

APPENDIX 2: Data of EMI test

Conducted Emission
Tx, Ch:Low

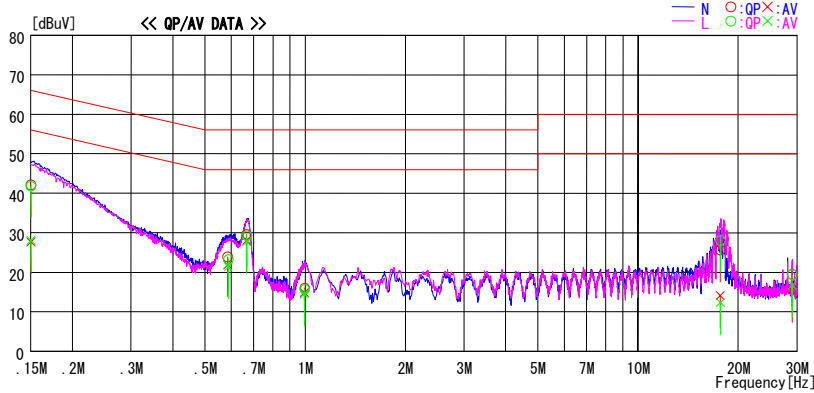
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 3 Semi Anechoic Chamber
Date : 2007/08/23

Company : SEIKO EPSON Corporation Report No. : 27LE0248-HO
Kind of EUT : WIFI Board Power : AC 120V / 60Hz (Module: DC 3.3V)
Model No. : M238A Temp./Humi. : 25deg. C / 59%
Serial No. : R-001 Operator : Kenichi Adachi

Mode / Remarks: Transmitting mode 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]		
0.15001	41.8	27.4	0.3	42.1	27.7	66.0	56.0	23.9	28.3	N	
0.15001	41.5	27.8	0.3	41.8	28.1	66.0	56.0	24.2	27.9	L	
0.58546	23.6	21.6	0.3	23.9	21.9	56.0	46.0	32.1	24.1	N	
0.58720	23.0	21.1	0.3	23.3	21.4	56.0	46.0	32.7	24.6	L	
0.66705	29.3	27.8	0.3	29.6	28.1	56.0	46.0	26.4	17.9	N	
0.66774	29.0	27.5	0.3	29.3	27.8	56.0	46.0	26.7	18.2	L	
0.99500	15.7	14.5	0.3	16.0	14.8	56.0	46.0	40.0	31.2	N	
0.99520	15.4	14.2	0.3	15.7	14.5	56.0	46.0	40.3	31.5	L	
17.64740	24.0	12.4	1.7	25.7	14.1	60.0	50.0	34.3	35.9	N	
17.69100	26.4	10.6	1.7	28.1	12.3	60.0	50.0	31.9	37.7	L	
29.01145	17.4	13.3	2.1	19.5	15.4	60.0	50.0	40.5	34.6	N	
29.01820	17.3	14.6	2.1	19.4	16.7	60.0	50.0	40.6	33.3	L	

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

*The test result is round off to one or two decimal places, so some differences might be observed.

Conducted Emission
Tx, Ch:Mid

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2007/08/23

Company	: SEIKO EPSON Corporation	Report No.	: 27LE0248-H0
Kind of EUT	: WiFi Board	Power	: AC 120V / 60Hz (Module: DC 3.3V)
Model No.	: M238A	Temp./Humi.	: 25deg. C / 59%
Serial No.	: R-001	Operator	: Kenichi Adachi

Mode / Remarks : Transmitting mode 11b, 2437MHz, 11Mbps

LIMIT : FCC15.207 QP
 FCC15.207 AV

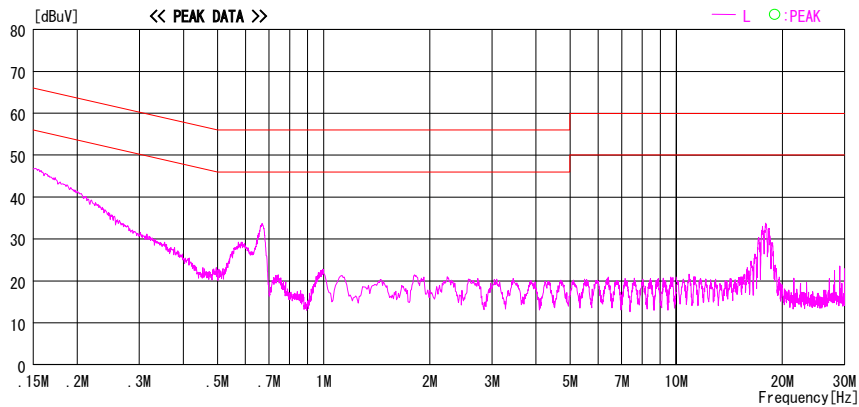
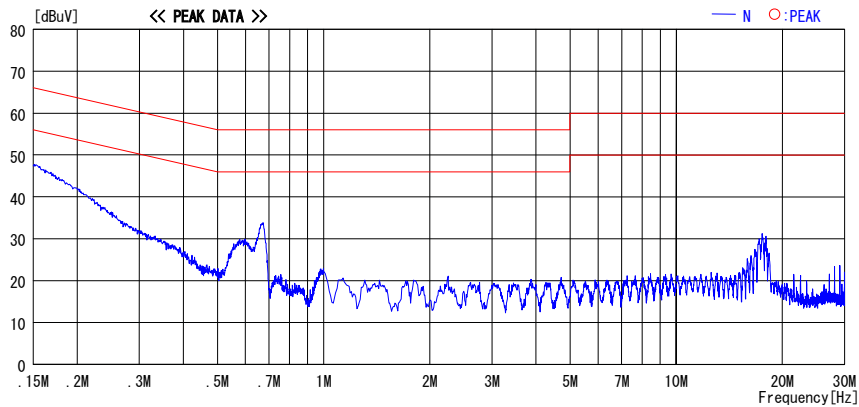


CHART:WITH FACTOR,Peak hold data.Data is uncorrected. CALCURATION:RESULT=READING+C.F(LISN LOSS+CABLE LOSS)
 Except for the above table : adequate margin data below the limits.

Conducted Emission
Tx, Ch:High

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2007/08/23

Company	: SEIKO EPSON Corporation	Report No.	: 27LE0248-H0
Kind of EUT	: WiFi Board	Power	: AC 120V / 60Hz (Module: DC 3.3V)
Model No.	: M238A	Temp./Humi.	: 25deg. C / 59%
Serial No.	: R-001	Operator	: Kenichi Adachi

Mode / Remarks : Transmitting mode 11b, 2462MHz, 11Mbps

LIMIT : FCC15.207 QP
 FCC15.207 AV

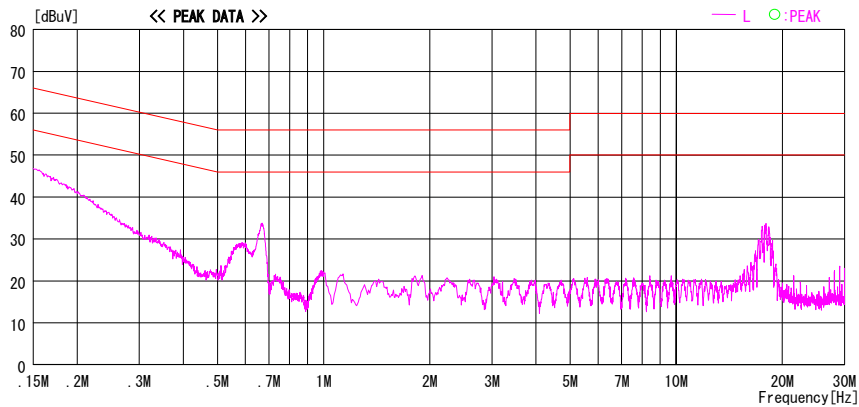
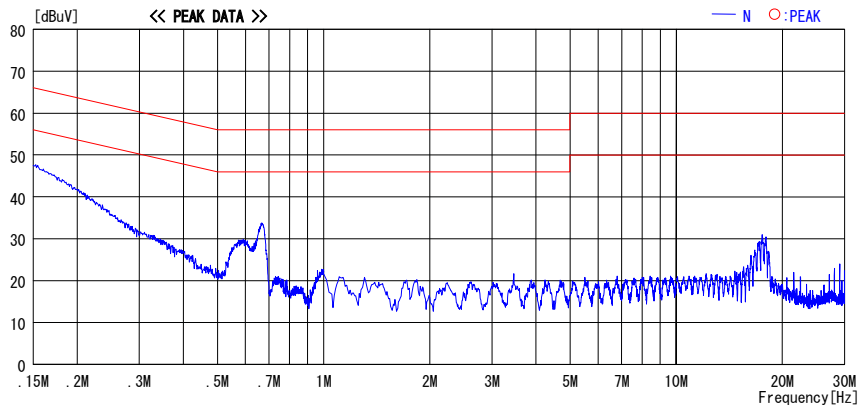


CHART:WITH FACTOR,Peak hold data.Data is uncorrected. CALCURATION:RESULT=READING+C.F(LISN LOSS+CABLE LOSS)
 Except for the above table : adequate margin data below the limits.

Conducted Emission
Rx, Ch:Mid

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2007/08/23

Company	: SEIKO EPSON Corporation	Report No.	: 27LE0248-HO
Kind of EUT	: WiFi Board	Power	: AC 120V / 60Hz (Module: DC 3.3V)
Model No.	: M238A	Temp./Humi.	: 25deg. C / 59%
Serial No.	: R-001	Operator	: Kenichi Adachi

Mode / Remarks : Receiving mode 11b, 2437MHz

LIMIT : FCC15.107(a) QP
 FCC15.107(a) AV

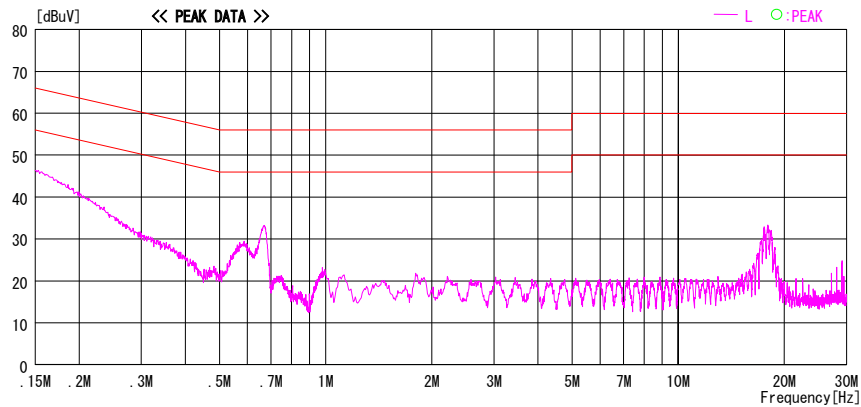
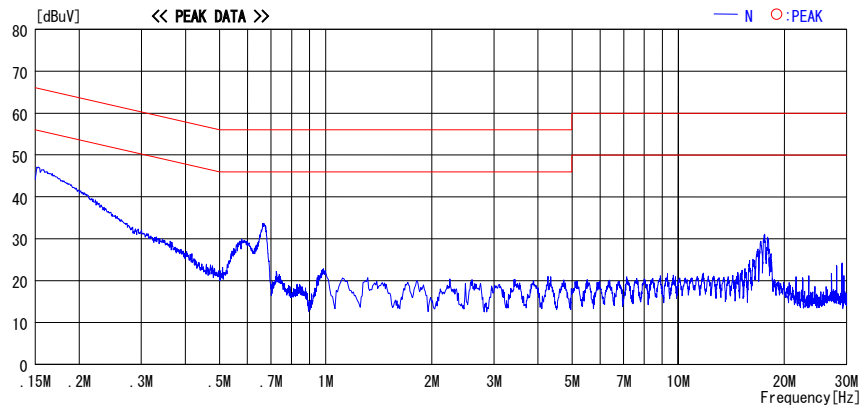


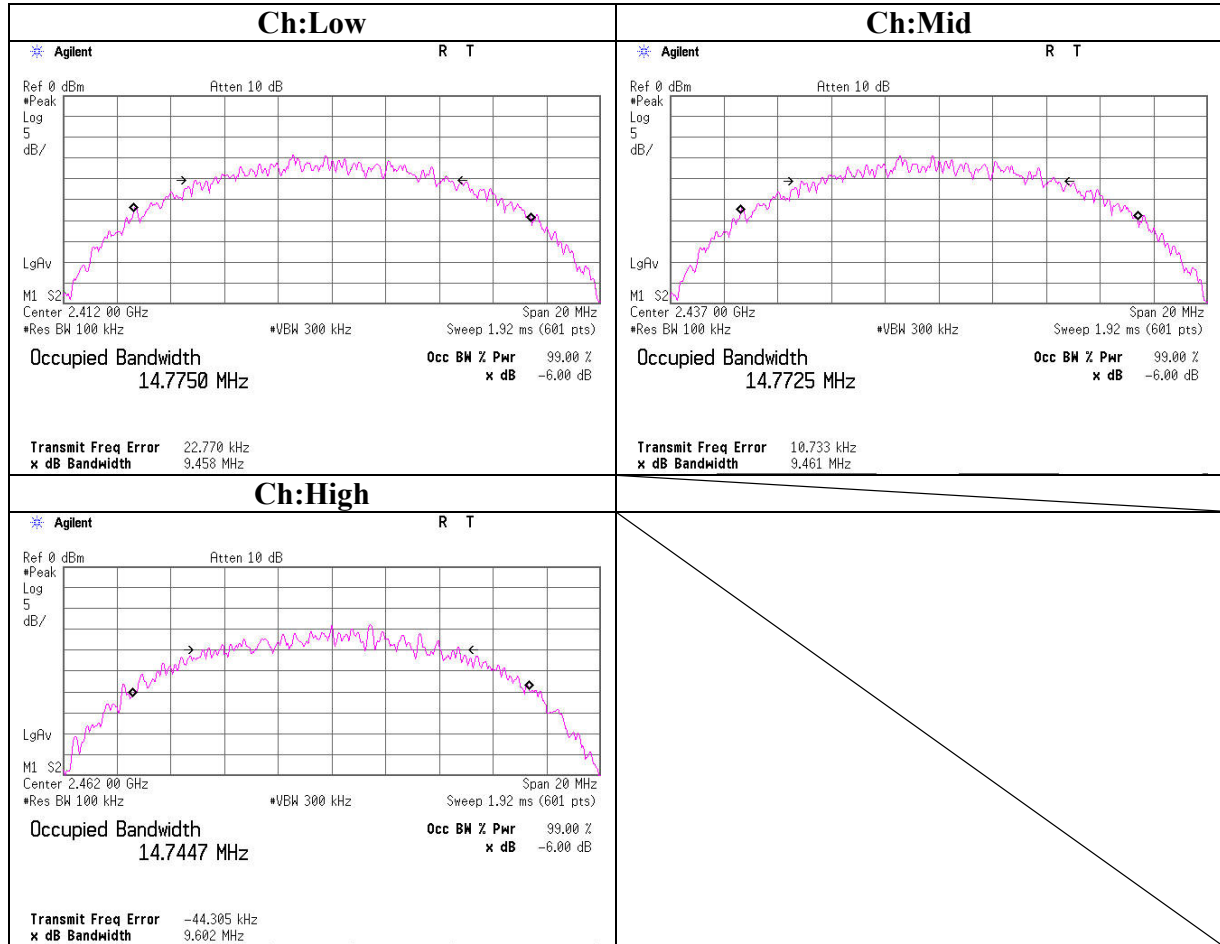
CHART:WITH FACTOR,Peak hold data.Data is uncorrected. CALCURATION:RESULT=READING+C.F(LISN LOSS+CABLE LOSS)
 Except for the above table : adequate margin data below the limits.

6dB Bandwidth

Company	SEIKO EPSON Corporation	UL Japan, Inc.
Equipment	WiFi Board	Head Office EMC Lab. No.2 semi-anechoic chamber
Model	M238A	Regulation FCC Part15 Subpart C 15.247(a)(2) / RSS-210 A8.2(a)
S/N	T-001	Test Distance -
Power	AC 120V / 60Hz (module: DC 3.3V)	Date 08/21/2007
Mode	Transmitting mode 11b (11Mbps)	Temperature 25deg.C.
		Humidity 61 %
		Engineer Kenichi Adachi

Ch	Freq. [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
Low	2412.0	9.458	>500
Mid	2437.0	9.461	>500
High	2462.0	9.602	>500

6dB Bandwidth



Maximum Peak Output Power

	UL Japan, Inc.	
	Head Office EMC Lab. No.2 semi-anechoic chamber	
Company	SEIKO EPSON Corporation	Regulation
Equipment	WiFi Board	FCC Part15 Subpart C 15.247(b)(3) / RSS-210 A8.4(4)
Model	M238A	Test Distance
S/N	T-001	-
Power	AC 120V / 60Hz (module: DC 3.3V)	Date
Mode	Transmitting mode 11b (11Mbps)	08/21/2007
		Temperature
		25deg.C.
		Humidity
		61 %
		Engineer
		Kenichi Adachi

[IEEE802.11b]

Ch	Freq. [MHz]	P/M (PK) Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2412.0	-2.58	0.47	10.07	7.96	6.26	30.00	1000.00	22.04
Mid	2437.0	-2.44	0.47	10.07	8.10	6.46	30.00	1000.00	21.90
High	2462.0	-2.97	0.46	10.07	7.56	5.70	30.00	1000.00	22.44

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer) + Attenuator

* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.

[IEEE802.11b] (Reference data)

Data Rate [Mbps]	Freq. [MHz]	P/M (PK) Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
1	2412.0	-2.85	0.47	10.07	7.69	5.88	30.00	1000.00	22.31
2	2412.0	-2.84	0.47	10.07	7.70	5.89	30.00	1000.00	22.30
5.5	2412.0	-2.71	0.47	10.07	7.83	6.07	30.00	1000.00	22.17
11	2412.0	-2.58	0.47	10.07	7.96	6.26	30.00	1000.00	22.04

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer) + Attenuator

* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.

UL Japan, Inc.

Head Office EMC Lab.

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Radiated Spurious Emission (below 1GHz)
Tx, Ch:Low

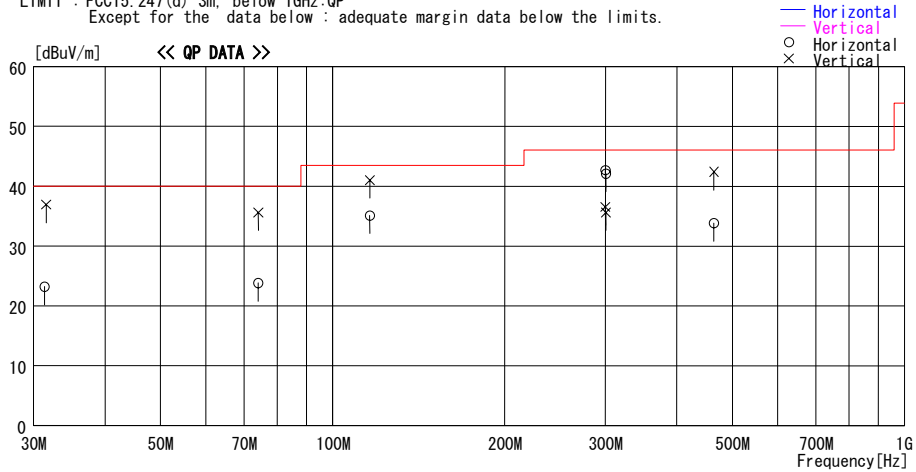
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2007/08/22

Company : SEIKO EPSON Corporation
Kind of EUT : WiFi Board
Model No. : M238A
Serial No. : R-001
Report No. : 27LE0248-HO
Power : AC 120V / 60Hz (Module: DC 3.3V)
Temp./Humi. : 24deg.C / 61%
Operator : Kenichi Adachi

Mode / Remarks : Transmitting mode 11b, 2412MHz, 11Mbps, EUT-worst-axis: Z-axis

LIMIT : FCC15.247(d) 3m, below 1GHz:QP
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
			Factor [dB/m]	Loss & Gain [dB]					[dBuV/m]	[dB]
31.350	29.5	QP	18.7	-25.0	23.2	146	282	Hori.	40.0	16.8
31.562	43.3	QP	18.6	-25.0	36.9	17	100	Vert.	40.0	3.1
74.087	41.0	QP	7.0	-24.2	23.8	332	265	Hori.	40.0	16.2
74.151	52.8	QP	7.0	-24.2	35.6	234	100	Vert.	40.0	4.4
116.201	46.3	QP	12.6	-23.8	35.1	128	257	Hori.	43.5	8.4
116.240	52.2	QP	12.6	-23.8	41.0	273	100	Vert.	43.5	2.5
299.840	45.2	QP	19.6	-22.1	42.7	231	116	Hori.	46.0	3.3
299.834	39.0	QP	19.6	-22.1	36.5	198	254	Vert.	46.0	9.5
300.800	50.1	QP	14.1	-22.1	42.1	251	100	Hori.	46.0	3.9
300.770	43.7	QP	14.0	-22.1	35.6	283	218	Vert.	46.0	10.4
464.609	36.7	QP	18.1	-21.0	33.8	238	297	Hori.	46.0	12.2
464.609	45.3	QP	18.1	-21.0	42.4	180	140	Vert.	46.0	3.6

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

*The test result is round off to one or two decimal places, so some differences might be observed.

Radiated Spurious Emission (below 1GHz)
Tx, Ch:Mid

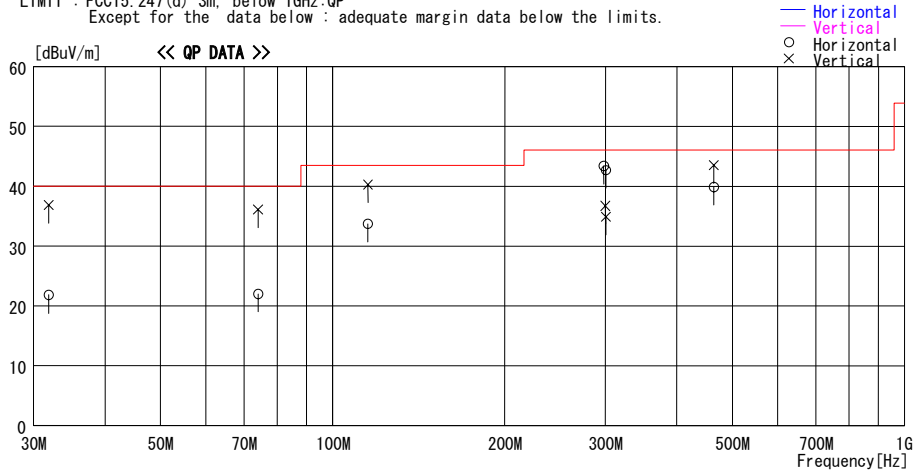
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2007/08/22

Company : SEIKO EPSON Corporation
Kind of EUT : WiFi Board
Model No. : M238A
Serial No. : R-001
Report No. : 27LE0248-HO
Power : AC 120V / 60Hz (Module: DC 3.3V)
Temp./Humi. : 24deg.C / 61%
Operator : Kenichi Adachi

Mode / Remarks : Transmitting mode 11b, 2437MHz, 11Mbps, EUT-worst-axis: Z-axis

LIMIT : FCC15.247(d) 3m, below 1GHz:QP
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit		Margin [dB]
			Factor [dB/m]	Loss & Gain [dB]					[dBuV/m]	[dB]	
31.861	28.4	QP	18.4	-25.0	21.8	279	297	Hori.	40.0	18.2	
31.861	43.4	QP	18.4	-25.0	36.8	343	100	Vert.	40.0	3.2	
74.091	39.2	QP	7.0	-24.2	22.0	323	287	Hori.	40.0	18.0	
74.090	53.3	QP	7.0	-24.2	36.1	194	100	Vert.	40.0	3.9	
115.249	45.0	QP	12.5	-23.8	33.7	141	178	Hori.	43.5	9.8	
115.287	51.6	QP	12.5	-23.8	40.3	266	100	Vert.	43.5	3.2	
297.867	46.0	QP	19.5	-22.1	43.4	249	119	Hori.	46.0	2.6	
299.820	39.2	QP	19.6	-22.1	36.7	303	331	Vert.	46.0	9.3	
300.750	50.8	QP	14.0	-22.1	42.7	244	100	Hori.	46.0	3.3	
300.750	43.0	QP	14.0	-22.1	34.9	192	188	Vert.	46.0	11.1	
464.607	42.8	QP	18.1	-21.0	39.9	107	100	Hori.	46.0	6.1	
464.503	46.4	QP	18.1	-21.0	43.5	155	105	Vert.	46.0	2.5	

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

*The test result is round off to one or two decimal places, so some differences might be observed.

Radiated Spurious Emission (below 1GHz)
Tx, Ch:High

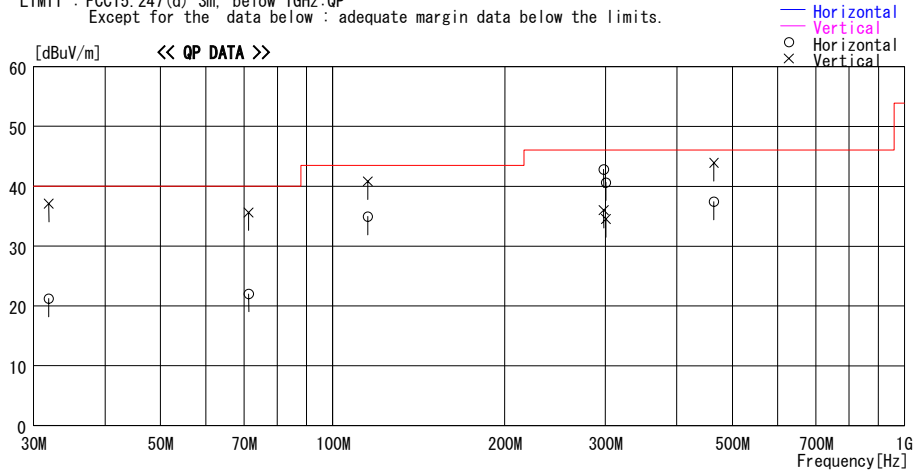
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2007/08/22

Company : SEIKO EPSON Corporation
Kind of EUT : WiFi Board
Model No. : M238A
Serial No. : R-001
Report No. : 27LE0248-HO
Power : AC 120V / 60Hz (Module: DC 3.3V)
Temp./Humi. : 24deg.C / 61%
Operator : Kenichi Adachi

Mode / Remarks : Transmitting mode 11b, 2462MHz, 11Mbps, EUT-worst-axis: Z-axis

LIMIT : FCC15.247(d) 3m, below 1GHz:QP
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit		Margin
			Factor [dB/m]	Loss & Gain [dB]					[dBuV/m]	[dB]	
31.867	27.8	QP	18.4	-25.0	21.2	281	321	Hori.	40.0	18.8	
31.883	43.6	QP	18.4	-25.0	37.0	360	100	Vert.	40.0	3.0	
71.347	39.2	QP	7.1	-24.3	22.0	297	297	Hori.	40.0	18.0	
71.309	52.8	QP	7.1	-24.3	35.6	268	100	Vert.	40.0	4.4	
115.244	46.2	QP	12.5	-23.8	34.9	116	289	Hori.	43.5	8.6	
115.251	52.1	QP	12.5	-23.8	40.8	254	100	Vert.	43.5	2.7	
297.850	45.4	QP	19.5	-22.1	42.8	219	118	Hori.	46.0	3.2	
297.849	38.6	QP	19.5	-22.1	36.0	133	229	Vert.	46.0	10.0	
300.683	48.7	QP	14.0	-22.1	40.6	230	100	Hori.	46.0	5.4	
300.684	42.6	QP	14.0	-22.1	34.5	155	190	Vert.	46.0	11.5	
464.610	40.3	QP	18.1	-21.0	37.4	100	226	Hori.	46.0	8.6	
464.611	46.8	QP	18.1	-21.0	43.9	158	115	Vert.	46.0	2.1	

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

*The test result is round off to one or two decimal places, so some differences might be observed.

Radiated Spurious Emission (below 1GHz)
Rx, Ch:Mid

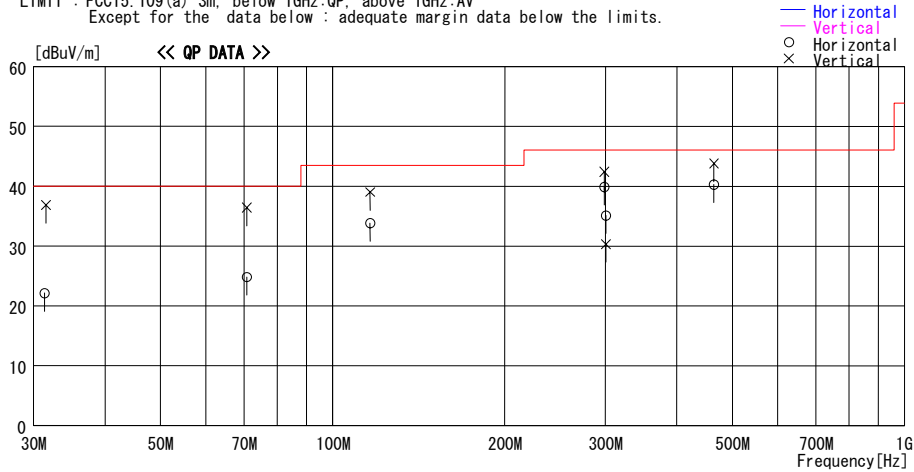
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2007/08/22

Company : SEIKO EPSON Corporation
Kind of EUT : WiFi Board
Model No. : M238A
Serial No. : R-001
Report No. : 27LE0248-HO
Power : AC 120V / 60Hz (Module: DC 3.3V)
Temp./Humi. : 24deg.C / 61%
Operator : Kenichi Adachi

Mode / Remarks : Receiving mode 11b, 2437MHz, EUT-worst-axis: Z-axis

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
			Factor [dB/m]	Loss& Gain [dB]					[dBuV/m]	[dB]
31.350	28.4	QP	18.7	-25.0	22.1	151	293	Hori.	40.0	17.9
31.536	43.2	QP	18.6	-25.0	36.8	15	100	Vert.	40.0	3.2
70.778	42.0	QP	7.1	-24.3	24.8	327	251	Hori.	40.0	15.2
70.778	53.6	QP	7.1	-24.3	36.4	228	100	Vert.	40.0	3.6
116.399	45.0	QP	12.6	-23.8	33.8	124	255	Hori.	43.5	9.7
116.370	50.2	QP	12.6	-23.8	39.0	275	100	Vert.	43.5	4.5
298.500	42.5	QP	19.5	-22.1	39.9	61	400	Hori.	46.0	6.1
298.500	45.0	QP	19.5	-22.1	42.4	243	119	Vert.	46.0	3.6
300.708	43.2	QP	14.0	-22.1	35.1	228	100	Hori.	46.0	10.9
300.708	38.4	QP	14.0	-22.1	30.3	278	241	Vert.	46.0	15.7
464.609	43.2	QP	18.1	-21.0	40.3	109	100	Hori.	46.0	5.7
464.609	46.7	QP	18.1	-21.0	43.8	159	100	Vert.	46.0	2.2

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - GAIN(AMP)

*The test result is round off to one or two decimal places, so some differences might be observed.

Radiated Spurious Emission (above 1GHz)
Tx, Ch:Low

Company	SEIKO EPSON Corporation	UL Japan, Inc.
Equipment	WiFi Board	Head Office EMC Lab. No.2 and No.3 Anechoic Chamber
Model	M238A	Regulation FCC Part15 Subpart C 15.247(d) / RSS-210 A8.5
S/N	R-001	Test Distance 3m (below 10GHz), 1m (above 10GHz)
Power	AC 120V / 60Hz (module: DC 3.3V)	Date 08/21/2007 08/23/2007
Mode	Transmitting mode 11b, 2412MHz (11Mbps)	Temperature 25deg.C. 25deg.C.
EUT-Axis	H: Z-axis, V: Z-axis	Humidity 61 % 59 %
		Engineer Kenichi Adachi

PK DETECT (RBW: 1MHz, VBW: 1MHz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	2390.0	45.1	44.5	27.1	32.3	3.0	0.0	42.9	42.3	73.9	31.0	31.6
2**	2400.0	61.3	58.6	27.1	32.3	3.1	0.0	59.2	56.5	73.9	-	-
3	4824.0	48.2	43.6	31.3	31.6	4.2	0.4	52.5	47.9	73.9	21.4	26.0
4	7236.0	43.3	42.9	35.8	31.4	5.1	0.6	53.4	53.0	73.9	20.5	20.9
5	9648.0	43.0	42.3	38.6	31.9	5.8	0.8	56.3	55.6	73.9	17.6	18.3
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
6	24120.0	46.5	46.5	38.7	30.5	9.3	0.0	54.5	54.5	73.9	19.4	19.4

** Reference data

AV DETECT (RBW: 1MHz, VBW: 10Hz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	2390.0	34.1	32.7	27.1	32.3	3.0	0.0	31.9	30.5	53.9	22.0	23.4
2**	2400.0	53.3	50.7	27.1	32.3	3.1	0.0	51.2	48.6	53.9	-	-
3	4824.0	32.2	30.5	31.3	31.6	4.2	0.4	36.5	34.8	53.9	17.4	19.1
4	7236.0	30.3	30.4	35.8	31.4	5.1	0.6	40.4	40.5	53.9	13.5	13.4
5	9648.0	30.5	30.6	38.6	31.9	5.8	0.8	43.8	43.9	53.9	10.1	10.0
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
6	24120.0	34.5	34.5	38.7	30.5	9.3	0.0	42.5	42.5	53.9	11.4	11.4

** Reference data

20dBc (Fundamental) 2412.0 MHz (RBW: 100kHz, VBW: 300kHz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit 20dBc [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
0	2412.00	92.2	90.4	27.1	32.3	3.1	0.0	90.1	88.3	-	-	-
2	2400.00	57.6	54.3	27.1	32.3	3.1	0.0	55.5	52.2	Funda-20dB	14.6	16.1

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.54 dB

*Except for the above table : All other spurious emissions were less than 20dB for the limit.

*In the frequency over the Third harmonic, the noise from the EUT was not seen. The data above is its base noise.

*Hi-Pass Filter was not used for factor 0.0dB of the above table.

*The limit is rounded down to one decimal place.

*The test result is round off to one or two decimal places, so some differences might be observed.

Radiated Spurious Emission
Tx, Ch:Mid

UL Japan, Inc.
Head Office EMC Lab. No.2 and No.3 Anechoic Chamber
Regulation FCC Part15 Subpart C 15.247(d) / RSS-210 A8.5
Test Distance 3m (below 10GHz), 1m (above 10GHz)
Date 08/21/2007 08/23/2007
Temperature 25deg.C. 25deg.C.
Humidity 61 % 59 %
Engineer Kenichi Adachi

Company SEIKO EPSON Corporation
Equipment WiFi Board
Model M238A
S/N R-001
Power AC 120V / 60Hz (module: DC 3.3V)
Mode Transmitting mode 11b, 2437MHz (11Mbps)
EUT-Axis H: Z-axis, V: Z-axis

PK DETECT (RBW: 1MHz, VBW: 1MHz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR [dBuV]	VER					HOR	VER		HOR	VER
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	4874.0	48.5	43.4	31.4	31.6	4.2	0.4	52.9	47.8	73.9	21.0	26.1
2	7311.0	43.7	43.8	35.9	31.4	5.1	0.6	53.9	54.0	73.9	20.0	19.9
3	9748.0	43.3	43.2	38.7	32.0	5.8	0.7	56.5	56.4	73.9	17.4	17.5
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
4	24370.0	46.4	46.3	38.8	30.3	9.4	0.0	54.8	54.7	73.9	19.1	19.2

AV DETECT (RBW: 1MHz, VBW: 10Hz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR [dBuV]	VER					HOR	VER		HOR	VER
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	4874.0	34.1	30.1	31.4	31.6	4.2	0.4	38.5	34.5	53.9	15.4	19.4
2	7311.0	30.3	30.3	35.9	31.4	5.1	0.6	40.5	40.5	53.9	13.4	13.4
3	9748.0	30.4	30.4	38.7	32.0	5.8	0.7	43.6	43.6	53.9	10.3	10.3
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
4	24370.0	34.7	34.6	38.8	30.3	9.4	0.0	43.1	43.0	53.9	10.8	10.9

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.54 dB
*Except for the above table : All other spurious emissions were less than 20dB for the limit.
*In the frequency over the Third harmonic, the noise from the EUT was not seen.The data above is its base noise.
*Hi-Pass Filter was not used for factor 0.0dB of the above table.
*The limit is rounded down to one decimal place.
*The test result is round off to one or two decimal places, so some differences might be observed.

Radiated Spurious Emission
Tx, Ch:High

UL Japan, Inc.
Head Office EMC Lab. No.2 and No.3 Anechoic Chamber
Regulation FCC Part15 Subpart C 15.247(d) / RSS-210 A8.5
Test Distance 3m (below 10GHz), 1m (above 10GHz)
Date 08/21/2007 08/23/2007
Temperature 25deg.C. 25deg.C.
Humidity 61 % 59 %
Engineer Kenichi Adachi

Company SEIKO EPSON Corporation
Equipment WiFi Board
Model M238A
S/N R-001
Power AC 120V / 60Hz (module: DC 3.3V)
Mode Transmitting mode 11b, 2462MHz (11Mbps)
EUT-Axis H: Z-axis, V: Z-axis

PK DETECT (RBW: 1MHz, VBW: 1MHz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR [dBuV]	VER					HOR [dBuV/m]	VER		HOR [dB]	VER
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	2483.5	45.0	44.4	27.2	32.3	2.8	0.0	42.7	42.1	73.9	31.2	31.8
2	4924.0	48.4	44.4	31.5	31.6	4.3	0.3	52.9	48.9	73.9	21.0	25.0
3	7386.0	42.8	42.7	36.1	31.4	5.2	0.6	53.3	53.2	73.9	20.6	20.7
4	9848.0	43.2	43.1	38.8	32.0	5.8	0.7	56.5	56.4	73.9	17.4	17.5
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
5	24620.0	46.8	46.9	38.8	30.2	9.4	0.0	55.3	55.4	73.9	18.6	18.5

AV DETECT (RBW: 1MHz, VBW: 10Hz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR [dBuV]	VER					HOR [dBuV/m]	VER		HOR [dB]	VER
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	2483.5	32.9	32.8	27.2	32.3	2.8	0.0	30.6	30.5	53.9	23.3	23.4
2	4924.0	34.4	31.1	31.5	31.6	4.3	0.3	38.9	35.6	53.9	15.0	18.3
3	7386.0	30.3	30.2	36.1	31.4	5.2	0.6	40.8	40.7	53.9	13.1	13.2
4	9848.0	30.5	30.4	38.8	32.0	5.8	0.7	43.8	43.7	53.9	10.1	10.2
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
5	24620.0	35.1	35.1	38.8	30.2	9.4	0.0	43.6	43.6	53.9	10.3	10.3

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.54 dB

*Except for the above table : All other spurious emissions were less than 20dB for the limit.

*In the frequency over the Third harmonic, the noise from the EUT was not seen. The data above is its base noise.

*Hi-Pass Fiter was not used for factor 0.0dB of the above table.

*The limit is rounded down to one decimal place.

*The test result is round off to one or two decimal places, so some differences might be observed.

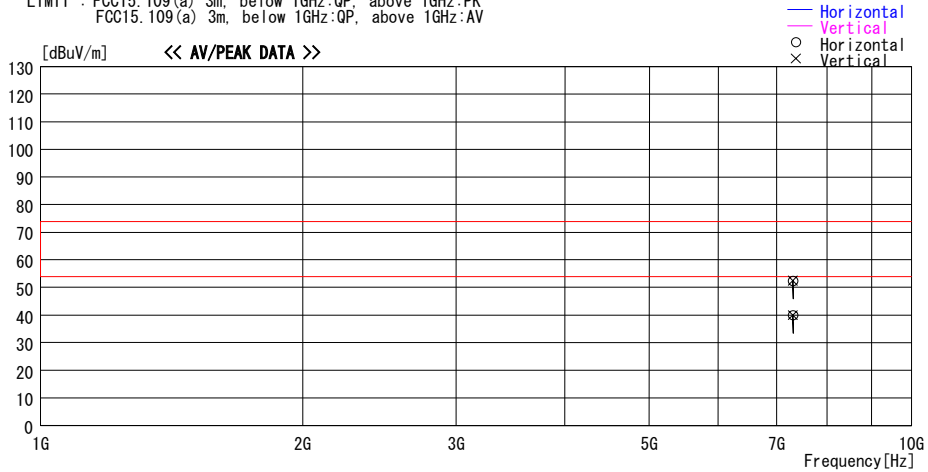
Radiated Spurious Emission
Rx, Ch:Mid
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2007/08/21

Company : SEIKO EPSON Corporation
Kind of EUT : WiFi Board
Model No. : M238A
Serial No. : R-001
Report No. : 27LE0248-HO
Power : AC 120V / 60Hz (Module: DC 3.3V)
Temp./Humi. : 24deg.C / 61%
Operator : Kenichi Adachi

Mode / Remarks : Receiving mode 11b, 2437MHz, EUT-worst-axis: Z-axis

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV

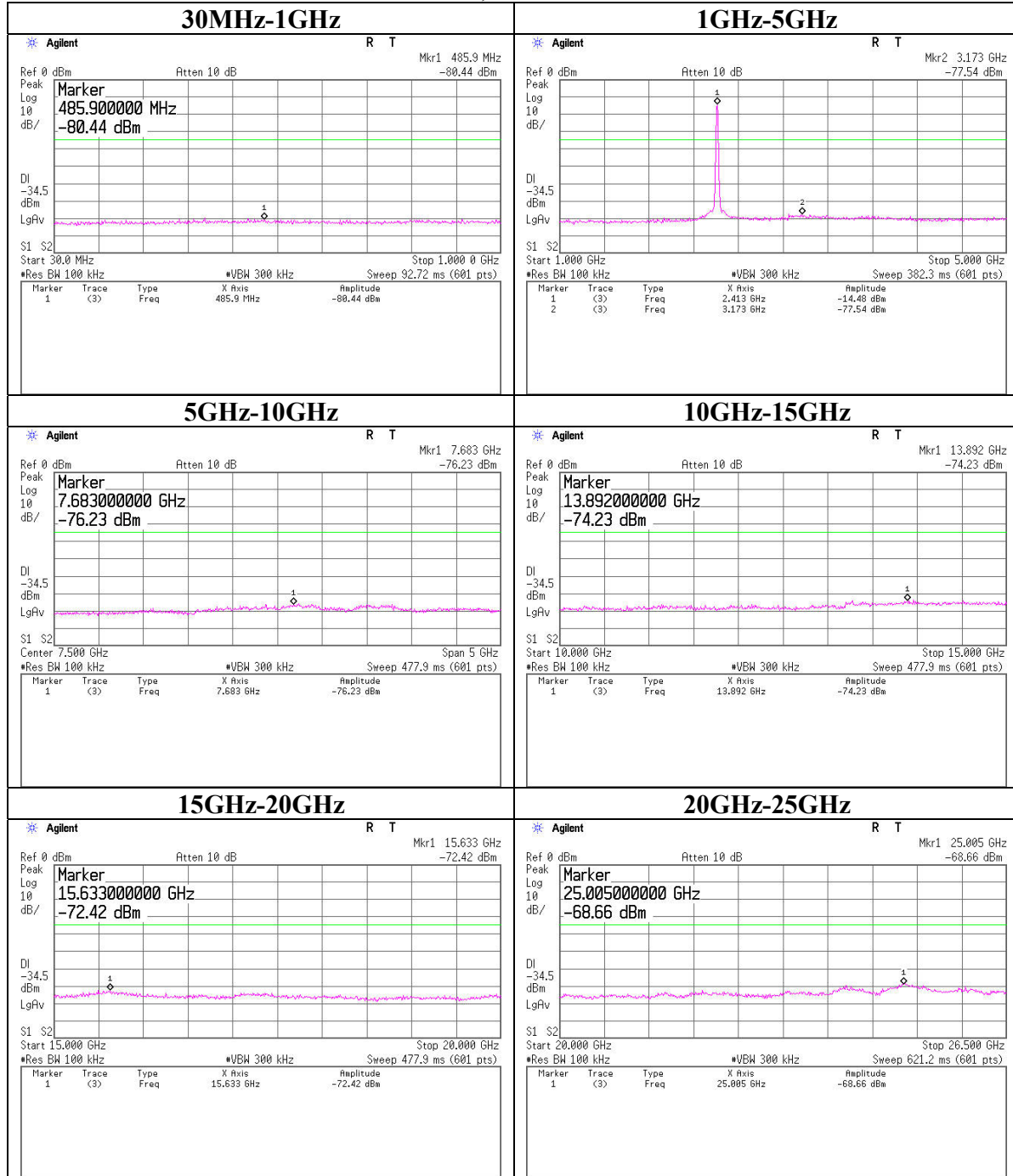


Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Polar.	Limit [dBuV/m]	Margin [dB]
			Factor [dB/m]	Loss & Gain [dB]				
7311.000	42.8	PK	35.9	-26.3	52.4	Hori.	73.9	21.5
7311.000	30.4	AV	35.9	-26.3	40.0	Hori.	53.9	13.9
7311.000	42.9	PK	35.9	-26.3	52.5	Vert.	73.9	21.4
7311.000	30.4	AV	35.9	-26.3	40.0	Vert.	53.9	13.9

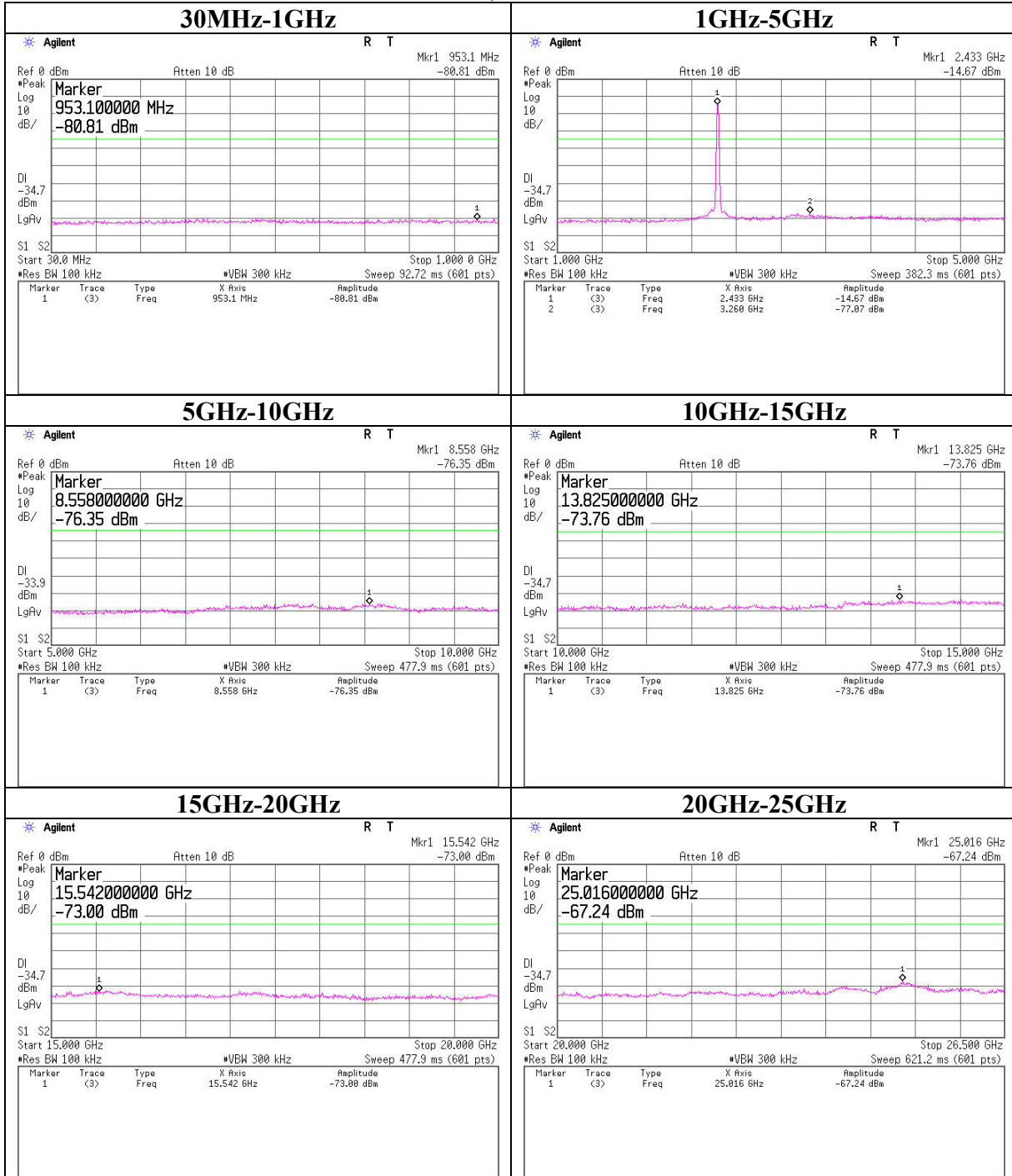
CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

*The test result is round off to one or two decimal places, so some differences might be observed.

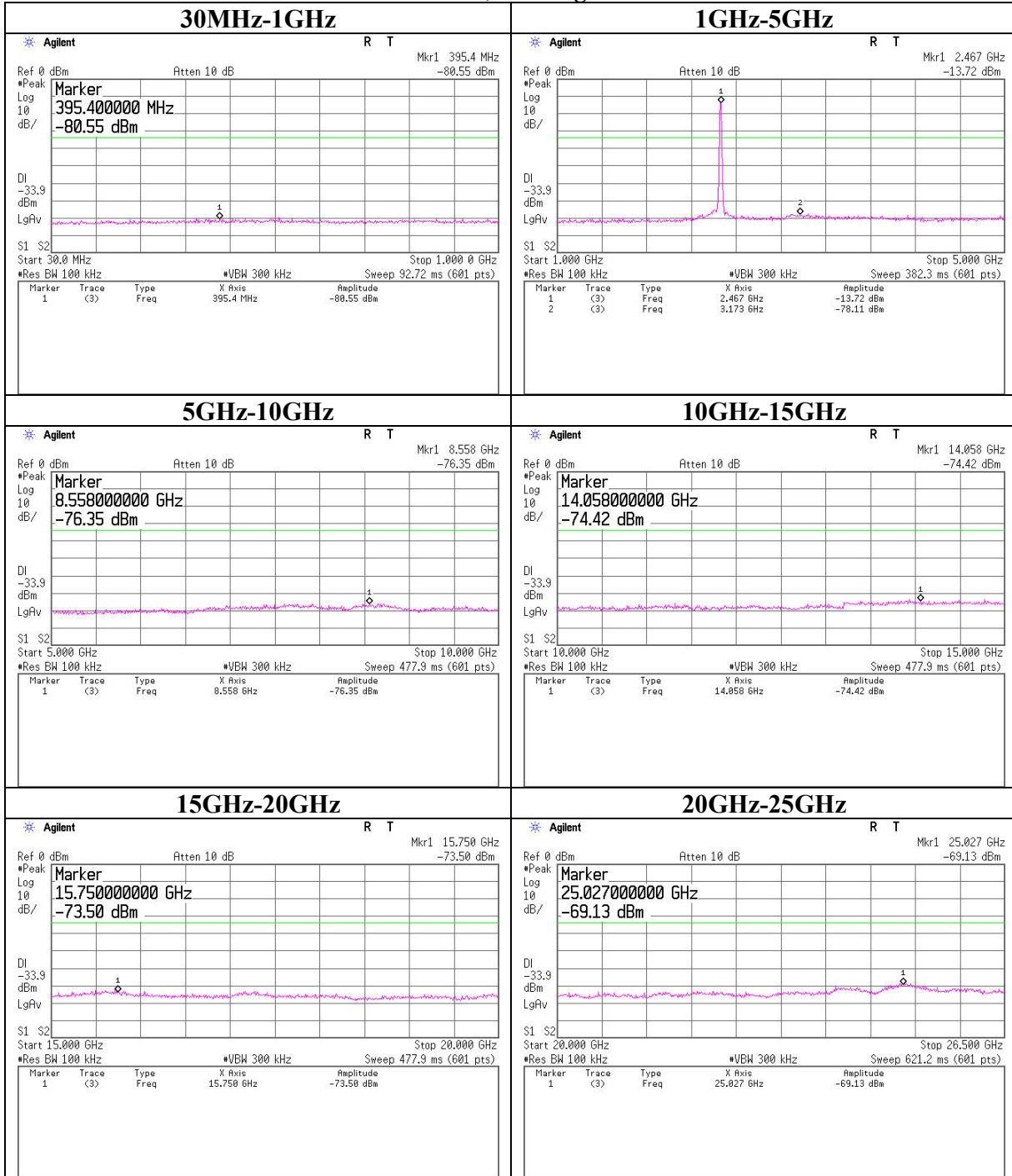
Conducted Spurious Emission
Tx, Ch: Low



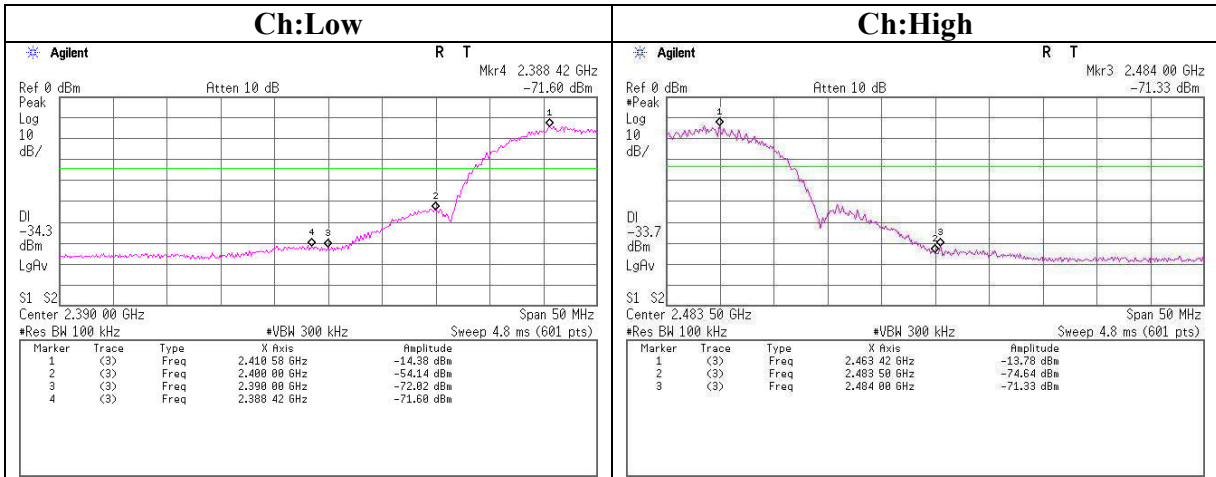
Conducted Spurious Emission
Tx, Ch: Mid



Conducted Spurious Emission
Tx, Ch: High



Conducted emission Band Edge compliance



Power Density

Company	SEIKO EPSON Corporation	Regulation	FCC Part15 Subpart C 15.247(e) / RSS-210 A8.2(b)
Equipment	WiFi Board	Test Distance	-
Model	M238A	Date	08/21/2007
S/N	T-001	Temperature	25deg.C.
Power	AC 120V / 60Hz (module: DC 3.3V)	Humidity	61 %
Mode	Transmitting mode 11b (11Mbps)	Engineer	Kenichi Adachi

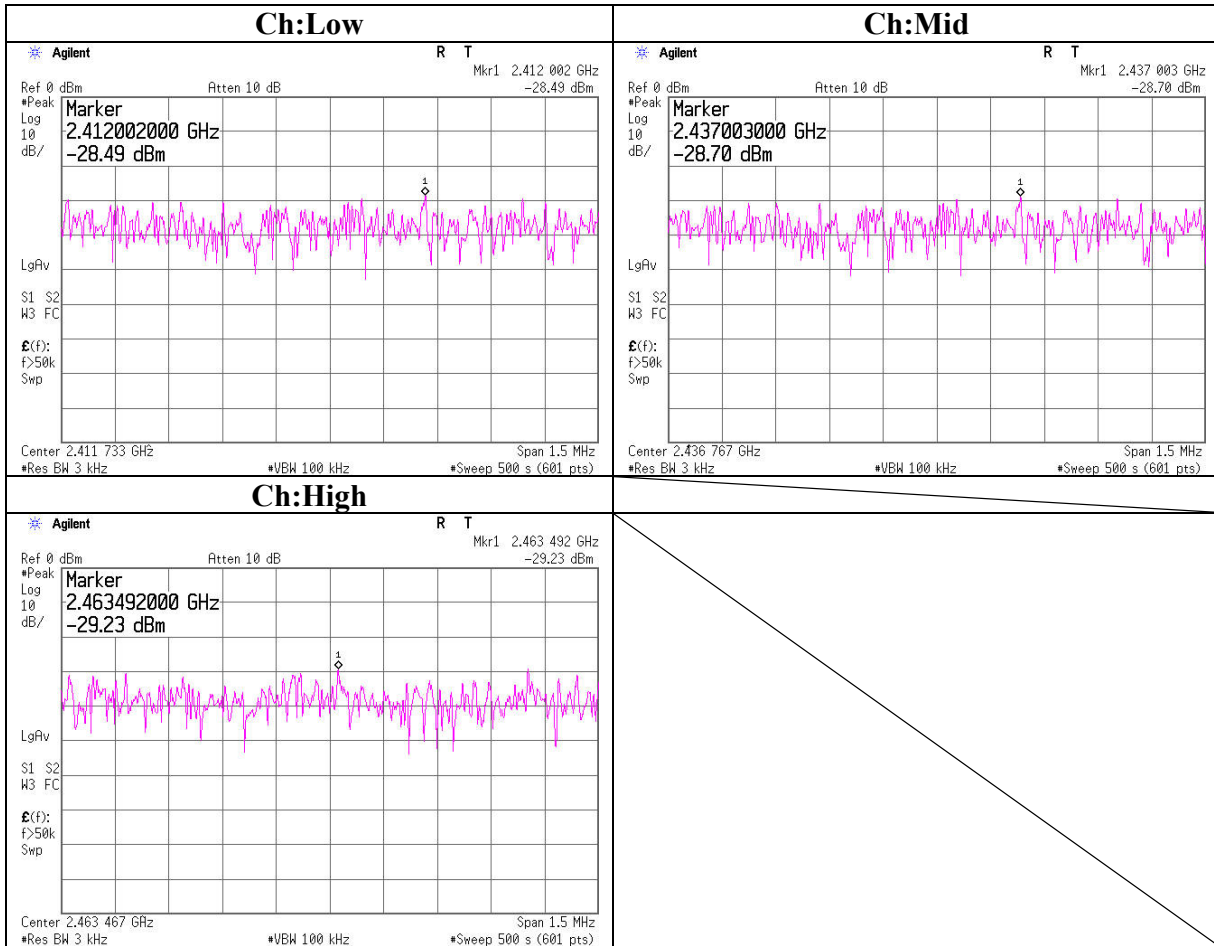
[IEEE802.11b]

Ch	Freq. [MHz]	Reading [dBm]	Cable [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
Low	2412.0	-28.49	0.47	10.07	-17.95	8.00	25.95
Mid	2437.0	-28.70	0.47	10.07	-18.16	8.00	26.16
High	2463.5	-29.23	0.46	10.07	-18.70	8.00	26.70

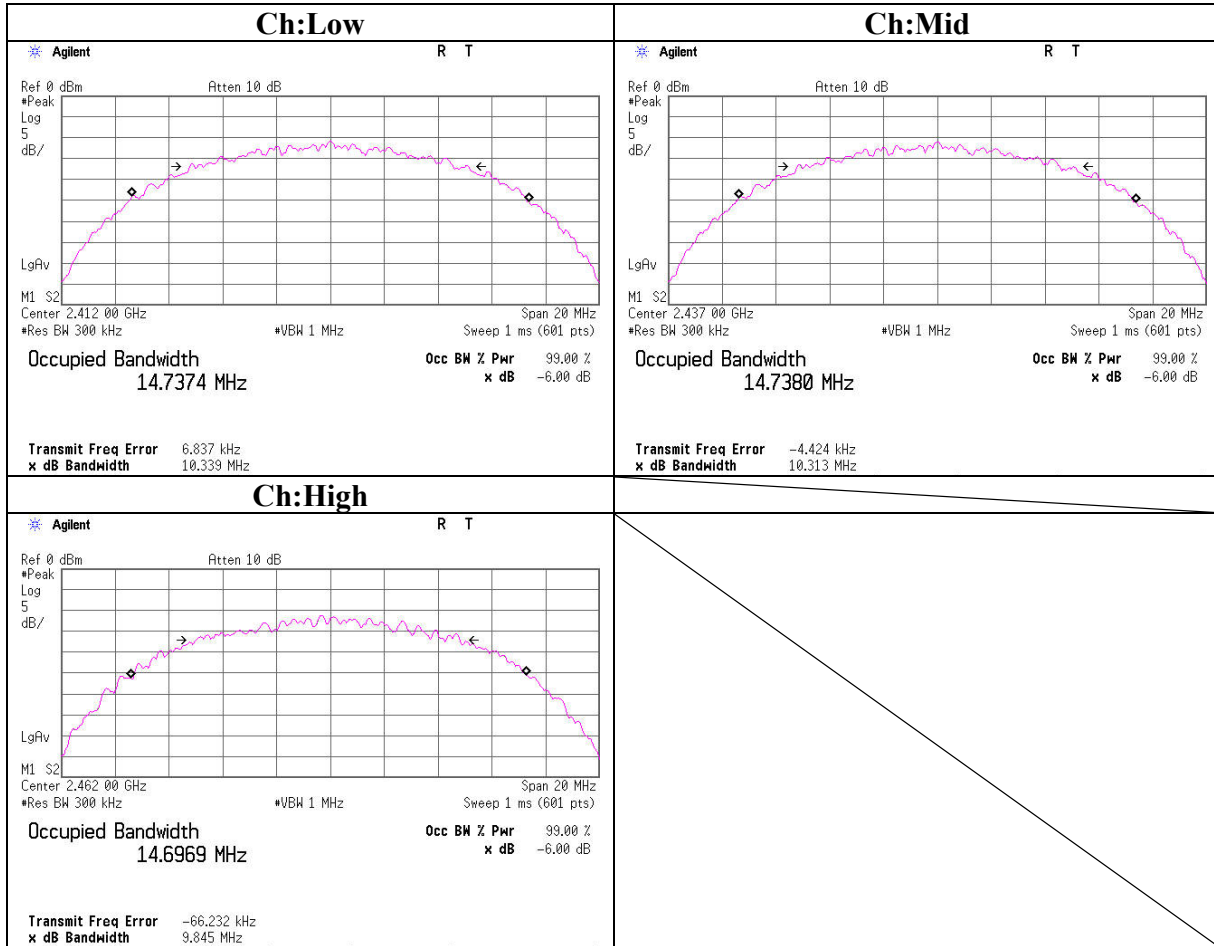
Sample Calculation:

Result = Reading + Cable Loss (spplied by customer) + Attenuator

Power Density



99% Occupied Bandwidth



APPENDIX 3:Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2007/04/02 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	AT / RE	2007/06/20 * 12
MCC-25	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	AT / RE	2006/08/29 * 12
MPA-10	Pre Amplifier	Agilent	8449B	RE	2006/09/11 * 12
MHF-06	High Pass Filter 3.5-24GHz	Tokimec	TF323DCA	RE	2007/05/30 * 12
MCC-47	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	RE	2006/08/29 * 12
MHA-06	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2007/01/30 * 12
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	RE / CE	-
MAT-25	Attenuator(10dB)(above 1GHz)	Agilent	8493C	AT	2007/06/28 * 12
MPM-09	Power Meter	Anritsu	ML2495A	AT	2006/09/20 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	AT	2006/09/20 * 12
MOS-02	Digital Humidity Indicator	N.T	NT-1800	AT / RE	2006/11/27 * 12
MJM-05	Measure	PROMART	SEN1955	RE	-
MAEC-03	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE / CE	2007/03/05 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE / CE	2007/02/03 * 12
MSA-09	Spectrum Analyzer	Advantest	R3273	RE / CE	2006/12/08 * 12
MCC-51	Coaxial cable	UL Japan	-	RE / CE	2007/07/26 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	RE	2007/03/16 * 12
MAT-30	Attenuator(6dB)	TME	UFA-01	RE	2007/03/05 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2007/01/19 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2007/01/19 * 12
MOS-12	Thermo-Hygrometer	Custom	CTH-180	RE / CE	2006/01/19 * 24
MJM-06	Measure	PROMART	SEN1955	RE / CE	-
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	RE	2007/04/14 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	RE	2007/04/06 * 12
MCC-56	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	RE	2007/03/29 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	RE	2007/03/02 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	CE (EUT)	2007/02/22 * 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.

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

UL Japan, Inc.

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