

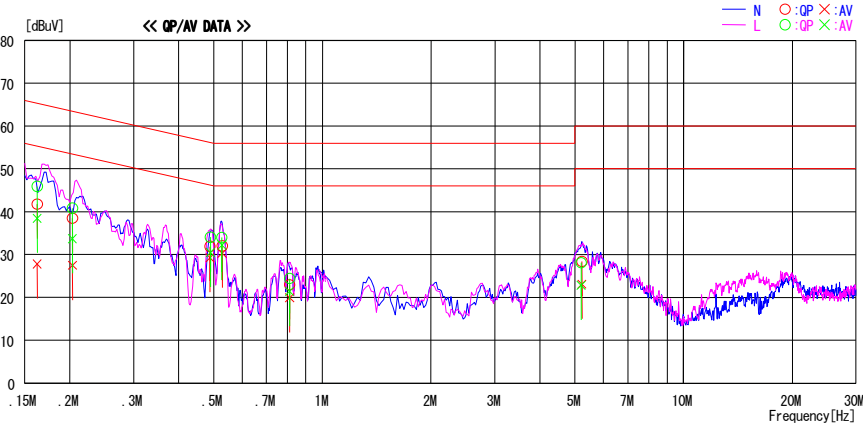
APPENDIX 2: Data of EMI test

Conducted Emission

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 29JE0008-HO-01
Date : 06/02/2009
Temperature/ Humidity : 24 deg. C./ 49%
Engineer : Takayuki Shimada
Mode : Tx

DATA OF CONDUCTED EMISSION TEST

Company : YAMAHA CORPORATION
Model No. : AWCARD
Serial No. : 025
Mode / Remarks : Tx 2405.376MHz
LIMIT : FCC15.207 QP
FCC15.207 AV

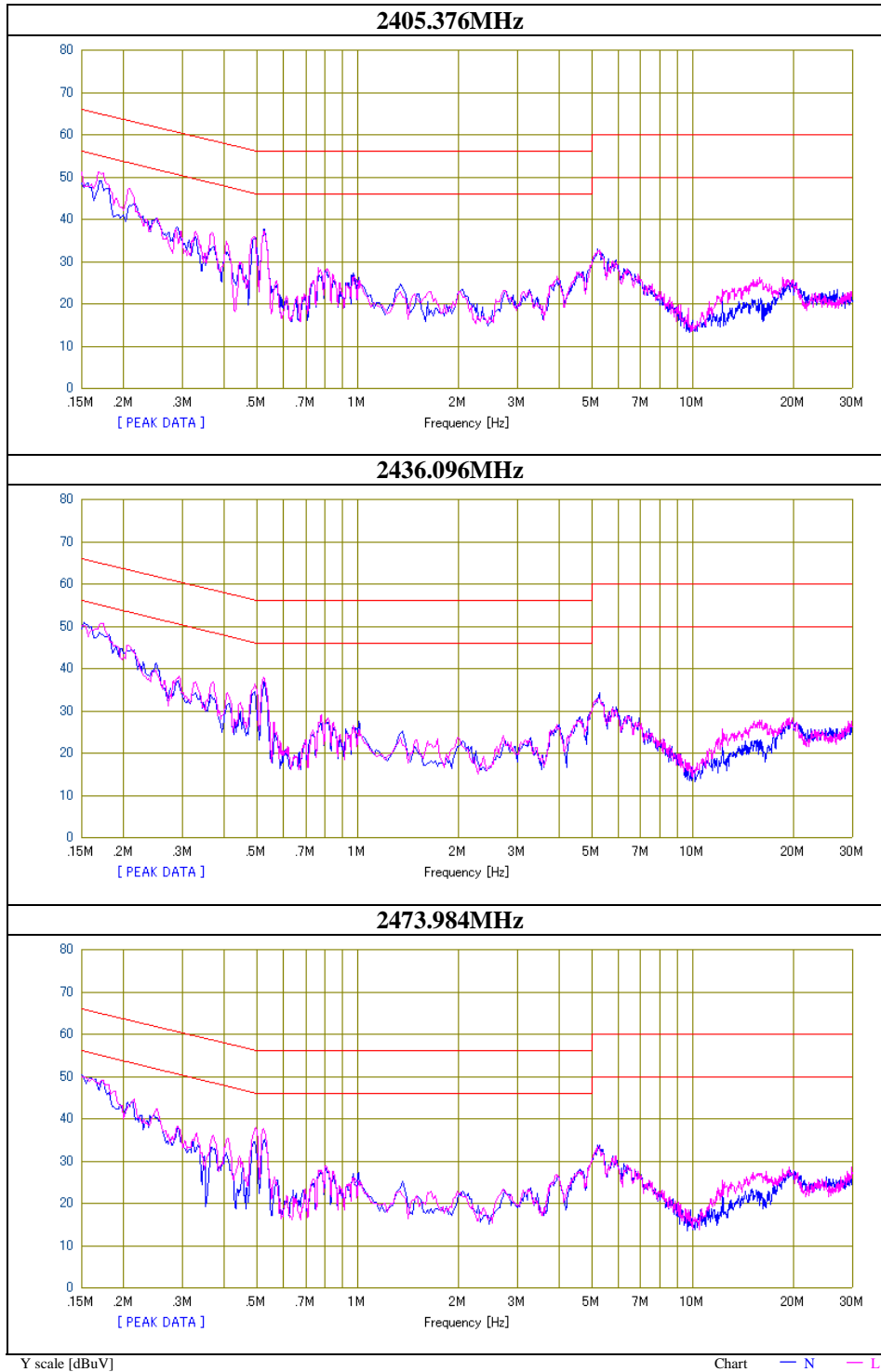


Frequency [MHz]	Reading Level		Corr Factor	Results		Limit		Margin		Phase
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
0.16225	41.5	27.5	0.3	41.8	27.8	65.3	55.3	23.5	27.5	N
0.20330	38.1	27.1	0.4	38.5	27.5	63.5	53.5	25.0	26.0	N
0.48845	31.5	28.9	0.4	31.9	29.3	56.2	46.2	24.3	16.9	N
0.52845	31.6	29.9	0.4	32.0	30.3	56.0	46.0	24.0	15.7	N
0.81185	22.6	19.5	0.4	23.0	19.9	56.0	46.0	33.0	26.1	N
5.22623	27.1	21.8	1.3	28.4	23.1	60.0	50.0	31.6	26.9	N
0.16232	45.6	38.2	0.3	45.9	38.5	65.3	55.3	19.4	16.8	L
0.20321	40.4	33.3	0.4	40.8	33.7	63.5	53.5	22.7	19.8	L
0.49008	33.7	30.1	0.4	34.1	30.5	56.2	46.2	22.1	15.7	L
0.52696	33.6	31.8	0.4	34.0	32.2	56.0	46.0	22.0	13.8	L
0.81126	24.0	21.0	0.4	24.4	21.4	56.0	46.0	31.6	24.6	L
5.20423	26.8	21.5	1.3	28.1	22.8	60.0	50.0	31.9	27.2	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.	29JE0008-HO-01
Date	06/02/2009
Temperature/ Humidity	24 deg.C./ 49%
Engineer	Takayuki Shimada
Mode	Tx

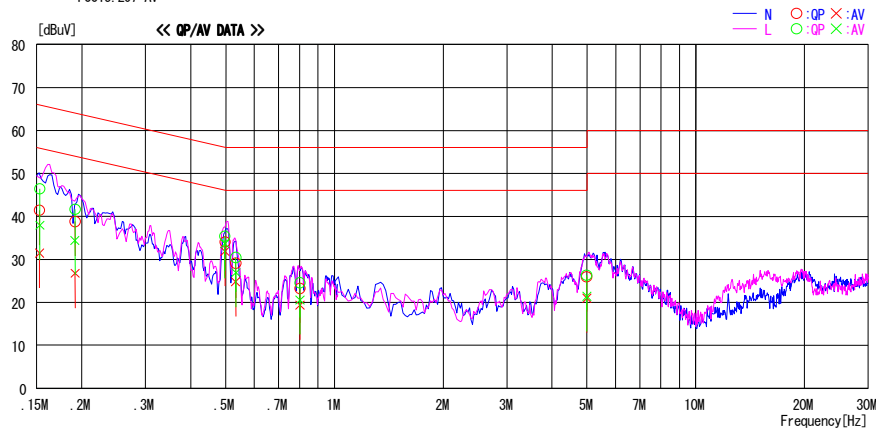


Conducted Emission

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 29JE0008-HO-01
Date : 06/02/2009
Temperature/ Humidity : 24 deg.C./ 49%
Engineer : Takayuki Shimada
Mode : Rx

DATA OF CONDUCTED EMISSION TEST

Company : YAMAHA CORPORATION
Model No. : AWCARD
Serial No. : 025
Mode / Remarks : Rx 2436.096MHz
LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
0.15268	41.1	31.1	0.3	41.4	31.4	65.9	55.9	24.5	24.5	N
0.19168	38.4	26.3	0.4	38.8	26.7	64.0	54.0	25.2	27.3	N
0.49806	33.6	31.4	0.4	34.0	31.8	56.0	46.0	22.0	14.2	N
0.53336	28.7	24.3	0.4	29.1	24.7	56.0	46.0	26.9	21.3	N
0.80281	22.8	18.9	0.4	23.2	19.3	56.0	46.0	32.8	26.7	N
4.99151	24.7	19.7	1.2	25.9	20.9	56.0	46.0	30.1	25.1	N
0.15312	46.1	37.6	0.3	46.4	37.9	65.8	55.8	19.4	17.9	L
0.19142	41.2	34.0	0.4	41.6	34.4	64.0	54.0	22.4	19.6	L
0.49740	35.0	33.2	0.4	35.4	33.6	56.0	46.0	20.6	12.4	L
0.53396	30.0	26.5	0.4	30.4	26.9	56.0	46.0	25.6	19.1	L
0.80256	24.1	20.1	0.4	24.5	20.5	56.0	46.0	31.5	25.5	L
4.99151	25.1	20.1	1.2	26.3	21.3	56.0	46.0	29.7	24.7	L

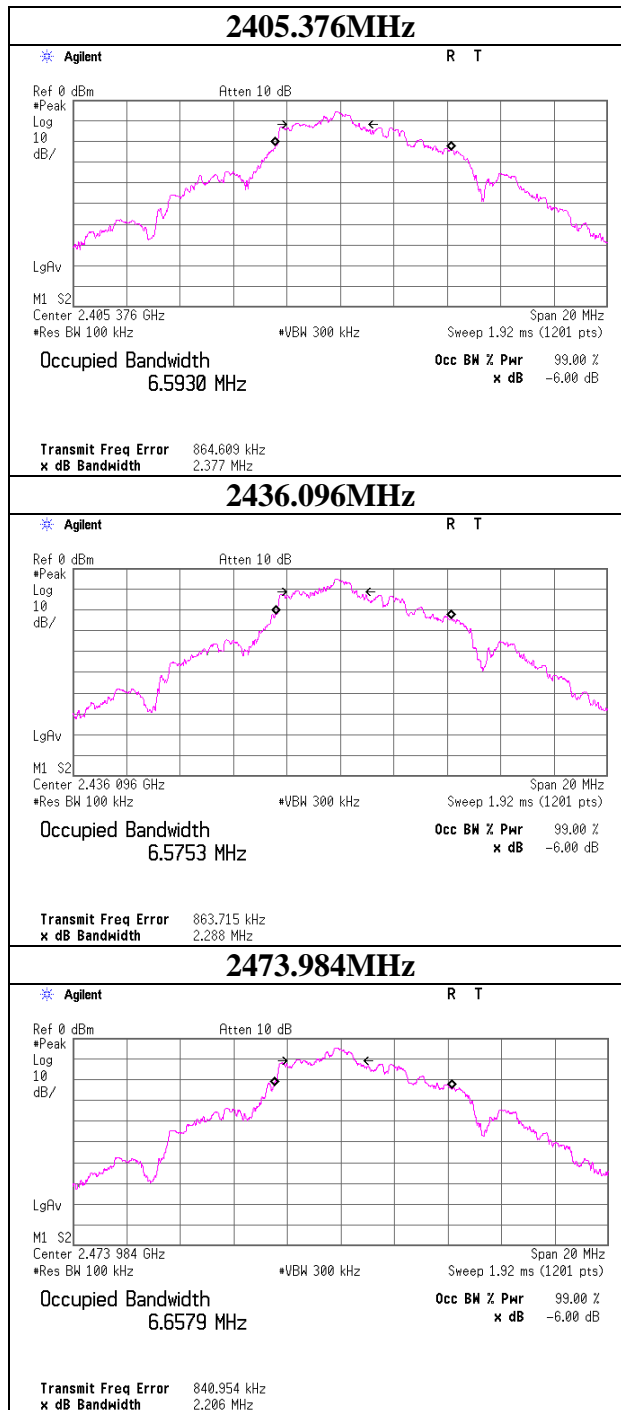
CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT[dBuV]=READING[dBuV]+C. F[dB] (LISN LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

6dB Bandwidth

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 29JE0008-HO-01
Date 05/30/2009
Temperature/ Humidity 26 deg.C./ 58%
Engineer Takayuki Shimada
Mode Tx

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2405.376	2.377	>500
2436.096	2.288	>500
2473.984	2.206	>500

6dB Bandwidth



Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 29JE0008-HO-01
Date 05/30/2009
Temperature/ Humidity 26 deg.C./ 58%
Engineer Takayuki Shimada
Mode Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2405.376	-4.38	1.08	10.02	6.72	4.70	30.00	1000	23.28
2436.096	-3.99	1.09	10.02	7.12	5.15	30.00	1000	22.88
2473.984	-3.61	1.10	10.02	7.51	5.64	30.00	1000	22.49

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.4 Anechoic Chamber
Report No. : 29JE0008-HO-01
Date : 06/01/2009 06/02/2009
Temperature/ Humidity : 23 deg.C./ 41% 22 deg.C./ 50%
Engineer : Takayuki Shimada Katsunori Okai
(Above 1GHz) (Below 1GHz)
Mode : Tx 2405.376MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	233.419	QP	38.1	17.2	9.4	31.9	32.8	46.0	13.2	
Hori	282.612	QP	38.9	19.3	9.8	31.9	36.1	46.0	9.9	
Hori	296.901	QP	37.0	20.0	9.9	31.9	35.0	46.0	11.0	
Hori	307.184	QP	41.0	16.4	10.0	31.9	35.5	46.0	10.5	
Hori	319.472	QP	40.6	16.6	10.0	31.9	35.3	46.0	10.7	
Hori	356.339	QP	35.7	17.2	10.3	32.0	31.2	46.0	14.8	
Hori	2390.000	PK	44.2	27.2	2.8	32.7	41.5	73.9	32.4	
Hori	2400.000	PK	68.7	27.2	12.9	32.7	76.1	-	-	See 20dBc Data Sheet
Hori	4810.752	PK	53.9	31.5	5.3	31.9	58.8	73.9	15.1	
Hori	24053.760	PK	47.7	38.6	-1.1	32.5	52.7	73.9	21.2	
Hori	2390.000	AV	30.6	27.2	2.8	32.7	27.9	53.9	26.0	
Hori	2400.000	AV	53.8	27.2	12.9	32.7	61.2	-	-	See 20dBc Data Sheet
Hori	4810.752	AV	48.1	31.5	5.3	31.9	53.0	53.9	0.9	
Hori	24053.760	AV	33.8	38.6	-1.1	32.5	38.8	53.9	15.1	
Vert	233.461	QP	32.6	17.2	9.4	31.9	27.3	46.0	18.7	
Vert	282.619	QP	37.3	19.3	9.8	31.9	34.5	46.0	11.5	
Vert	294.899	QP	36.7	19.9	9.9	31.9	34.6	46.0	11.4	
Vert	307.193	QP	38.5	16.4	10.0	31.9	33.0	46.0	13.0	
Vert	319.478	QP	35.4	16.6	10.0	31.9	30.1	46.0	15.9	
Vert	356.338	QP	31.1	17.2	10.3	32.0	26.6	46.0	19.4	
Vert	2390.000	PK	43.3	27.2	2.8	32.7	40.6	73.9	33.3	
Vert	2400.000	PK	66.6	27.2	12.9	32.7	74.0	-	-	See 20dBc Data Sheet
Vert	4810.752	PK	53.5	31.5	5.3	31.9	58.4	73.9	15.5	
Vert	24053.760	PK	47.4	38.6	-1.1	32.5	52.4	73.9	21.5	
Vert	2390.000	AV	29.8	27.2	2.8	32.7	27.1	53.9	26.8	
Vert	2400.000	AV	51.6	27.2	12.9	32.7	59.0	-	-	See 20dBc Data Sheet
Vert	4810.752	AV	47.7	31.5	5.3	31.9	52.6	53.9	1.3	
Vert	24053.760	AV	33.8	38.6	-1.1	32.5	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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.4 Anechoic Chamber
Report No. 29JE0008-HO-01
Date 06/01/2009
Temperature/ Humidity 23 deg.C./ 41%
Engineer Takayuki Shimada
Mode Tx 2405.376MHz

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	2405.376	PK	97.9	27.2	12.9	32.7	105.3	-	-	Carrier
Hori	2400.000	PK	63.0	27.2	12.9	32.7	70.4	85.3	14.9	
Vert	2405.376	PK	96.2	27.2	12.9	32.7	103.6	-	-	Carrier
Vert	2400.000	PK	60.8	27.2	12.9	32.7	68.2	83.6	15.4	

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

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.4 Anechoic Chamber
Report No. 29JE0008-HO-01
Date 06/01/2009 06/02/2009
Temperature/ Humidity 23 deg.C./ 41% 22 deg.C./ 50%
Engineer Takayuki Shimada Katsunori Okai
(Above 1GHz) (Below 1GHz)
Mode Tx 2436.096MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	233.462	QP	35.4	17.2	9.4	31.9	30.1	46.0	15.9	
Hori	282.643	QP	37.8	19.3	9.8	31.9	35.0	46.0	11.0	
Hori	294.911	QP	39.4	19.9	9.9	31.9	37.3	46.0	8.7	
Hori	307.232	QP	40.7	16.4	10.0	31.9	35.2	46.0	10.8	
Hori	319.499	QP	37.8	16.6	10.0	31.9	32.5	46.0	13.5	
Hori	356.379	QP	36.8	17.2	10.3	32.0	32.3	46.0	13.7	
Hori	4872.192	PK	52.2	31.7	5.3	31.9	57.3	73.9	16.6	
Hori	24360.960	PK	47.3	38.8	-1.1	32.3	52.7	73.9	21.2	
Hori	4872.192	AV	46.1	31.7	5.3	31.9	51.2	53.9	2.7	
Hori	24360.960	AV	33.6	38.8	-1.1	32.3	39.0	53.9	14.9	
Vert	233.456	QP	31.6	17.2	9.4	31.9	26.3	46.0	19.7	
Vert	282.676	QP	38.4	19.3	9.8	31.9	35.6	46.0	10.4	
Vert	294.904	QP	36.2	19.9	9.9	31.9	34.1	46.0	11.9	
Vert	307.212	QP	37.6	16.4	10.0	31.9	32.1	46.0	13.9	
Vert	319.483	QP	35.7	16.6	10.0	31.9	30.4	46.0	15.6	
Vert	356.372	QP	31.6	17.2	10.3	32.0	27.1	46.0	18.9	
Vert	4872.192	PK	52.1	31.7	5.3	31.9	57.2	73.9	16.7	
Vert	24360.960	PK	47.1	38.8	-1.1	32.3	52.5	73.9	21.4	
Vert	4872.192	AV	46.1	31.7	5.3	31.9	51.2	53.9	2.7	
Vert	24360.960	AV	33.6	38.8	-1.1	32.3	39.0	53.9	14.9	

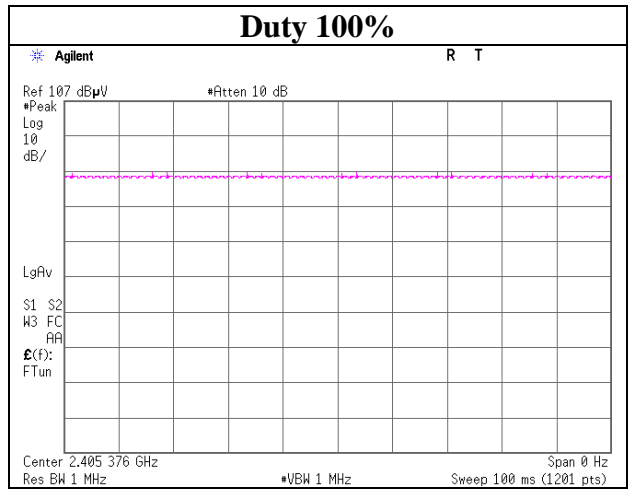
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

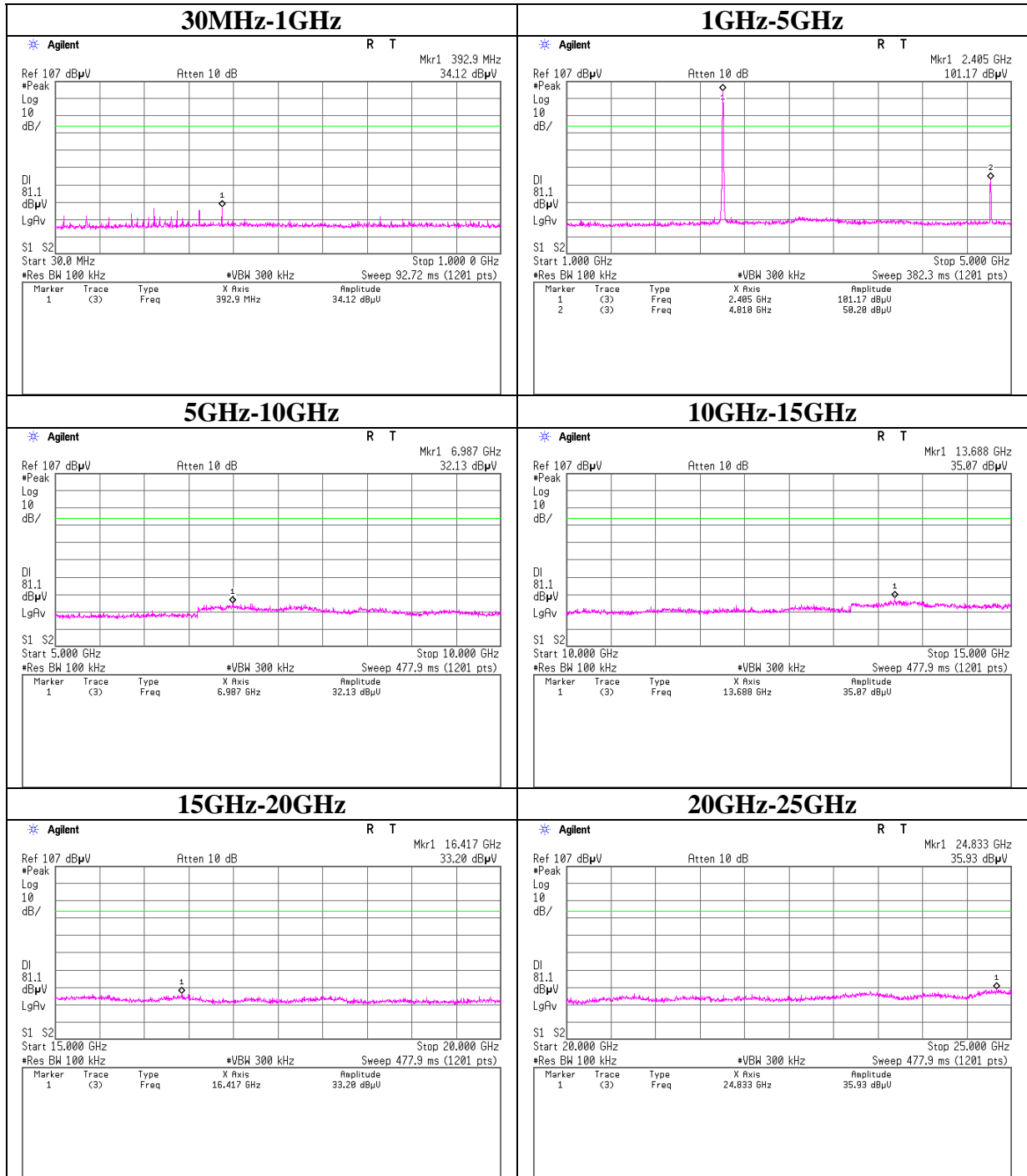
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

VBW (AV) Calculation



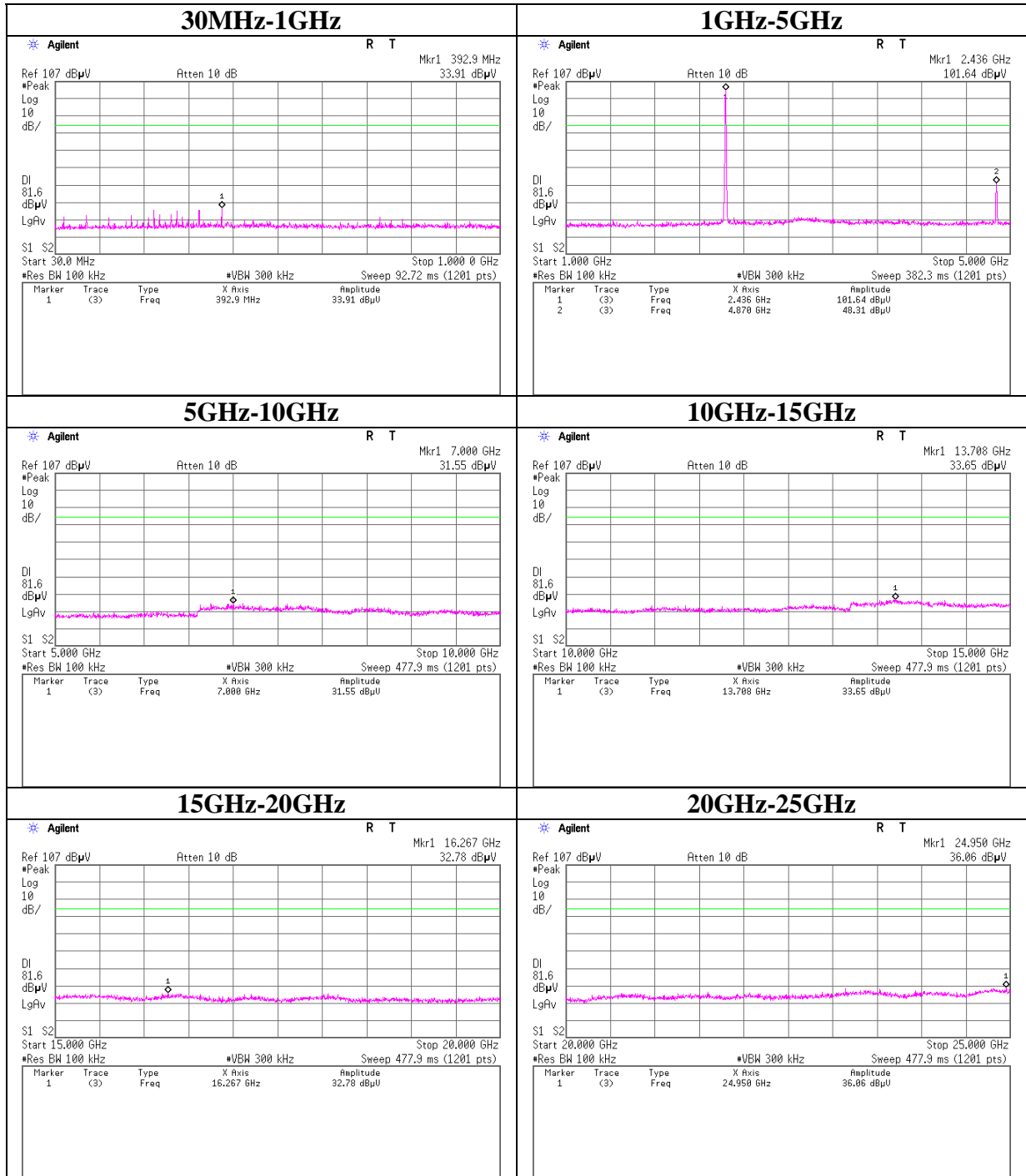
Conducted Spurious Emission

Tx 2405.376MHz



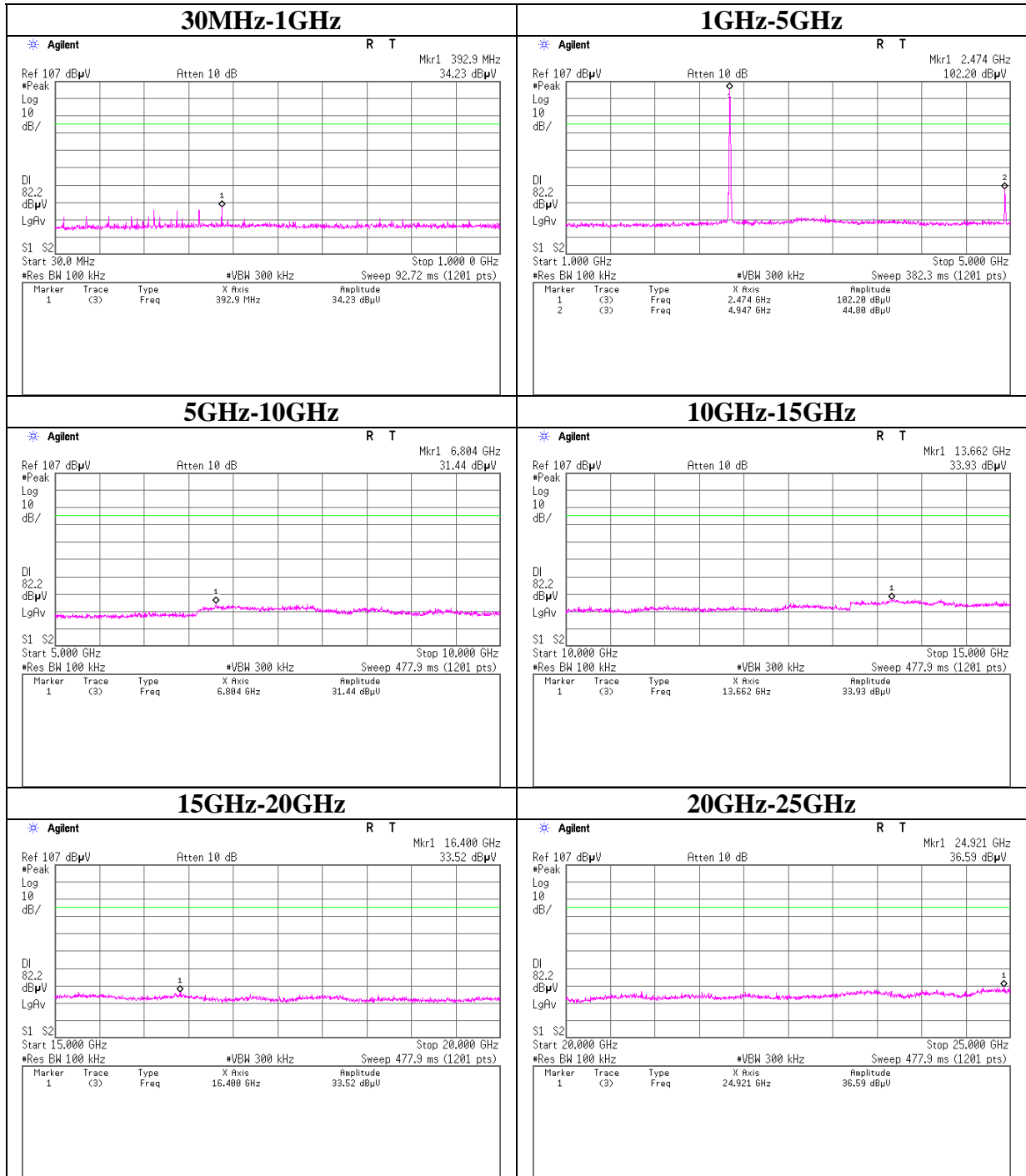
Conducted Spurious Emission

Tx 2436.096MHz



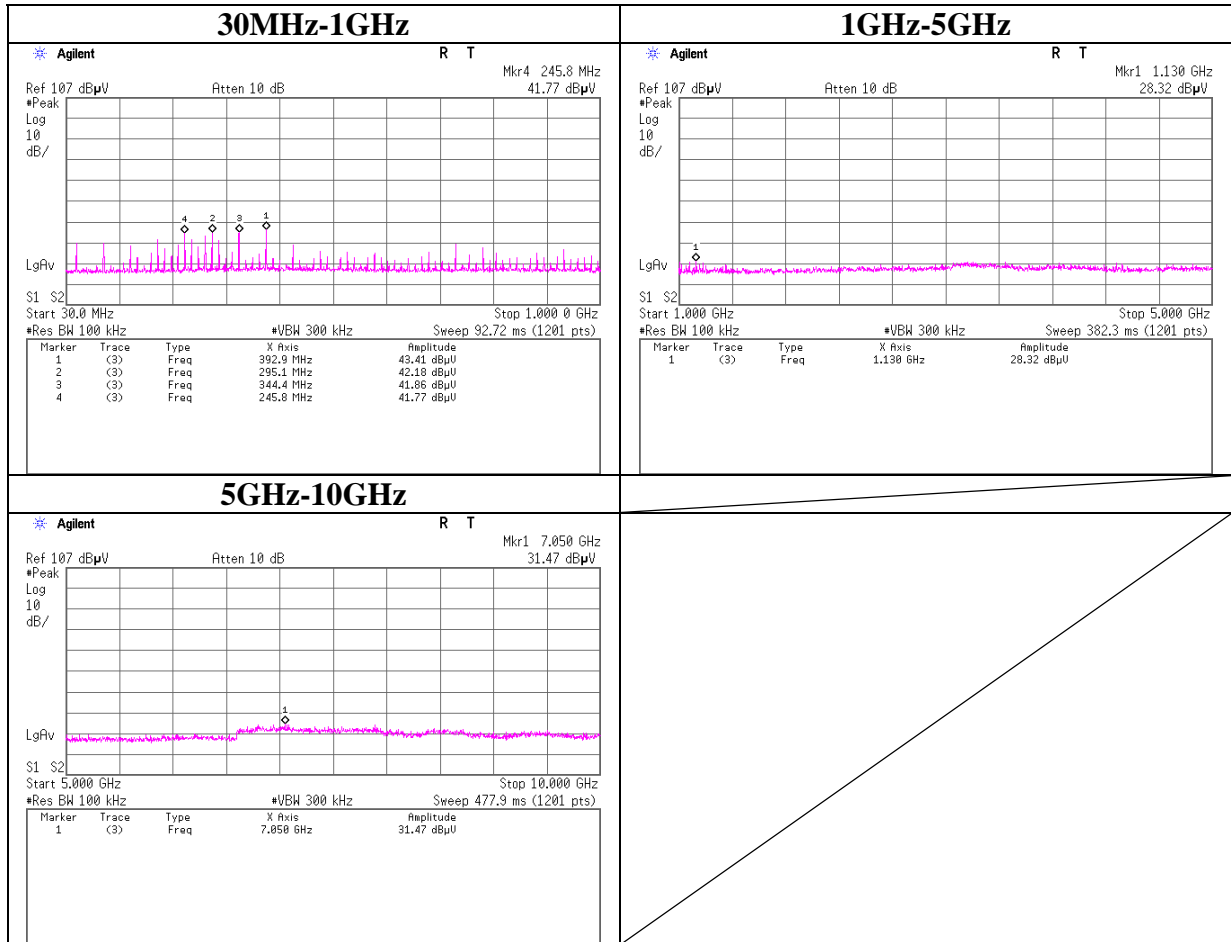
Conducted Spurious Emission

Tx 2473.984MHz



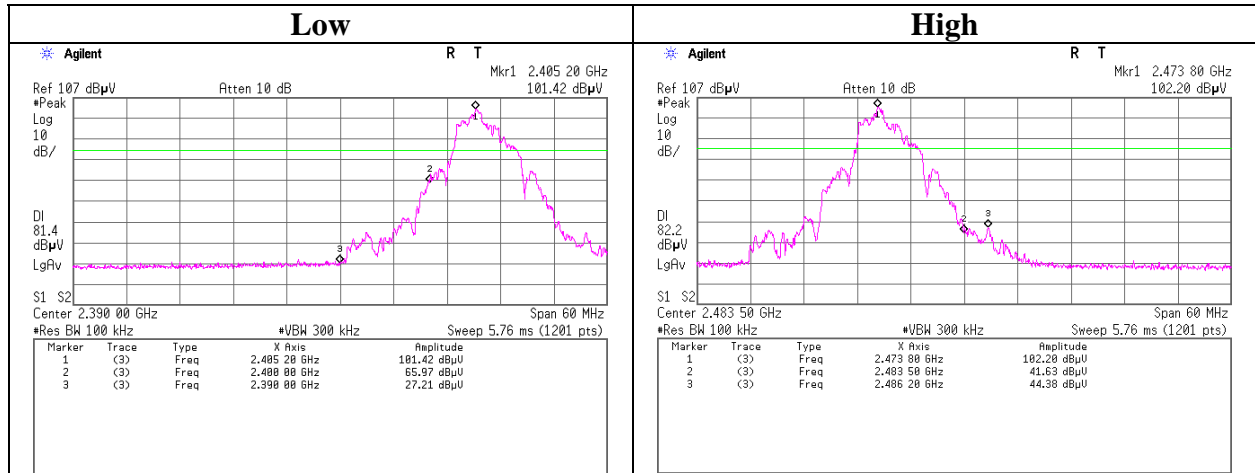
Conducted Spurious Emission

Rx 2436.096MHz



Conducted Emission Band Edge compliance

Tx



Power Density

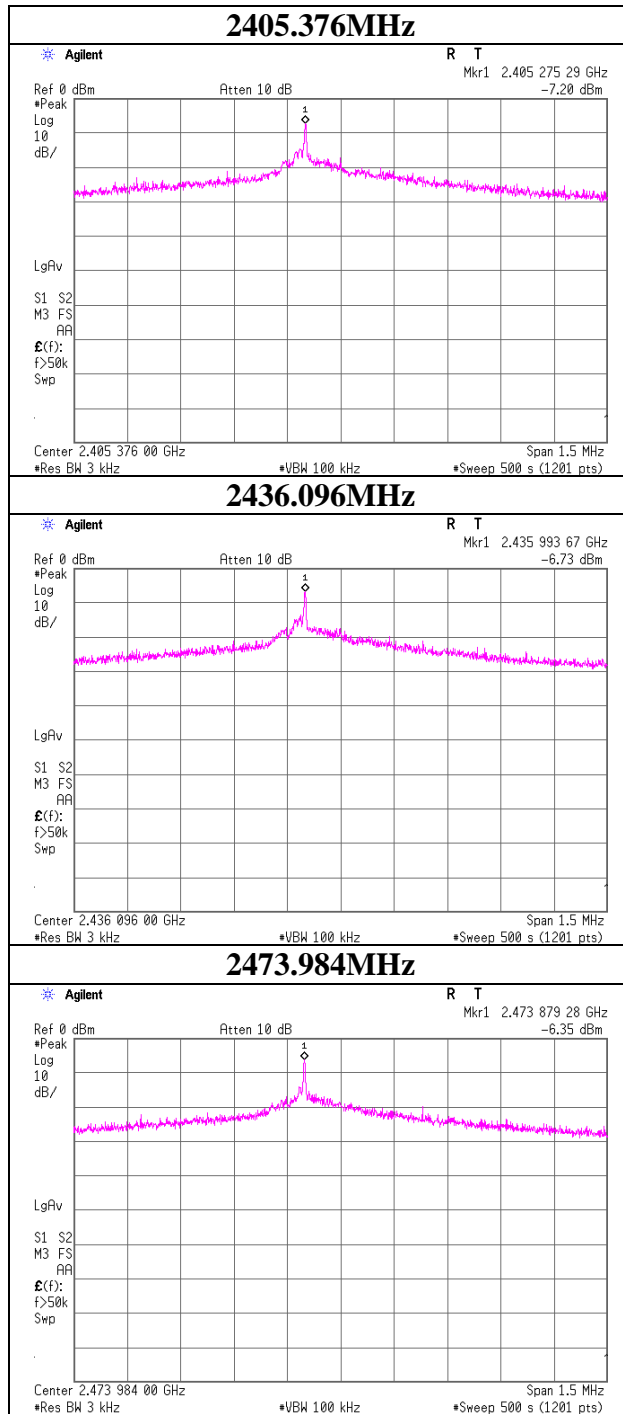
Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 29JE0008-HO-01
Date 05/30/2009
Temperature/ Humidity 26 deg.C./ 58%
Engineer Takayuki Shimada
Mode Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2405.275	-7.20	1.08	10.02	3.90	8.00	4.10
2435.994	-6.73	1.09	10.02	4.38	8.00	3.62
2473.879	-6.35	1.10	10.02	4.77	8.00	3.23

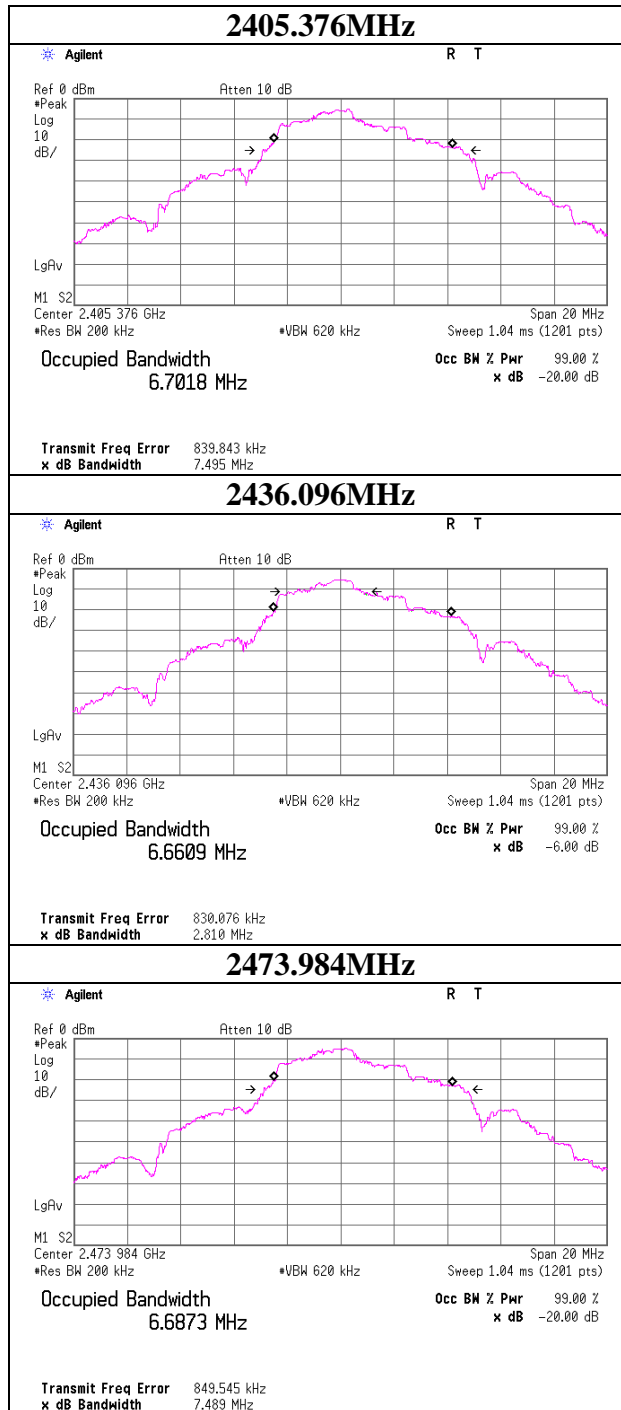
Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Power Density



99% Occupied Bandwidth



APPENDIX 3: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-14	Thermo-Hygrometer	Custom	CTH-180	-	AT	2009/02/04 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2009/02/25 * 12
MPM-13	Power Meter	Anritsu	ML2495A	0824014	AT	2008/08/13 * 12
MPSE-18	Power sensor	Anritsu	MA2411B	0738174	AT	2008/08/13 * 12
MCC-45	Microwave Cable	Murata	MXGS83RK3000	-	AT	2008/07/14 * 12
MAT-22	Attenuator(10dB) DC-18GHz	Orient Microwave	BX10-0476-00	-	AT	2009/03/24 * 12
MAEC-04	Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2009/02/03 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2009/02/06 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE/CE	2008/08/18 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2008/08/11 * 12
MCC-57	Microwave Cable 1G-26.5GHz 6m	Suhner	SUCOFLEX104	246769(1m) / 292411(5m)	RE	2008/11/05 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2009/03/19 * 12
MCC-79	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278923/4	RE	2008/12/17 * 12
MHF-20	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCC	607	RE	2008/12/12 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE/CE	2008/10/03 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2009/01/10 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2009/01/10 * 12
MCC-50	Coaxial cable	UL Japan	-	-	RE	2009/03/18 * 12
MAT-31	Attenuator(6dB)	TME	UFA-01	-	RE	2009/03/03 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2009/03/18 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2009/04/30 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	-	-	CE	2008/07/03 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE	2009/02/18 * 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: CE: Conducted Emission
RE: Radiated Emission
AT: Antenna Terminal Conducted test

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