

MEASUREMENT/TECHNICAL REPORT
FCC Part 15 Subpart C

Issued: February 28, 2006

Name and Address of the Applicant: Buffalo Inc.
15, Shibata Hondori 4, Minami-ku Nagoya, Aichi Japan 457-8520

Test Item: Wireless LAN Card Adapter

Identification: "AirStation" WLI-CB-G54S"

Serial No.: 000D0BD135C3

Sample No.: 1

Sample Receipt Date: December 9th, 2005

Test Specification: CFR 47 Part.15 Subpart C 15.247

Date of Testing: January 12th – February 2nd, 2006

Test Result: PASS

Report Prepared by: Cosmos Corporation
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Date

February 28, 2006

Reviewed by:


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Date

February 28, 2006

Notes:

1. This report should not be reproduced except in full, without the written approval of Cosmos Corporation.
2. All measurement data contained in this report may have uncertainty. A judgement for the limitation should be taken into the count.
3. The report in this report apply only to the sample tested.

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1. Description of Equipment Under Test

1.1 Product Description

Manufacturer	: Buffalo Inc.
Model (referred to as the EUT)	: WLI-CB-G54S
Nominal Voltage	: DC 3.3V
Type of Modulation	: ☒ DSSS ☐ FHSS ☐ Other
FCC ID	: FDI-04600046-1
The type of the equipment	: ☐ Stand-alone ☐ Combined Equipment ☒ Plug –In Card ☐ Other
The type of the antenna	: ☒ Integral ☐ external ☐ Other
The type of power source	: ☐ AC mains ☐ Dedicated AC adapter (VAC) ☒ DC Voltage ☐ Battery
The type of battery (if applicable)	: N/A
Type of Operation	: ☐ Continuous ☒ Burst ☐ Intermittent
Stand by Mode	: ☐ Available ☒ N/A
Intended functions	: Wireless data transmission
The type of modulation	: CCK, OFDM
The bandwidth of the IF filters	: 5MHz
Method of Communication Link	: Software to make high speed packet transmitting
The operating frequency band	: 2,412 to 2,462 MHz
The thermal limitation	: 0 to 40 degree

1.2 Antenna Description

Following five antennas are provided to EUT as optional enhanced antenna.

No.	Type Name	Gain	Antenna Type	Remarks
1	N/A	0.12 dBi	On board metal forming antenna	Originally Integrated.

2. General Information

2.1 Test Methodology

All measurement subject to the present report was carried out according to the procedures in ANSI C63.4: 2003.

2.2 Test Facility

All measurement was performed in the following facility;

Cosmos Corporation EMC Lab. Ohnogi

(2-3571 Ohaza-iwatachi, Ohnogi, Watarai-cho, Watarai-gun, Mie-ken 516-2102, Japan) This site has been accepted in a letter dated November 2, 2004 from FCC.

2.3 Traceability

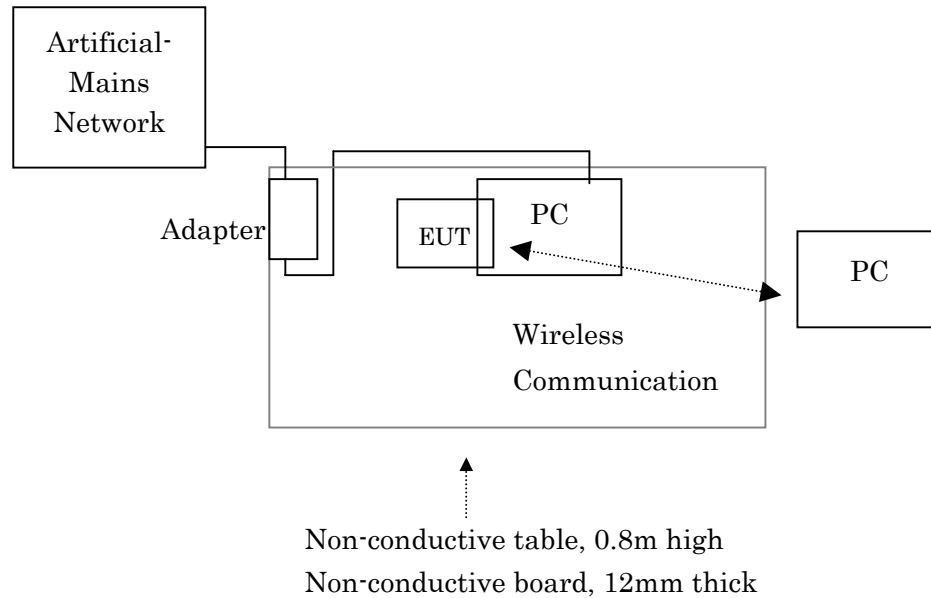
The calibration of measurement equipment used in the test subject to the present report is designed and operated to ensure that the measurement is traceable to national standards of measurement or equivalent abroad.

3. Summary of Test Results

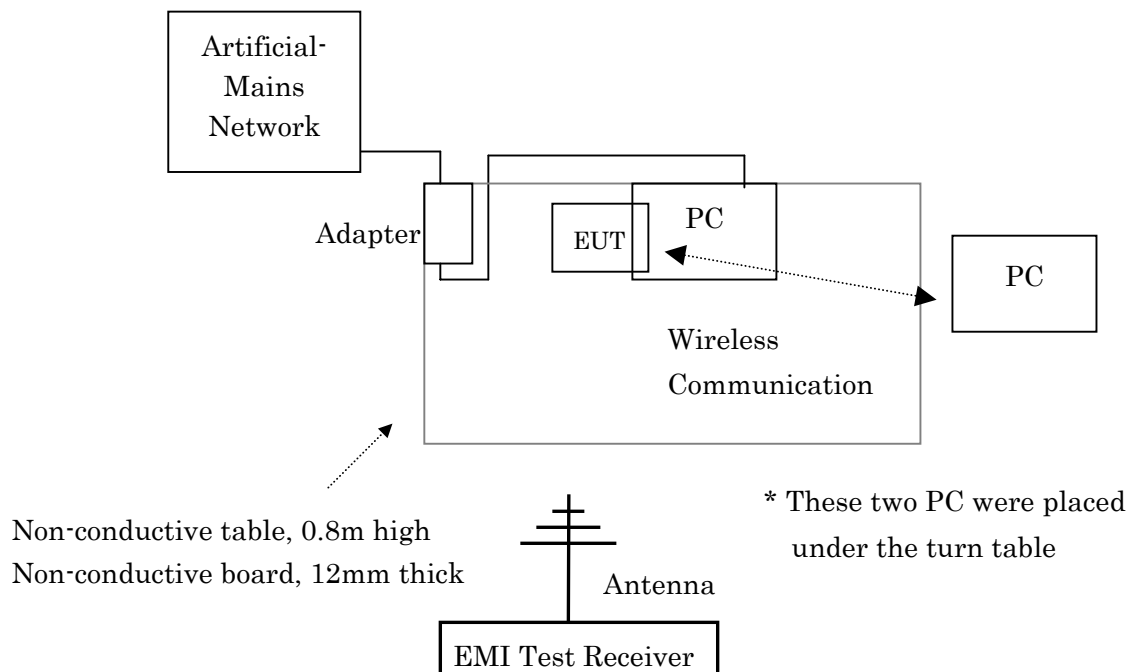
Section	Test Item	Limit	Result
15. 207	AC Power Conducted Emission	Limit: 48dBuV	Pass
15. 247(a)(2)	Spectrum Bandwidth of Direct Sequence Spread Spectrum System	Min. 500kHz	Pass
15. 247(b)	Maximum Peak Output Power	Max. 30dBm	Pass
15. 247(c)	Transmitter Radiated Emissions	20dB less than the peak value	Pass
15. 247(d)	Power Spectrum Density	Max. 8dBm	Pass
15. 247(e)	Band Edge Measurement	Refer to 15. 209	Pass

4. Test Configuration

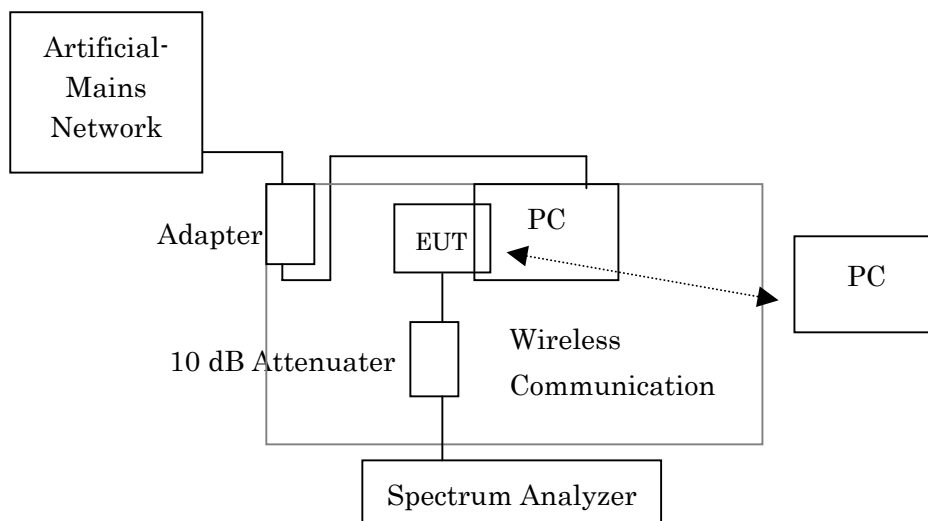
4.1 15. 207 AC Power Conducted Emission in Shield Room



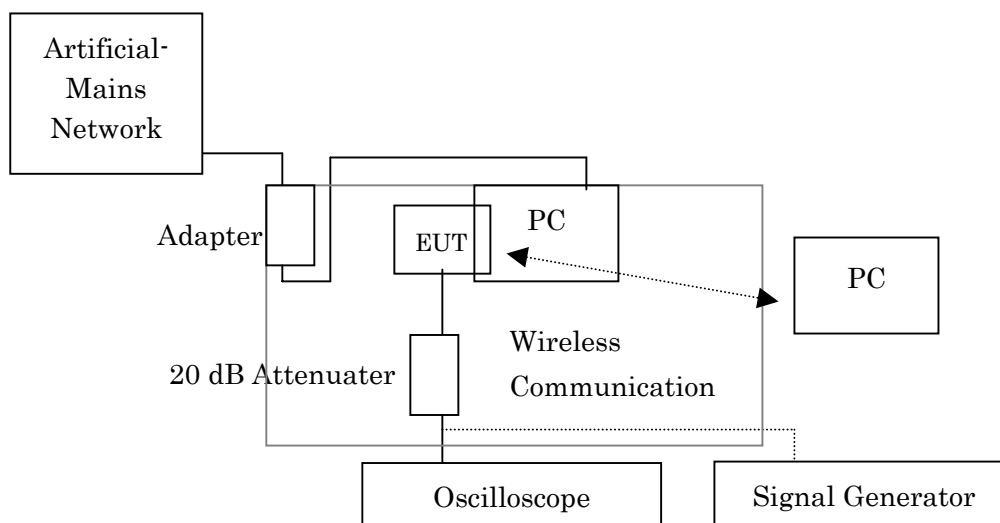
4.2 15. 247(c) Transmitter Radiated Emissions and Band Edge (Radiated) in 3m Anechoic Chamber



4.3 All Other Test Items (Except Maximum Peak Output Power)



4.4 Maximum Peak Output Power



4.5 Test Mode

In all test configurations above, EUT and the support PC made communication link by First Packet Transmitting Software. The software provides channel selection, change modulation type, where necessary.

All conducted measurement was performed with an external stabilized power supply voltage varied between 85% and 115% of the nominal rated supply voltage in accordance with the section 15.31 (e) of the part.

5. Measurement Result

5.1 15. 207 AC Power Conducted Emission

5.1.1 Setting Remarks

- Configure the EUT System in accordance with ANSI C63.4-2003.
- A wooden test table (1.5m×1.0m, height 0.8m) was used.
- EUT's dedicated AC adapter connected to Artificial Mains Network (AMN).
- Other power cord of support equipment is connected to another AMN to isolate its emission from the measured emission of EUT.
- The measuring port of AMN for support equipment was terminated by the 50Ω
- Activate the EUT System and run the software prepared for the test, if necessary.
- Refer to test configuration figure 4.1.

5.1.2 Minimum Standard

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

5.1.3 Result

EUT complies with the requirement.

Uncertainty of measurement : ± 2.26 dB
 Temperature, Humidity : 23°C, 40%

5.1.4 Measured Data

Measured Value Table

Model Name : WLI-CB-G54S
 Serial No. :
 Operator : K.Yamashita
 Power Supply : AC120V,60Hz

Job No : CJ05-050617E
 Temp/Humi : 23°C/40%
 Condition : Operated
 Remark :

Memo :

LIMIT : FCC Part 15 SubpartC ClassB QP
 FCC Part 15 SubpartC ClassB AV

No	Freq. [MHz]	Reading Level		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		QP	AV		QP	AV	QP	AV	QP	AV		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.18244	41.5	26.2	10.5	52.0	36.7	64.4	54.4	12.4	17.7	La	
2	0.27033	31.6	15.2	10.3	41.9	25.5	61.1	51.1	19.2	25.6	La	
3	0.36390	27.0	13.4	10.3	37.3	23.7	58.6	48.6	21.3	24.9	La	
4	0.70541	27.5	14.5	10.5	38.0	25.0	56.0	46.0	18.0	21.0	La	
5	5.43008	24.8	13.0	10.6	35.4	23.6	60.0	50.0	24.6	26.4	La	
6	7.85880	27.8	16.6	10.8	38.6	27.4	60.0	50.0	21.4	22.6	La	
7	0.19187	40.8	28.1	10.5	51.3	38.6	64.0	54.0	12.7	15.4	Lb	
8	0.27933	32.2	19.9	10.3	42.5	30.2	60.8	50.8	18.3	20.6	Lb	
9	0.39879	27.3	17.9	10.3	37.6	28.2	57.9	47.9	20.3	19.7	Lb	
10	0.69979	27.8	14.5	10.5	38.3	25.0	56.0	46.0	17.8	21.1	Lb	
11	1.00746	25.8	12.9	10.5	36.3	23.4	56.0	46.0	19.7	22.6	Lb	
12	5.33327	25.1	13.1	10.6	35.7	23.7	60.0	50.0	24.3	26.3	Lb	
13	7.05290	25.3	13.9	10.6	35.9	24.5	60.0	50.0	24.1	25.5	Lb	

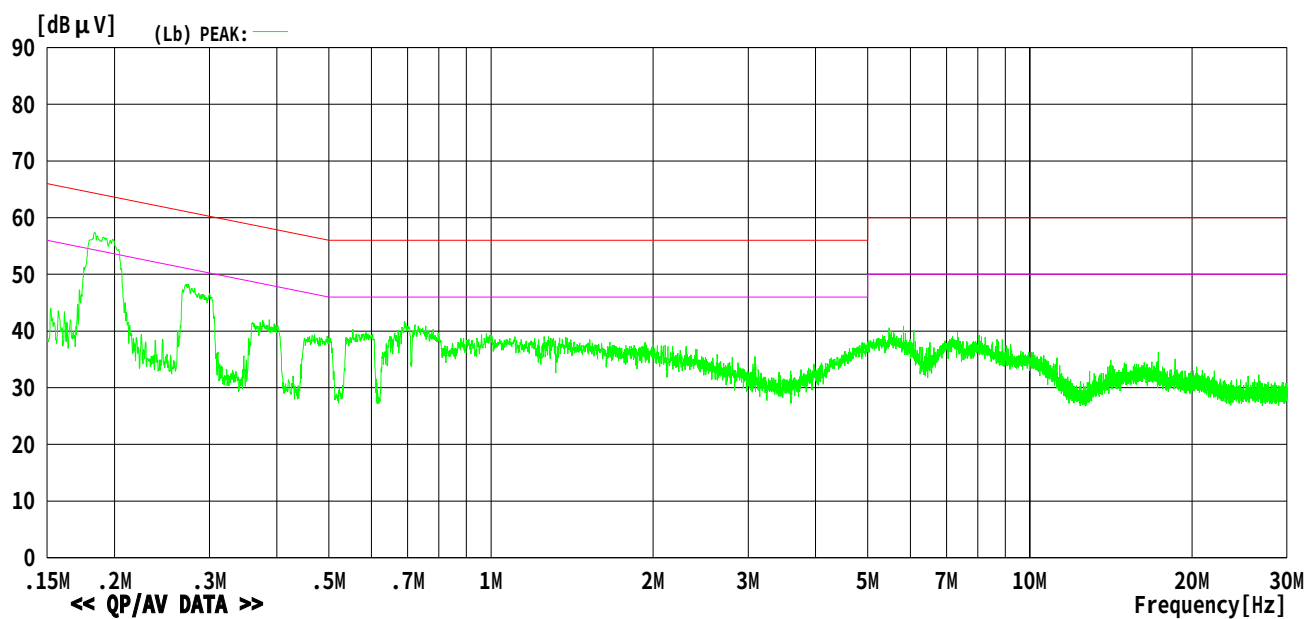
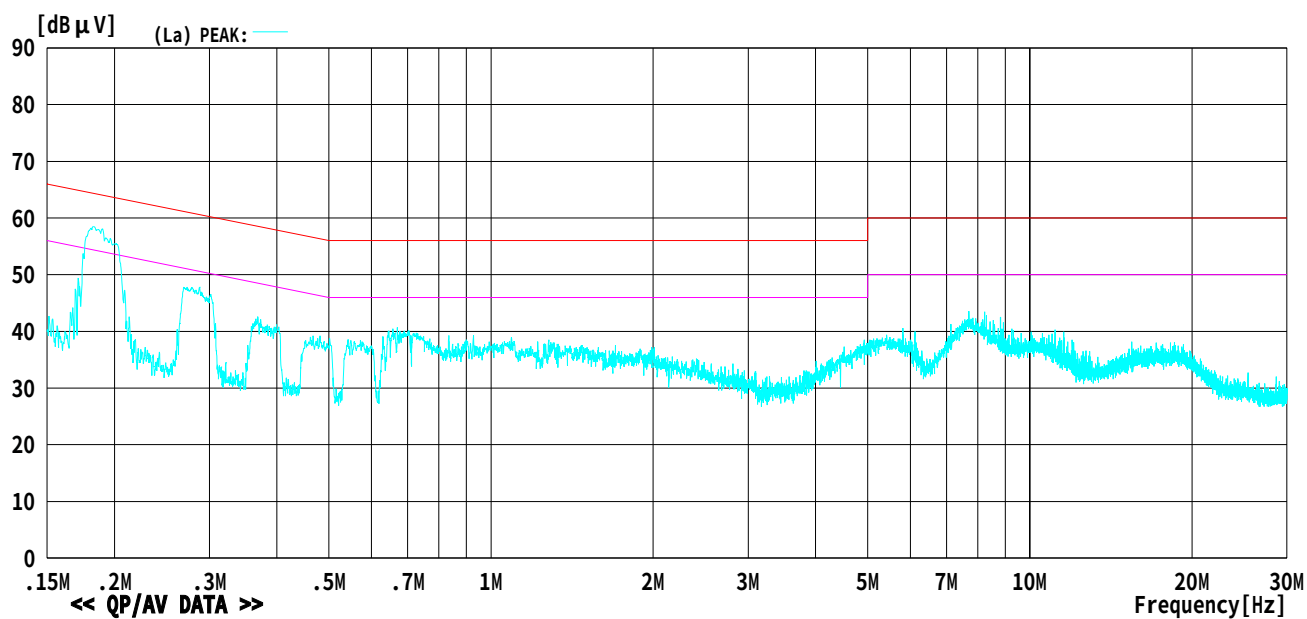
Peak Hold Wave Form

Model Name : WLI-CB-G54S
Serial No. :
Operator : K.Yamashita
Power Supply : AC120V,60Hz

Job No : CJ05-050617E
Temp/Humi : 23°C/40%
Condition : Operated
Remark :

Memo :

LIMIT : FCC Part 15 SubpartC ClassB QP
FCC Part 15 SubpartC ClassB AV



5.2 15. 247(a)(2) Spectrum Bandwidth of Direct Sequence Spread Spectrum System

5.2.1 Setting Remarks

- The both side of 6dB down value from peak power were measured by using delta-maker function of the spectrum analyzer.
- The spectrum analyzer was set-up as following;
 - ✓ Frequency Span : 30 MHz
 - ✓ Resolution bandwidth : 100 kHz
 - ✓ Video bandwidth : 300 kHz
 - ✓ Sweep : 1sec
 - ✓ Detector function : Peak
 - ✓ Trace Mode : Max Hold
- Refer to test configuration figure 4.1.

5.2.2 Minimum Standard

(2) Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.2.3 Result

EUT complies with the requirement.

Uncertainty of measurement : ± 0.8 dB
Temperature, Humidity : 25 °C, 58%

5.2.4 Measured Data

Frequency (MHz)	Measured Bandwidth (MHz)	Limit (MHz)
CCK (11Mbps)		
2412 (1ch)	12.27	> 0.5
2437 (6ch)	12.16	> 0.5
2462 (11ch)	12.02	> 0.5
OFDM (54 Mbps)		
2412 (1ch)	16.77	> 0.5
2437 (6ch)	16.89	> 0.5
2462 (11ch)	16.89	> 0.5

5.3 15. 247(b) Maximum Peak Output Power

5.3.1 Setting Remarks

- Refer to test configuration figure 4.4.
- The maximum peak output power was measured as following;
 1. The diode detector is inserted between EUT and the oscilloscope.
 2. The oscilloscope was used to read the peak response of the detector.
 3. Replaced EUT by the signal generator (SG).
 4. Adjusted the frequency of SG to the fundamental frequency.
 5. Adjusted the amplitude of SG to be the same peak recorded in 2.
- The spectrum analyzer was set-up as following;

✓ Voltage level range	: 10 mV / Div
✓ Sampling time	: 1.00GS / s
✓ Function	: Peak search

5.3.2 Minimum Standard

The maximum peak output power shall not exceed 1 watt. If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.3.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 0.5 dB

Temperature, Humidity : 23 °C, 40

5.3.4 Measured Data

(Normal Rated Voltage, 120 VAC)

Frequency (MHz)	Peak Voltage (mV)	Peak Power (dBm)	Limit (dB)	Margin (dB)
CCK (11 Mbps)				
2412 (1ch)	19.20	21.13	30	8.87
2437 (6ch)	19.20	21.07	30	8.93
2462 (11ch)	20.00	21.13	30	8.87
OFDM (54 Mbps)				
2412 (1ch)	20.80	21.85	30	8.15
2437 (6ch)	20.40	21.58	30	8.42
2462 (11ch)	19.20	20.85	30	9.15

(High-varied voltage, 138 VAC)

Frequency (MHz)	Peak Voltage (mV)	Peak Power (dBm)	Limit (dB)	Margin (dB)
CCK (11 Mbps)				
2412 (1ch)	19.20	21.13	30	8.87
2437 (6ch)	19.20	21.07	30	8.93
2462 (11ch)	20.00	21.13	30	8.87
OFDM (54 Mbps)				
2412 (1ch)	20.80	21.85	30	8.15
2437 (6ch)	20.40	21.58	30	8.42
2462 (11ch)	19.20	20.85	30	9.15

(Low-varied voltage, 102 VAC)

Frequency (MHz)	Peak Voltage (mV)	Peak Power (dBm)	Limit (dB)	Margin (dB)
CCK (11 Mbps)				
2412 (1ch)	19.20	21.13	30	8.87
2437 (6ch)	19.20	21.07	30	8.93
2462 (11ch)	20.00	21.13	30	8.87
OFDM (54 Mbps)				
2412 (1ch)	20.80	21.85	30	8.15
2437 (6ch)	20.40	21.58	30	8.42
2462 (11ch)	19.20	20.85	30	9.15

5.4 15. 247(c) Transmitter Radiated Emissions (Conducted)

5.4.1 Setting Remarks

- EUT directly connects to the spectrum analyzer via calibrated coaxial cable and 10 dB attenuator.
- The Spectrums are scanned from the lowest generated frequency of EUT up to the 10th harmonics by using the spectrum analyzer.
- The spectrum analyzer was set-up as following;
 - ✓ Resolution bandwidth : 100 kHz
 - ✓ Video bandwidth : 100 kHz
 - ✓ Sweep : Auto
 - ✓ Detector function : Peak
 - ✓ Trace Mode : Max Hold
- Refer to test configuration figure 4.3.

5.4.2 Minimum Standard

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

5.4.3 Result

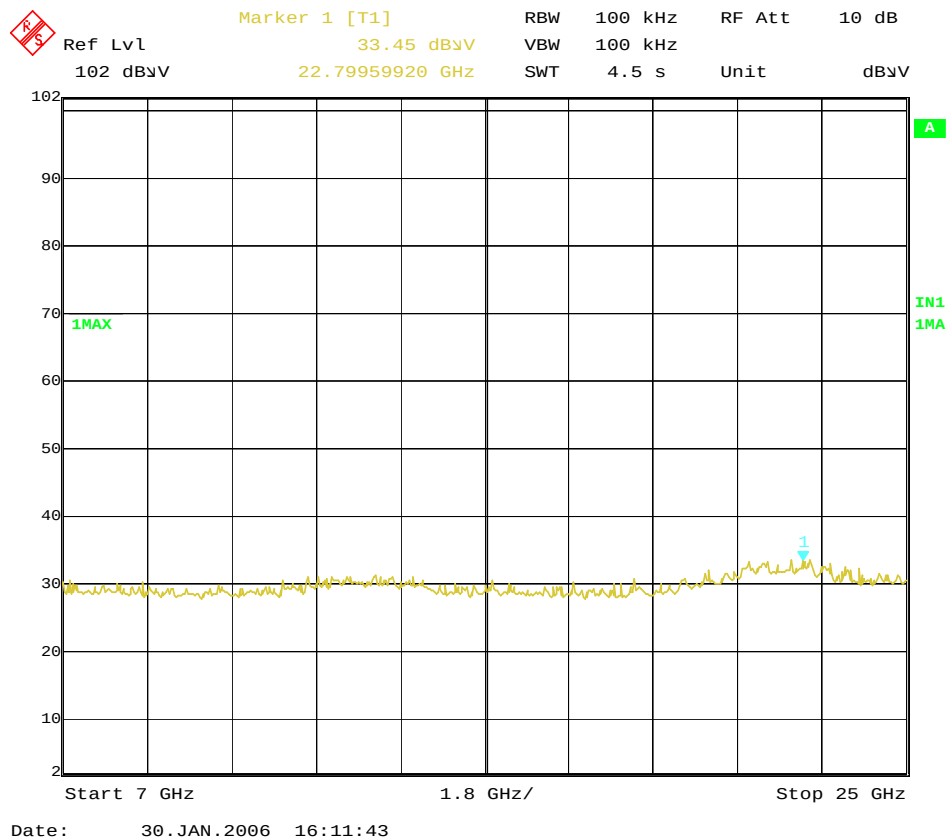
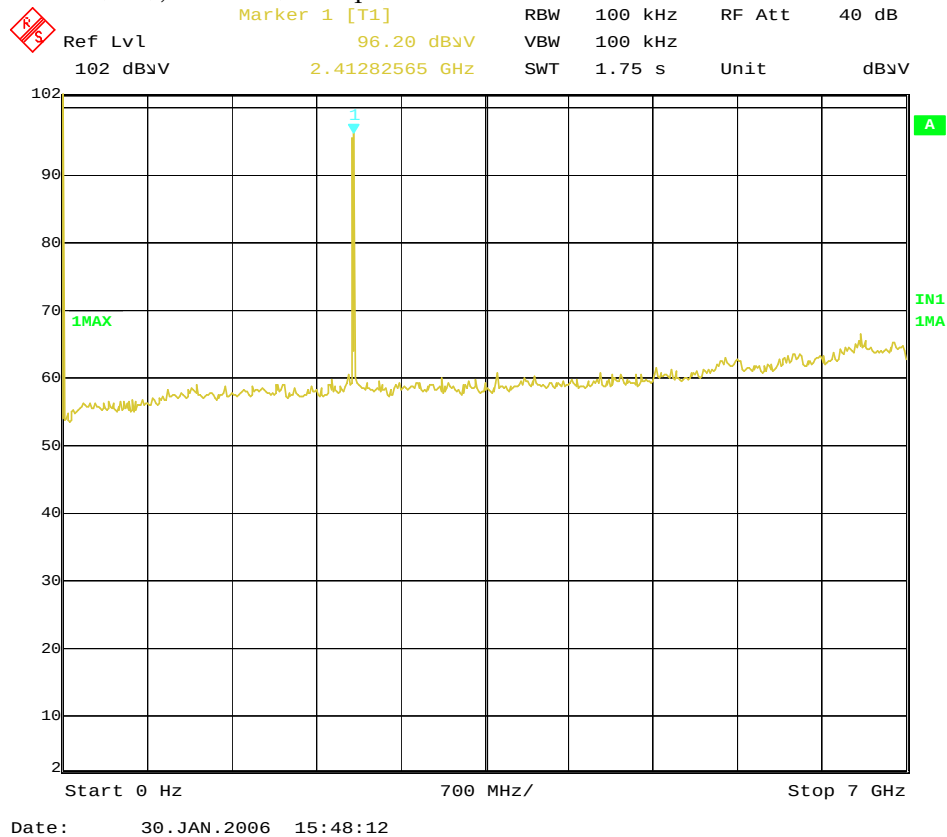
EUT complies with the requirement.

Uncertainty of measurement result: ± 0.8 dB

Temperature, Humidity : 25 °C, 58%

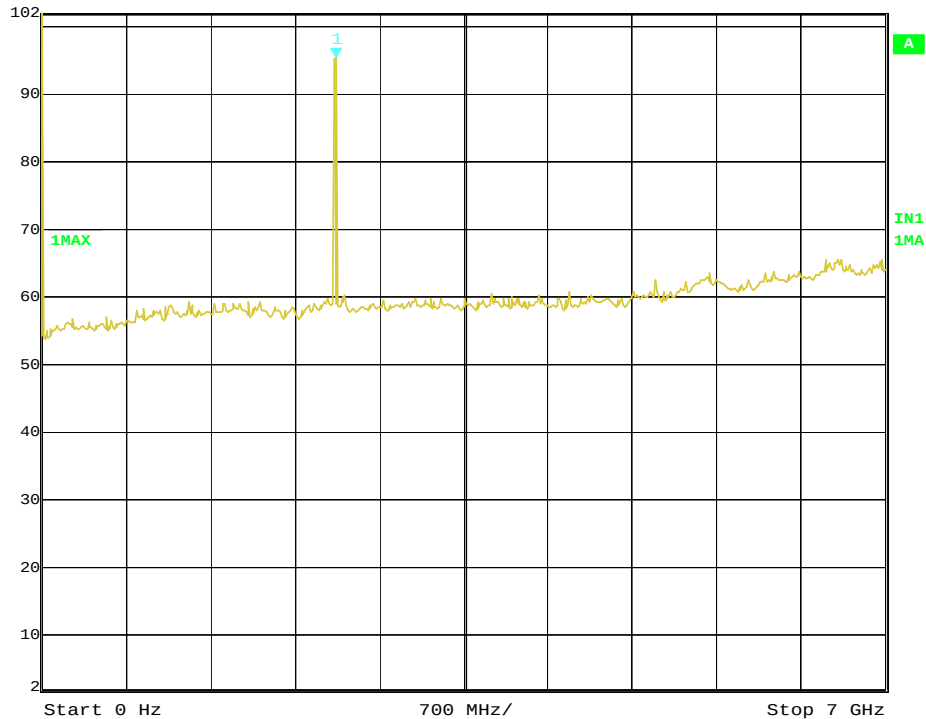
5.4.4 Measured Data (No emission exceeding the 20dB limit was found)

2412 MHz (1ch), OFDM (54Mbps)



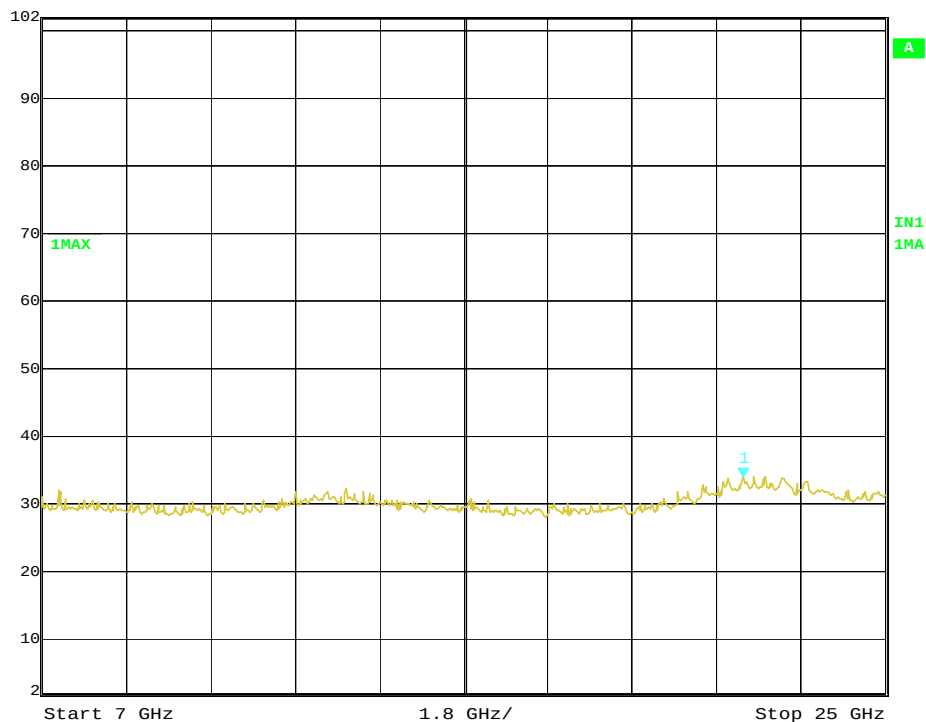
2437 MHz (6ch), OFDM (54Mbps)

Marker 1 [T1]
Ref Lvl 102 dBV
95.25 dBV
2.44088176 GHz
RBW 100 kHz
VBW 100 kHz
SWT 1.75 s
RF Att 40 dB
Unit dBV



Date: 30.JAN.2006 15:52:02

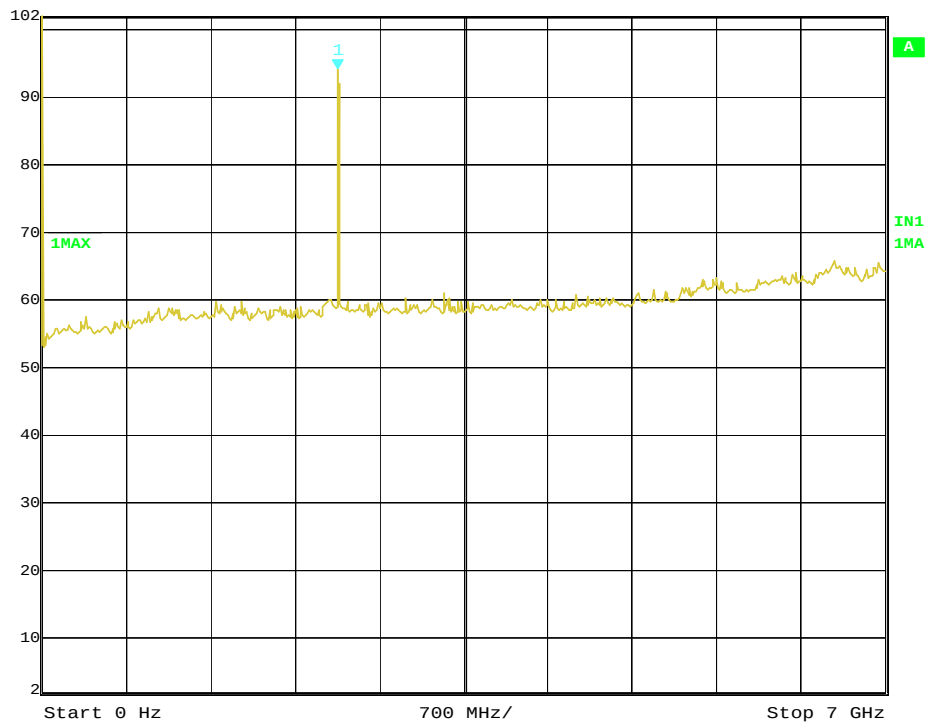
Marker 1 [T1]
Ref Lvl 102 dBV
33.97 dBV
21.96993988 GHz
RBW 100 kHz
VBW 100 kHz
SWT 4.5 s
RF Att 10 dB
Unit dBV



Date: 30.JAN.2006 16:09:31

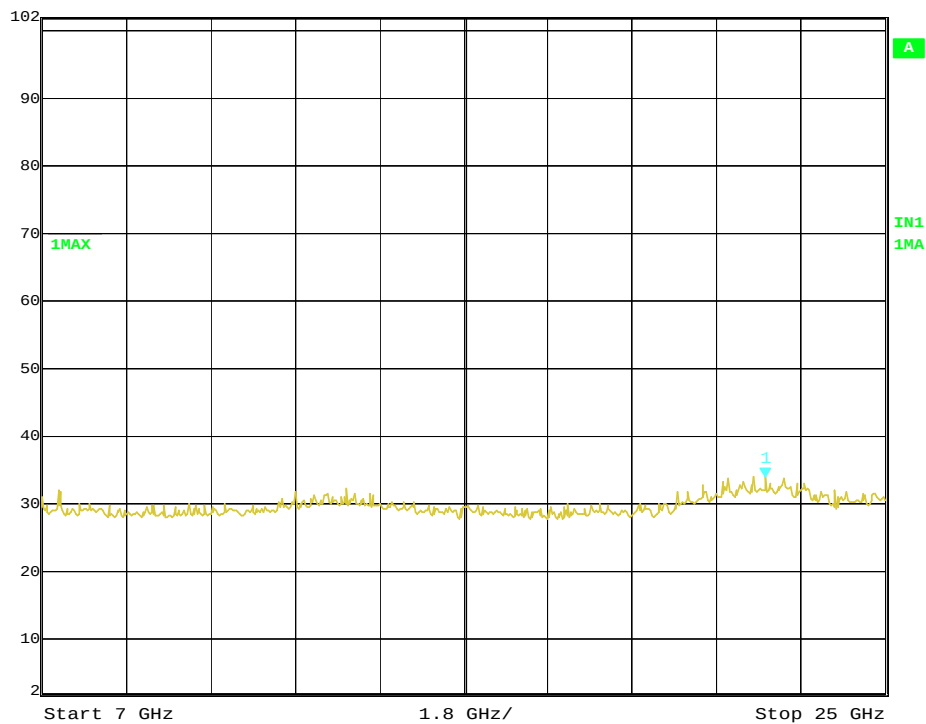
2462 MHz (11ch), OFDM (54Mbps)

Marker 1 [T1]
Ref Lvl 102 dBV
102 dBV
94.06 dBV
2.45490982 GHz
RBW 100 kHz
VBW 100 kHz
SWT 1.75 s
RF Att 40 dB
Unit dBV



Date: 30.JAN.2006 15:54:42

Marker 1 [T1]
Ref Lvl 102 dBV
102 dBV
33.76 dBV
22.43887776 GHz
RBW 100 kHz
VBW 100 kHz
SWT 4.5 s
RF Att 10 dB
Unit dBV



Date: 30.JAN.2006 16:06:45

5.5 15. 247(c) Transmitter Radiated Emissions (Radiated)

5.5.1 Setting Remarks

- The data lists in “5.5.4 Measured Data “ list the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, plus the limit.
- In the frequency range between 30MHz to 25 GHz (as 10th harmonics), the Electric Field Strength was measured in accordance with ANSI C63.4: 2003 and CISPR22: 1997.
- The test setup was made in accordance with ANSI C63.4: 2003.
- The antenna was measured at 1-4m height.
- The EUT was placed on the non-conductive table in the center of turntable. The height of this table was 0.8m.
- The measurement was carried out with both horizontal and vertical antenna polarization.
- The highest radiation from the equipment was recorded.
- By varying the configuration of the test sample and the cable routing, it was attempted to maximize the emission.
- The test receiver with Quasi Peak and Average detector is in compliance with CISPR 16-1:1993.
- The spectrum analyzer was set-up as following;

(Frequency range : 30 - 1000 MHz)

- ✓ Resolution bandwidth : 100 kHz
- ✓ Video bandwidth : 300 kHz
- ✓ Detector function : Peak
- ✓ Trace Mode : Max Hold

(Frequency range : Above 1000 MHz)

- ✓ Resolution bandwidth : 1 MHz
- ✓ Video bandwidth : 1 MHz
- ✓ Detector function : Peak
- ✓ Trace Mode : Max Hold

- EMI Test Receiver analyzer was set-up as following;

- ✓ IF bandwidth : 120 kHz (Quasi-Peak Detector)
- ✓ IF bandwidth : 1 MHz (Average Detector)

- Refer to test configuration figure 4.2.

5.5.2 Minimum Standard

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.5.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 3.28 dB

Temperature, Humidity : Refer to each data table

*Note In 5GHz to 25GHz, no significant noises were detected.

5.4.4 Measured Data

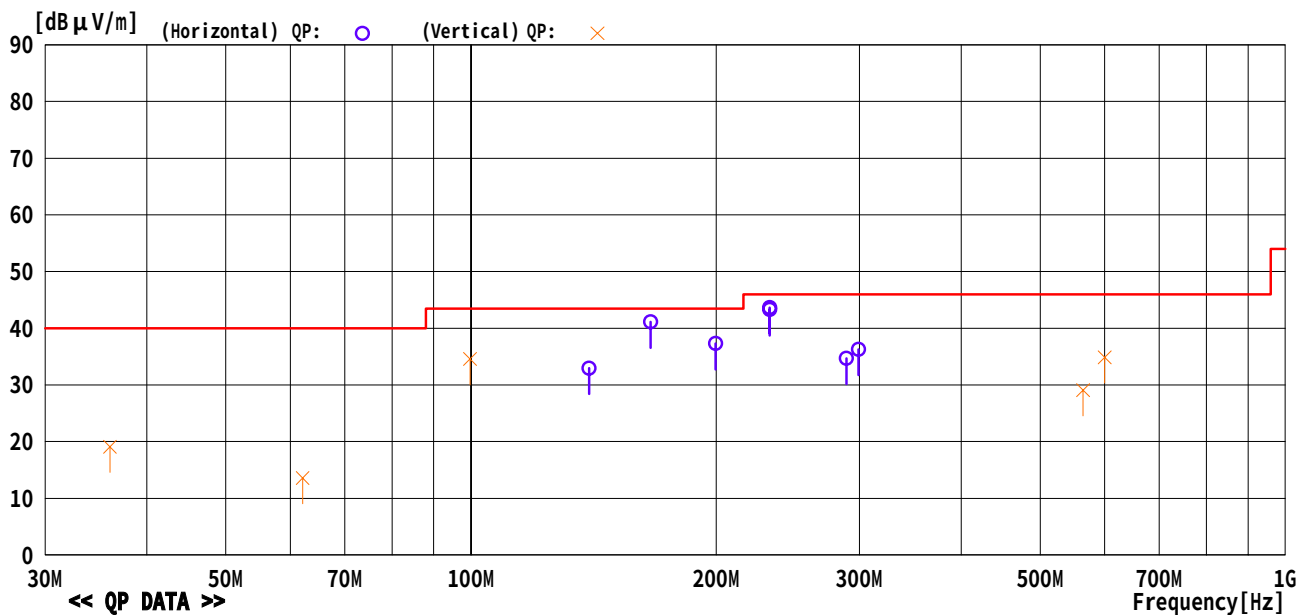
30MHz to 1GHz, Channel 1

Model Name : WLI-CB-G54S
 Serial No. :
 Operator : K.Yamashita
 Power Supply : DC 3.3V

Job No : CJ05-050617E
 Temp./Humi. : 22°C/32%
 Condition : Operated
 Remark : CH 1

Memo : RBW:120KHz VBW:1MHz
 Data Comment : FCC Part15 Subpart C CH 1

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant
	[MHz]	[dB μ V]	[dB/m]	[dB μ V/m]	[dB μ V/m]	[dB]	[H/V]	[cm]	[deg]	Type
1	36.032	30.9	-11.8	19.1	40.0	20.9	Vert.	100	340	BC
2	62.124	28.3	-14.7	13.6	40.0	26.4	Vert.	100	358	BC
3	99.760	48.2	-13.6	34.6	43.5	8.9	Vert.	102	244	BC
4	139.642	44.0	-11.0	33.0	43.5	10.5	Hori.	237	113	BC
5	166.260	50.4	-9.3	41.1	43.5	2.4	Hori.	280	82	BC
6	199.648	44.4	-7.1	37.3	43.5	6.2	Hori.	171	236	BC
7	232.753	48.8	-5.2	43.6	46.0	2.4	Hori.	143	129	BC
8	232.861	48.5	-5.2	43.3	46.0	2.7	Hori.	140	112	BC
9	289.224	36.5	-1.8	34.7	46.0	11.3	Hori.	100	256	BC
10	299.078	37.4	-1.1	36.3	46.0	9.7	Hori.	108	248	BC
11	564.489	31.4	-2.3	29.1	46.0	16.9	Vert.	103	179	LP
12	599.981	36.6	-1.7	34.9	46.0	11.1	Vert.	139	269	LP

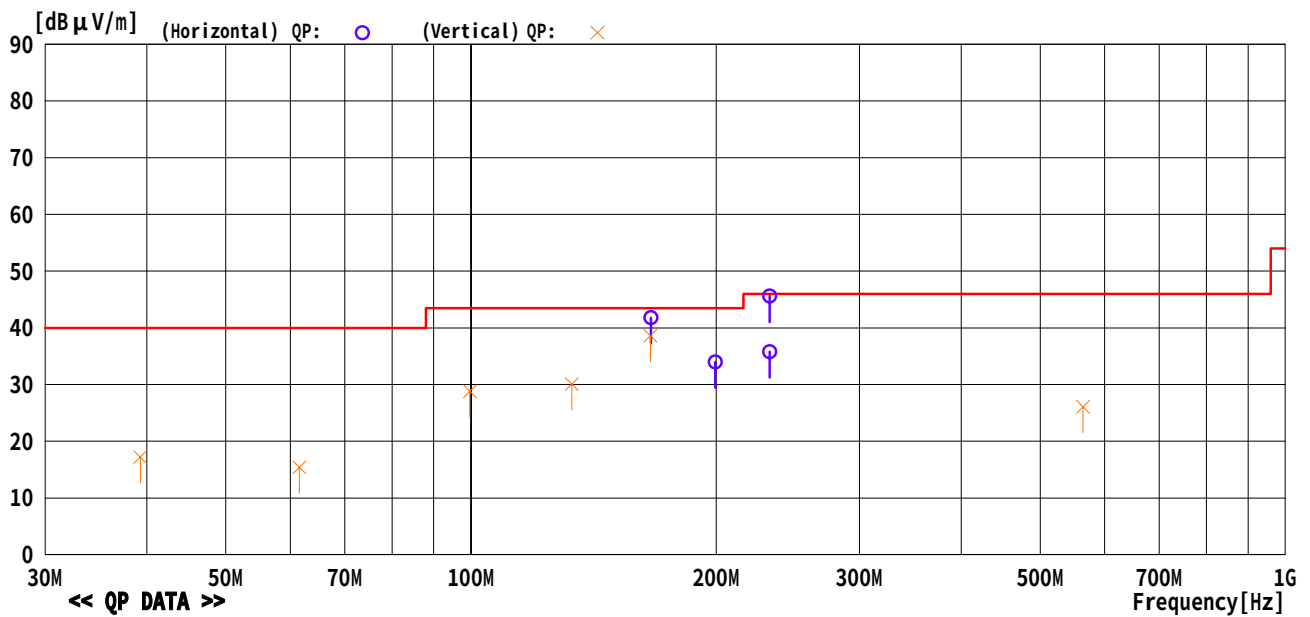
30MHz to 1GHz, Channel 6

Model Name : WLI-CB-G54S
 Serial No. :
 Operator : K.Yamashita
 Power Supply : DC 3.3V

Job No : CJ05-050617E
 Temp./Humi. : 24°C/32%
 Condition : Operated
 Remark : CH 6

Memo : RBW:120KHz VBW:1MHz
 Data Comment : FCC Part15 Subpart C CH6

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type
1	39.258	29.7	-12.5	17.2	40.0	22.8	Vert.	100	280	BC
2	61.563	30.1	-14.7	15.4	40.0	24.6	Vert.	100	1	BC
3	99.711	42.4	-13.6	28.8	43.5	14.7	Vert.	100	260	BC
4	132.993	41.6	-11.5	30.1	43.5	13.4	Vert.	100	284	BC
5	166.108	48.0	-9.4	38.6	43.5	4.9	Vert.	282	317	BC
6	166.366	51.1	-9.3	41.8	43.5	1.7	Hori.	291	78	BC
7	199.582	41.1	-7.1	34.0	43.5	9.5	Hori.	161	101	BC
8	232.670	50.8	-5.2	45.6	46.0	0.4	Hori.	143	116	BC
9	232.793	41.0	-5.2	35.8	46.0	10.2	Hori.	136	110	BC
10	564.367	28.4	-2.3	26.1	46.0	19.9	Vert.	100	206	LP

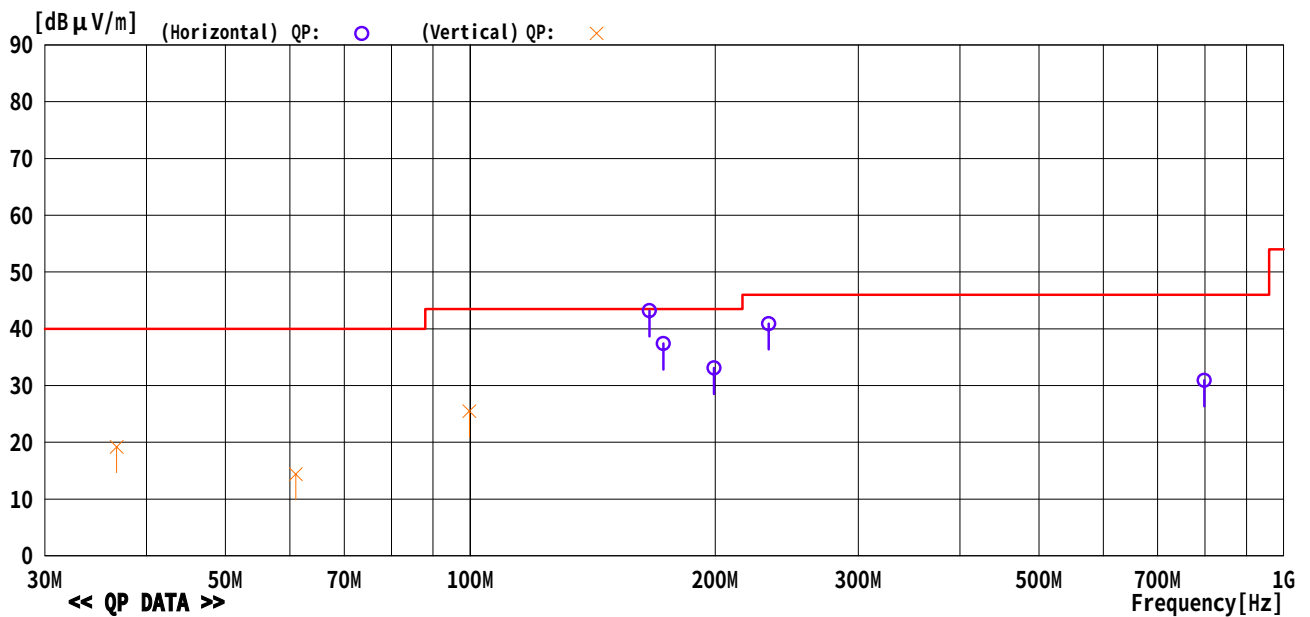
30MHz to 1GHz, Channel 11

Model Name : WLI-CB-G54S
 Serial No. :
 Operator : K.Yamashita
 Power Supply : DC 3.3V

Job No : CJ05-050617E
 Temp./Humi. : 24°C/32%
 Condition : Operated
 Remark : CH 11

Memo : RBW:120KHz VBW:1MHz
 Data Comment : FCC Part15 Subpart C CH11

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type
1	36.733	31.2	-12.0	19.2	40.0	20.8	Vert.	100	1	BC
2	61.002	29.1	-14.7	14.4	40.0	25.6	Vert.	100	82	BC
3	99.715	39.1	-13.6	25.5	43.5	18.0	Vert.	144	172	BC
4	166.108	52.6	-9.4	43.2	43.5	0.3	Hori.	291	242	BC
5	172.753	46.3	-8.9	37.4	43.5	6.1	Hori.	187	214	BC
6	199.384	40.2	-7.1	33.1	43.5	10.4	Hori.	161	102	BC
7	232.663	46.1	-5.2	40.9	46.0	5.1	Hori.	132	122	BC
8	798.298	29.4	1.5	30.9	46.0	15.1	Hori.	132	156	LP

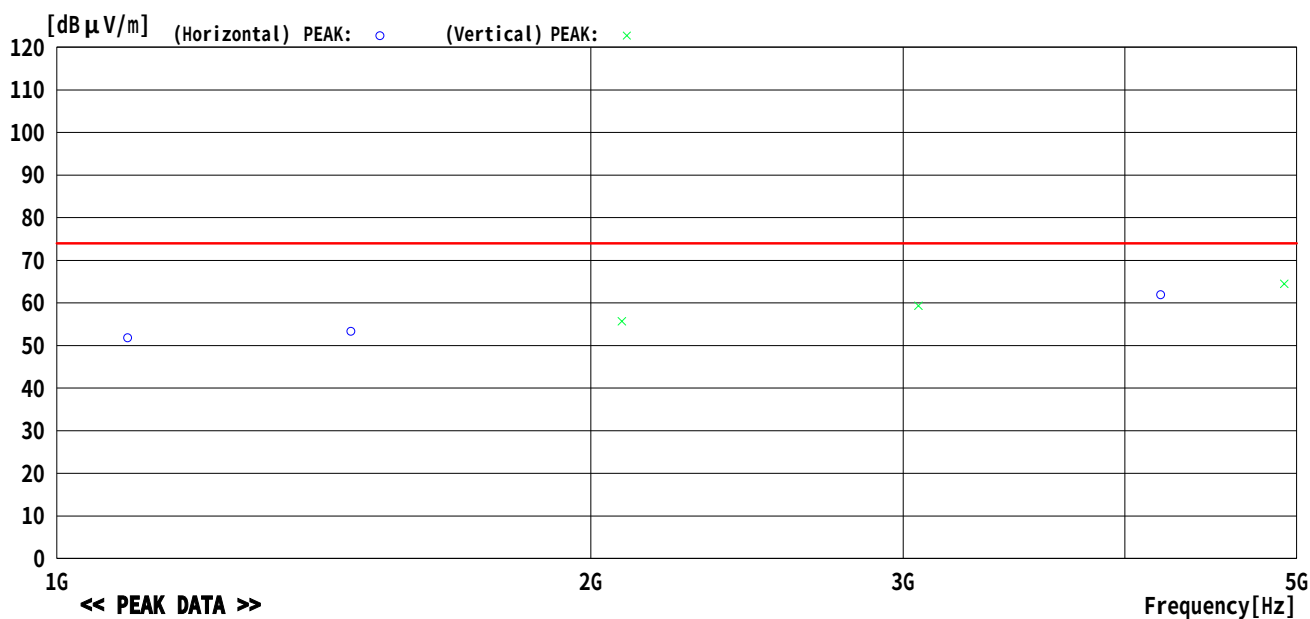
1GHz to 5GHz, Channel 1

Model Name : WLI-CB-G54S
 Serial No. :
 Operator : K. Yamashita
 Power Supply : DC 3.3 V

Job No. : CJ05-050617E
 Temp/Humi : 25deg. 31%
 Condition : Operated
 Remark : CH 1

Memo :
 Data Comment : FCC Subpart C 1GHz-5GHz CH1

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(PK)



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant
	[MHz]	[dB μ V]	[dB/m]	[dB μ V/m]	[dB μ V/m]	[dB]	[H/V]	[cm]	[deg]	Type
1	1096.192	24.2	27.6	51.8	74.0	22.2	Hori.	100	358	HRN
2	1464.928	24.6	28.7	53.3	74.0	20.7	Hori.	100	0	HRN
3	2082.160	24.7	31.0	55.7	74.0	18.3	Vert.	100	358	HRN
4	3060.120	25.7	33.6	59.3	74.0	14.7	Vert.	100	1	HRN
5	4190.376	26.0	35.9	61.9	74.0	12.1	Hori.	100	1	HRN
6	4919.832	26.2	38.3	64.5	74.0	9.5	Vert.	100	266	HRN

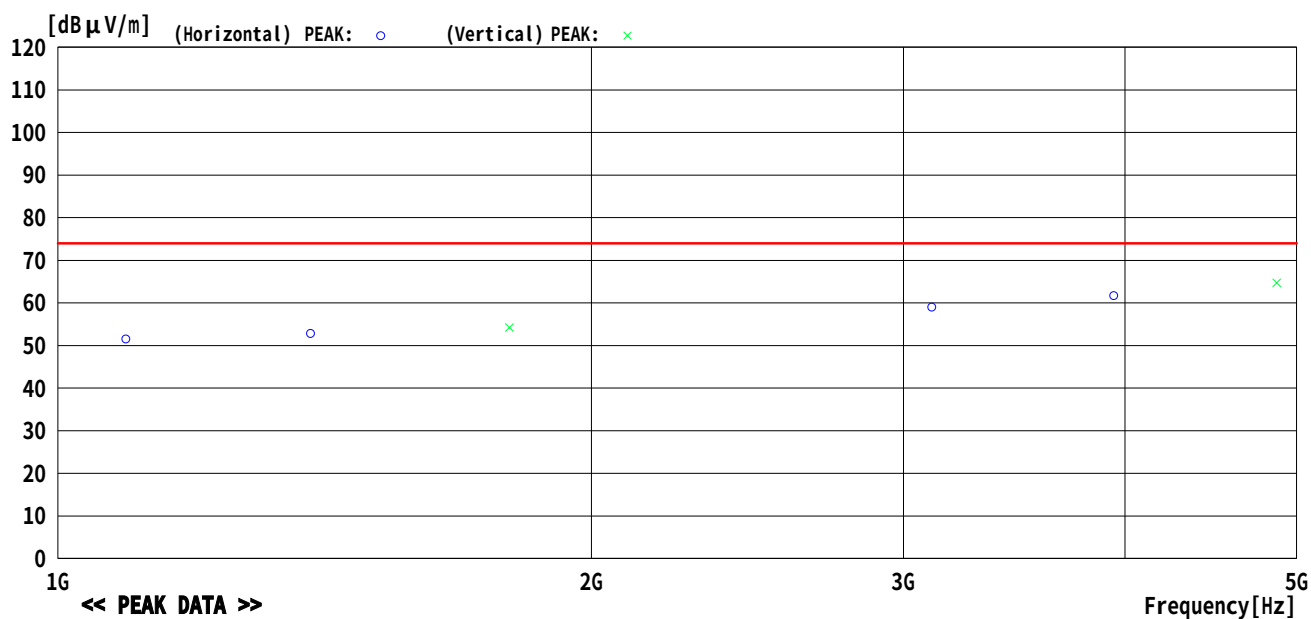
1GHz to 5GHz, Channel 6

Model Name : WLI-CB-G54S
 Serial No. :
 Operator : K. Yamashita
 Power Supply : DC 3.3 V

Job No. : CJ05-050617E
 Temp/Humi : 25deg. 31%
 Condition : Operated
 Remark : CH 6

Memo :
 Data Comment : FCC Subpart C 1GHz-5GHz CH6

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(PK)



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant
	[MHz]	[dB μ V]	[dB/m]	[dB μ V/m]	[dB μ V/m]	[dB]	[H/V]	[cm]	[deg]	Type
1	1092.184	23.9	27.6	51.5	74.0	22.5	Hori.	100	358	HRN
2	1388.776	24.0	28.8	52.8	74.0	21.2	Hori.	100	358	HRN
3	1797.592	25.2	29.0	54.2	74.0	19.8	Vert.	100	358	HRN
4	3112.224	25.3	33.7	59.0	74.0	15.0	Hori.	100	75	HRN
5	3941.880	26.2	35.5	61.7	74.0	12.3	Hori.	100	313	HRN
6	4871.736	26.4	38.3	64.7	74.0	9.3	Vert.	100	295	HRN

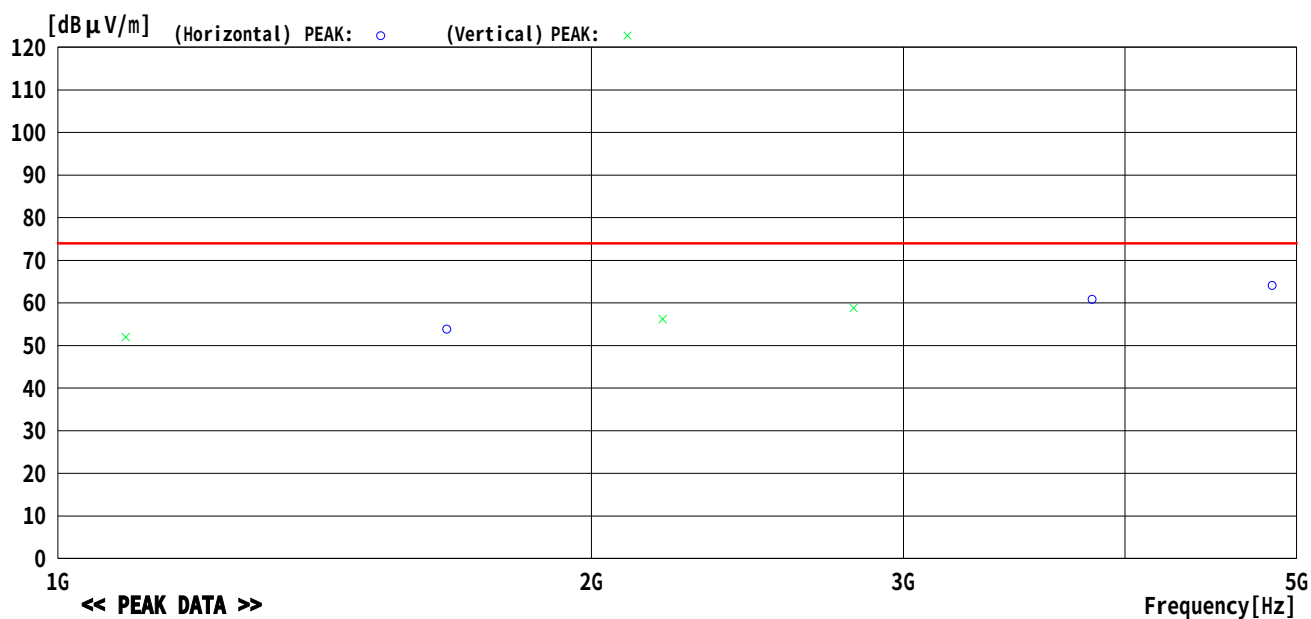
1GHz to 5GHz, Channel 11

Model Name : WLI-CB-G54S
 Serial No. :
 Operator : K. Yamashita
 Power Supply : DC 3.3 V

Job No. : CJ05-050617E
 Temp/Humi : 25deg. 31%
 Condition : Operated
 Remark : CH 11

Memo :
 Data Comment : FCC Subpart C 1GHz-5GHz CH11

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(PK)



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant
	[MHz]	[dB μ V]	[dB/m]	[dB μ V/m]	[dB μ V/m]	[dB]	[H/V]	[cm]	[deg]	Type
1	1092.184	24.4	27.6	52.0	74.0	22.0	Vert.	100	206	HRN
2	1657.312	25.2	28.6	53.8	74.0	20.2	Hori.	100	0	HRN
3	2194.384	23.8	32.4	56.2	74.0	17.8	Vert.	100	358	HRN
4	2811.616	25.4	33.4	58.8	74.0	15.2	Vert.	100	51	HRN
5	3833.664	25.7	35.1	60.8	74.0	13.2	Hori.	100	1	HRN
6	4843.680	25.8	38.3	64.1	74.0	9.9	Hori.	100	290	HRN

Measured data table for 1 to 25 GHz

Ch.	Frequency (MHz)	Peak (dB μ V/m)	Average (dB μ V/m)	Pola.	Pk. Limit (dB μ V/m)	Margin (dB μ V/m)	Av. Limit (dB μ V/m)	Margin (dB μ V/m)
1	*2,410.8	105.5	98.34	Hori.	—	—	—	—
1	4,919.8	64.5	51.9	Vert.	74.0	9.5	54.0	2.1
1	7,120.2	64.5	51.5	Vert.	74.0	9.5	54.0	2.5
6	*2,442.9	102.8	88.54	Hori.	—	—	—	—
6	4,871.7	64.7	52.5	Vert.	74.0	9.3	54.0	1.5
6	7,997.0	65.2	52.8	Vert.	74.0	8.8	54.0	1.2
11	*2,466.9	104.4	90.14	Hori.	—	—	—	—
11	4,843.7	64.1	49.84	Hori.	74.0	9.9	54.0	4.2
11	7,997.0	65.4	52.2	Vert.	74.0	8.6	54.0	1.8

* Fundamental frequency

5.6 15. 247(d) Power Spectrum Density

5.6.1 Setting Remarks

- EUT directly connects to the spectrum analyzer via calibrated coaxial cable and 10 dB attenuator.
- The loss of the coaxial cable is maximum 1 dB.
- The peak output power was determined by using the marker-data function of spectrum analyzer.
- The spectrum analyzer was set-up as following;

✓ Frequency Span	: 2 MHz
✓ Resolution bandwidth	: 3 kHz
✓ Video bandwidth	: 3 MHz
✓ Sweep	: 680msec
✓ Detector function	: Peak
✓ Trace Mode	: Max Hold
- Refer to test configuration figure 4.3.

5.6.2 Minimum Standard

(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

5.6.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 0.8 dB

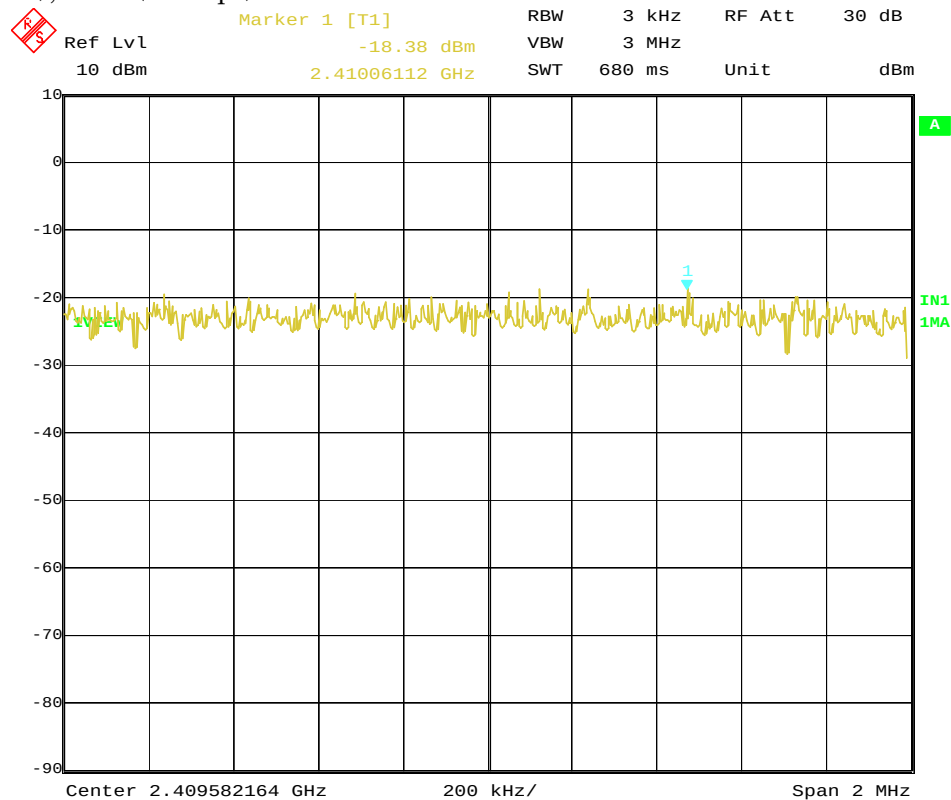
Temperature, Humidity : 24 °C, 58%

5.6.4 Measured Data

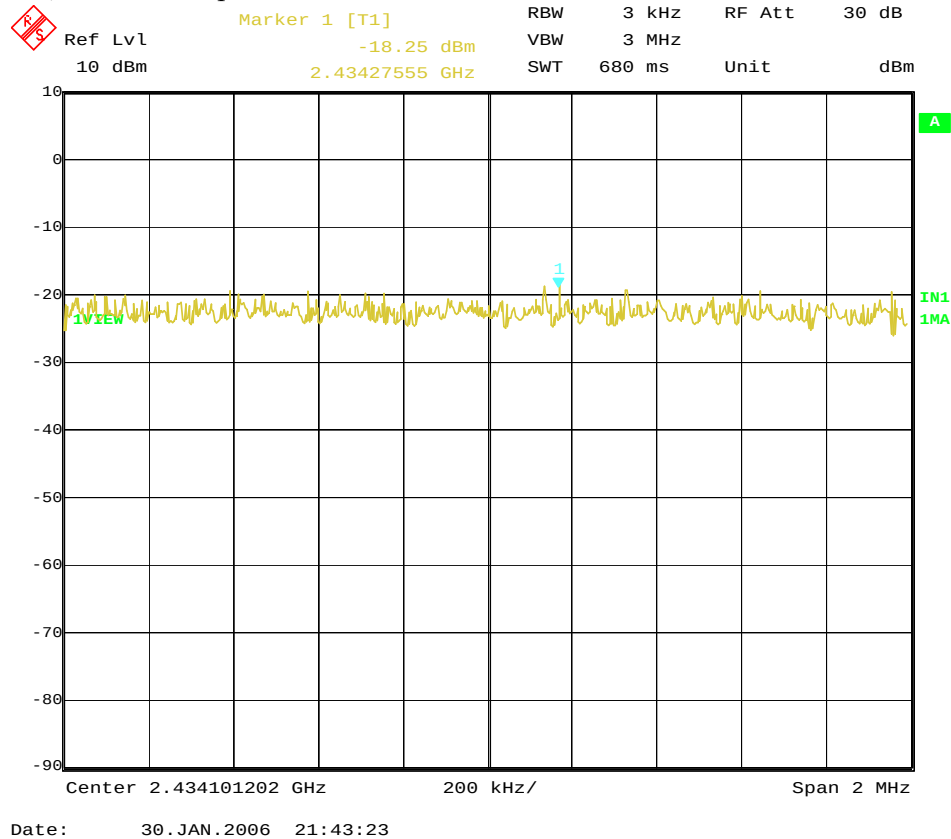
Frequency (MHz)	Correction Factor (dB)	Reading (dBm)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
CCK (11 Mbps)					
2412 (1ch)	11	-18.38	-7.38	8	15.38
2437 (6ch)	11	-18.25	-7.25	8	15.25
2462 (11ch)	11	-18.38	-7.38	8	15.38
OFDM (54 Mbps)					
2412 (1ch)	11	-23.25	-12.25	8	20.25
2437 (6ch)	11	-23.17	-12.17	8	20.17
2462 (11ch)	11	-25.52	-14.52	8	22.52

* Correction Factor = Cable Loss (dB) + External Attenuator (dB)

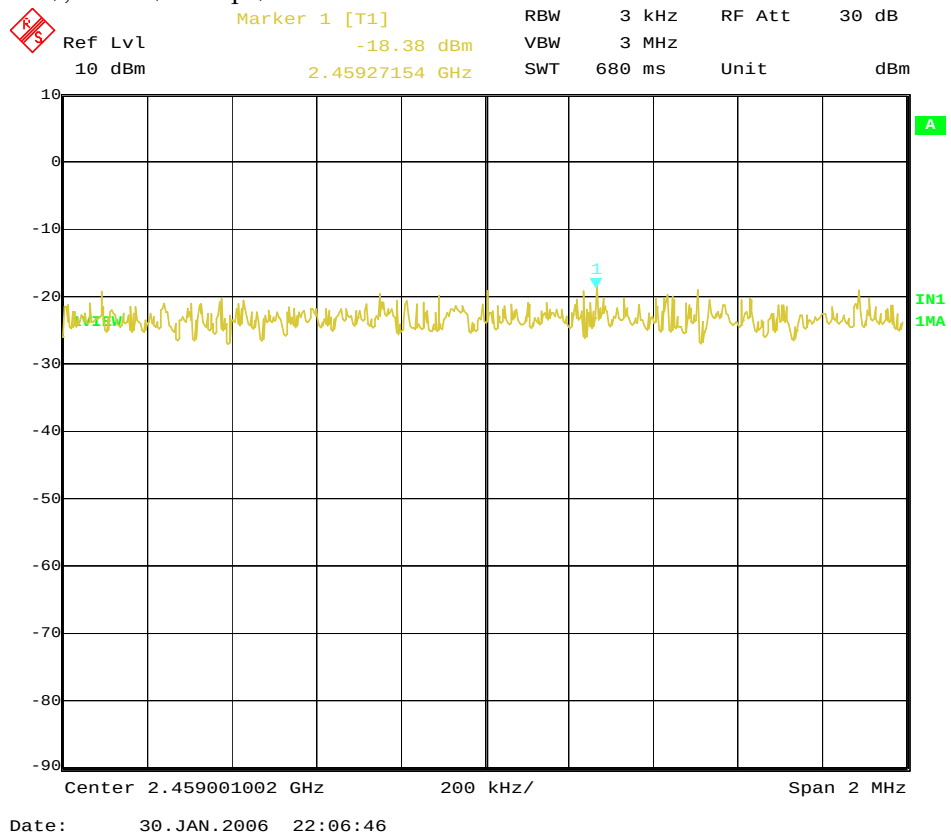
2412 MHz (1ch), CCK (11Mbps)



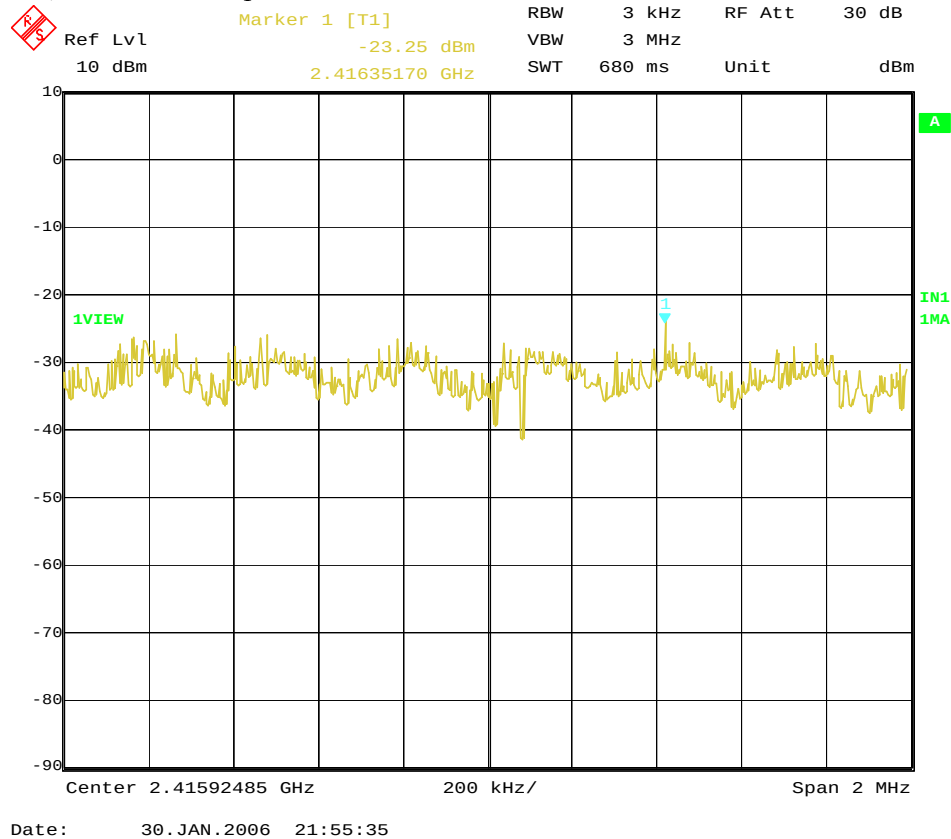
2437 MHz (6ch), CCK (11Mbps)



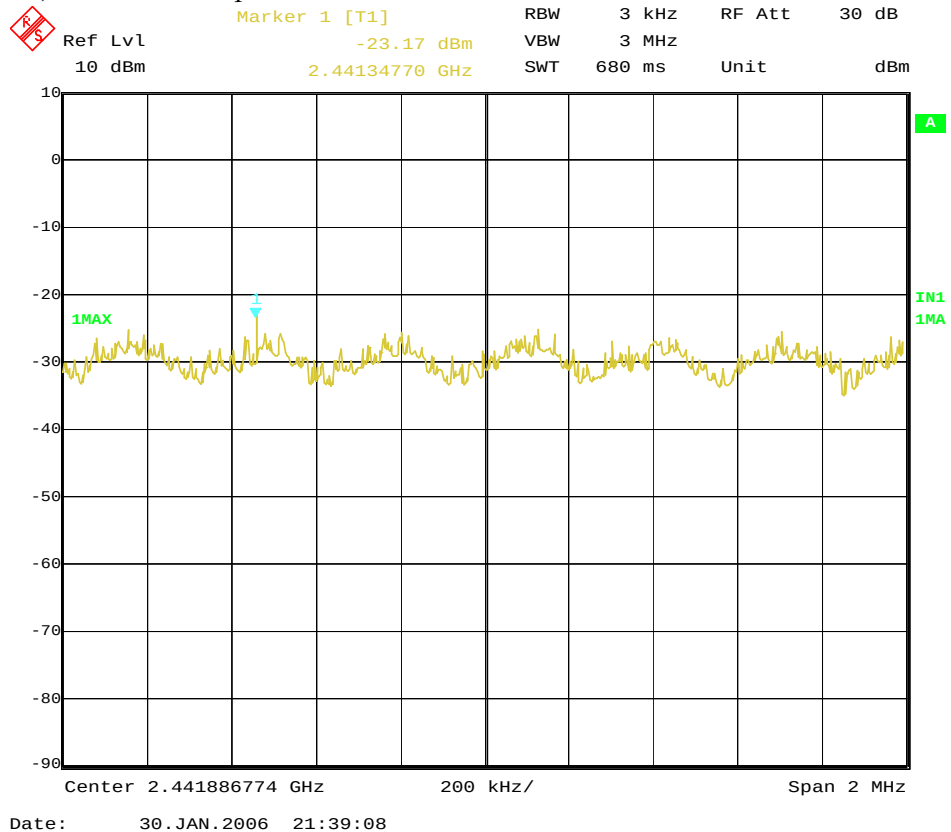
2462 MHz (11ch), CCK (11Mbps)



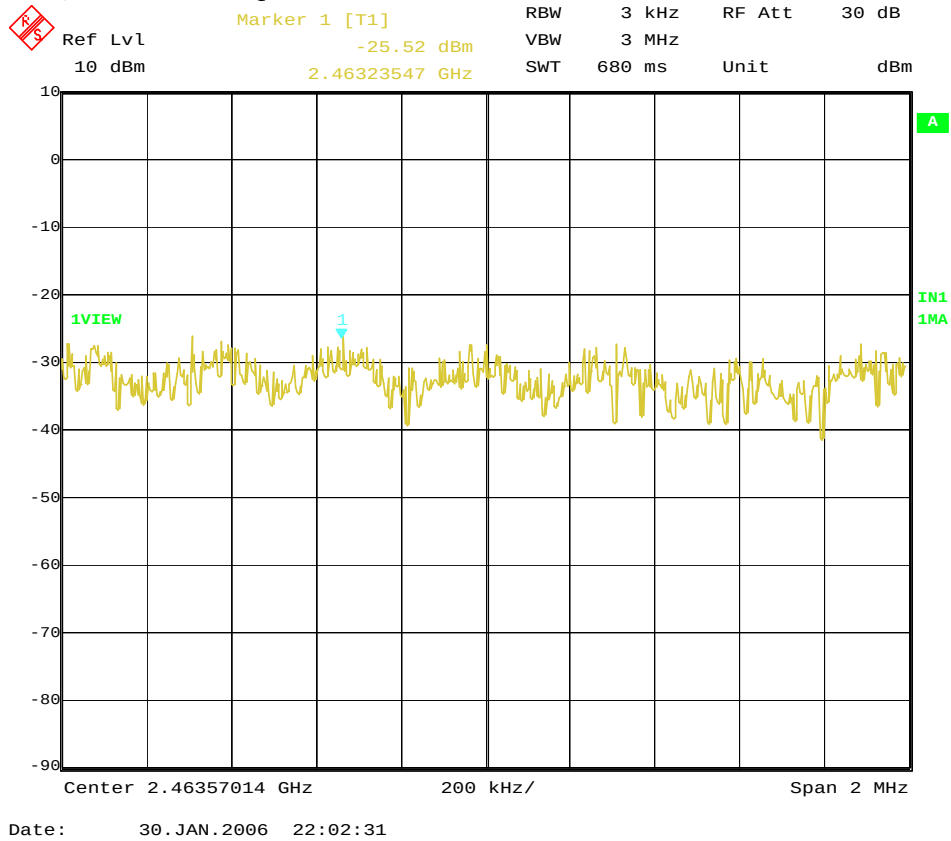
2412 MHz (1ch), OFDM (54Mbps)



2437MHz (6ch), OFDM (54Mbps)



2462 MHz (11ch), OFDM (54Mbps)



5.7 15. 247(c) Band Edge Measurement

5.7.1 Setting Remarks

- EUT directly connects to the spectrum analyzer via calibrated coaxial cable and 10 dB attenuator.
- The loss of the coaxial cable is maximum 1 dB.
- The emission at the band edge was measured by using the marker function of spectrum analyzer.
- The peak of the in-band emission was measured by using the marker to peak function of spectrum analyzer.
- This measurement was repeated in both side of the spectrum.
- The spectrum analyzer was set-up as following;

- ✓ Resolution bandwidth : 100 kHz
- ✓ Video bandwidth : > RBW
- ✓ Sweep : Auto
- ✓ Detector function : Peak
- ✓ Trace Mode : Max Hold

- Refer to test configuration figure 4.3.

5.7.2 Minimum Standard

In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency of Emission (MHz)	Limit of the band edge spurious emission (dB μ V)	
Below 2,390.0	Peak	Average
Above 2,483.5	74	54

5.7.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 2.6 dB

Temperature, Humidity : 25 °C, 35%

5.7.4 Measured Data

The band edge emissions are calculated as following;

(Band edge emission at the lower frequency 2,390 MHz in CCK modulation.)

$P_{\max} / P_{\text{av}}$	=	96.86 dB μ V / m, 91.00 dB μ V / m
P_{dev}	=	42.84 dB
E_{be}	=	54.02 dB μ V / m (Margin: 19.98 dB)
E_{av}	=	48.16 dB μ V / m (Margin: 5.84 dB)

(Band edge emission at the higher frequency 2,483.5 MHz in CCK modulation.)

$P_{\max} / P_{\text{av}}$	=	97.30 dB μ V / m, 90.30 dB μ V / m
P_{dev}	=	42.63 dB
E_{be}	=	54.67 dB μ V / m (Margin: 19.33 dB)
E_{av}	=	47.63 dB μ V / m (Margin: 6.37 dB)

(Band edge emission at the lower frequency 2,390 MHz in OFDM modulation.)

$P_{\max} / P_{\text{av}}$	=	97.30 dB μ V / m, 87.3 dB μ V / m
P_{dev}	=	40.42 dB
E_{be}	=	56.88 dB μ V / m (Margin: 17.12 dB)
E_{av}	=	46.88 dB μ V / m (Margin: 7.12 dB)

(Band edge emission at the higher frequency 2,483.5 MHz in OFDM modulation.)

$P_{\max} / P_{\text{av}}$	=	91.30 dB μ V / m, 88.4 dB μ V / m
P_{dev}	=	41.95 dB
E_{be}	=	49.35 dB μ V / m (Margin: 24.65 dB)
E_{av}	=	46.45 dB μ V / m (Margin: 7.55 dB)

$P_{\max}$: Maximum peak power of the fundamental emission observed in the radiated spurious emission test. (Refer to page 38).

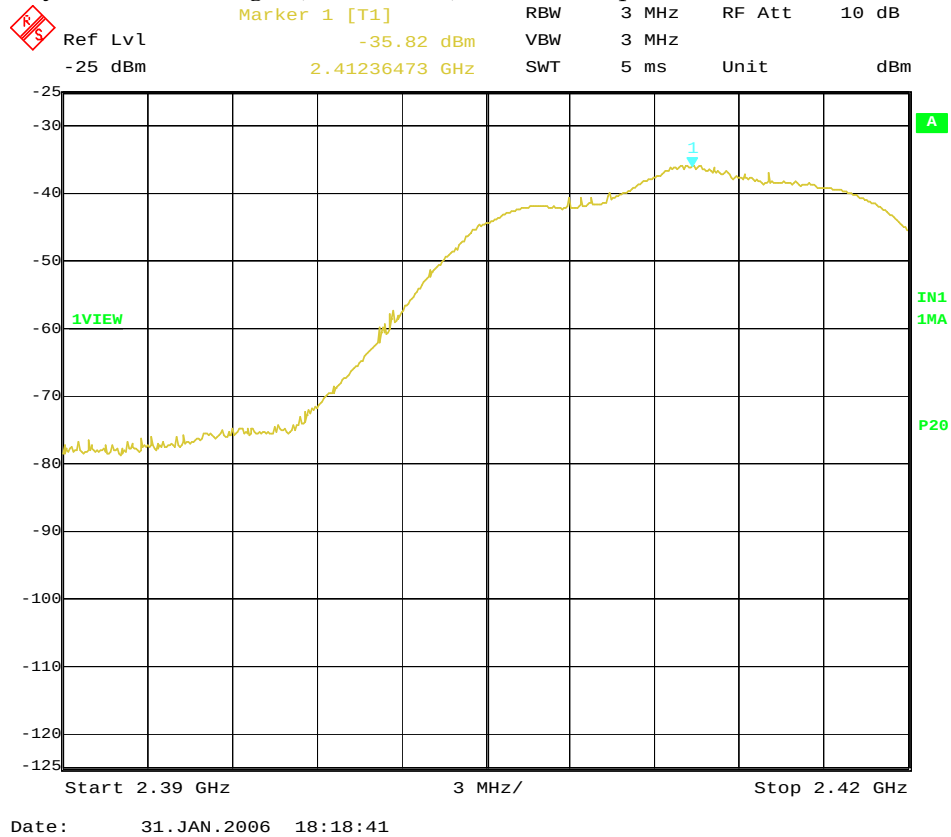
P_{dev} : The amplitude delta between the peak power and the band edge emission.

E_{be} : Band edge emission.

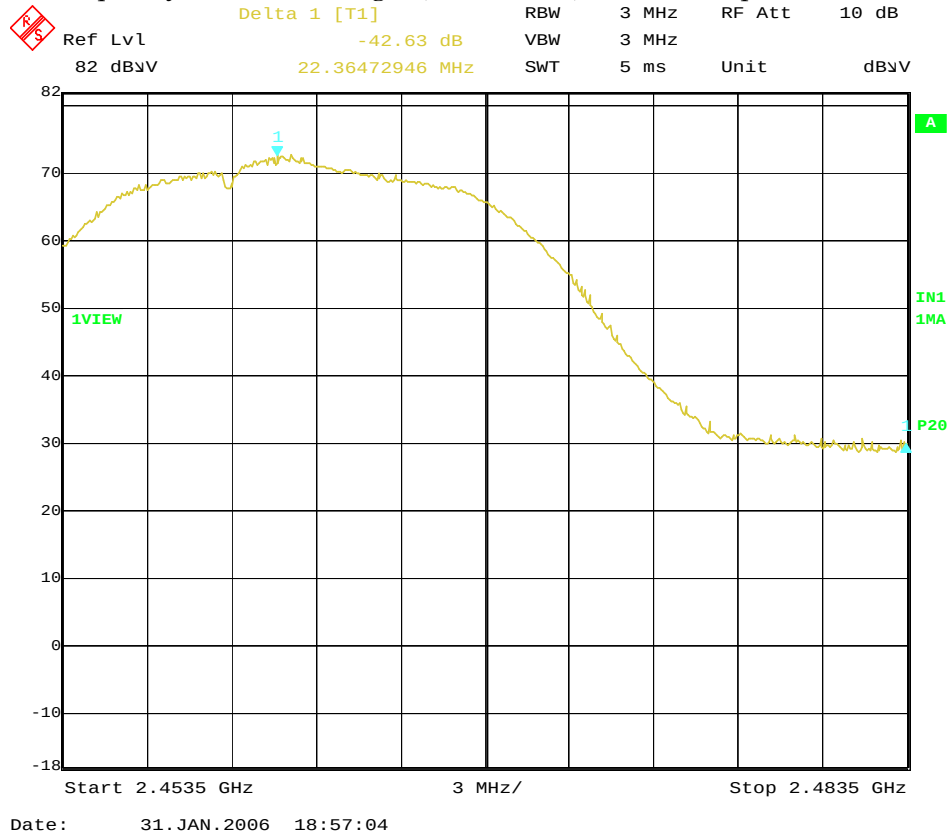
E_{av} : Average of the band edge emission.

*Note The correction factor 32.3dB (including antenna factor) was used to convert into the relevant unit.

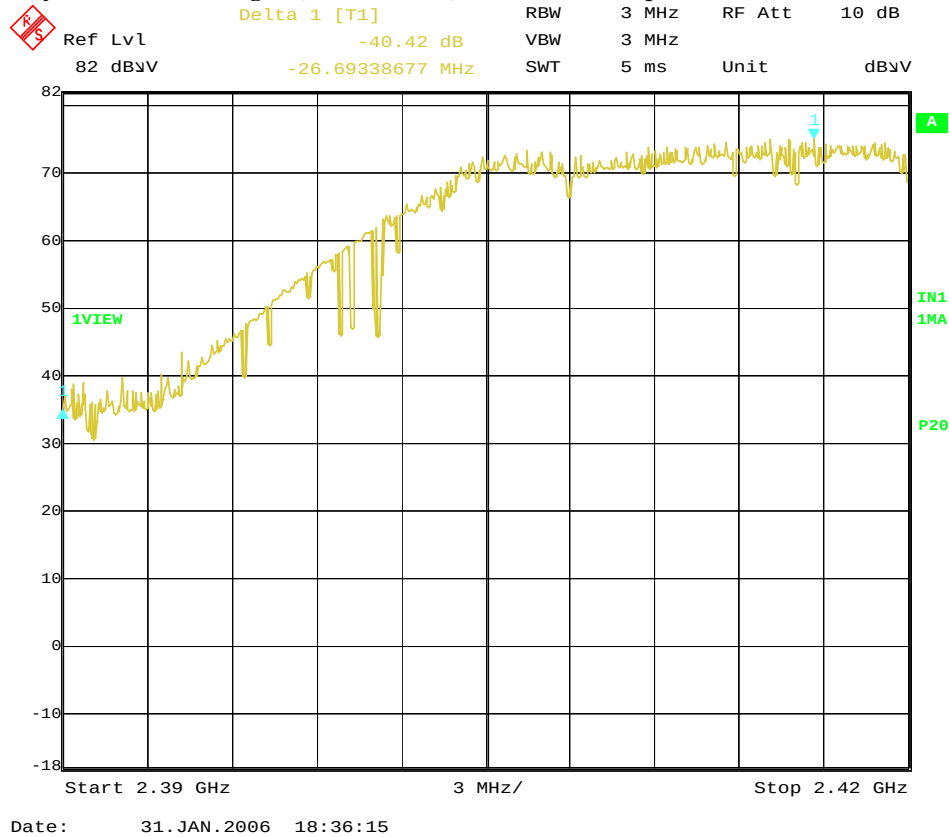
Lower frequency of the band edge 2,390.0 MHz, CCK (11Mbps)



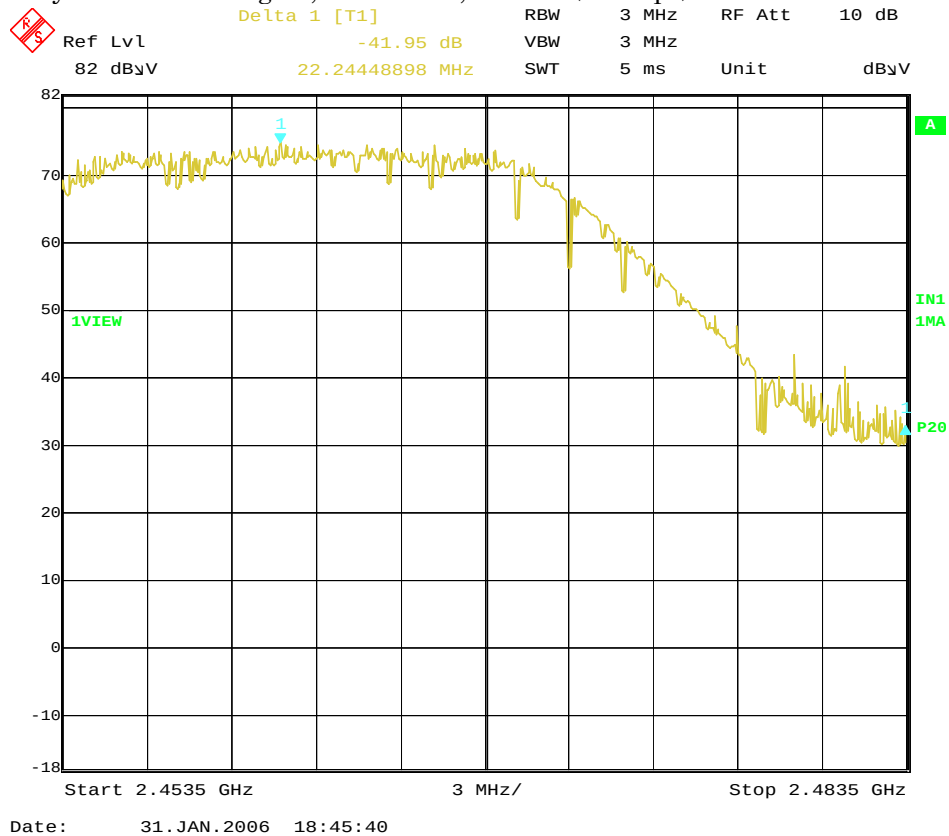
Higher frequency of the band edge 2,483.5 MHz, CCK (11Mbps)



Lower frequency of the band edge 2,390.0 MHz, OFDM (54Mbps)



Higher frequency of the band edge 2,483.5 MHz, OFDM (54Mbps)



6. Photos

6.1 Setup Photo (Conducted Emission)

Front View



Side View



6.2 Setup Photo (Radiated Emission)

Front View



Rear View



7. List of Test Measurement Instruments

7.1 Conducted Emission

Instruments	Manufacturer	Model / Type	Serial No.	Calibration Date Next Calibration
Spectrum Analyzer	ADVANTEST CORPORATION	R3132	140501174	July, 2005 July, 2006
EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100335	May, 2005 May, 2006
Artificial-Mains Network	KYORITSU CORPORATION	KNW-341C (for EUT)	8-1659-1	September, 2005 September, 2006
Artificial-Mains Network	KYORITSU CORPORATION	KNW-244C (for Peripheral)	8-1657-1	September, 2005 September, 2006
Transient Limiter	AGILENT TECHNOLOGIES	11947A	3107A03745	July, 2005 July, 2006
RF Selector	Techno Science Japan Corp.	RFM-E221	3148	---
Spectrum Analyzer	ADVANTEST CORPORATION	R3132	140501174	July, 2005 July, 2006

7.2 Radiated Emission Measurement

Instruments	Manufacturer	Model / Type	Serial No.	Calibration Date Next Calibration
Programmable AC/DC Power Source	NF Corporation	ES18000W	425779	---
EMI Test Receiver	ROHDE & SCHWARZ	ESIB40	100211	April, 2005 April, 2006
Biconical Antenna (30 to 300MHz)	SCHWARZBECK	VHBB9124(Balun) BBA9106(Elements)	311	September, 2005 September, 2006
Log.-Periodic Antenna (300 MHz to 1 GHz)	SCHWARZBECK	UHALP 9108 A	645	September, 2005 September, 2006
Horn Antenna	SCHWARZBECK	BBHA 9120 D	446	September, 2005 September, 2006
Horn Antenna	ETS LINDGREN	3160-08	00033778	September, 2005 September, 2006
Horn Antenna	ETS LINDGREN	3160-09	00034723	September, 2005 September, 2006

7.3 Conducted Radio Measurement

Instruments	Manufacturer	Model / Type	Serial No.	Calibration Date Next Calibration
DC Power Source	Diamond Antenna	GSV3000	01101481	---
Spectrum Analyzer	ROHDE & SCHWARZ	ESIB40	100211	April, 2005 April, 2006
Signal Generator	Agilent Technology	E8254A	US411401 86	June, 2005 June, 2006
Oscilloscope	Tektronix	TDS794D	B031832	June, 2005 June, 2006
Diode Detector	Agilent Technology	423B	MY422418 36	March, 2005 March, 2006