EMI TEST REPORT

Test Report No. : 24EE0057-YK-6

Applicant	:	**YAMAHA CORPORATION**
Type of Equipment	:	**Wireless LAN Card**
Model No.	:	**WD05740**
FCC ID	:	**A6RDKV137138**
Test standard	:	**FCC Part15 Subpart C, Section 15.247: 2003**
Test Result	:	**Complied**

1. This test report shall not be reproduced except in full or partial, without the written approval of UL Apex Co., Ltd.

2. The results in this report apply only to the sample tested.

Date of test: December 15 and 18, 2003

Tested by: T. Imamura
Toyokazu Imamura

Approved by: O. Watatani
Osamu Watatani
Site Manager of Yamakita EMC Lab.

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1 GENERAL INFORMATION

Company Name	: YAMAHA CORPORATION
Brand Name	: YAMAHA
Address	: 10-1 Nakazawa-cho, Hamamatsu-shi, Shizuoka-ken, 430-8650 JAPAN
Telephone Number	: +81 53 460 2376
Facsimile Number	: +81 53 460 2379
Contact Person	: Kenji Fujisawa
Type of Equipment	: Wireless LAN Card
Model No.	: WD05740
Serial No.	: D2.3A.E4
Rating	: DC 3.3V
Country of Manufacture	: Japan
Receipt Date of Sample	: December 15, 2003
Condition of EUT	: Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Regulation(s)	: FCC Part15 Subpart C, Section 15.247
Test Site	: UL Apex Yamakita EMC Lab. No.1 Open Test Site

1.1 Tested Methodology
The measurements were performed according to the procedures in ANSI C63.4 (2001).
These tests were also referred to FCC 97-114 “Guidance on Measurement for Direct Spread Spectrum Systems”.

1.2 Test Facility
This site has been fully described in a report submitted to FCC office, and accepted on September 20, 2002.
(No.1 Open Test Site Registration No.: 95486)
NVLAP Lab. code : 200441-0

2 PRODUCT DESCRIPTION

Model: WD05740 (referred to as the EUT in this report) is a Wireless LAN Card.
The clock frequency used in EUT : 44MHz

Frequency characteristics	:	2412MHz through 2462MHz
Number of channels/ channel spacing	:	11 channels/ 5MHz spacing
Modulation	:	DSSS: Direct sequence spread spectrum (IEEE802.11b)
Antenna type	:	Monopole
Antenna Gain	:	1.1dBi
Operating Voltage	:	DC 3.3V(AC Adapter of PC, 100V-240V)

*FCC Part15.31(e)

The host device provide the Wireless LAN Card with stable power supply (DC: 3.3V), and the Wireless LAN Card complies power supply regulation.

*FCC Part15.203

The Wireless LAN Card and its antenna comply with this requirement since this antenna is built in Wireless LAN Card when they are put up for sale and they are used with a particular antenna connector.

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured in typical fashion (as a customer would normally use it) for testing.

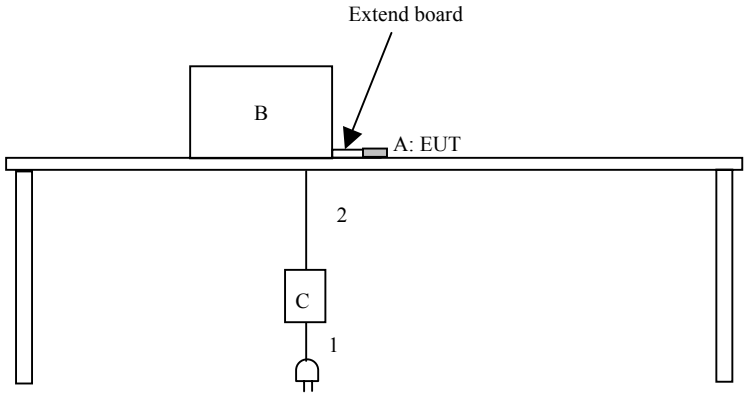
Test mode:

Transmitting mode

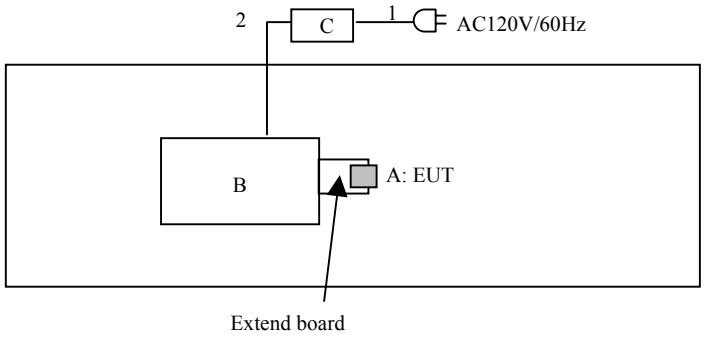
Low channel	:	2412MHz
Middle channel	:	2437MHz
High channel	:	2462MHz

3.2 Configuration of Tested System

Front View



Top View



*Cabling was taken into consideration and test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID	Remarks
A	Wireless LAN Card	WD05740	D2.3A. E4	YAMAHA CORPORATION	A6RDKV137138	EUT
B	Note PC	FMV-LS553W	R1100518	Fujitsu Limited	-	-
C	AC Adapter	FMV-AC311S	02609311A	Fujitsu Limited	-	-

List of cables used

No.	Name	Length (m)	Shield	Backshell material
1	AC Power Cable	1.9	Unshielded	Polyvinyl chloride
2	DC Power Cable	1.8	Unshielded	Polyvinyl chloride

4 MEASUREMENT UNCERTAINTY

Conducted emission test
The measurement uncertainty (with a 95% confidence level) for this test was ±1.3dB.

The data listed in this test report has enough margin, more than site margin.

Radiated emission test
The measurement uncertainty (with 95% confidence level) for this test using Biconical antenna is ±4.8dB.
The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is ±5.2dB.
The measurement uncertainty (with 95% confidence level) for this test using Horn antenna is ±6.6dB.

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

5 SUMMARY OF TESTS

5.1 §15.207 Conducted Emissions (Limits by CISPR Pub.22 Class B)

Test Procedure
EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT's host device and AC adapter were aligned and flushed with rear of tabletop.
All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN and excess AC cable was bundled in center.
Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source.
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT on a shielded room.
The EUT was connected to a Line Impedance Stabilization Network (LISN).
An overview sweep with peak detection has been performed.
The measurements have been performed with a CISPR quasi-peak detector (IF BW 9kHz).
Measurement range : 150kHz to 30MHz

Test data : APPENDIX Page 15 to 19
Photographs of test setup : Page 12
Test result : Pass
Test instruments : KCC-14/15/16/18/KPL-01, KLS-01, KSA-01, KTR-02

5.2 §15.247(a)(2) 6dB Bandwidth (Antenna Port Conducted)

Test Procedure
The minimum 6dB bandwidth was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX Page 20
Test result : Pass
Test instruments : KSA-04

5.3 § 15.247(b) (3) Maximum Peak Output Power (Antenna Port Conducted)

Test Procedure
The Maximum Peak Output power was measured with a power meter connected to the antenna port.
* Antenna Gain dose not exceed 6dBi.

Test data : APPENDIX Page 21
Test result : Pass
Test instruments : KPM-05, KPSS-01

5.4 § 15.247(c) Out of Band Emissions (Radiated)

Test Procedure
EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.
The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.
The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.
The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization.
EUT emission levels were compared when the EUT antenna position was vertical polarization and horizontal polarization.
The equipment was also previously checked at each position of three axes X, Y and Z.
In 30-1000MHz, Y axis was worst under vertical antenna polarization and Z axis was worst under horizontal antenna polarization.
In above 1GHz, as the same results, Y axis was worst under vertical antenna polarization and Z axis was worst under horizontal antenna polarization.
See the photographs in page 14.

Radiated Spurious emissions
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.
The result was also satisfied the general limits specified in Sec.15.209 (a).
Measurement range : 30MHz to 1000MHz CISPR QP Detector, IF BW 120kHz
: 1GHz to 26GHz PK and AV Detector

It was confirmed that spurious emission frequencies (2038MHz, 2063MHz and 2088MHz) are >20dB lower than fandamental waves.
These spurious emission frequencies are not the restricted band regulated in 15.205(a).

Test data	**: APPENDIX Page 22 to 24 (30 - 1000MHz)**
	: APPENDIX Page 25 to 27 (1 - 26GHz)
	: APPENDIX Page 28 to 33 (Out of Band Emission :2037.8MHz,2062.8MHz and 2087.8MHz)
	: APPENDIX Page 34 to 37 (Band Edges: 2390MHz/ 2483.5MHz, Restricted band Charts)
Photographs of test setup	**: Page 13**
Test result	**: Pass**
Test instruments	**: KAF-01, KAF-02, KAT10-S1, KAT6-02, KBA-01, KFL-01 KCC-10/11/12/13/18, KCC-D3/D7, KHA-01, KHA-03, KOTS-01 KLA-01, KSA-01, KSA-04, KTR-02**

5.5 § 15.247(c) Out of Band Emissions (Antenna Port Conducted)

Test Procedure
The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX Page 38 to 43
Test result : Pass
Test instruments : KSA-04

5.6 § 15.247(d) Power Density (Antenna Port Conducted)

Test Procedure
The Power Density was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX Page 44 to 45
Test result : Pass
Test instruments : KSA-04

APPENDIX 1: Photographs of test setup

1.Page 12 : Conducted emission
2.Page 13 : Radiated emission
3.Page 14 : Pre check of worse-case position

APPENDIX 2: Test Data

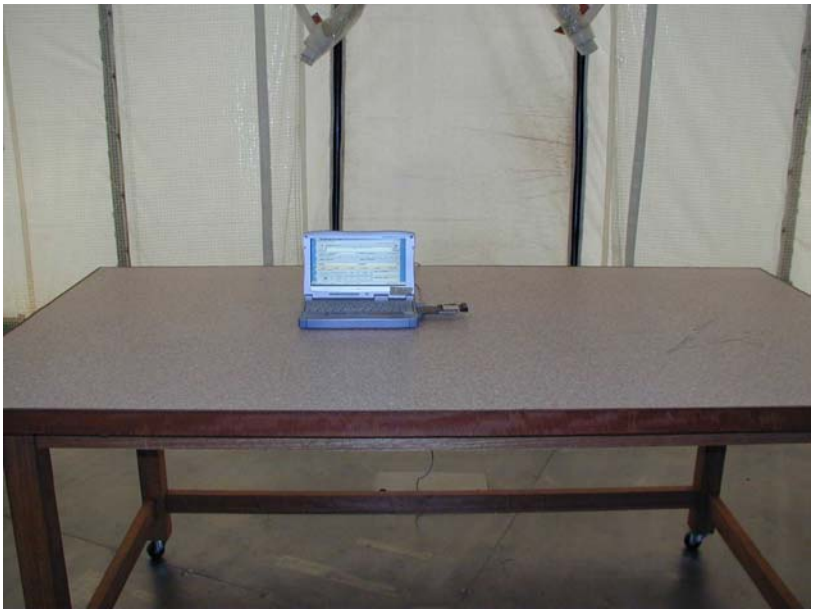
1.Page 15 – 19 : Conducted emission
2.Page 20 : 6dB Bandwidth (Antenna Port Conducted)
3.Page 21 : Maximum Peak Power (Antenna Port Conducted)
4.Page 22 – 37 : Out Band of Emissions (Radiated)
5.Page 38 – 43 : Out Band of Emissions (Antenna Port Conducted)
6.Page 44 – 45 : Power Density (Antenna Port Conducted)

APPENDIX 3: Test instruments

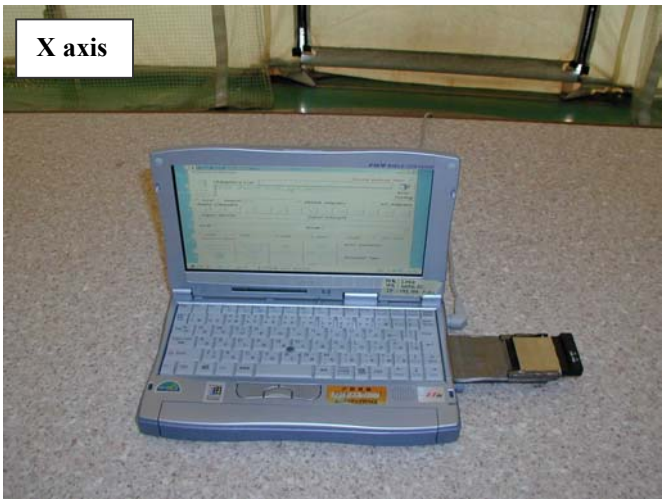
Page 46 : Test instruments

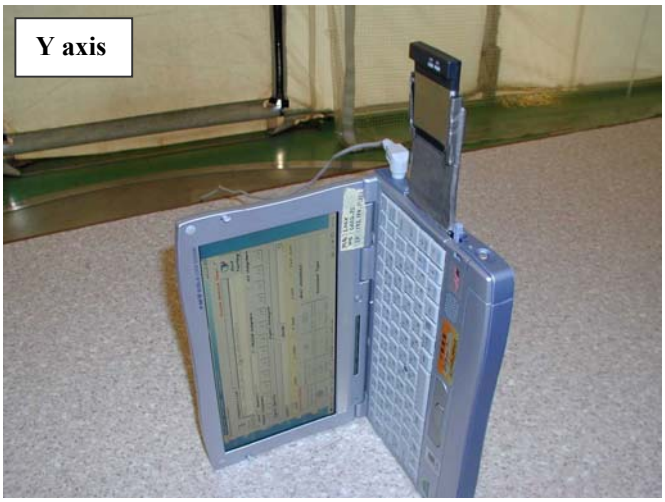
Conducted emission

Radiated emission



Pre check of worse-case position





DATA OF CONDUCTION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Shielded Room
Report No. : 24EE0057-YK- 6

Applicant	: YAMAHA CORPORATION		
Kind of Equipment	: Wireless LAN Card		
Model No.	: WD05740		
Serial No.	: D2.3A.E4		
Power	: AC120V/60Hz		
Mode	: Transmitting:2412(Ch1)		
Remarks	:		
Date	: 12/18/2003		
Phase	: Single Phase		
Temperature	: 22 ℃	Engineer	: Toyokazu Imamura
Humidity	: 30 %		
Regulation	: FCC Part15C §15.207. (CISPR Pub.22)		

No.	FREQ.	READING(N) QP	READING(N) AV	READING(L1) QP	READING(L1) AV	LISN FACTOR	CABLE LOSS	ATTEN.	RESULT QP	RESULT AV	LIMITS QP	LIMITS AV	MARGIN QP	MARGIN AV
	[MHz]	[dBuV]		[dBuV]		[dB]	[dB]	[dB]	[dBuV]		[dBuV]		[dB]	
1.	0.1500	47.0	27.8	47.4	33.5	0.1	0.1	0.0	47.6	33.7	66.0	56.0	18.4	22.3
2.	0.2202	41.0	28.7	42.7	39.1	0.1	0.2	0.0	43.0	39.4	62.8	52.8	19.8	13.4
3.	0.4278	34.5	30.0	37.1	33.1	0.1	0.2	0.0	37.4	33.4	57.3	47.3	19.9	13.9
4.	0.5078	38.4	29.4	32.4	22.8	0.1	0.2	0.0	38.7	29.7	56.0	46.0	17.3	16.3
5.	0.5700	39.5	35.2	41.6	31.3	0.1	0.2	0.0	41.9	35.5	56.0	46.0	14.1	10.5
6.	27.8351	37.2	30.2	37.9	31.1	1.1	1.9	0.0	40.9	34.1	60.0	50.0	19.1	15.9

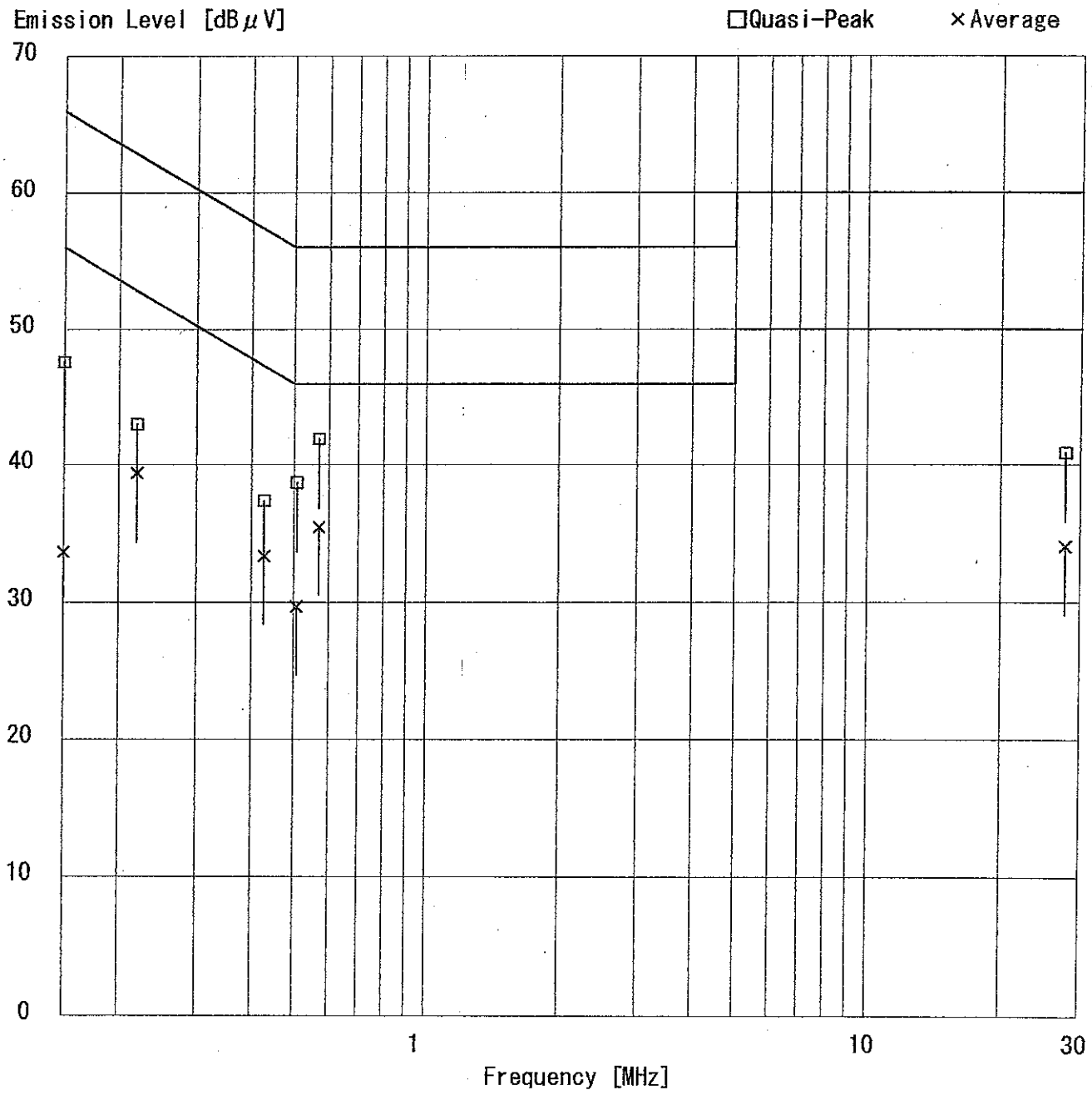
CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

■LISN :KLS-01(NSLK8126) ■COAXIAL CABLE:KCC-B1/16/17/18
■PULSE LIMTTER:KPL-01(PL01) ■EMI RECEIVER:KTR-02(ESCS30)

DATA OF CONDUCTION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Shielded Room
Report No. : 24EE0057-YK- 6

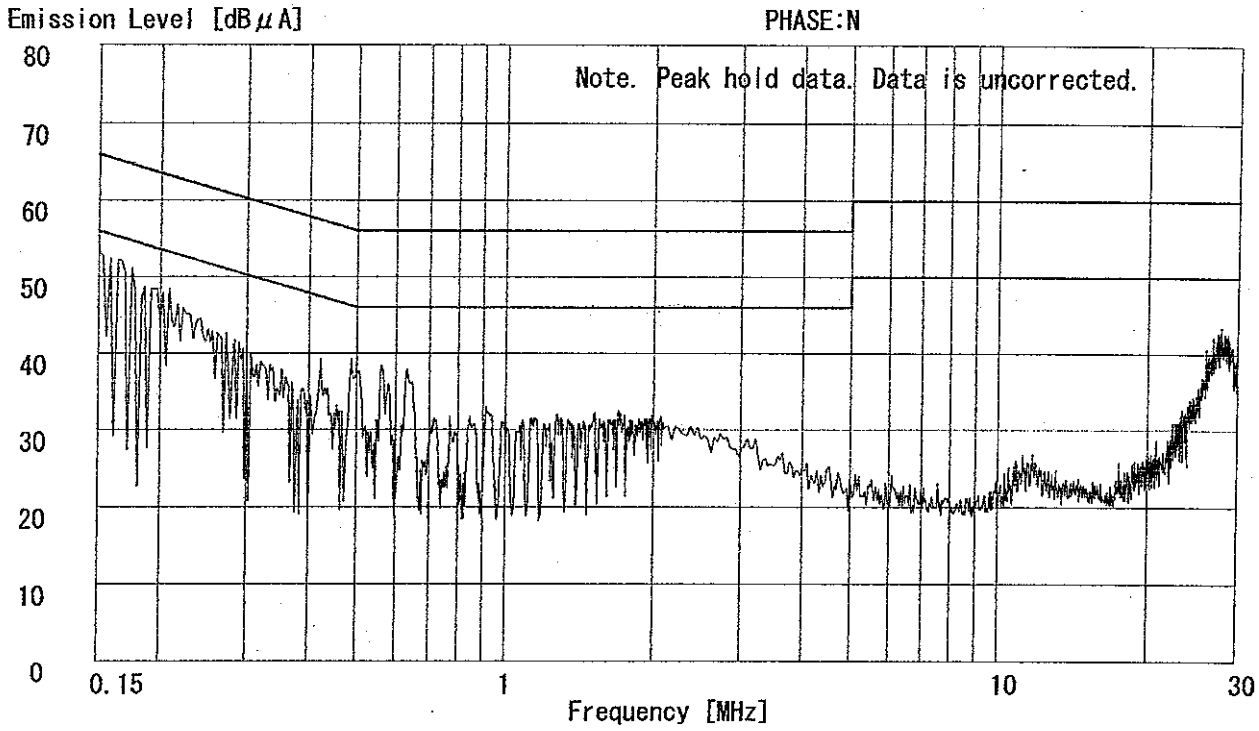
Applicant	: YAMAHA CORPORATION		
Kind of Equipment	: Wireless LAN Card		
Model No.	: WD05740		
Serial No.	: D2.3A.E4		
Power	: AC120V/60Hz		
Mode	: Transmitting:2412(Ch1)		
Remarks	:		
Date	: 12/18/2003		
Phase	: Single Phase		
Temperature	: 22 °C	Engineer	: Toyokazu Imamura
Humidity	: 30 %		
Regulation	: FCC Part15C §15.207.(CISPR Pub.22)		

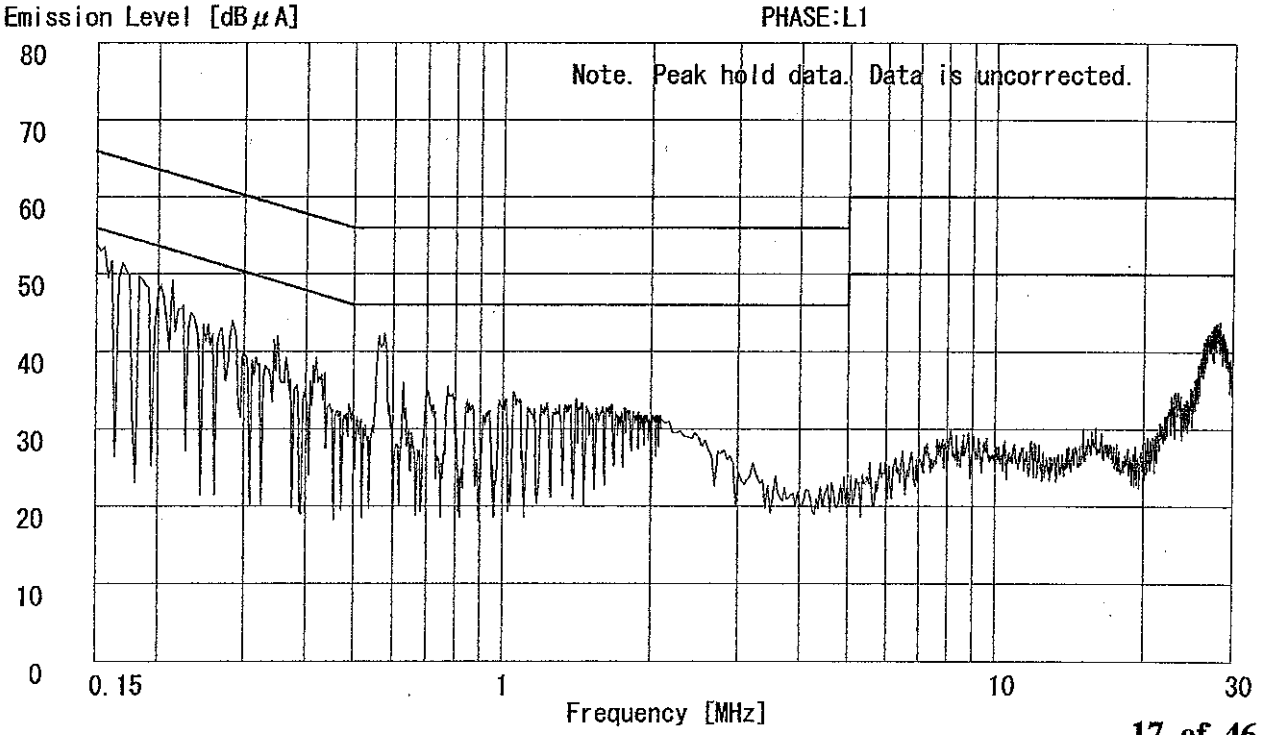


DATA OF CONDUCTION TEST CHART

UL Apex Co.,Ltd.
Yamakita No.1 Shielded Room
Report No.: 24EE0057-YK ~ 6

Applicant	: YAMAHA CORPORATION		
Kind of Equipment	: Wireless LAN Card		
Model No.	: WD05740		
Serial No.	: D2.3A.E4		
Power	: AC120V/60Hz		
Mode	: Transmitting:2412(Ch1)		
Remarks	:		
Date	: 12/18/2003		
Temperature	: 22 ℃	Engineer	: Toyokazu Imamura
Humidity	: 30 %		
Regulation 1	: FCC Part15C §15.207.(CISPR Pub.22)		
Regulation 2	: None		



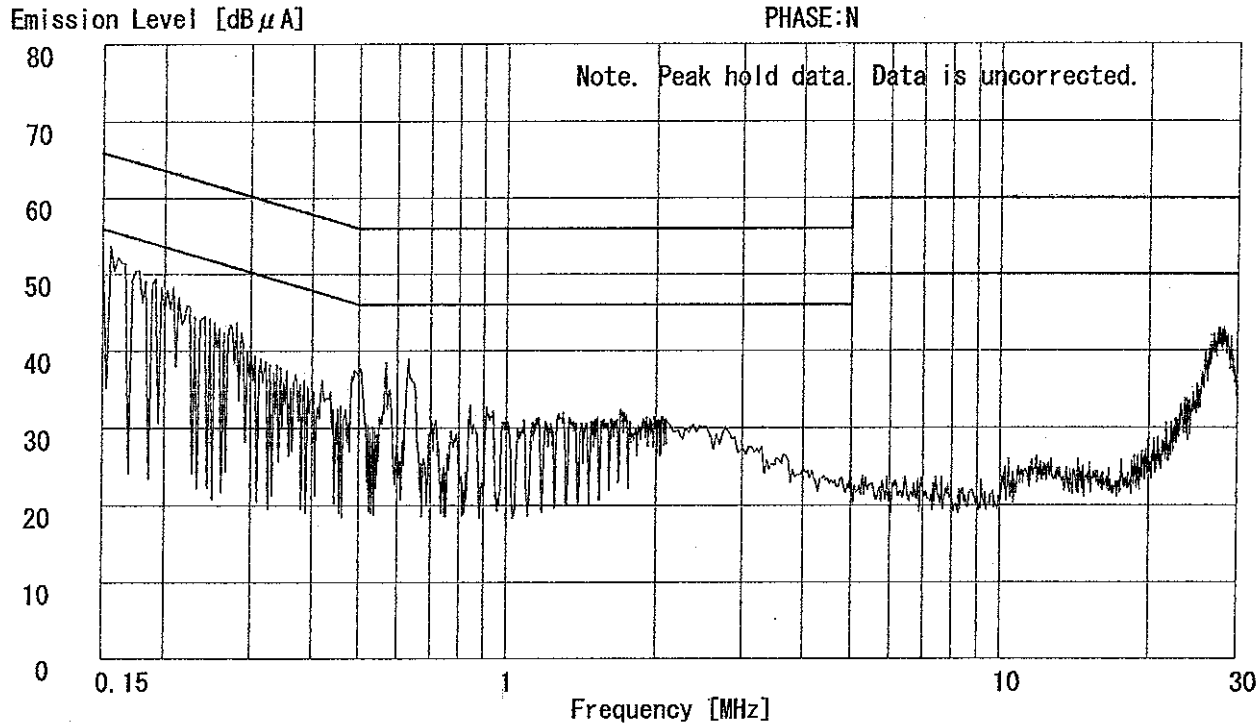


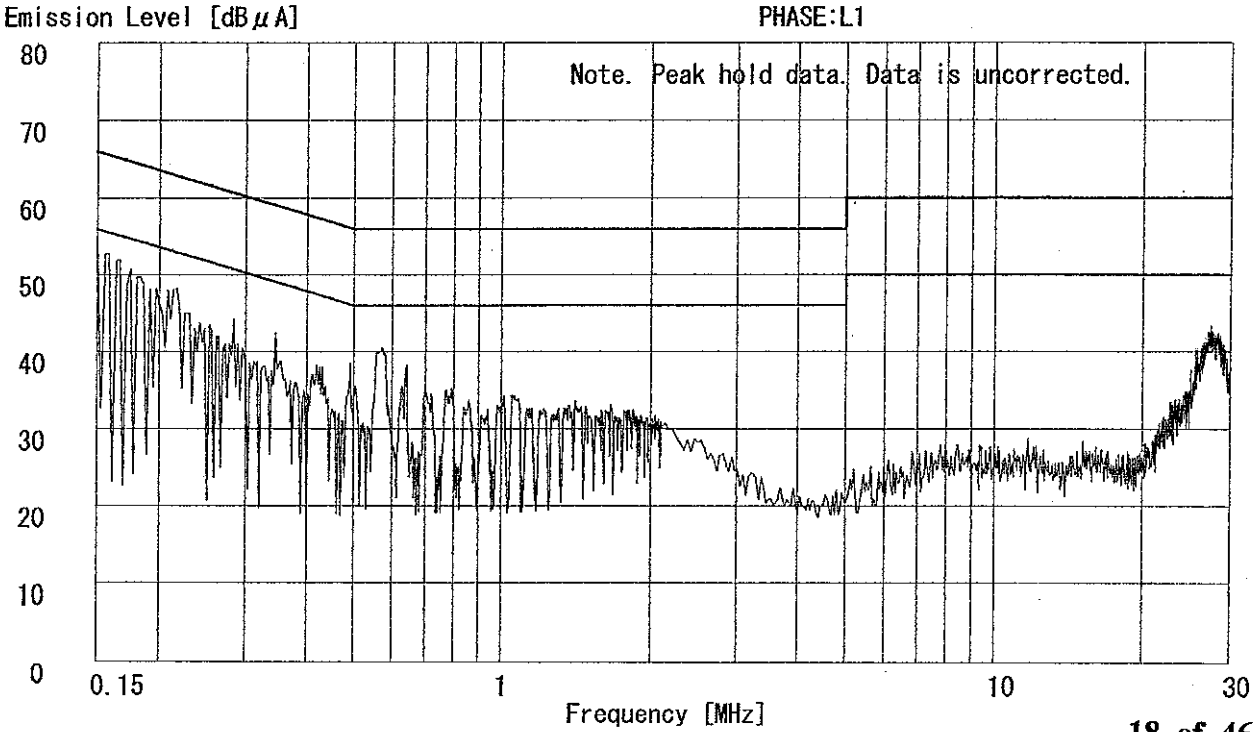
DATA OF CONDUCTION TEST CHART

UL Apex Co.,Ltd.
Yamakita No.1 Shielded Room
Report No. : 24EE0057-YK - 6

Applicant	:	YAMAHA CORPORATION
Kind of Equipment	:	Wireless LAN Card
Model No.	:	WD05740
Serial No.	:	D2.3A.E4
Power	:	AC120V/60Hz
Mode	:	Transmitting:2437(Ch6)
Remarks	:	
Date	:	12/18/2003
Temperature	:	22 ℃
Humidity	:	30 %
Regulation 1	:	FCC Part15C §15.207.(CISPR Pub.22)
Regulation 2	:	None

Engineer : Toyokazu Imamura

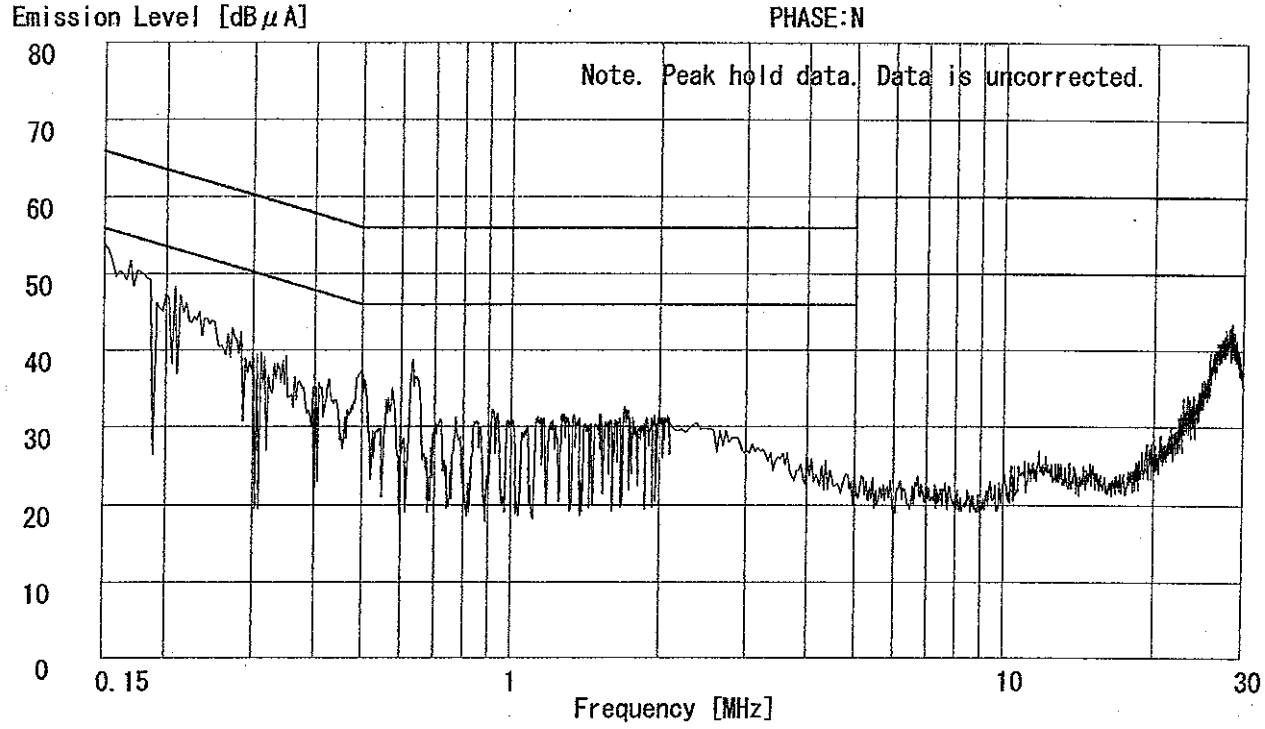


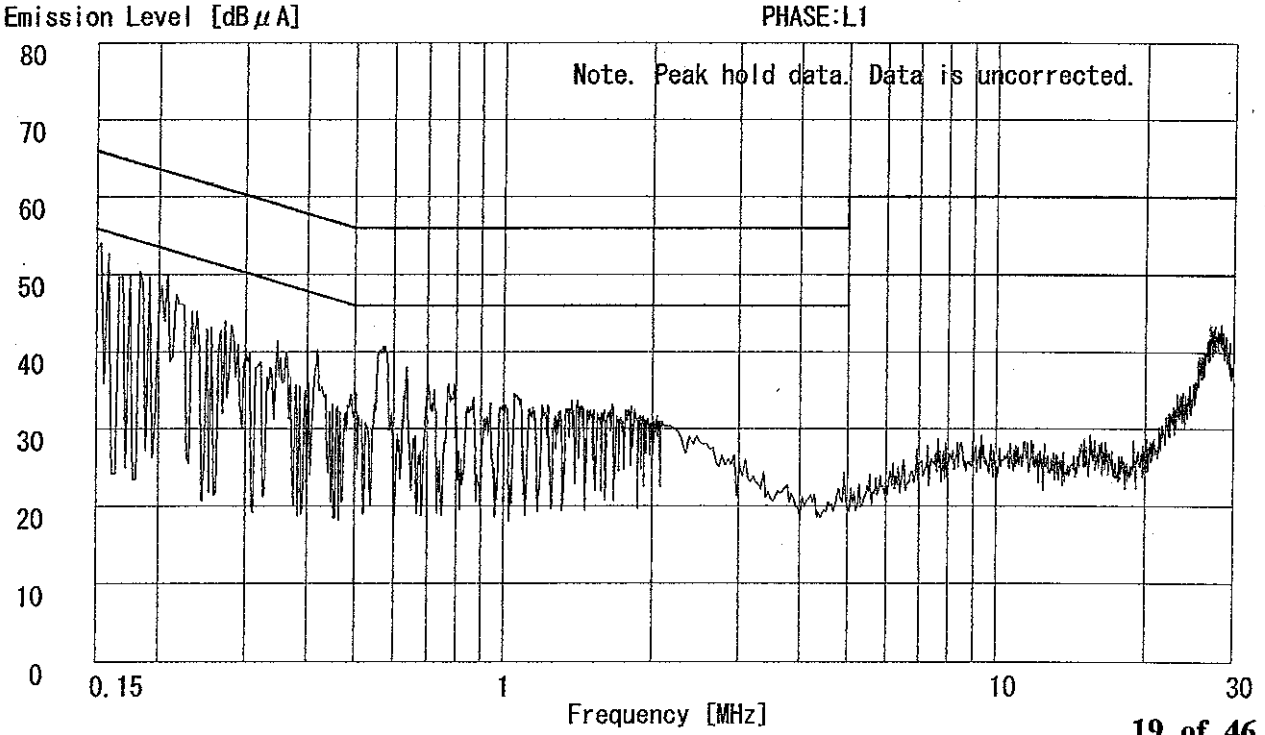


DATA OF CONDUCTION TEST CHART

UL Apex Co.,Ltd.
Yamakita No.1 Shielded Room
Report No. : 24EE0057-YK ~ 6

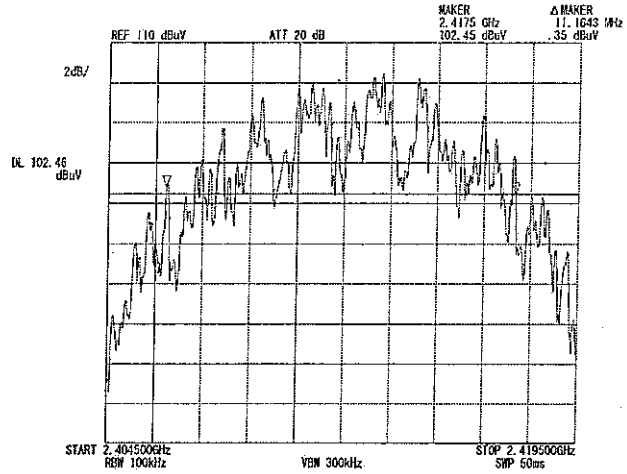
Applicant	: YAMAHA CORPORATION		
Kind of Equipment	: Wireless LAN Card		
Model No.	: WD05740		
Serial No.	: D2.3A.E4		
Power	: AC120V/60Hz		
Mode	: Transmitting:2462(Ch11)		
Remarks	:		
Date	: 12/18/2003		
Temperature	: 22 ℃	Engineer	: Toyokazu Imamura
Humidity	: 30 %		
Regulation 1	: FCC Part15C §15.207.(CISPR Pub.22)		
Regulation 2	: None		



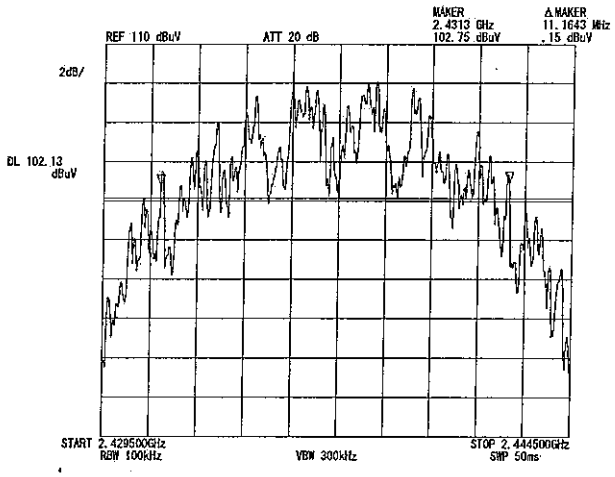


T. Imamura

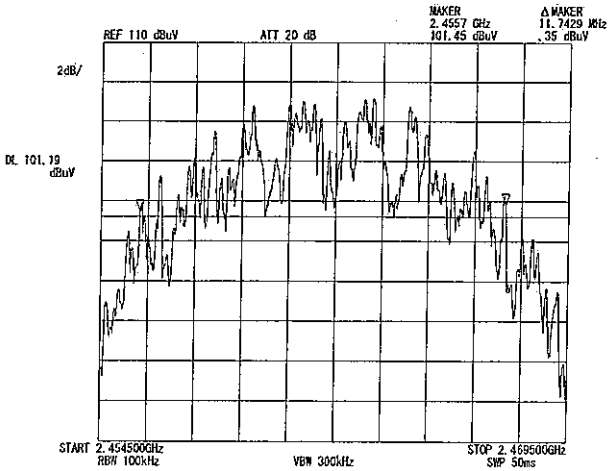
1. Ch Low:2412MHz



2. Ch Mid:2437MHz



3. Ch High:2462MHz



Peak Output Power(Conducted)

UL Apex Co.,Ltd
YAMAKITA NO.5 Shielded Room

COMPANY : YAMAHA CORPORATION
EQUIPMENT : WIRELESS LAN CARD
MODEL : WD05740
FCC ID : A6RDKV137138
POWER : DC3.3V(PC:AC120V/60Hz)
Mode : Transmitting

REPORT NO : 24EE0057-YK-6
REGULATION : Fcc Part15SubpartC 247(b)(3)
DATE : 2003/ 12/18
Temp./Humi. : 19℃/47%

ENGINEER : Toyokazu Imamura

CH	FREQ [GHz]	PM Reading [dBm]	Cable Loss [dB]	Results [dBm]	Limit (1W) [dBm]	MARGIN [dB]
Low	2412.00	14.6	1.3	15.9	30.0	14.1
Mid	2437.00	14.4	1.3	15.7	30.0	14.3
High	2462.00	14.0	1.3	15.3	30.0	14.7

DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Open Test Site
Report No. : 24EE0057-YK - 6

Applicant	: YAMAHA CORPORATION
Kind of Equipment	: Wireless LAN Card
Model No.	: WD05740
Serial No.	: D2.3A.E4
Power	: AC120V/60Hz
Mode	: Transmitting:2412(Ch1)
Remarks	:
Date	: 12/15/2003
Test Distance	: 3 m
Temperature	: 15 ℃
Humidity	: 57 %
Regulation	: FCC Part15C §15.209

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	132.90	BB	29.8	34.3	14.5	28.2	3.0	6.1	25.2	29.7	43.5	18.3	13.8
2.	265.45	BB	35.5	31.7	18.5	27.6	4.4	6.1	36.9	33.1	46.0	9.1	12.9
3.	299.18	BB	31.2	30.1	20.0	27.7	4.8	6.1	34.4	33.3	46.0	11.6	12.7
4.	462.00	BB	29.0	33.6	17.8	28.9	6.1	6.1	30.1	34.7	46.0	15.9	11.3
5.	495.01	BB	26.3	35.4	18.1	29.0	6.4	6.1	27.9	37.0	46.0	18.1	9.0
6.	506.00	BB	31.1	33.9	18.2	29.1	6.4	6.1	32.7	35.5	46.0	13.3	10.5
7.	526.83	BB	28.7	27.6	18.4	29.2	6.6	6.1	30.6	29.5	46.0	15.4	16.5
8.	528.04	BB	33.0	35.5	18.5	29.2	6.6	6.1	35.0	37.5	46.0	11.0	8.5
9.	550.01	BB	32.3	34.6	18.8	29.2	6.7	6.1	34.7	37.0	46.0	11.3	9.0
10.	561.00	BB	28.7	26.6	18.9	29.1	6.8	6.1	31.4	29.3	46.0	14.6	16.7
11.	594.02	BB	26.6	26.2	19.3	29.2	7.0	6.1	29.8	29.4	46.0	16.2	16.6

CALCULATION: READING[dBμV] + ANT.FACTOR[dB/m] + CABLE LOSS[dB] - AMP.GAIN[dB] + ATTEN[dB].

■ANTENNA:KBA-01(BBA9106)30-299.99MHz/KLA-01(USLP9143)300-1000MHz
■CABLE:KCC-10/11/12/13/18■PREAMP:KAF-01(8447D)■EMI RECEIVER:KTR-02(ESCS30)

DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Open Test Site
Report No. : 24EE0057-YK - 6

Applicant	: YAMAHA CORPORATION
Kind of Equipment	: Wireless LAN Card
Model No.	: WD05740
Serial No.	: D2.3A.E4
Power	: AC120V/60Hz
Mode	: Transmitting:2437(Ch6)
Remarks	:
Date	: 12/15/2003
Test Distance	: 3 m
Temperature	: 15 ℃
Humidity	: 57 %
Regulation	: FCC Part15C §15.209

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	132.90	BB	30.4	30.0	14.5	28.2	3.0	6.1	25.8	25.4	43.5	17.7	18.1
2.	265.45	BB	31.9	30.1	18.5	27.6	4.4	6.1	33.3	31.5	46.0	12.7	14.5
3.	299.05	BB	32.4	29.9	20.0	27.7	4.8	6.1	35.6	33.1	46.0	10.4	12.9
4.	462.03	BB	30.7	32.2	17.8	28.9	6.1	6.1	31.8	33.3	46.0	14.2	12.7
5.	495.01	BB	30.8	34.0	18.1	29.0	6.4	6.1	32.4	35.6	46.0	13.6	10.4
6.	506.00	BB	30.9	34.8	18.2	29.1	6.4	6.1	32.5	36.4	46.0	13.5	9.6
7.	526.83	BB	27.9	28.4	18.4	29.2	6.6	6.1	29.8	30.3	46.0	16.2	15.7
8.	528.04	BB	32.8	36.0	18.5	29.2	6.6	6.1	34.8	38.0	46.0	11.2	8.0
9.	550.01	BB	30.6	34.2	18.8	29.2	6.7	6.1	33.0	36.6	46.0	13.0	9.4
10.	561.00	BB	26.9	29.0	18.9	29.1	6.8	6.1	29.6	31.7	46.0	16.4	14.3
11.	594.00	BB	26.4	26.4	19.3	29.2	7.0	6.1	29.6	29.6	46.0	16.4	16.4

CALCULATION: READING[dBμV] + ANT.FACTOR[dB/m] + CABLE LOSS[dB] - AMP.GAIN[dB] + ATTEN[dB].

■ANTENNA:KBA-01(BBA9106)30-299.99MHz/KLA-01(USLP9143)300-1000MHz
■CABLE:KCC-10/11/12/13/18■PREAMP:KAF-01(8447D)■EMI RECEIVER:KTR-02(ESCS30)

DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Open Test Site
Report No. : 24EE0057-YK - 6

Applicant	: YAMAHA CORPORATION
Kind of Equipment	: Wireless LAN Card
Model No.	: WD05740
Serial No.	: D2.3A.E4
Power	: AC120V/60Hz
Mode	: Transmitting:2462(Ch11)
Remarks	:
Date	: 12/15/2003
Test Distance	: 3 m
Temperature	: 15 ℃
Humidity	: 57 %
Regulation	: FCC Part15C §15.209

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	132.90	BB	30.2	27.5	14.5	28.2	3.0	6.1	25.6	22.9	43.5	17.9	20.6
2.	265.82	BB	32.7	31.2	18.5	27.6	4.4	6.1	34.1	32.6	46.0	11.9	13.4
3.	299.18	BB	31.6	30.7	20.0	27.7	4.8	6.1	34.8	33.9	46.0	11.2	12.1
4.	462.01	BB	29.2	33.4	17.8	28.9	6.1	6.1	30.3	34.5	46.0	15.7	11.5
5.	495.01	BB	32.1	35.3	18.1	29.0	6.4	6.1	33.7	36.9	46.0	12.3	9.1
6.	506.00	BB	32.2	35.7	18.2	29.1	6.4	6.1	33.8	37.3	46.0	12.2	8.7
7.	526.83	BB	27.2	28.7	18.4	29.2	6.6	6.1	29.1	30.6	46.0	16.9	15.4
8.	528.05	BB	35.0	36.6	18.5	29.2	6.6	6.1	37.0	38.6	46.0	9.0	7.4
9.	550.01	BB	33.2	33.1	18.8	29.2	6.7	6.1	35.6	35.5	46.0	10.4	10.5
10.	561.00	BB	28.8	29.3	18.9	29.1	6.8	6.1	31.5	32.0	46.0	14.5	14.0
11.	594.00	BB	28.2	27.1	19.3	29.2	7.0	6.1	31.4	30.3	46.0	14.6	15.7

CALCULATION: READING[dBμV] + ANT.FACTOR[dB/m] + CABLE LOSS[dB] - AMP.GAIN[dB] + ATTEN[dB].

■ANTENNA:KBA-01(BBA9106)30-299.99MHz/KLA-01(USLP9143)300-1000MHz
■CABLE:KCC-10/11/12/13/18■PREAMP:KAF-01(8447D)■EMI RECEIVER:KTR-02(ESCS30)

DATA OF SPURIOUS EMISSIONS(1GHz to 26GHz)

UL Apex Co., Ltd.
YAMAKITA EMC LAB. No.1 OPEN TEST SITE

COMPANY	:	YAMAHA CORPORATION	REPORT NO	:	24EE0057-YK - 6
EQUIPMENT	:	Wireless LAN Card	REGULATION	:	Fcc Part15 Subpart C 15.247(c)
MODEL	:	WD05740	TEST DISTANCE	:	3m(1 to 14GHz) and 1 m(14 to 25GHz)
S/ N	:	D2.3A.E4	DATE	:	2003/12/17
POWER	:	AC120V/60Hz	TEMPERATURE	:	18℃
MODE	:	Transmitting:2412(Ch1)	HUMIDITY	:	45%
Remarks	:				

Engineer : Toyokazu Imamura

PK DETECT : RBW 1MHz VBW 1MHz

No.	FREQ	T/R READING		ANT	AMP	CABLE	High-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	or Atten	HOR	VER	PK	HOR	VER
	[MHz]	[dBuV/m]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass(Atten).												
1	2390.0	44.9	43.8	30.6	36.9	4.1	10.0	52.7	51.6	74.0	21.3	22.5
2	4075.5	51.0	50.6	33.7	36.2	5.4	0.7	54.6	54.2	74.0	19.4	19.8
3	4824.0	41.2	40.0	35.3	35.2	5.6	0.6	47.5	46.3	74.0	26.5	27.7
4	7236.0	42.8	39.1	38.3	36.8	6.5	0.5	51.3	47.6	74.0	22.7	26.4
5	9648.0	44.8	45.0	39.1	36.9	7.2	0.5	54.7	54.9	74.0	19.3	19.1
6	12060.0	44.4	44.5	43.4	36.3	8.1	0.5	60.1	60.2	74.0	13.9	13.8
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass - Dfac												
7	14472.0	46.0	46.3	42.6	35.2	7.3	0.2	51.4	51.7	74.0	22.6	22.3
8	16884.0	47.5	47.3	43.0	35.0	8.8	0.5	55.3	55.1	74.0	18.7	18.9
9	19296.0	49.0	48.9	39.1	34.7	9.4	0.0	53.3	53.2	74.0	20.7	20.8
10	21708.0	49.9	49.4	39.2	34.3	9.9	0.0	55.2	54.7	74.0	18.8	19.3
11	24120.0	51.9	51.4	40.3	35.5	10.9	0.0	58.1	57.6	74.0	15.9	16.4

AV DETECT : RBW1MHz VBW10Hz

No.	FREQ	T/R READING		ANT	AMP	CABLE	High-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	or Atten	HOR	VER	AV	HOR	VER
	[MHz]	[dBuV/m]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass(Atten).												
1	2390.0	34.5	33.8	30.6	36.9	4.1	10.0	42.3	41.6	54.0	11.7	12.5
2	4075.5	47.5	48.6	33.7	36.2	5.4	0.7	51.1	52.2	54.0	2.9	1.8
3	4824.0	31.5	30.5	35.3	35.2	5.6	0.6	37.8	36.8	54.0	16.2	17.2
4	7236.0	32.3	29.5	38.3	36.8	6.5	0.5	40.8	38.0	54.0	13.2	16.0
5	9648.0	34.7	35.6	39.1	36.9	7.2	0.5	44.6	45.5	54.0	9.4	8.5
6	12060.0	33.9	34.5	43.4	36.3	8.1	0.5	49.6	50.2	54.0	4.4	3.8
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass - Dfac												
7	14472.0	39.1	36.0	42.6	35.2	7.3	0.2	44.5	41.4	54.0	9.5	12.6
8	16884.0	37.5	37.8	43.0	35.0	8.8	0.5	45.3	45.6	54.0	8.7	8.4
9	19296.0	38.9	39.1	39.1	34.7	9.4	0.0	43.2	43.4	54.0	10.8	10.6
10	21708.0	40.0	40.1	39.2	34.3	9.9	0.0	45.3	45.4	54.0	8.7	8.6
11	24120.0	41.6	41.4	40.3	35.5	10.9	0.0	47.8	47.6	54.0	6.2	6.4

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5 dB
Atten : 1GHz to 3.5GHz
High Pass Filter : 3.5GHz to 18GHz(3.5GHz Pass)
*Except for the above table : All other spurious emissions were less than 20dB for the limit.

DATA OF SPURIOUS EMISSIONS(1GHz to 26GHz)

UL Apex Co., Ltd.
YAMAKITA EMC LAB. No.1 OPEN TEST SITE

COMPANY	:	YAMAHA CORPORATION	REPORT NO	:	24EE0057-YK - 6
EQUIPMENT	:	Wireless LAN Card	REGULATION	:	Fcc Part15 Subpart C 15.247(c)
MODEL	:	WD05740	TEST DISTANCE	:	3m(1 to 14GHz) and 1 m(14 to 25GHz)
S/ N	:	D2.3A.E4	DATE	:	2003/12/17
POWER	:	AC120V/60Hz	TEMPERATURE	:	18℃
MODE	:	Transmitting:2437(6Ch)	HUMIDITY	:	45%
Remarks	:				

Engineer : Toyokazu Imamura

PK DETECT : RBW 1MHz VBW 1MHz

No.	FREQ [MHz]	T/R READING HOR [dBuV/m]	T/R READING VER [dBuV/m]	ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	High-Pass or Atten [dB]	RESULT HOR [dBuV/m]	RESULT VER [dBuV/m]	Limit PK [dBuV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass(Atten).												
1	4125.5	51.3	50.3	33.7	36.1	5.5	0.7	55.1	54.1	74.0	18.9	19.9
2	4874.0	47.1	46.4	35.6	35.2	5.6	0.6	53.7	53.0	74.0	20.3	21.0
3	7311.0	42.1	40.2	38.4	36.8	6.6	0.5	50.8	48.9	74.0	23.2	25.1
4	9748.0	44.6	45.6	39.1	37.0	7.2	0.6	54.5	55.5	74.0	19.5	18.5
5	12185.0	43.4	44.1	43.3	36.1	8.1	0.4	59.1	59.8	74.0	14.9	14.3
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass - Dfac												
6	14622.0	45.7	45.8	43.0	35.2	7.7	0.3	52.0	52.1	74.0	22.0	21.9
7	17059.0	47.8	48.1	43.3	34.9	8.7	0.5	55.9	56.2	74.0	18.2	17.8
8	19496.0	48.2	48.7	39.0	34.7	9.5	0.0	52.5	53.0	74.0	21.6	21.0
9	21933.0	49.8	50.5	39.3	33.6	10.2	0.0	56.2	56.9	74.0	17.8	17.1
10	24370.0	51.6	51.2	40.4	36.3	10.8	0.0	57.0	56.6	74.0	17.0	17.4

AV DETECT : RBW1MHz VBW10Hz

No.	FREQ [MHz]	T/R READING HOR [dBuV/m]	T/R READING VER [dBuV/m]	ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	High-Pass or Atten [dB]	RESULT HOR [dBuV/m]	RESULT VER [dBuV/m]	Limit AV [dBuV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass(Atten).												
1	4125.5	47.3	48.4	33.7	36.1	5.5	0.7	51.1	52.2	54.0	2.9	1.8
2	4874.0	34.9	34.8	35.6	35.2	5.6	0.6	41.5	41.4	54.0	12.5	12.6
3	7311.0	31.8	31.3	38.4	36.8	6.6	0.5	40.5	40.0	54.0	13.5	14.0
4	9748.0	35.8	35.5	39.1	37.0	7.2	0.6	45.7	45.4	54.0	8.3	8.6
5	12185.0	34.3	34.3	43.3	36.1	8.1	0.4	50.0	50.0	54.0	4.0	4.0
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass - Dfac												
6	14622.0	35.6	36.2	43.0	35.2	7.7	0.3	41.9	42.5	54.0	12.1	11.5
7	17059.0	37.6	37.7	43.3	34.9	8.7	0.5	45.7	45.8	54.0	8.3	8.2
8	19496.0	38.8	38.8	39.0	34.7	9.5	0.0	43.1	43.1	54.0	10.9	10.9
9	21933.0	40.6	40.7	39.3	33.6	10.2	0.0	47.0	47.1	54.0	7.0	6.9
10	24370.0	41.7	41.5	40.4	36.3	10.8	0.0	47.1	46.9	54.0	6.9	7.1

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5 dB
Atten : 1GHz to 3.5GHz
High Pass Filter : 3.5GHz to 18GHz(3.5GHz Pass)
*Except for the above table : All other spurious emissions were less than 20dB for the limit.

DATA OF SPURIOUS EMISSIONS(1GHz to 26GHz)

UL Apex Co., Ltd.
YAMAKITA EMC LAB. No.1 OPEN TEST SITE

COMPANY	:	YAMAHA CORPORATION	REPORT NO	:	24EE0057-YK-6
EQUIPMENT	:	Wireless LAN Card	REGULATION	:	Fcc Part15 Subpart C 15.247(c)
MODEL	:	WD05740	TEST DISTANCE	:	3m(1 to 14GHz) and 1 m(14 to 25GHz)
S/ N	:	D2.3A.E4	DATE	:	2003/12/17
POWER	:	AC120V/60Hz	TEMPERATURE	:	18℃
MODE	:	Transmitting2462(11Ch)	HUMIDITY	:	45%
Remarks	:				

Engineer : Toyokazu Imamura

PK DETECT : RBW 1MHz VBW 1MHz

No.	FREQ [MHz]	T/R READING HOR [dBuV/m]	T/R READING VER [dBuV/m]	ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	High-Pass or Atten [dB]	RESULT HOR [dBuV/m]	RESULT VER [dBuV/m]	Limit PK [dBuV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass(Atten).												
1	2483.5	44.5	42.5	30.7	36.9	4.1	10.0	52.4	50.4	74.0	21.6	23.6
2	4175.5	51.5	51.2	33.7	36.0	5.5	0.7	55.4	55.1	74.0	18.6	18.9
3	4924.0	42.9	42.1	35.8	35.2	5.6	0.5	49.6	48.8	74.0	24.4	25.3
4	7386.0	41.1	40.8	38.6	36.9	6.6	0.5	49.9	49.6	74.0	24.1	24.4
5	9848.0	45.5	44.9	39.0	37.0	7.2	0.7	55.4	54.8	74.0	18.6	19.2
6	12310.0	42.6	44.0	43.2	35.9	8.1	0.4	58.4	59.8	74.0	15.6	14.2
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass - Dfac												
7	14772.0	44.7	44.2	43.2	35.1	8.1	0.4	51.8	51.3	74.0	22.2	22.7
8	17234.0	47.4	48.4	43.8	34.8	8.5	0.6	56.0	57.0	74.0	18.0	17.0
9	19696.0	48.9	48.4	39.5	35.0	9.6	0.0	53.5	53.0	74.0	20.5	21.0
10	22158.0	50.6	51.6	39.2	33.7	10.3	0.0	56.9	57.9	74.0	17.1	16.1
11	24620.0	53.0	52.3	40.4	36.0	10.9	0.0	58.8	58.1	74.0	15.2	15.9

AV DETECT : RBW1MHz VBW10Hz

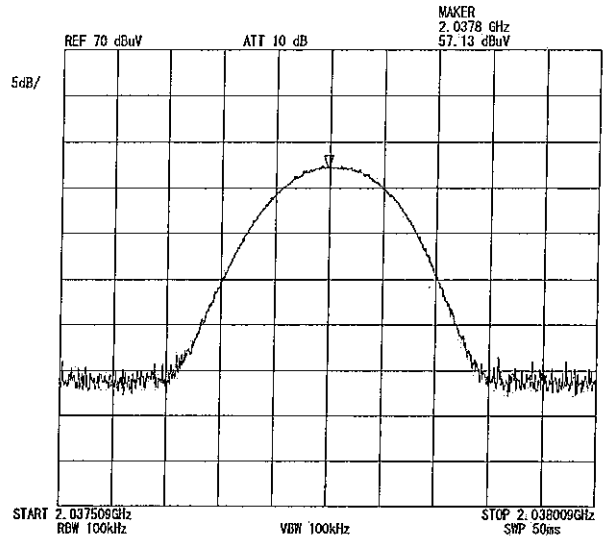
No.	FREQ [MHz]	T/R READING HOR [dBuV/m]	T/R READING VER [dBuV/m]	ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	High-Pass or Atten [dB]	RESULT HOR [dBuV/m]	RESULT VER [dBuV/m]	Limit AV [dBuV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass(Atten).												
1	2483.5	34.0	33.5	30.7	36.9	4.1	10.0	41.9	41.4	54.0	12.1	12.6
2	4175.5	48.7	48.2	33.7	36.0	5.5	0.7	52.6	52.1	54.0	1.4	1.9
3	4924.0	31.8	31.2	35.8	35.2	5.6	0.5	38.5	37.9	54.0	15.5	16.1
4	7386.0	31.9	31.5	38.6	36.9	6.6	0.5	40.7	40.3	54.0	13.3	13.7
5	9848.0	35.2	35.6	39.0	37.0	7.2	0.7	45.1	45.5	54.0	8.9	8.5
6	12310.0	33.3	34.0	43.2	35.9	8.1	0.4	49.1	49.8	54.0	4.9	4.2
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass - Dfac												
7	14772.0	35.5	35.7	43.2	35.1	8.1	0.4	42.6	42.8	54.0	11.4	11.2
8	17234.0	37.3	37.7	43.8	34.8	8.5	0.6	45.9	46.3	54.0	8.1	7.7
9	19696.0	39.0	38.9	39.5	35.0	9.6	0.0	43.6	43.5	54.0	10.4	10.5
10	22158.0	41.2	41.4	39.2	33.7	10.3	0.0	47.5	47.7	54.0	6.5	6.3
11	24620.0	42.9	42.8	40.4	36.0	10.9	0.0	48.7	48.6	54.0	5.3	5.4

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5 dB
Atten : 1GHz to 3.5GHz
High Pass Filter : 3.5GHz to 18GHz(3.5GHz Pass)
*Except for the above table : All other spurious emissions were less than 20dB for the limit.

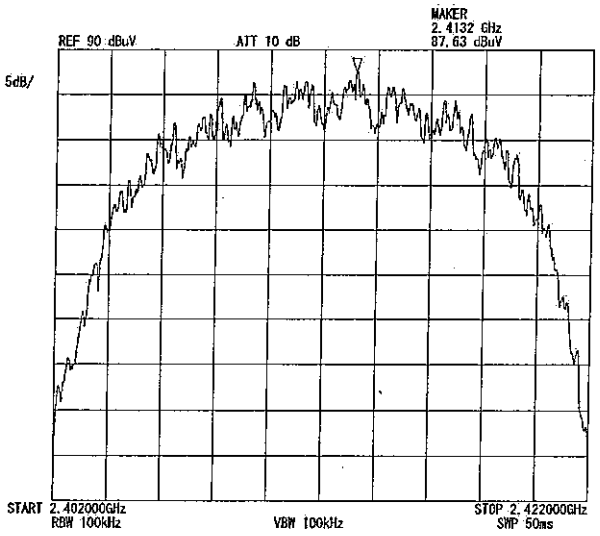
Out of Band Emissions (Radiated): FCC 15.247(c)

Ch 1: 2412MHz

1.Spurious emission (2037.8MHz-Horizontal)

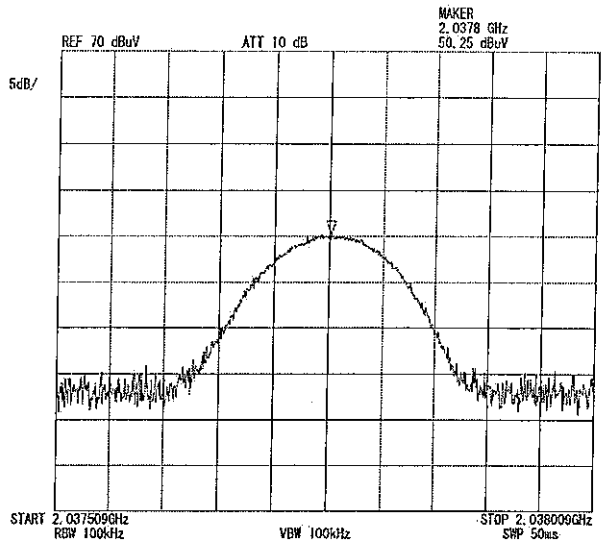


2. Fundamental (2412MHz-Horizontal)

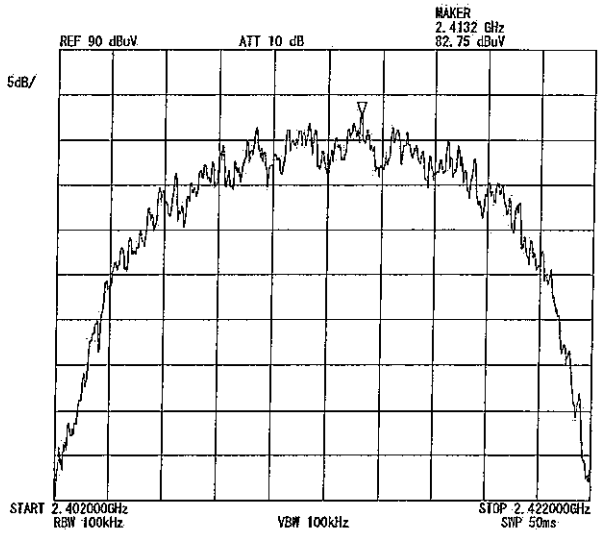


T. Imamura

3. Spurious emission (2037.8MHz-Vertical)



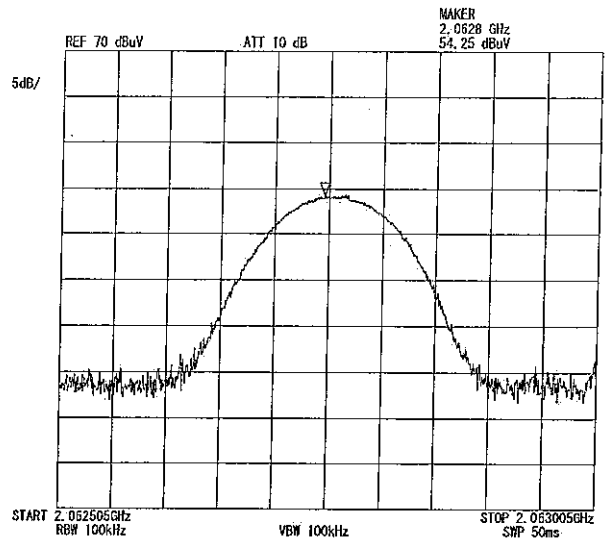
4. Fundamental (2412MHz-Vertical)



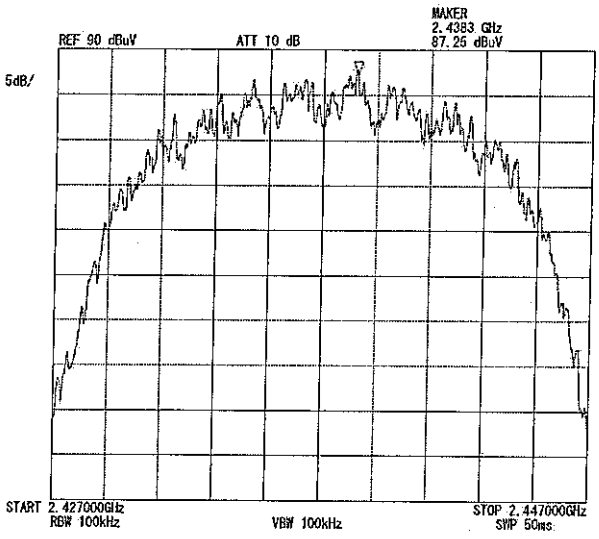
Out of Band Emissions (Radiated): FCC 15.247(c)

Ch 6: 2437MHz

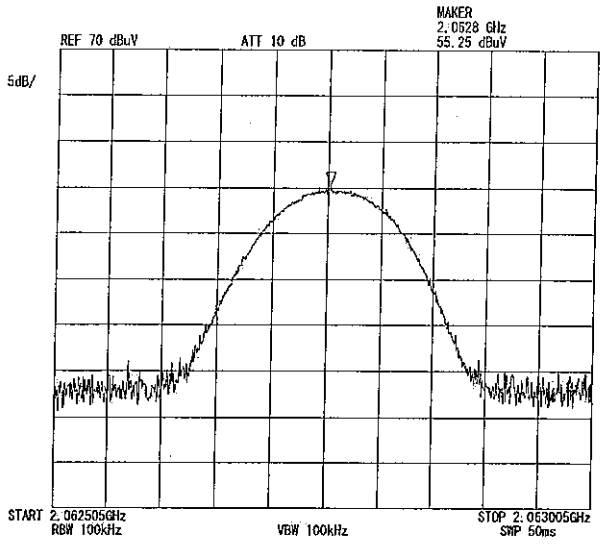
1. Spurious emission (2062.8MHz-Horizontal)



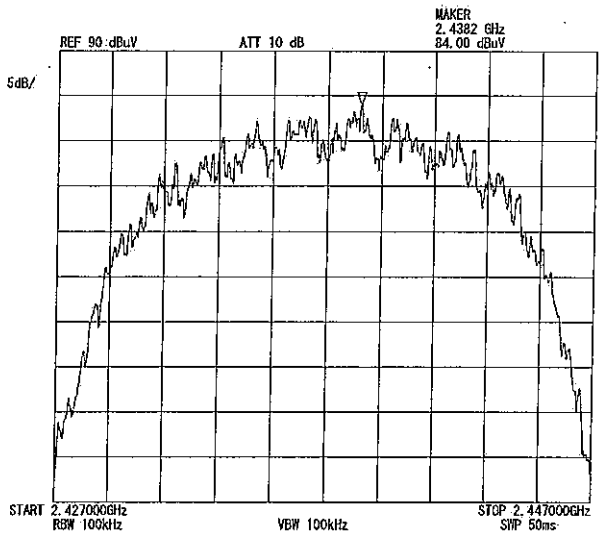
2. Fundamental (2437MHz-Horizontal)



3. Spurious emission (2062.8MHz-Vertical)



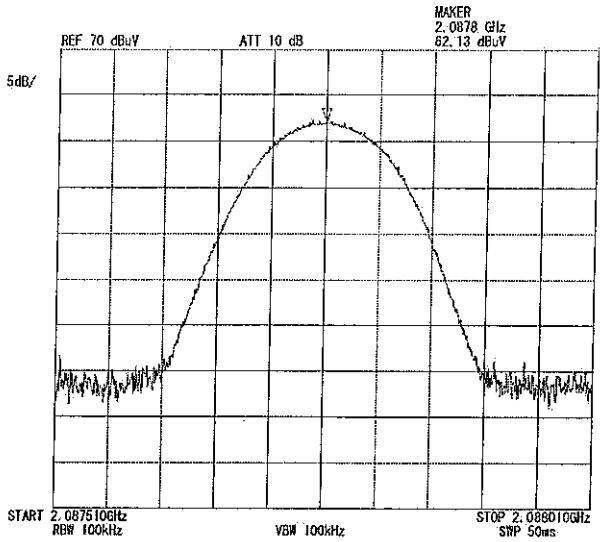
4. Fundamental (2437MHz-Vertical)



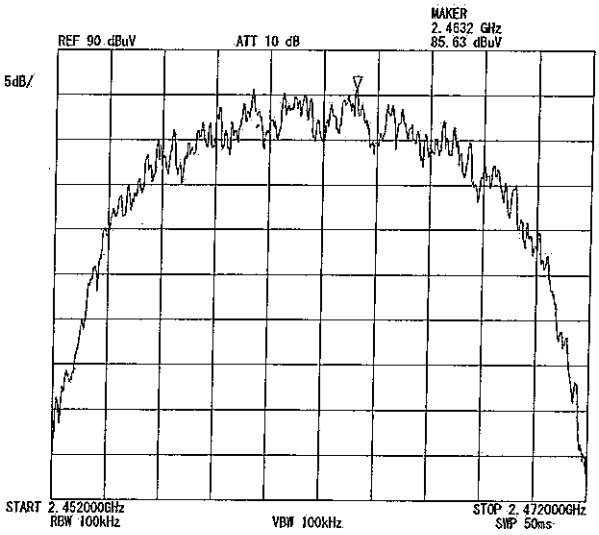
Out of Band Emissions (Radiated): FCC 15.247(c)

Ch 11: 2462MHz

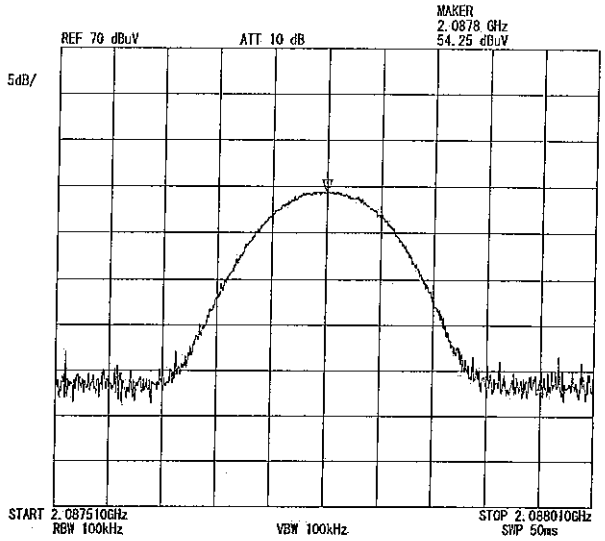
1. Spurious emission (2087.8MHz-Horizontal)



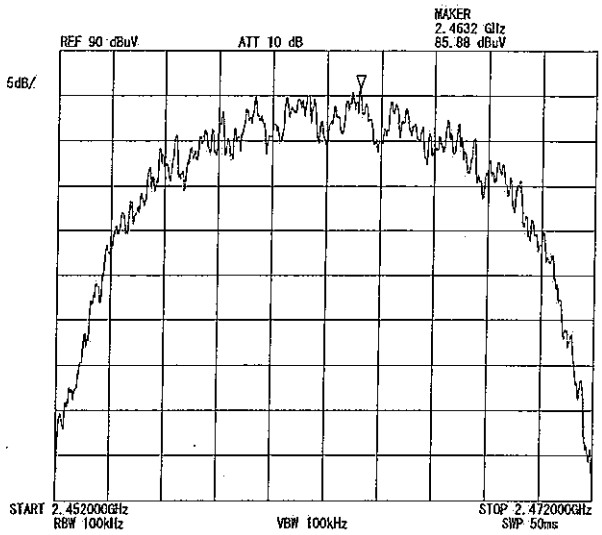
2. Fundamental (2462MHz-Horizontal)



3. Spurious emission (2087.7MHz-Vertical)



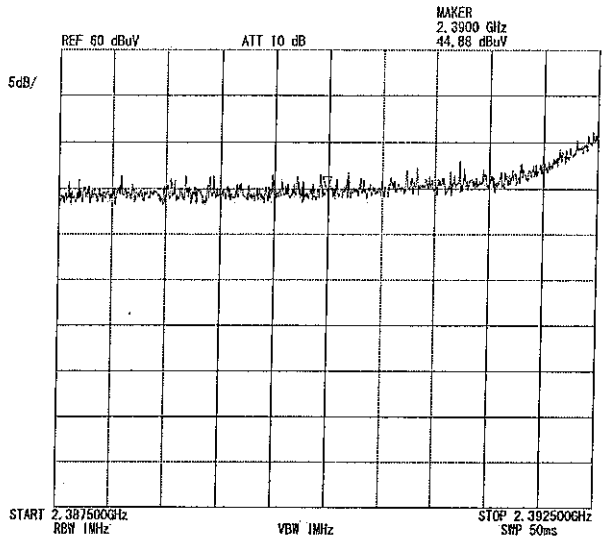
4. Fundamental (2462MHz-Vertical)



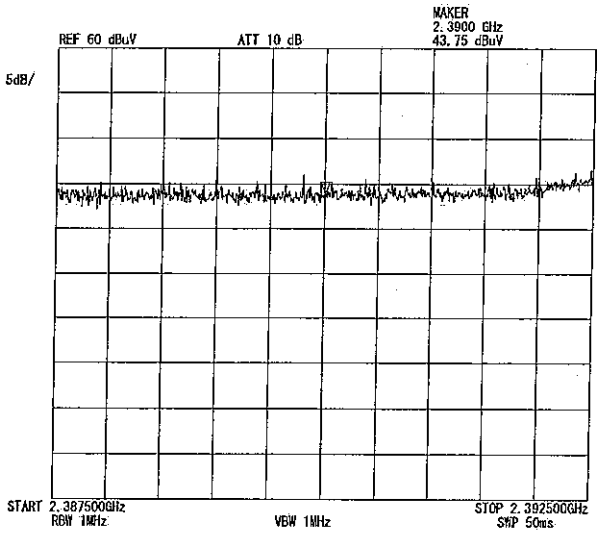
T. Imamura

2.39GHz (Ch 1:2412MHz)

1. **Horizontal/ PK**

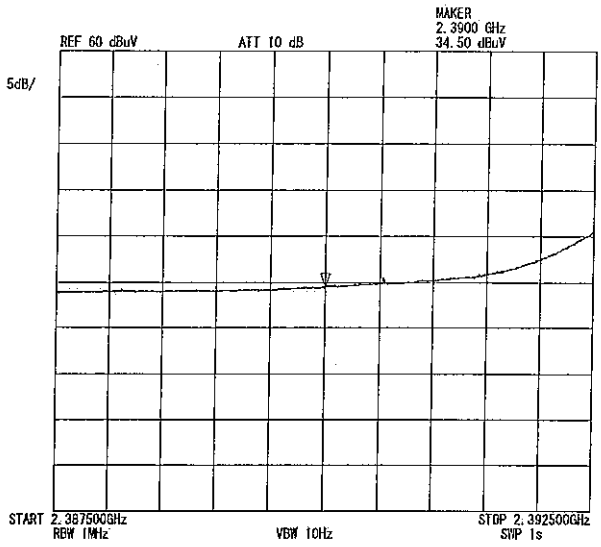


2. **Vertical/ PK**

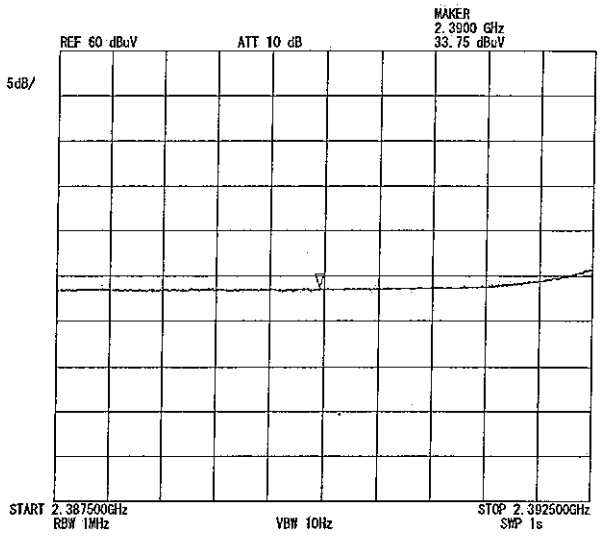


T. Imamura

3. Horizontal/ AV



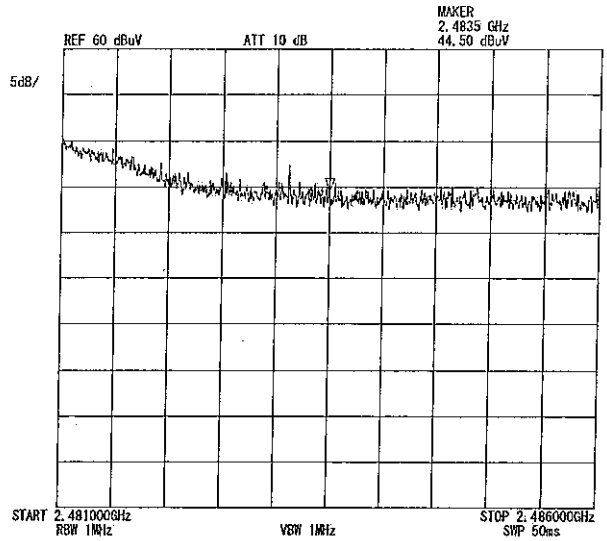
4. Vertical/ AV



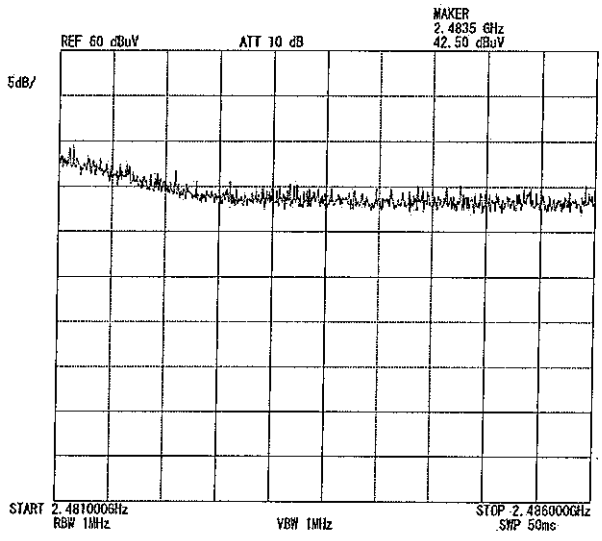
T. Inamura

2.4835GHz (Ch 11:2462MHz)

1. **Horizontal/ PK**

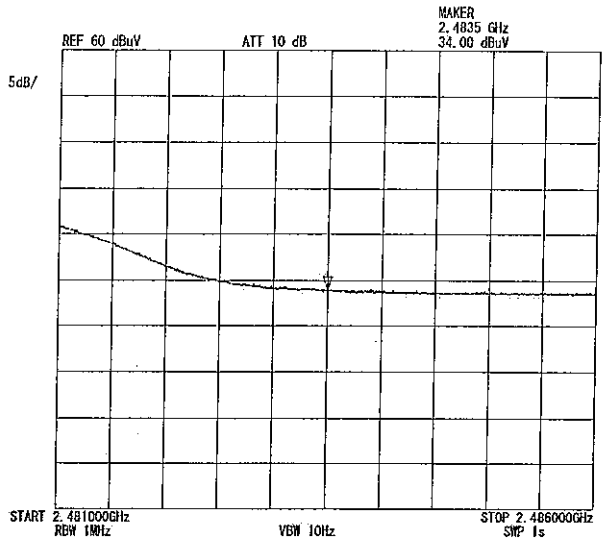


2. **Vertical/ PK**

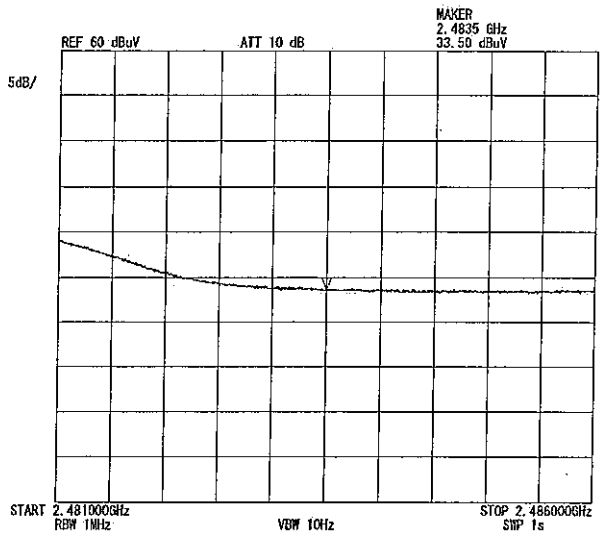


T. Imamura

3. Horizontal/ AV



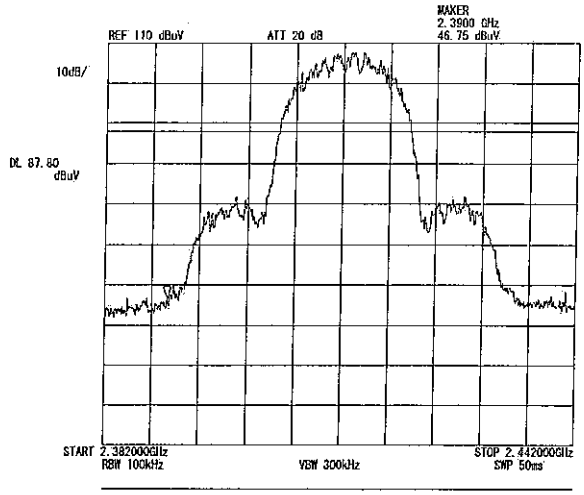
4. Vertical/ AV



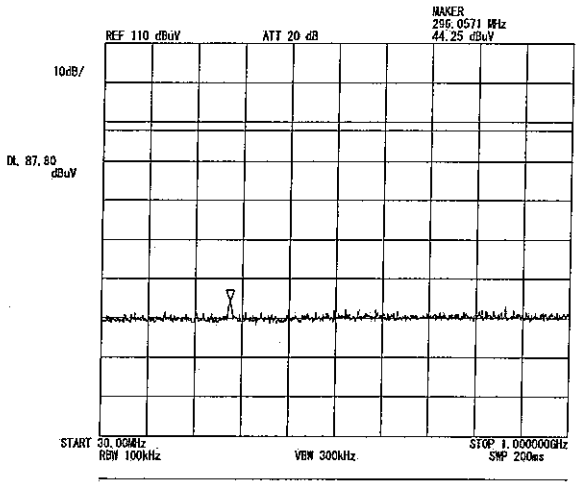
T. Imamura

Ch 1: 2412MHz

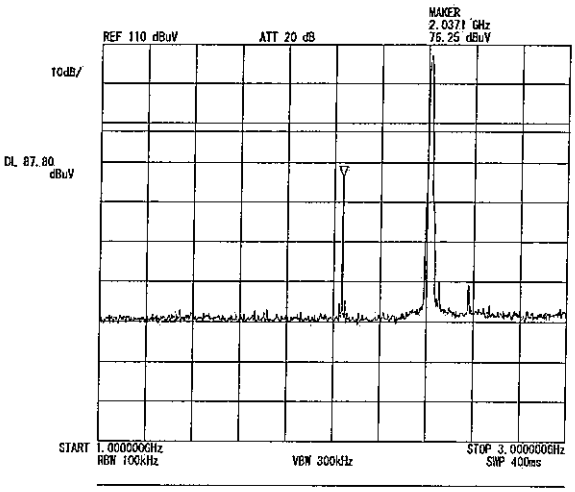
1.



2.

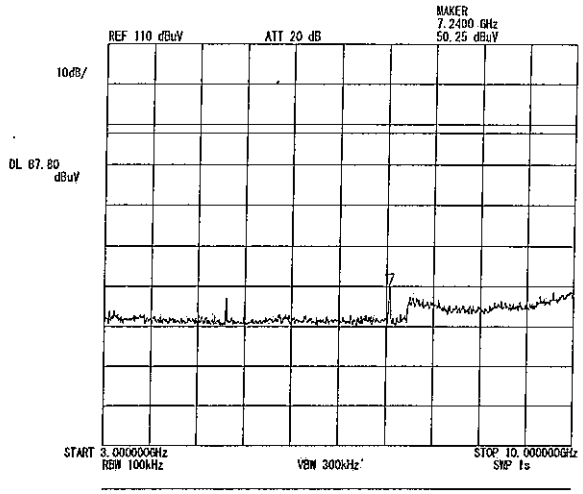


3.

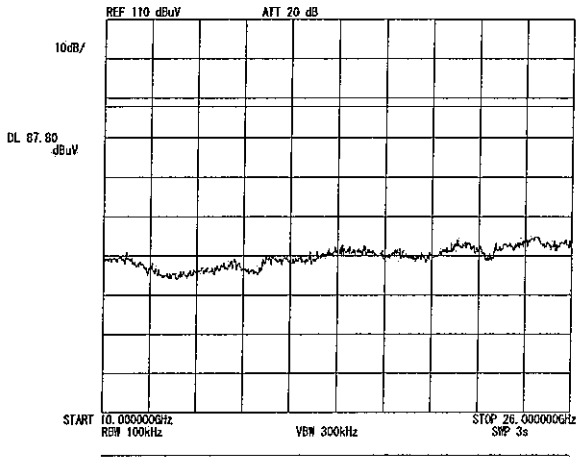


T. Imamura

4.


MAKER
7.2490 GHz
50.25 dBuV
REF 110 dBuV
ATT 20 dB
10dB/
DL 87.80
dBuV
START 3.000000GHz
RBW 100kHz
VBW 300kHz
STOP 10.000000GHz
SWP 1s

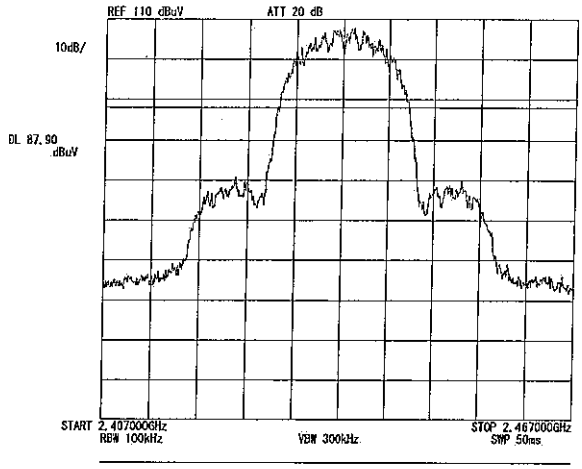
5.


REF 110 dBuV
ATT 20 dB
10dB/
DL 87.80
dBuV
START 10.000000GHz
RBW 100kHz
VBW 300kHz
STOP 26.000000GHz
SWP 3s

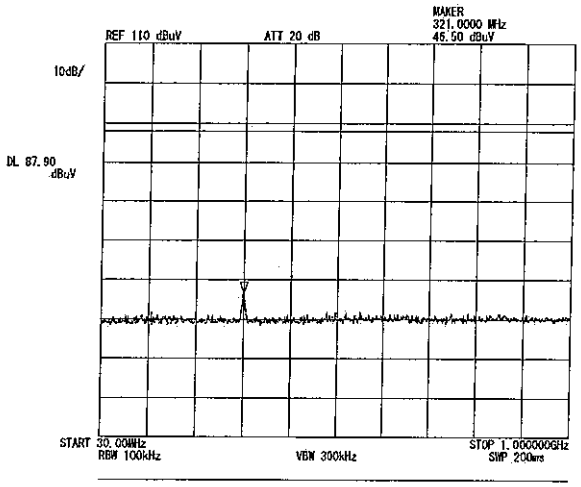
T. Imamura

Ch 6: 2437MHz

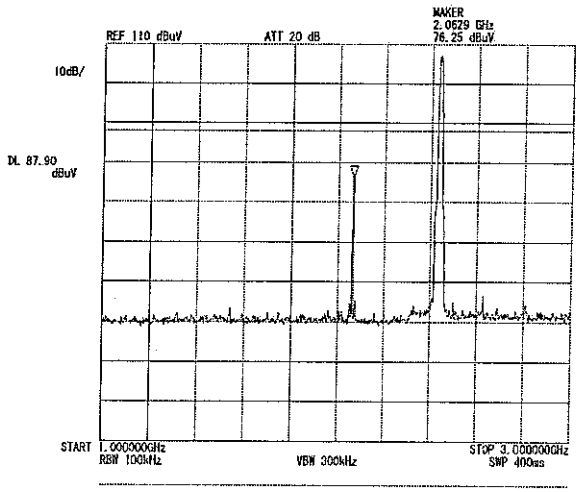
1.



2.

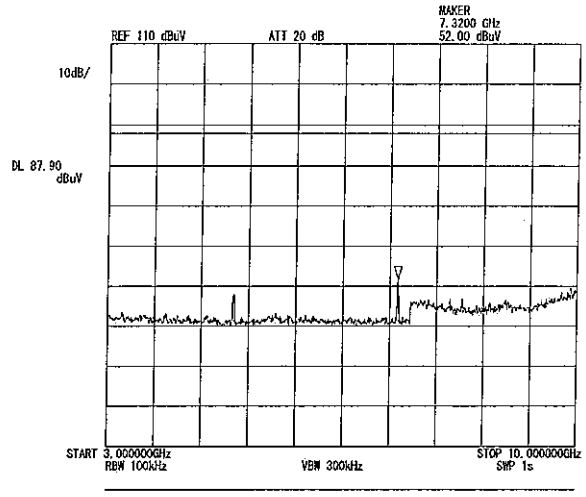


3.

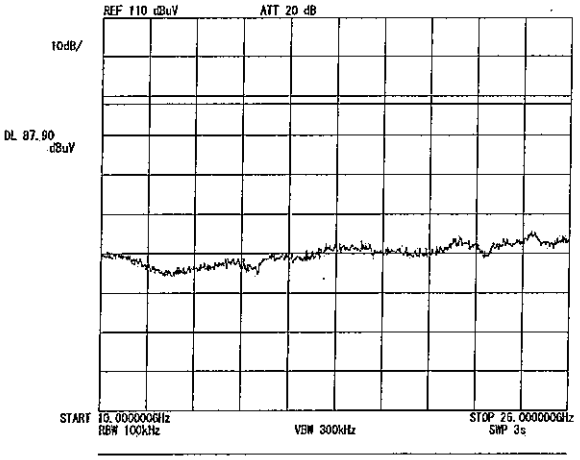


T. Imamura

4.


MAKER
7.3200 GHz
52.00 dBuV
REF 110 dBuV
ATT 20 dB
10dB/
DL 87.90
dBuV
START 3.000000GHz
RBW 100kHz
VBW 300kHz
STOP 10.000000GHz
SWP 1s

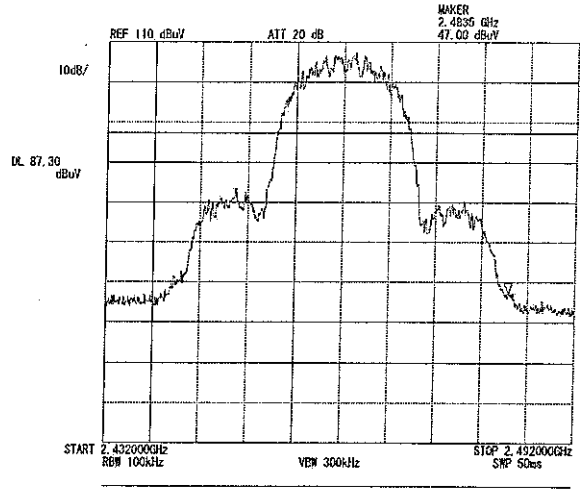
5.


REF 110 dBuV
ATT 20 dB
10dB/
DL 87.90
dBuV
START 10.000000GHz
RBW 100kHz
VBW 300kHz
STOP 26.000000GHz
SWP 3s

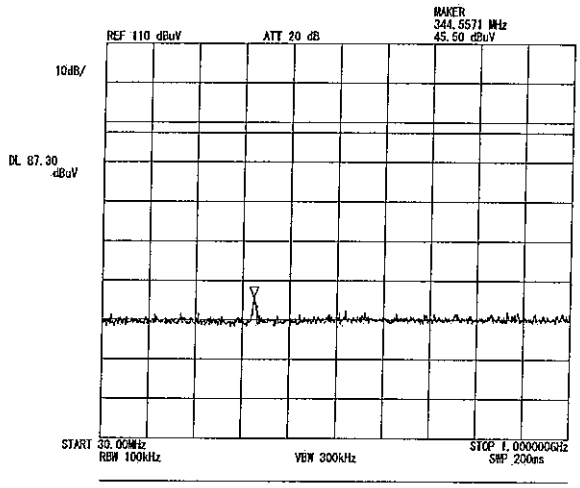
T. Imamura

Ch 11: 2462MHz

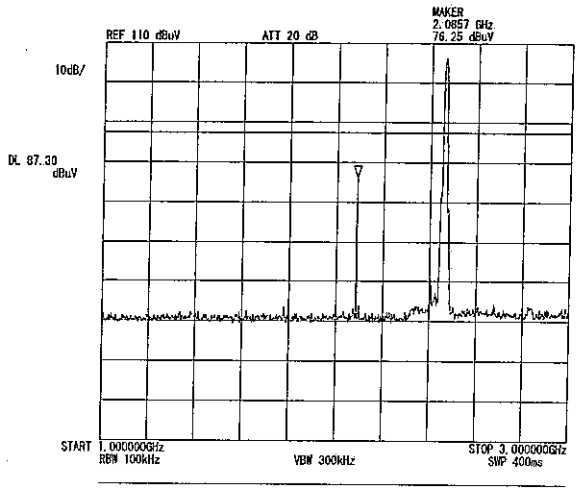
1.



2.

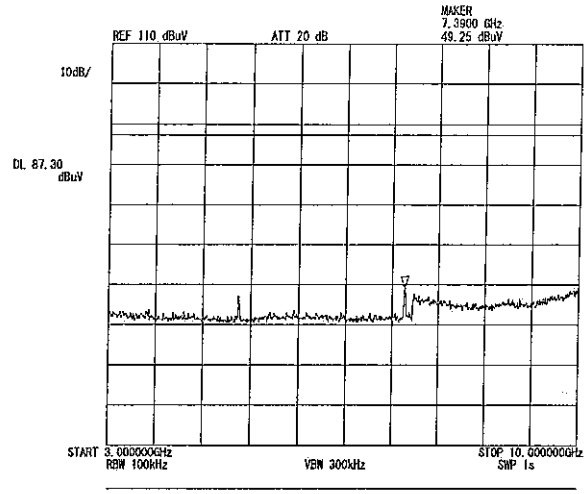


3.

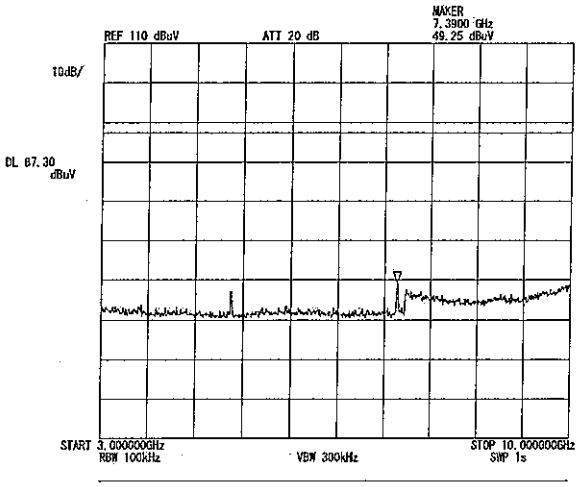


T. Imamura

4.


MAKER
7.3900 GHz
49.25 dBuV
REF 110 dBuV
ATT 20 dB
10dB/
DL 87.30
dBuV
START 3.000000GHz
RBW 100kHz
VBW 300kHz
STOP 10.000000GHz
SWP 1s

5.


MAKER
7.3900 GHz
49.25 dBuV
REF 110 dBuV
ATT 20 dB
10dB/
DL 87.30
dBuV
START 3.000000GHz
RBW 100kHz
VBW 300kHz
STOP 10.000000GHz
SWP 1s

Power Density(Conducted)

UL Apex Co.,Ltd
YAMAKITA NO.5 Shielded Room

COMPANY : YAMAHA CORPORATION
EQUIPMENT : WIRELESS LAN CARD
MODEL : WD05740
FCC ID : A6RDKV137138
POWER : DC3.3V(PC:AC120V/60Hz)
Mode : Transmitting

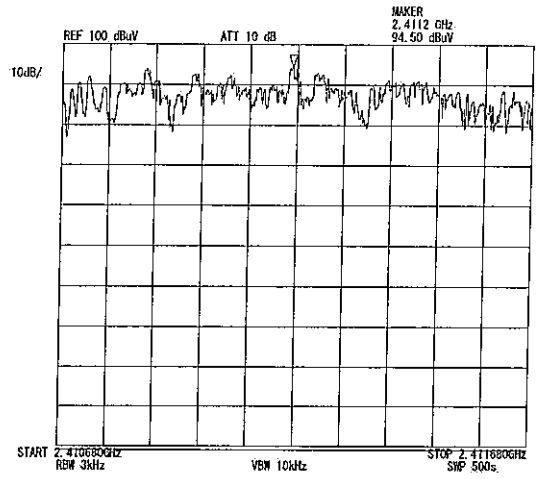
REPORT NO : 24EE0057-YK-6
REGULATION : Fcc Part15SubpartC 247(d)
DATE : 2003/ 12/18
Temp./Humi. : 19℃/47%

ENGINEER : Toyokazu Imamura

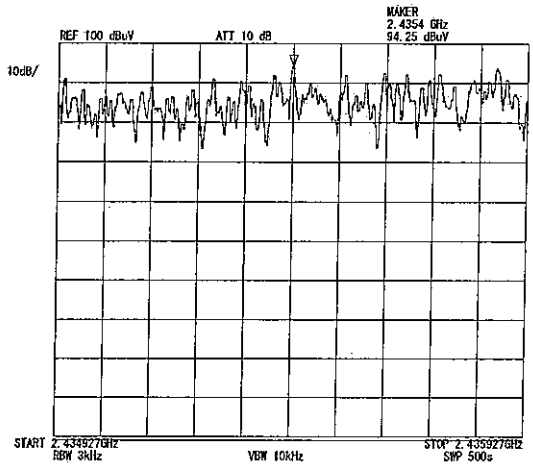
CH	FREQ [GHz]	S/A Reading [dBm]	Cable Loss [dB]	Results [dBm]	Limit [dBm]	MARGIN [dB]
Low	2.411200	-12.50	1.3	-11.2	8.0	19.2
Mid	2.435400	-12.75	1.3	-11.45	8.0	19.5
High	2.460400	-13.25	1.3	-11.95	8.0	20.0

T. Imamura

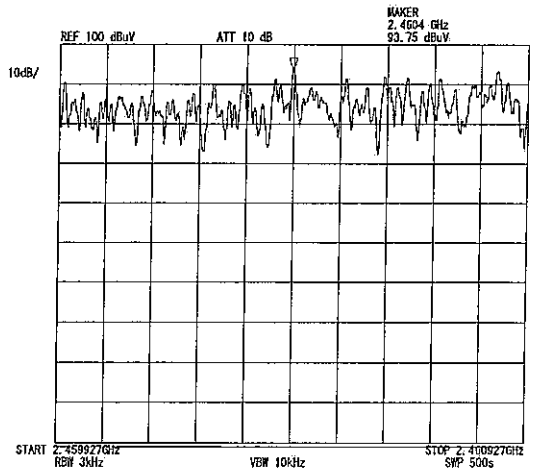
1. **ch 1: 2412MHz**



2. **ch 6: 2437MHz**



3. **ch 11: 2462MHz**



APPENDIX 3
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
KCC-14/15/16/18/KPL-01	Coaxial Cable/Pulse Limitter	Fujikura/Suhner/PMM	5D-2W/8D-2W/S04272B/S04272B/PL01	CE	2003/07/25 * 12
KLS-01	LISN(AMN)	Schwarzbeck	NSLK8126	CE	2003/07/25 * 12
KSA-01	Spectrum Analyzer	Advantest	R3365	CE/RE	2003/06/09 * 12
KTR-02	Test Receiver	Rohde & Schwarz	ESCS30	CE/RE	2003/12/02 * 12
KSA-04	Spectrum Analyzer	Advantest	R3271A	CE/RE/AT	2003/09/17 * 12
KPM-05	Power meter	Agilent	E4417A	AT	2003/02/17 * 12
KPSS-01	Power sensor	Agilent	E9327A	AT	2003/02/21 * 12
KAF-01	Pre Amplifier	Hewlett Packard	8447D	RE	2003/07/18 * 12
KAF-02	Pre Amplifier	Hewlett Packard	8449B	RE	2003/05/08 * 12
KAT10-S1	Attenuator	Agilent	8449D 010	RE	2003/04/18 * 12
KAT6-02	Attenuator	INMET	18N-6dB	RE	2003/05/12 * 12
KBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/08/11 * 12
KFL-01	Highpass Filter	Hewlett Packard	84300 80038	RE	2003/04/18 * 12
KCC-10/11/12/13/18	Coaxial Cable	Fujikura/Suhner	8D-2W/12D-SFA/S04272B/S04272B/S04272B	RE	2003/07/25 * 12
KCC-D3/D7	Coaxial Cable	Rosenberger/Advantest	2201/JUN-08-01-061	RE	2003/04/18 * 12
KHA-01	Horn Antenna	A.H.Systems	SAS-200/571	RE	2003/08/11 * 12
KHA-03	Horn Antenna	EMCO	3160-09	RE	2003/04/23 * 12
KOTS-01	Open Test Site	JSE	30m	RE	2003/08/16 * 12
KLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/02/19 * 12

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