Humidity 23 deg.C./ 32%
Engineer Satofumi Matsuyama
Mode Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402.01	-25.57	1.50	10.02	-14.05	8.00	22.05
2441.01	-25.32	1.50	10.02	-13.80	8.00	21.80
2481.01	-25.41	1.50	10.02	-13.89	8.00	21.89

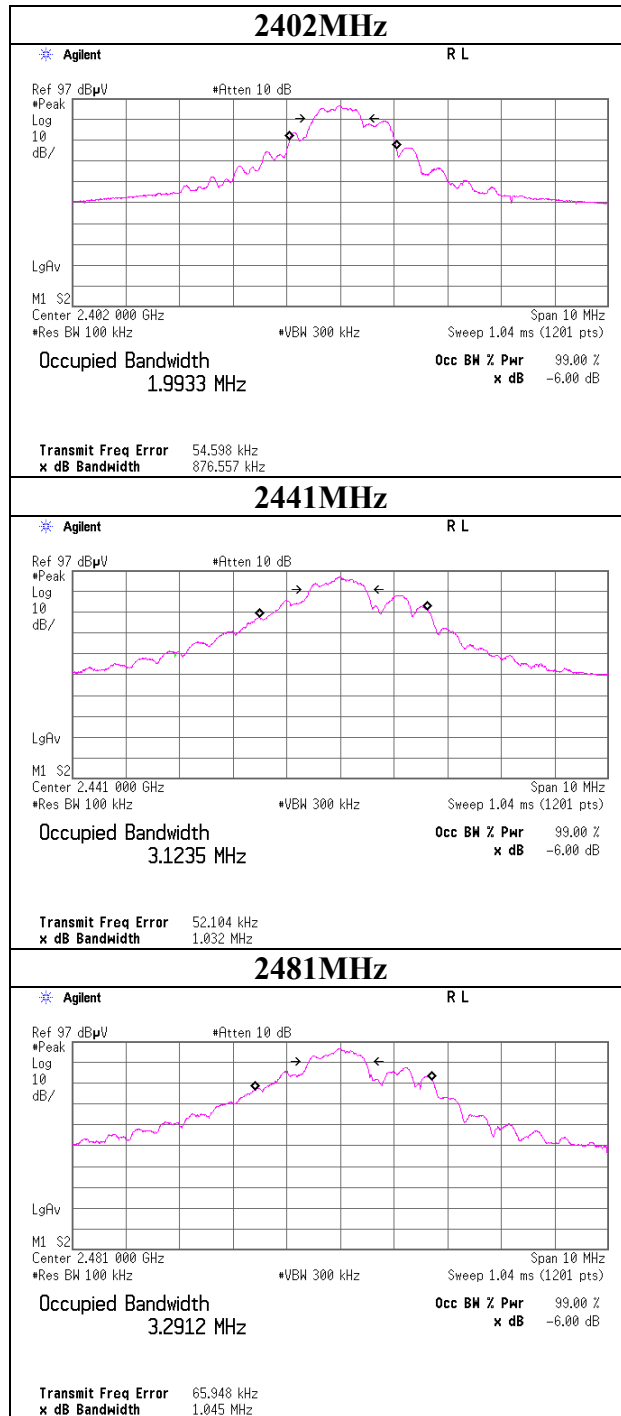
Sample Calculation:

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

Power Density



99% Occupied Bandwidth



APPENDIX 3: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2010/02/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/AT	2009/02/06 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE/AT	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE/AT	2010/02/03 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2009/08/10 * 12
MCC-57	Microwave Cable 1G-26.5GHz 6m	Suhner	SUCOFLEX104	246769(1m) / 292411(5m)	RE	2009/11/17 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2009/03/19 * 12
MHF-20	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCC	607	RE	2009/12/19 * 12
MCC-79	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278923/4	RE	2009/12/19 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2009/08/26 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2009/08/26 * 12
MAT-22	Attenuator(10dB) DC-18GHz	Orient Microwave	BX10-0476-00	-	AT	2009/03/24 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2009/12/15 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE	2009/10/23 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2010/01/23 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2010/01/23 * 12
MCC-50	Coaxial cable	UL Japan	-	-	RE	2009/03/18 * 12
MAT-51	Attenuator(6dB)	Weinschel	2	AS3557	RE	2010/01/20 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2009/03/18 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2009/06/18 * 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: 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