EMI TEST REPORT

Test Report No. : 23KE0041-YK-2

Applicant	:	**NIHON KOHDEN CORPORATION**
Type of Equipment	:	**Access Point**
Model No.	:	**ZR-101AA**
FCC ID	:	**B6BZR-101AA**
Test standard	:	**FCC Part15 Subpart C, Section 15.247**
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: June 30, July 4, 2003

Tested by: Takahiro Suzuki & Ichiro Isozaki

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

UL Apex Co., Ltd.
YAMAKITA EMC LAB.
907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

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Table of Contents Page

1 GENERAL INFORMATION

Company Name	: NIHON KOHDEN CORPORATION
Brand Name	: NIHON KOHDEN
Address	: 1-31-4 Nishiochiai Shinjuku-ku, Tokyo, 161-8560 Japan
Telephone Number	: +81 3 5996 8066
Facsimile Number	: +81 3 5996 8103
Contact Person	: Kazuteru Yanagihara
Type of Equipment	: Access Point
Model No.	: ZR-101AA
Serial No.	: 91002
Rating	: AC120V,60Hz
Country of Manufacture	: Japan
Receipt Date of Sample	: June 30, 2003
Condition of E.U.T.	: Production prototype
Regulation(s)	: FCC Part15 Subpart C, Section 15.247
Test Site	: UL Apex Yamakita EMC Lab. No.1 Open Test Site and No.1 Shielded Room

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 Sequence 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: ZR-101AA, (referred to as the EUT in this report), is a Access Point.

Clock frequency used in EUT : 32.768kHz, 14.7456MHz, 25MHz, 44MHz

Frequency Characteristics	: 2412 - 2462MHz
Channel Characteristics	: 11 channel selectable by 5MHz spacing
Modulation	: DBPSK, DQPSK, CCK
Antenna Type	: Dipole Antenna
Antenna Gain	: 2.14dBi
ITU Emission Code(s)	: G1D
Power Supply	: DC 3.3V±0.3V
Operation Temperature range	: 10 - 40 deg. C.
Antenna Connector Type	: SMA-P

*FCC Part15.31 (e)

The host device ZR-101AA provides the Wireless LAN module with stable power supply (DC3.3V), and the power is not changed when voltage of the personal computer is varied.
Therefore, the Access Point power supply regulation.

*FCC Part 15.203 Antenna requirement

The standard type of antenna connector is applied: however, the Access Point complies this requirement since this radio equipment is for professional installation.

3 SYSTEM TEST CONFIGURATION

3.1 Justification

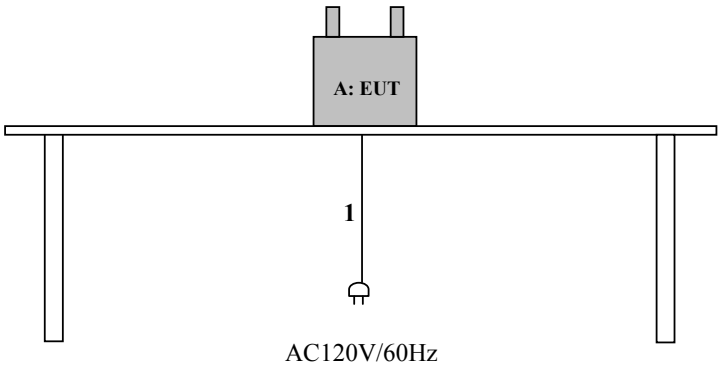
The system was configured in typical fashion (as a customer would normally use it) for testing.

Test mode:

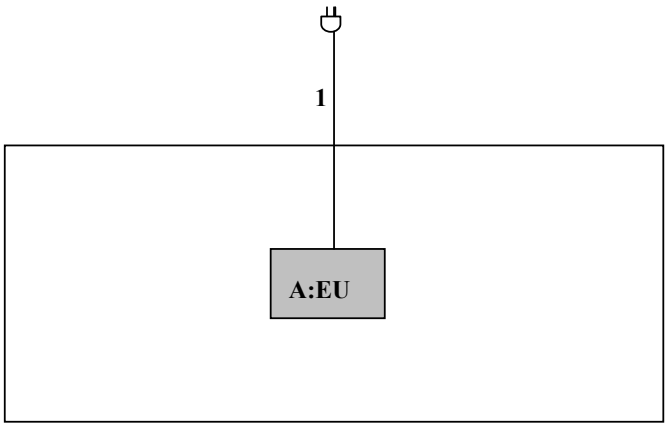
1. Transmitting 2412MHz (Low)
2. Transmitting 2437MHz (Middle)
3. Transmitting 2462MHz (High)

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	Access Point	ZR-101AA	91002	NIHON KOHDEN	B6BZR-101AA	EUT

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	AC 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 result is within Yamakita EMC lab's uncertainty.

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 12 to 16
Photographs of test setup: Page 10
Test result : Pass
Worst margin: 8.7dB (0.5340MHz, N, AV)
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 17
Test result : Pass
Test instruments : KTR-01, KCC-D7

5.3 § 15.247(b)(3) Maximum Peak Out Put 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 18
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.

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

Test data : APPENDIX Page 19 to 21 (30 - 1000MHz)
: APPENDIX Page 22 to 27 (1 - 26GHz)
: APPENDIX Page 28 to 31
(Band Edges: 2390MHz/ 2483.5MHz, Restricted band Charts)
Photographs of test setup: Page 11
Test result : Pass
Test instruments: KAF-01, KAF-02, KAT10-S1, KAT6-01, KBA-03, KTR-01, KTR-02, KFL-01 KCC-10/11/12/13/18, KCC-D3/D7, KHA-01, KLA-01, KOTS-01, KSA-01

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 32 to 37
Test result : Pass
Test instruments : KTR-01, KCC-D7

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 38 to 39
Test result : Pass
Test instruments : KTR-01, KCC-D7

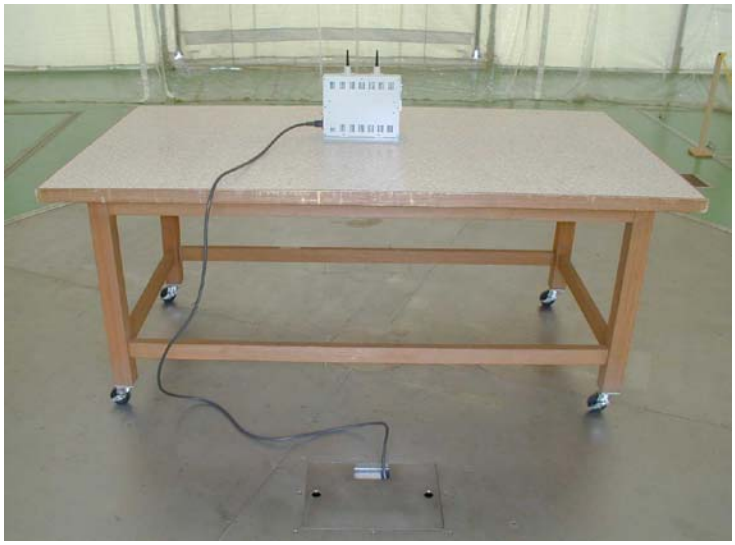
APPENDIX 1: Photographs of test setup

APPENDIX 2: Test Data

APPENDIX 3: Test instruments

Conducted emission

Radiated emission



DATA OF CONDUCTION TEST

UL Apex Co., Ltd.
Yamakita No.1 Shielded Room
Report No.: 23KE0041-YK ∞ 2

Applicant	:	NIHON KOHDEN CORPORATION
Kind of Equipment	:	Access Point
Model No.	:	ZR-101AA
Serial No.	:	91002
Power	:	AC120V/60Hz
Mode	:	Transmitting(2412MHz)
Remarks	:	
Date	:	7/4/2003
Phase	:	Single Phase
Temperature	:	24 ℃
Humidity	:	63 %
Regulation	:	FCC Part15C §15.207.(CISPR Pub.22)

Engineer : Ichiro Isozaki

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.	0.1529	47.2	43.3	46.9	42.3	0.0	0.1	0.0	47.3	43.4	65.8	55.8	18.5	12.4
2.	0.1899	45.3	42.8	44.0	41.5	0.0	0.1	0.0	45.4	42.9	64.0	54.0	18.6	11.1
3.	0.3815	39.1	38.6	38.4	37.7	0.0	0.2	0.0	39.3	38.8	58.2	48.2	18.9	9.4
4.	0.5340	37.6	37.1	37.5	37.0	0.0	0.2	0.0	37.8	37.3	56.0	46.0	18.2	8.7
5.	0.8768	37.3	36.5	37.2	36.5	0.1	0.2	0.0	37.6	36.8	56.0	46.0	18.4	9.2
6.	1.2211	34.1	33.2	34.2	33.3	0.1	0.3	0.0	34.6	33.7	56.0	46.0	21.4	12.3

CALCULATION: READING[dBμV] + LISN FACTOR[dB] + CABLE LOSS[dB] + ATTEN[dB].

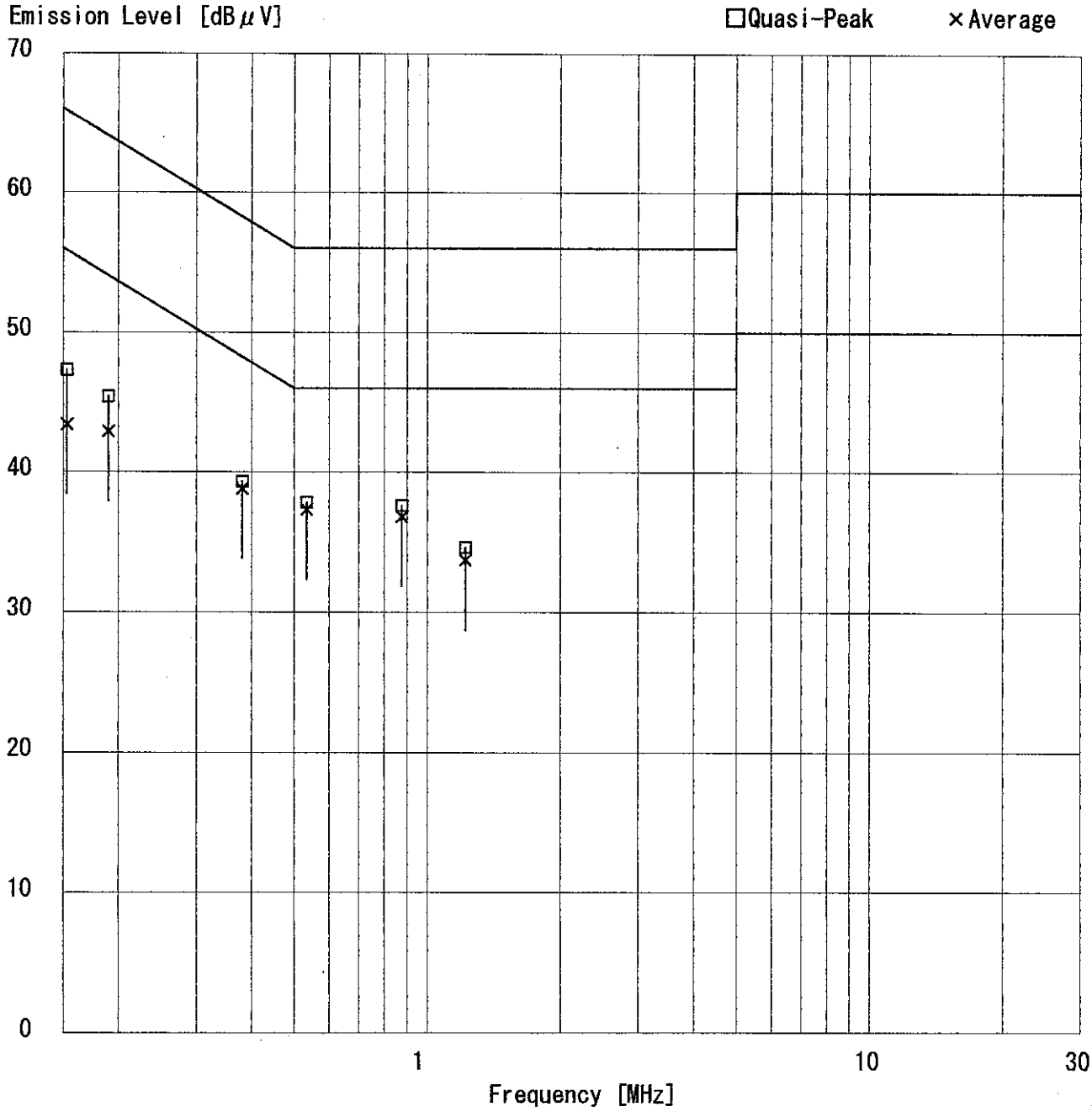
■LISN :KLS-01(NSLK8126) ■COAXIAL CABLE:KCC-14/15/16/18
■PULSE LIMITTER:KPL-01(PL01) ■EMI RECEIVER:KTR-02(ESCS30)

DATA OF CONDUCTION TEST

UL Apex Co., Ltd.
Yamakita No.1 Shielded Room
Report No.: 23KE0041-YK~2

Applicant	:	NIHON KOHDEN CORPORATION
Kind of Equipment	:	Access Point
Model No.	:	ZR-101AA
Serial No.	:	91002
Power	:	AC120V/60Hz
Mode	:	Transmitting(2412MHz)
Remarks	:	
Date	:	7/4/2003
Phase	:	Single Phase
Temperature	:	24 ℃
Humidity	:	63 %
Regulation	:	FCC Part15C §15.207.(CISPR Pub.22)

Engineer : Ichiro Isozaki

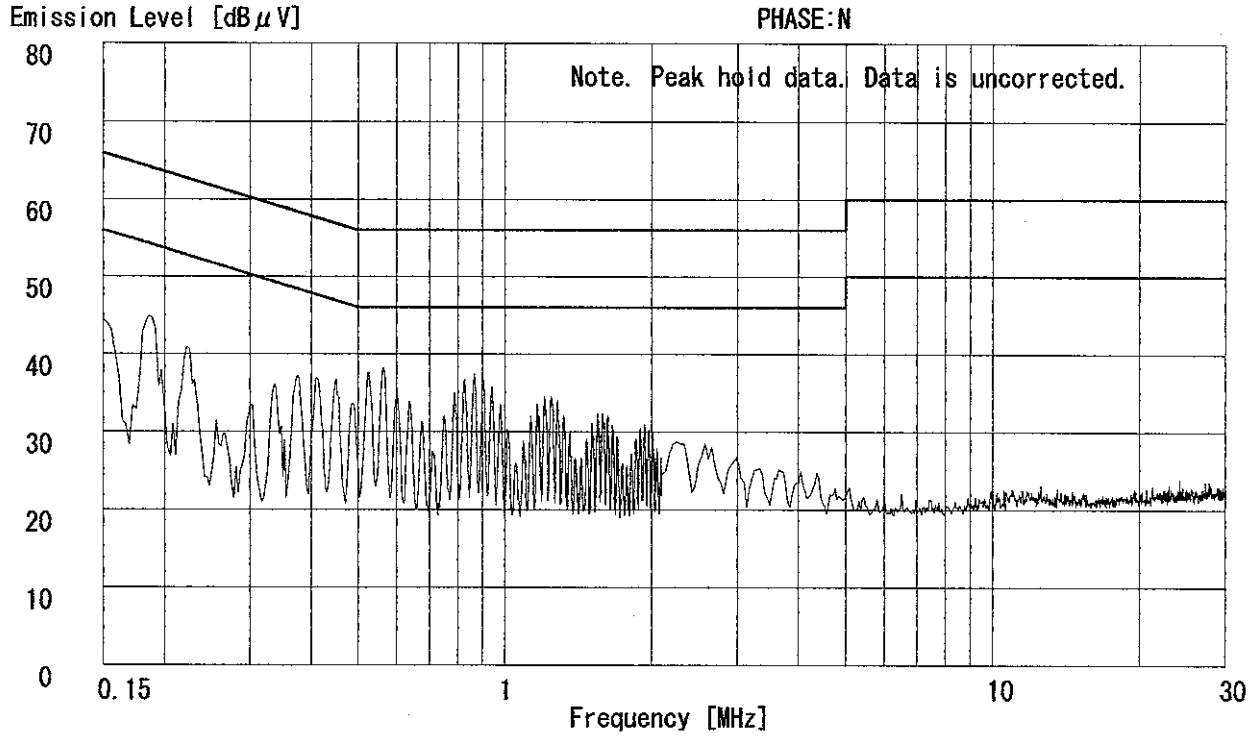


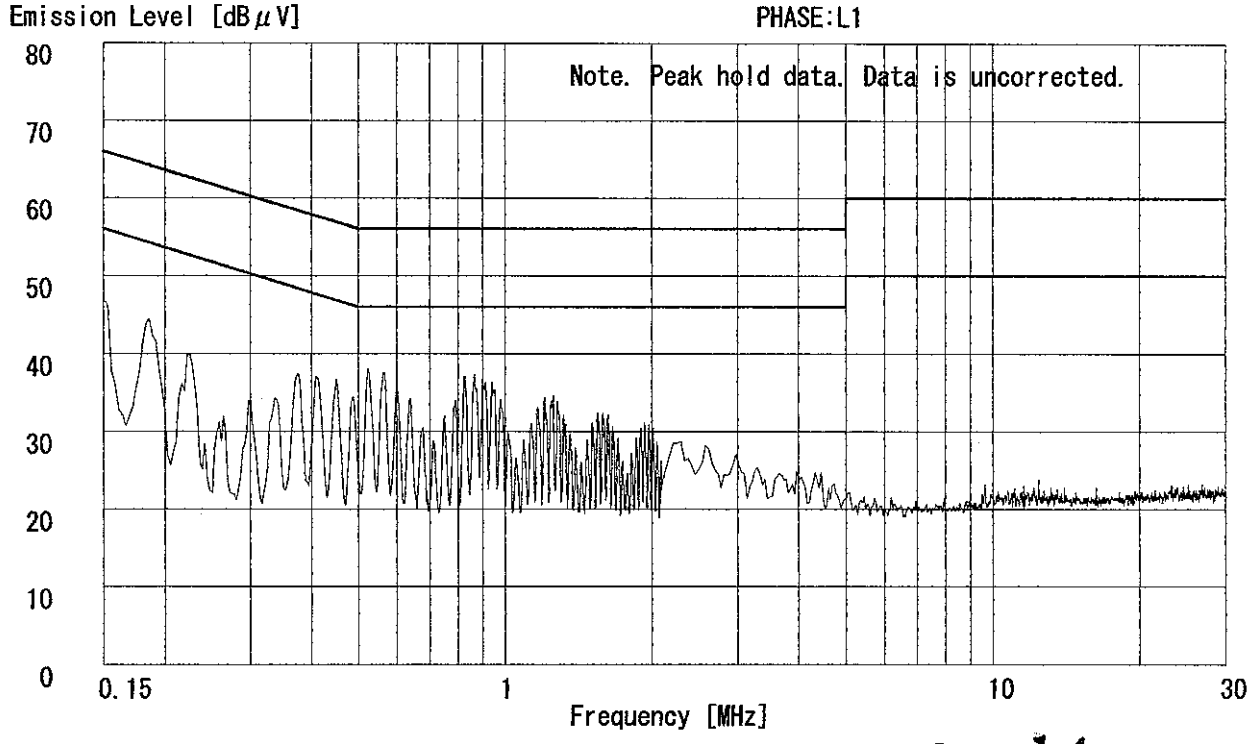
DATA OF CONDUCTION TEST CHART

UL Apex Co., Ltd.
Yamakita No.1 Shielded Room
Report No.: 23KE0041-YK = 2

Applicant	:	NIHON KOHDEN CORPORATION
Kind of Equipment	:	Access Point
Model No.	:	ZR-101AA
Serial No.	:	91002
Power	:	AC120V/60Hz
Mode	:	Transmitting(2412MHz)
Remarks	:	
Date	:	7/4/2003
Phase	:	Single Phase
Temperature	:	24 ℃
Humidity	:	63 %
Regulation 1	:	FCC Part15C §15.207.(CISPR Pub.22)
Regulation 2	:	None

Engineer : Ichiro Isozaki



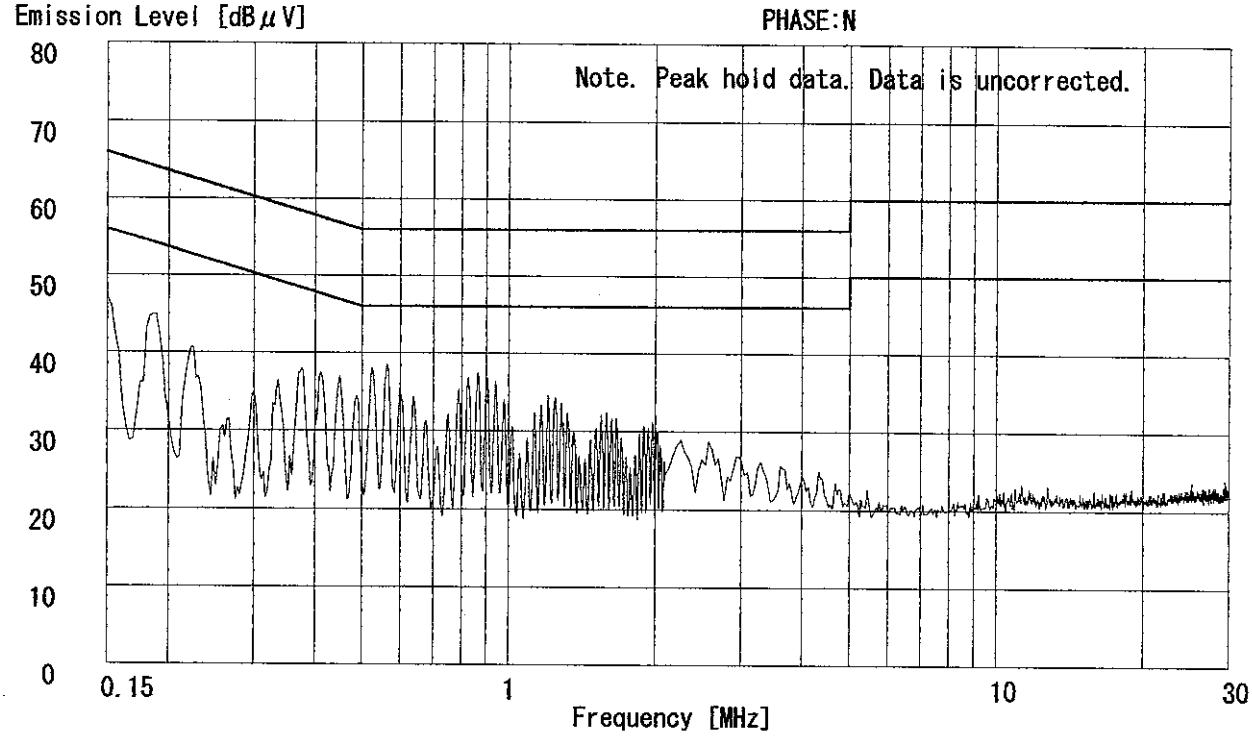


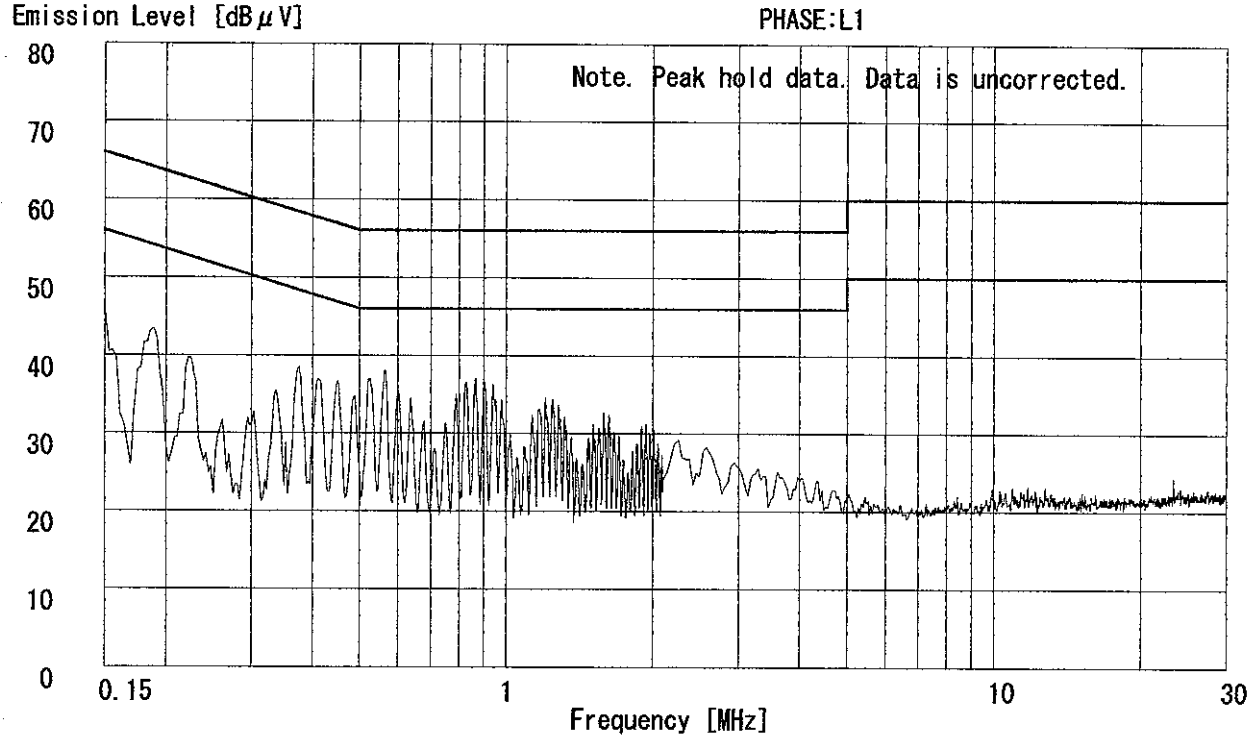
DATA OF CONDUCTION TEST CHART

UL Apex Co., Ltd.
Yamakita No.1 Shielded Room
Report No.: 23KE0041-YK ⇨ 2

Applicant	:	NIHON KOHDEN CORPORATION
Kind of Equipment	:	Access Point
Model No.	:	ZR-101AA
Serial No.	:	91002
Power	:	AC120V/60Hz
Mode	:	Transmitting(2437MHz)
Remarks	:	
Date	:	7/4/2003
Phase	:	Single Phase
Temperature	:	24 ℃
Humidity	:	63 %
Regulation 1	:	FCC Part15C §15.207.(CISPR Pub.22)
Regulation 2	:	None

Engineer : Ichiro Isozaki



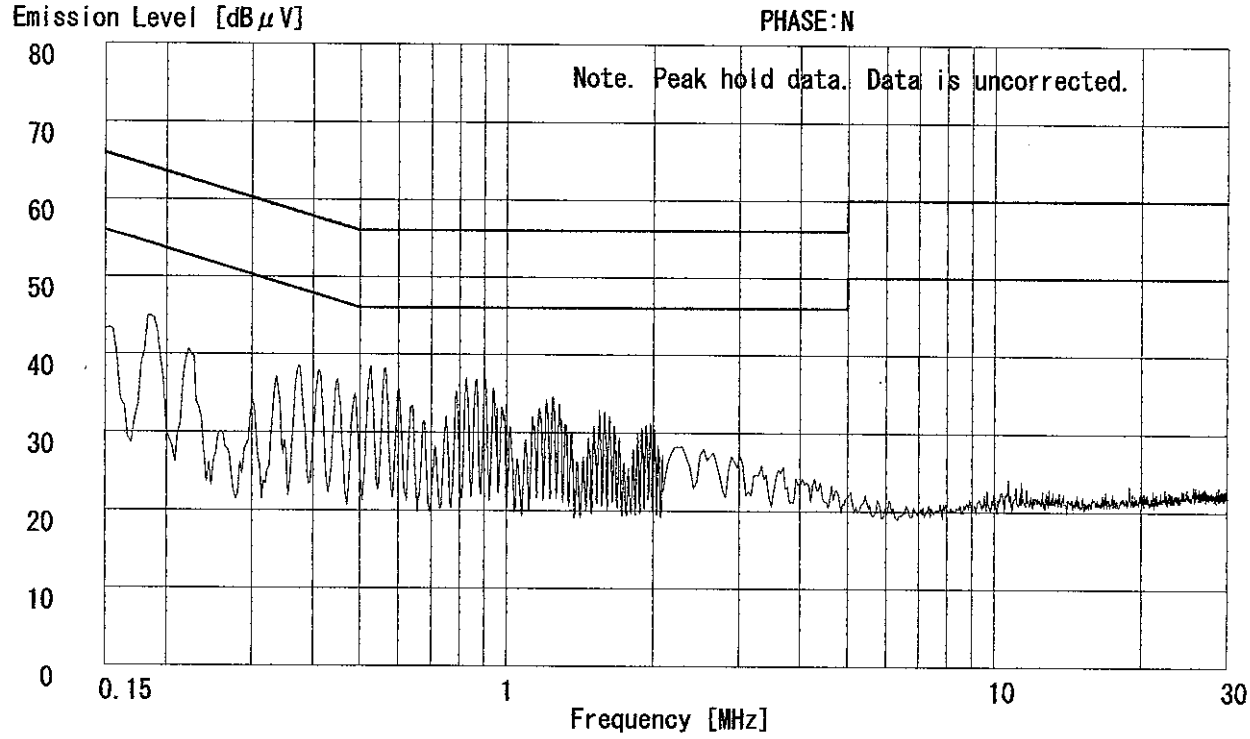


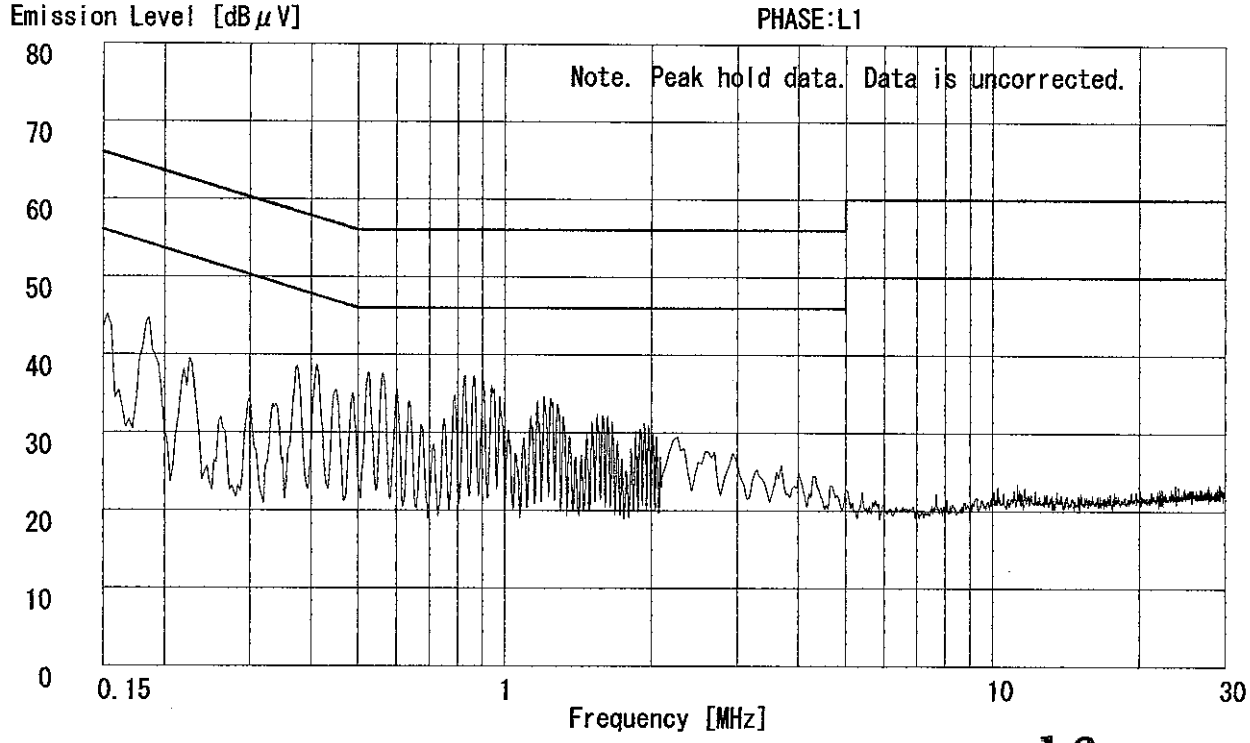
DATA OF CONDUCTION TEST CHART

UL Apex Co., Ltd.
Yamakita No.1 Shielded Room
Report No.: 23KE0041-YK-2

Applicant	:	NIHON KOHDEN CORPORATION
Kind of Equipment	:	Access Point
Model No.	:	ZR-101AA
Serial No.	:	91002
Power	:	AC120V/60Hz
Mode	:	Transmitting(2462MHz)
Remarks	:	
Date	:	7/4/2003
Phase	:	Single Phase
Temperature	:	24 ℃
Humidity	:	63 %
Regulation 1	:	FCC Part15C §15.207.(CISPR Pub.22)
Regulation 2	:	None

Engineer : Ichiro Isozaki

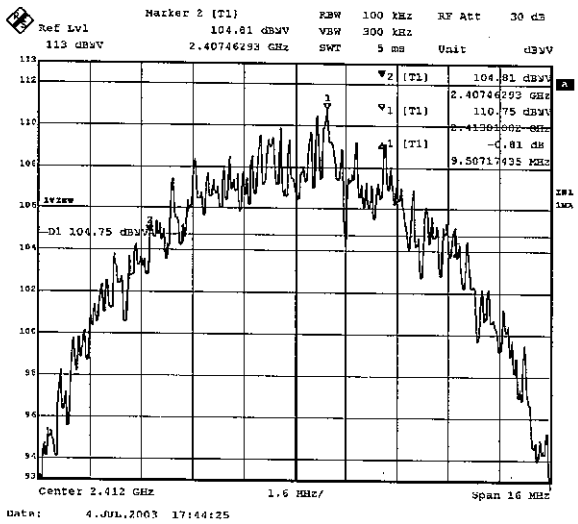




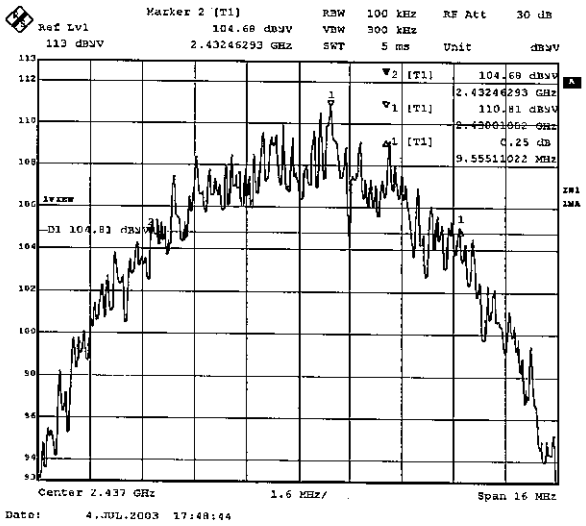
6dB Bandwidth: FCC 15.247(a)

O. Isozaki

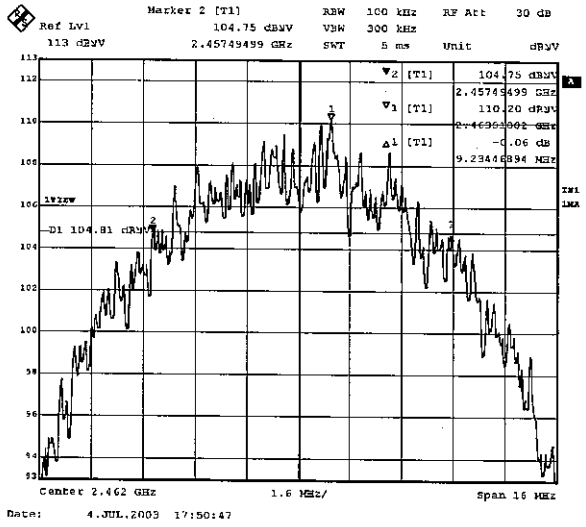
1. Ch Low:2412MHz



2. Ch Mid:2437MHz



3. Ch High:2462MHz



Peak Out Put Power(Conducted)

UL Apex Co., Ltd.
YAMAKITA EMC NO.1 OPEN SITE

COMPANY : NIHON KOHDEN CORPORATION
EQUIPMENT : Access Point
MODEL : ZR-101AA
FCC ID :B6BZR-101AA
POWER : AC120V/60Hz
Mode : Transmitting

REPORT NO : 23KE0041-YK-2
REGULATION : Fcc Part15SubpartC 247(b)
DATE : 2003/ 07/04
Temp./Humi. : 24℃/59%

ENGINEER : Ichiro Isozaki

CH	FREQ [MHz]	PM Reading [dBm]	Cable Loss [dB]	Results [dBm]	Limit (1W) [dBm]	MARGIN [dB]
Low	2412.00	16.59	0.35	16.94	30.0	13.06
Mid	2437.00	16.28	0.35	16.63	30.0	13.37
High	2462.00	16.20	0.35	16.55	30.0	13.45

DATA OF RADIATION TEST

UL Apex Co., Ltd.
Yamakita No.1 Open Test Site
Report No. : 23KE0041-YK-2

Applicant	:	NIHON KOHDEN CORPORATION
Kind of Equipment	:	Access Point
Model No.	:	ZR-101AA
Serial No.	:	91002
Power	:	AC120V/60Hz
Mode	:	Transmitting(2412MHz)
Remarks	:	
Date	:	6/30/2003
Test Distance	:	3 m
Temperature	:	24 ℃
Humidity	:	56 %
Regulation	:	FCC Part15C §15.209

Engineer : Takahiro Suzuki

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.	54.01	BB	23.6	31.3	10.2	28.6	1.8	6.0	13.0	20.7	40.0	27.0	19.3
2.	100.00	BB	28.2	27.3	10.2	28.4	2.6	6.1	18.7	17.8	43.5	24.8	25.7
3.	203.72	BB	20.4	20.7	16.5	28.1	3.7	6.1	18.6	18.9	43.5	24.9	24.6
4.	402.68	BB	24.1	28.3	17.4	28.5	5.5	6.1	24.6	28.8	46.0	21.4	17.2
5.	456.01	BB	21.1	21.2	17.8	29.1	5.9	6.1	21.8	21.9	46.0	24.2	24.1
6.	712.10	BB	21.3	21.3	20.4	29.2	7.7	6.1	26.3	26.3	46.0	19.7	19.7

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

■ANTENNA:KBA-03(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.: 23KE0041-YK-2

Applicant	: NIHON KOHDEN CORPORATION
Kind of Equipment	: Access Point
Model No.	: ZR-101AA
Serial No.	: 91002
Power	: AC120V/60Hz
Mode	: Transmitting(2437MHz)
Remarks	:
Date	: 6/30/2003
Test Distance	: 3 m
Temperature	: 24 ℃
Humidity	: 56 %
Regulation	: FCC Part15C §15.209

Engineer : Takahiro Suzuki

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.	54.01	BB	21.9	30.9	10.2	28.6	1.8	6.0	11.3	20.3	40.0	28.7	19.7
2.	100.00	BB	27.5	26.4	10.2	28.4	2.6	6.1	18.0	16.9	43.5	25.5	26.6
3.	203.72	BB	20.3	20.4	16.5	28.1	3.7	6.1	18.5	18.6	43.5	25.0	24.9
4.	402.68	BB	24.2	28.2	17.4	28.5	5.5	6.1	24.7	28.7	46.0	21.3	17.3
5.	456.01	BB	21.2	21.3	17.8	29.1	5.9	6.1	21.9	22.0	46.0	24.1	24.0
6.	712.10	BB	21.1	21.2	20.4	29.2	7.7	6.1	26.1	26.2	46.0	19.9	19.8

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

■ANTENNA:KBA-03(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. : 23KE0041-YK-2

Applicant	: NIHON KOHDEN CORPORATION
Kind of Equipment	: Access Point
Model No.	: ZR-101AA
Serial No.	: 91002
Power	: AC120V/60Hz
Mode	: Transmitting(2462MHz)
Remarks	:
Date	: 6/30/2003
Test Distance	: 3 m
Temperature	: 24 ℃
Humidity	: 56 %
Regulation	: FCC Part15C §15.209

Engineer : Takahiro Suzuki

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.	54.01	BB	22.7	27.2	10.2	28.6	1.8	6.0	12.1	16.6	40.0	27.9	23.4
2.	100.00	BB	27.3	26.8	10.2	28.4	2.6	6.1	17.8	17.3	43.5	25.7	26.2
3.	203.72	BB	20.3	20.2	16.5	28.1	3.7	6.1	18.5	18.4	43.5	25.0	25.1
4.	402.68	BB	23.8	27.6	17.4	28.5	5.5	6.1	24.3	28.1	46.0	21.7	17.9
5.	456.01	BB	21.3	21.2	17.8	29.1	5.9	6.1	22.0	21.9	46.0	24.0	24.1
6.	712.10	BB	21.2	21.4	20.4	29.2	7.7	6.1	26.2	26.4	46.0	19.8	19.6

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

■ANTENNA:KBA-03(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.: 23KE0041-YK-2

Applicant	: NIHON KOHDEN CORPORATION
Kind of Equipment	: Access Point
Model No.	: ZR-101AA
Serial No.	: 91002
Power	: AC120V/60Hz
Mode	: Transmitting(2412MHz)
Remarks	:
Date	: 6/30/2003
Test Distance	: 3 m
Temperature	: 24 ℃
Humidity	: 56 %
Regulation	: FCC Part15C §15.209(AV Detection)

Engineer : Takahiro Suzuki

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.	2390.00	BB	34.1	34.1	30.6	36.9	4.1	10.0	41.9	41.9	54.0	12.1	12.1
2.	4076.00	BB	32.9	31.9	33.0	36.2	5.4	0.7	35.8	34.8	54.0	18.2	19.2
3.	4824.00	BB	30.8	31.8	34.7	35.2	5.6	0.6	36.5	37.5	54.0	17.5	16.5
4.	7236.00	BB	29.3	29.3	37.7	36.8	6.5	0.5	37.2	37.2	54.0	16.8	16.8
5.	9648.00	BB	28.2	28.2	39.0	36.9	7.2	0.5	38.0	38.0	54.0	16.0	16.0
6.	12060.00	BB	28.3	28.3	42.1	36.3	8.1	0.5	42.7	42.7	54.0	11.3	11.3
7.	14472.00	BB	27.8	27.6	41.2	35.2	7.3	0.2	41.3	41.1	54.0	12.7	12.9
8.	16884.00	BB	27.7	27.8	41.6	35.0	8.8	0.5	43.6	43.7	54.0	10.4	10.3
9.	19296.00	BB	26.3	26.3	39.1	34.7	9.4	0.0	40.1	40.1	54.0	13.9	13.9
10.	21708.00	BB	27.7	27.8	39.2	34.3	9.9	0.0	42.5	42.6	54.0	11.5	11.4
11.	24120.00	BB	26.6	26.6	40.3	35.5	10.9	0.0	42.3	42.3	54.0	11.7	11.7

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

■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■AMP:KAF-02(8449B) ■RECEIVER:KTR-01(ESI40) ■CABLE:KCC-D3/D7

DATA OF RADIATION TEST

UL Apex Co., Ltd.
Yamakita No.1 Open Test Site
Report No.: 23KE0041-YK-2

Applicant	: NIHON KOHDEN CORPORATION
Kind of Equipment	: Access Point
Model No.	: ZR-101AA
Serial No.	: 91002
Power	: AC120V/60Hz
Mode	: Transmitting(2412MHz)
Remarks	:
Date	: 6/30/2003
Test Distance	: 3 m
Temperature	: 24 ℃
Humidity	: 56 %
Regulation	: FCC Part15C §15.209(PK Detection)

Engineer : Takahiro Suzuki

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.	2390.00	BB	45.8	46.3	30.6	36.9	4.1	10.0	53.6	54.1	74.0	20.4	19.9
2.	4076.00	BB	44.3	45.0	33.0	36.2	5.4	0.7	47.2	47.9	74.0	26.8	26.1
3.	4824.00	BB	44.6	46.7	34.7	35.2	5.6	0.6	50.3	52.4	74.0	23.7	21.6
4.	7236.00	BB	42.3	42.6	37.7	36.8	6.5	0.5	50.2	50.5	74.0	23.8	23.5
5.	9648.00	BB	40.9	40.8	39.0	36.9	7.2	0.5	50.7	50.6	74.0	23.3	23.4
6.	12060.00	BB	41.2	41.4	42.1	36.3	8.1	0.5	55.6	55.8	74.0	18.4	18.2
7.	14472.00	BB	40.2	40.1	41.2	35.2	7.3	0.2	53.7	53.6	74.0	20.3	20.4
8.	16884.00	BB	41.3	40.6	41.6	35.0	8.8	0.5	57.2	56.5	74.0	16.8	17.5
9.	19296.00	BB	39.5	39.8	39.1	34.7	9.4	0.0	53.3	53.6	74.0	20.7	20.4
10.	21708.00	BB	40.5	40.6	39.2	34.3	9.9	0.0	55.3	55.4	74.0	18.7	18.6
11.	24120.00	BB	39.5	39.8	40.3	35.5	10.9	0.0	55.2	55.5	74.0	18.8	18.5

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

■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■AMP:KAF-02(8449B) ■RECEIVER:KTR-01(ESI40) ■CABLE:KCC-D3/D7

DATA OF RADIATION TEST

UL Apex Co., Ltd.
Yamakita No.1 Open Test Site
Report No.: 23KE0041-YK-2

Applicant	:	NIHON KOHDEN CORPORATION
Kind of Equipment	:	Access Point
Model No.	:	ZR-101AA
Serial No.	:	91002
Power	:	AC120V/60Hz
Mode	:	Transmitting(2437MHz)
Remarks	:	
Date	:	6/30/2003
Test Distance	:	3 m
Temperature	:	24 ℃
Humidity	:	56 %
Regulation	:	FCC Part15C §15.209(AV Detection)

Engineer : Takahiro Suzuki

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.	4126.00	BB	48.0	36.4	32.9	36.1	5.5	0.7	51.0	39.4	54.0	3.0	14.6
2.	4874.00	BB	31.3	32.2	35.0	35.2	5.6	0.6	37.3	38.2	54.0	16.7	15.8
3.	7311.00	BB	29.3	29.2	37.8	36.8	6.6	0.5	37.4	37.3	54.0	16.6	16.7
4.	9748.00	BB	28.3	28.2	39.0	37.0	7.2	0.6	38.1	38.0	54.0	15.9	16.0
5.	12185.00	BB	28.3	28.3	42.3	36.1	8.1	0.4	43.0	43.0	54.0	11.0	11.0
6.	14622.00	BB	27.6	27.6	41.7	35.2	7.7	0.3	42.1	42.1	54.0	11.9	11.9
7.	17059.00	BB	27.4	27.4	41.7	34.9	8.7	0.5	43.4	43.4	54.0	10.6	10.6
8.	19496.00	BB	26.3	26.3	39.0	34.7	9.5	0.0	40.1	40.1	54.0	13.9	13.9
9.	21933.00	BB	28.5	28.2	39.3	33.6	10.2	0.0	44.4	44.1	54.0	9.6	9.9
10.	24370.00	BB	26.9	26.5	40.4	36.3	10.8	0.0	41.8	41.4	54.0	12.2	12.6

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

■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■CABLE:KCC-D3/D7■PREAMP:KAF-02(8449B)■EMI RECEIVER:KTR-01(ESI40)

DATA OF RADIATION TEST

UL Apex Co., Ltd.
Yamakita No.1 Open Test Site
Report No. : 23KE0041-YK-2

Applicant	:	NIHON KOHDEN CORPORATION
Kind of Equipment	:	Access Point
Model No.	:	ZR-101AA
Serial No.	:	91002
Power	:	AC120V/60Hz
Mode	:	Transmitting(2437MHz)
Remarks	:	
Date	:	6/30/2003
Test Distance	:	3 m
Temperature	:	24 ℃
Humidity	:	56 %
Regulation	:	FCC Part15C §15.209(PK Detection)

Engineer : Takahiro Suzuki

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.	4126.00	BB	52.2	46.2	32.9	36.1	5.5	0.7	55.2	49.2	74.0	18.8	24.8
2.	4874.00	BB	44.6	45.3	35.0	35.2	5.6	0.6	50.6	51.3	74.0	23.4	22.7
3.	7311.00	BB	42.9	42.1	37.8	36.8	6.6	0.5	51.0	50.2	74.0	23.0	23.8
4.	9748.00	BB	40.8	41.9	39.0	37.0	7.2	0.6	50.6	51.7	74.0	23.4	22.3
5.	12185.00	BB	41.3	41.4	42.3	36.1	8.1	0.4	56.0	56.1	74.0	18.0	17.9
6.	14622.00	BB	40.9	40.7	41.7	35.2	7.7	0.3	55.4	55.2	74.0	18.6	18.8
7.	17059.00	BB	41.2	39.8	41.7	34.9	8.7	0.5	57.2	55.8	74.0	16.8	18.2
8.	19496.00	BB	39.7	39.3	39.0	34.7	9.5	0.0	53.5	53.1	74.0	20.5	20.9
9.	21933.00	BB	41.5	40.9	39.3	33.6	10.2	0.0	57.4	56.8	74.0	16.6	17.2
10.	24370.00	BB	39.8	40.1	40.4	36.3	10.8	0.0	54.7	55.0	74.0	19.3	19.0

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

■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■CABLE:KCC-D3/D7■PREAMP:KAF-02(8449B)■EMI RECEIVER:KTR-01(ESI40)

DATA OF RADIATION TEST

UL Apex Co., Ltd.
Yamakita No.1 Open Test Site
Report No.: 23KE0041-YK-2

Applicant	: NIHON KOHDEN CORPORATION
Kind of Equipment	: Access Point
Model No.	: ZR-101AA
Serial No.	: 91002
Power	: AC120V/60Hz
Mode	: Transmitting(2462MHz)
Remarks	:
Date	: 6/30/2003
Test Distance	: 3 m
Temperature	: 24 ℃
Humidity	: 56 %
Regulation	: FCC Part15C §15.209(AV Detection)

Engineer : Takahiro Suzuki

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.	2483.50	BB	41.3	42.5	30.6	36.9	4.1	10.0	49.1	50.3	54.0	4.9	3.7
2.	2484.00	BB	42.1	43.6	30.6	36.9	4.1	10.0	49.9	51.4	54.0	4.1	2.6
3.	4176.00	BB	50.1	35.3	32.9	36.0	5.5	0.7	53.2	38.4	54.0	0.8	15.6
4.	4924.00	BB	46.8	32.7	35.3	35.2	5.6	0.5	53.0	38.9	54.0	1.0	15.1
5.	7386.00	BB	29.3	29.3	37.9	36.9	6.6	0.5	37.4	37.4	54.0	16.6	16.6
6.	9848.00	BB	28.3	28.3	39.0	37.0	7.2	0.7	38.2	38.2	54.0	15.8	15.8
7.	12310.00	BB	28.4	28.4	42.5	35.9	8.1	0.4	43.5	43.5	54.0	10.5	10.5
8.	14772.00	BB	27.7	27.7	42.2	35.1	8.1	0.4	43.3	43.3	54.0	10.7	10.7
9.	17234.00	BB	26.7	26.7	42.3	34.8	8.5	0.6	43.3	43.3	54.0	10.7	10.7
10.	19696.00	BB	26.6	26.5	39.5	35.0	9.6	0.0	40.7	40.6	54.0	13.3	13.4
11.	22158.00	BB	27.9	27.9	39.2	33.7	10.3	0.0	43.7	43.7	54.0	10.3	10.3
12.	24620.00	BB	27.1	27.0	40.4	36.0	10.9	0.0	42.4	42.3	54.0	11.6	11.7

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

■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■CABLE:KCC-D3/D7■PREAMP:KAF-02(8449B)■EMI RECEIVER:KTR-01(ESI40)

DATA OF RADIATION TEST

UL Apex Co., Ltd.
Yamakita No.1 Open Test Site
Report No.: 23KE0041-YK-2

Applicant	:	NIHON KOHDEN CORPORATION
Kind of Equipment	:	Access Point
Model No.	:	ZR-101AA
Serial No.	:	91002
Power	:	AC120V/60Hz
Mode	:	Transmitting(2462MHz)
Remarks	:	
Date	:	6/30/2003
Test Distance	:	3 m
Temperature	:	24 ℃
Humidity	:	56 %
Regulation	:	FCC Part15C §15.209(PK Detection)

Engineer : Takahiro Suzuki

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.	2483.50	BB	51.7	52.9	30.6	36.9	4.1	10.0	59.5	60.7	74.0	14.5	13.3
2.	2484.00	BB	52.2	55.0	30.6	36.9	4.1	10.0	60.0	62.8	74.0	14.0	11.2
3.	4176.00	BB	53.3	45.1	32.9	36.0	5.5	0.7	56.4	48.2	74.0	17.6	25.8
4.	4924.00	BB	60.6	47.1	35.3	35.2	5.6	0.5	66.8	53.3	74.0	7.2	20.7
5.	7386.00	BB	42.1	42.6	37.9	36.9	6.6	0.5	50.2	50.7	74.0	23.8	23.3
6.	9848.00	BB	41.5	41.6	39.0	37.0	7.2	0.7	51.4	51.5	74.0	22.6	22.5
7.	12310.00	BB	41.4	41.1	42.5	35.9	8.1	0.4	56.5	56.2	74.0	17.5	17.8
8.	14772.00	BB	40.8	41.4	42.2	35.1	8.1	0.4	56.4	57.0	74.0	17.6	17.0
9.	17234.00	BB	39.3	39.8	42.3	34.8	8.5	0.6	55.9	56.4	74.0	18.1	17.6
10.	19696.00	BB	39.6	39.2	39.5	35.0	9.6	0.0	53.7	53.3	74.0	20.3	20.7
11.	22158.00	BB	40.7	40.3	39.2	33.7	10.3	0.0	56.5	56.1	74.0	17.5	17.9
12.	24620.00	BB	40.8	40.2	40.4	36.0	10.9	0.0	56.1	55.5	74.0	17.9	18.5

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

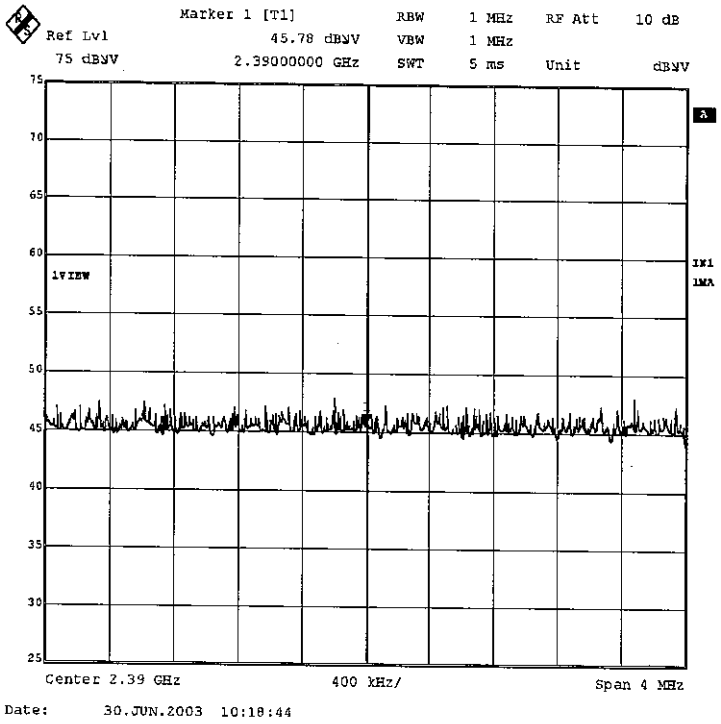
■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■CABLE:KCC-D3/D7■PREAMP:KAF-02(8449B)■EMI RECEIVER:KTR-01(ESI40)

Restricted band edges: FCC 15.247(c)

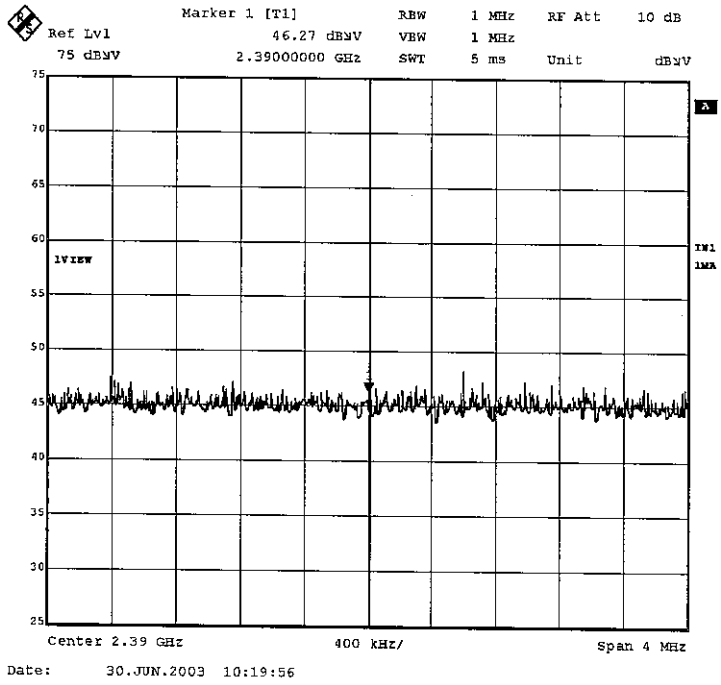
T. Nazu L.

2.39GHz (Ch 1:2412MHz)

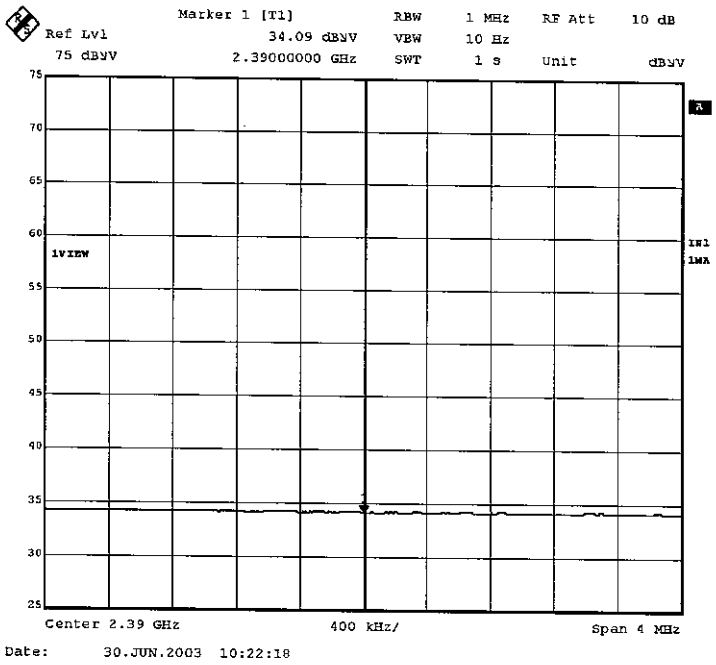
1. Horizontal/ PK



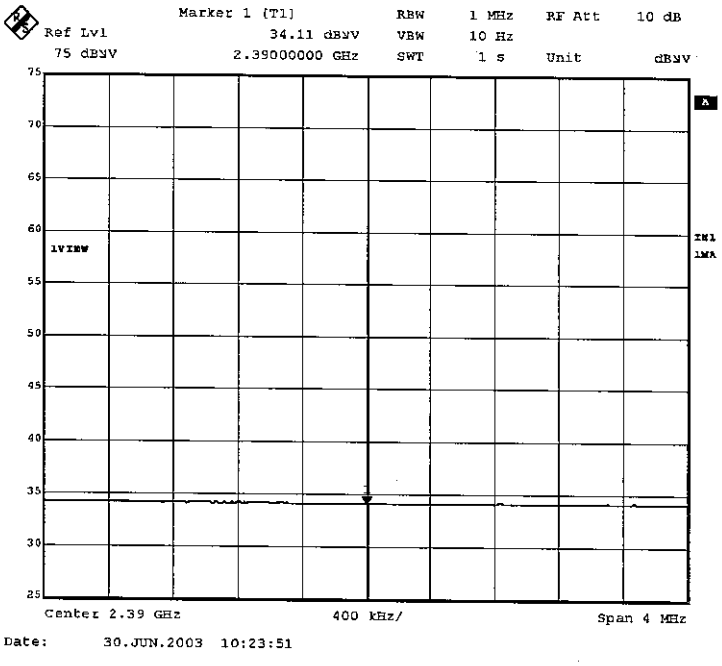
2. Vertical/ PK



3. Horizontal/ AV



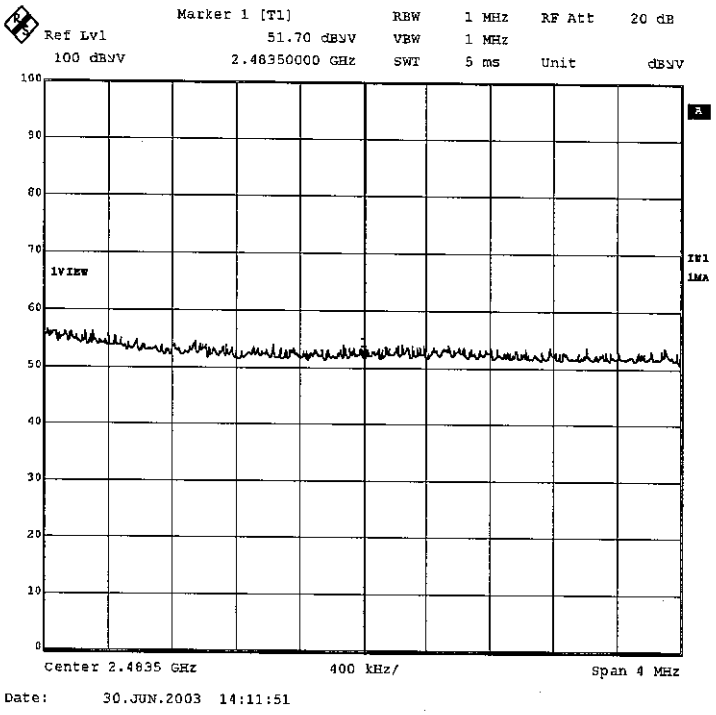
4. Vertical/ AV



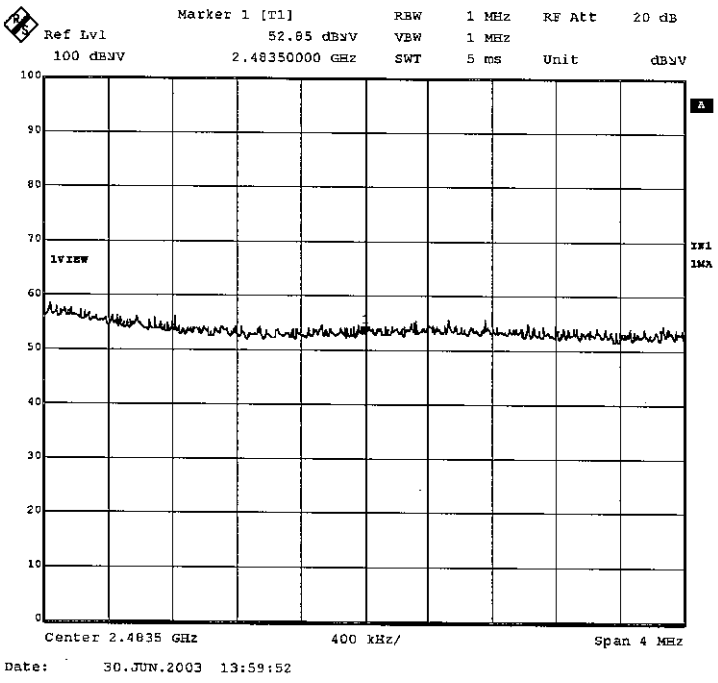
Restricted band edges: FCC 15.247(c)

2.4835GHz (Ch 11:2462MHz)

1. Horizontal/ PK

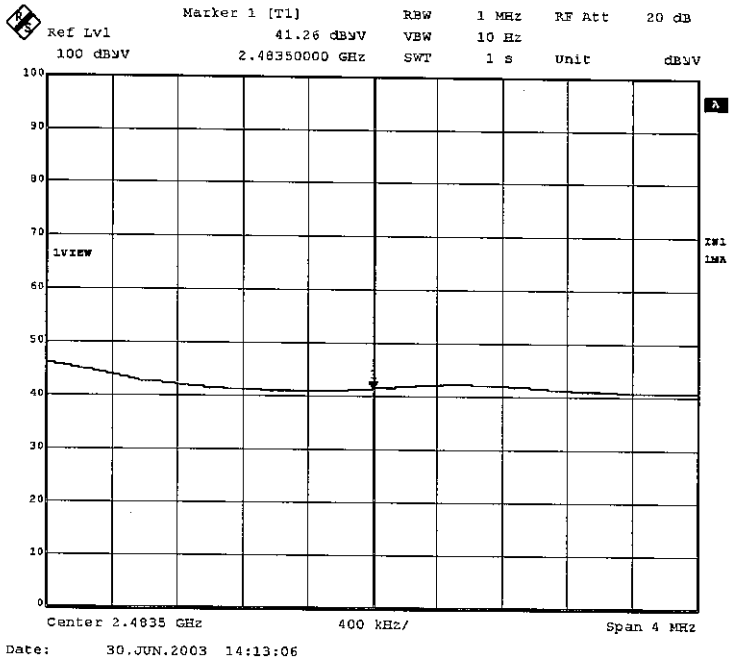


2. Vertical/ PK

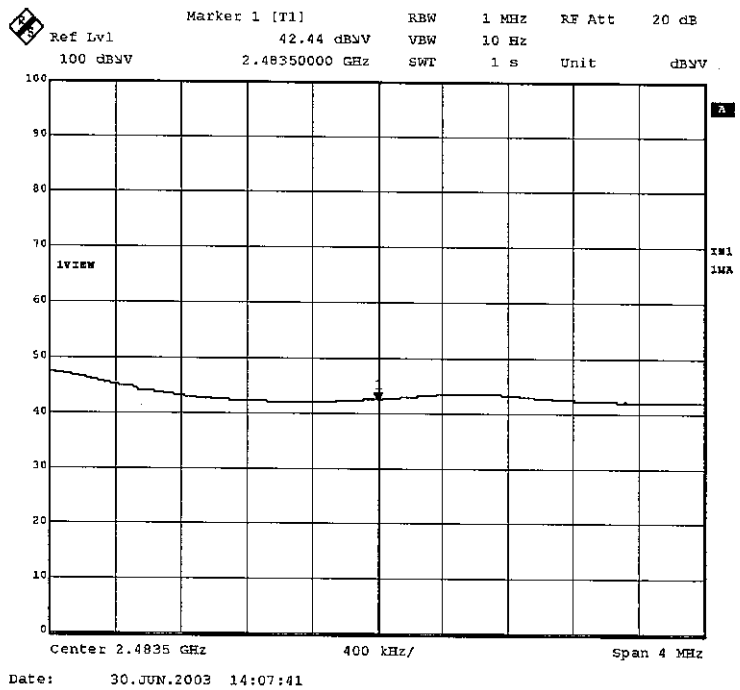


T. Sato

3. Horizontal/ AV



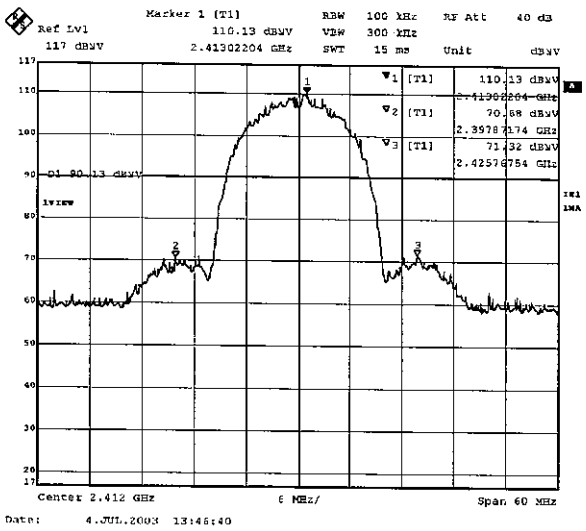
4. Vertical/ AV



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

Ch 1: 2412MHz

1.



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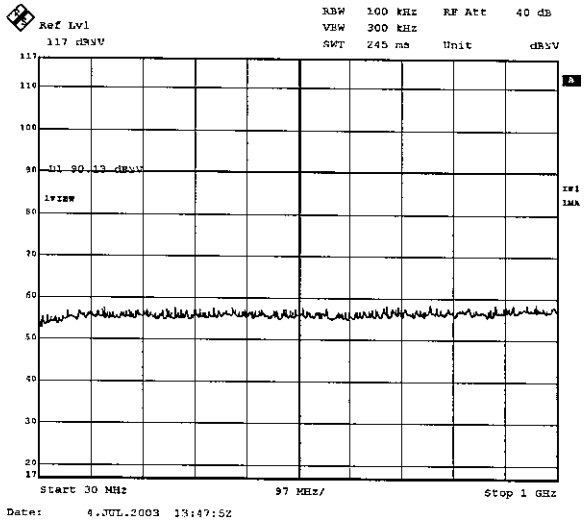

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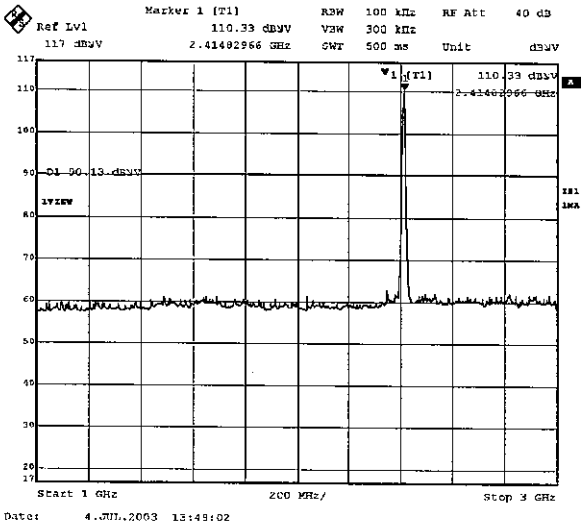

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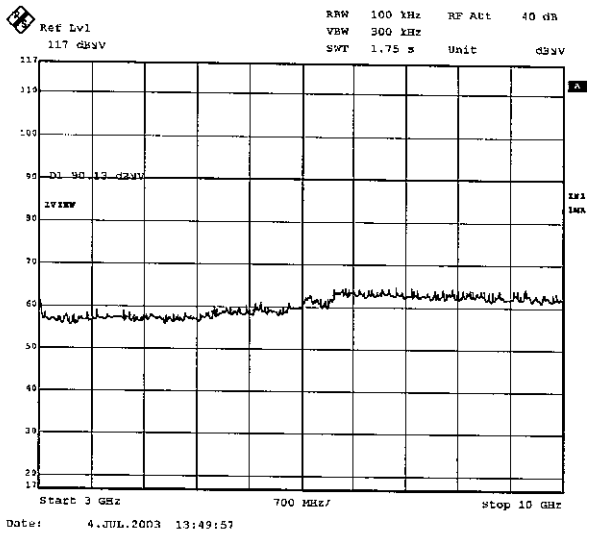
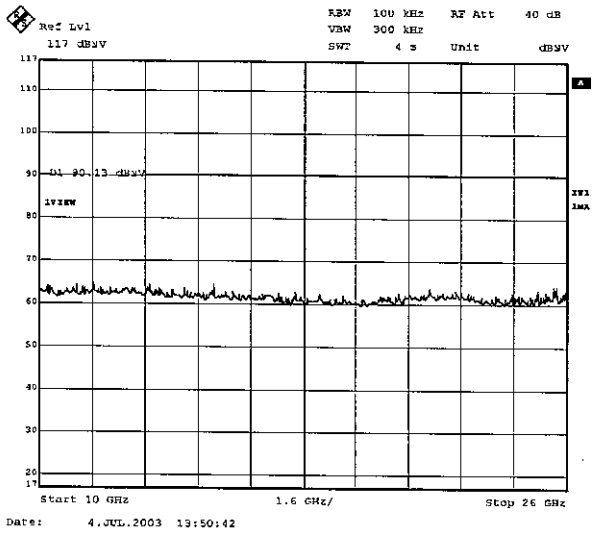

Ref Lvl
117 dBµV
RBW 100 kHz
VBW 300 kHz
SWT 1.75 s
RF Att 40 dB
Unit dBµV
D1 90.13 dBµV
1VIEW
Start 3 GHz
700 MHz/
Stop 10 GHz
Date: 4.JUL.2003 13:49:57

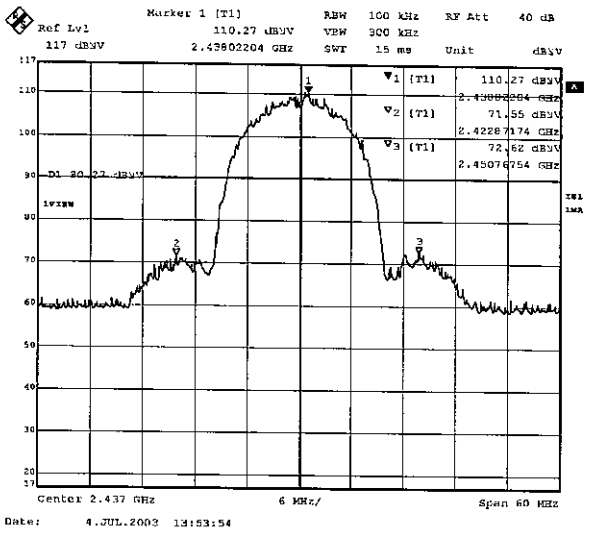
5.


Ref Lvl
117 dBµV
RBW 100 kHz
VBW 300 kHz
SWT 4 s
RF Att 40 dB
Unit dBµV
D1 90.13 dBµV
1VIEW
Start 10 GHz
1.6 GHz/
Stop 26 GHz
Date: 4.JUL.2003 13:50:42

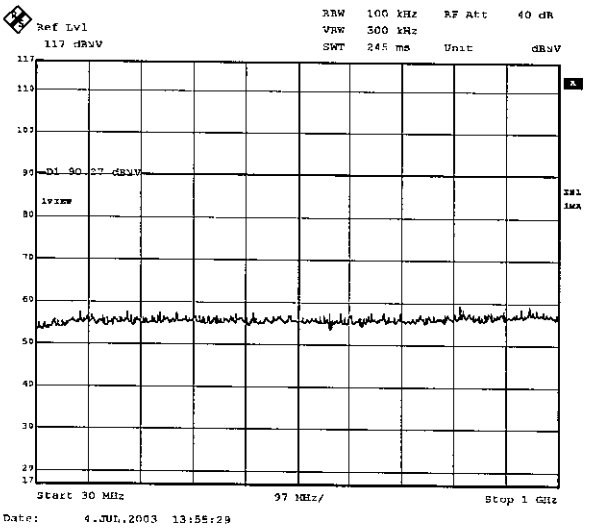
Out of Band Emissions (Conducted): FCC 15.247(c)

Ch 6: 2437MHz

1.



2.



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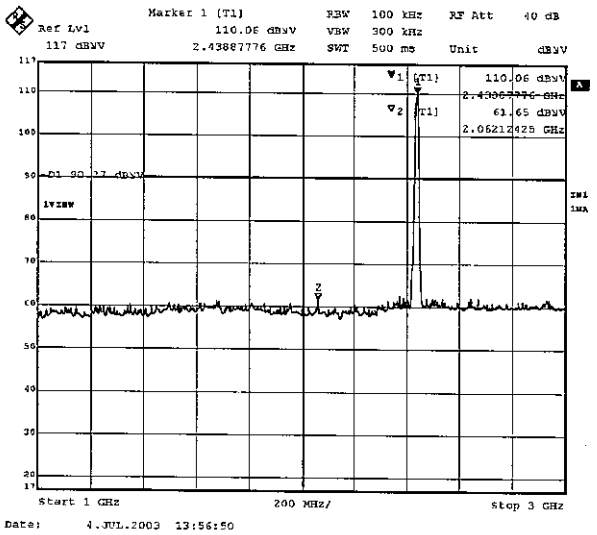
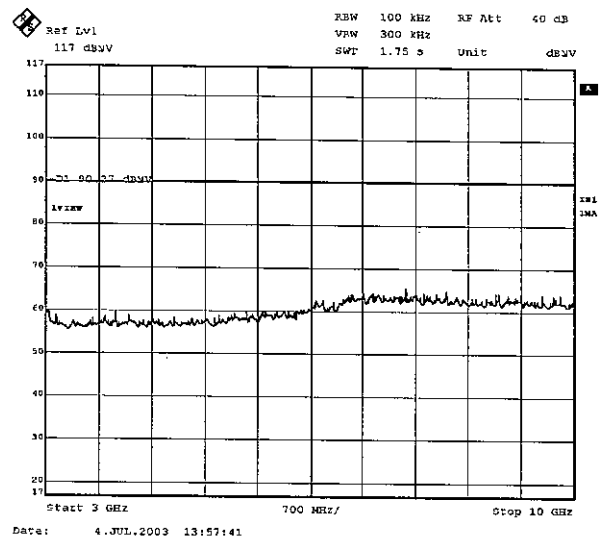
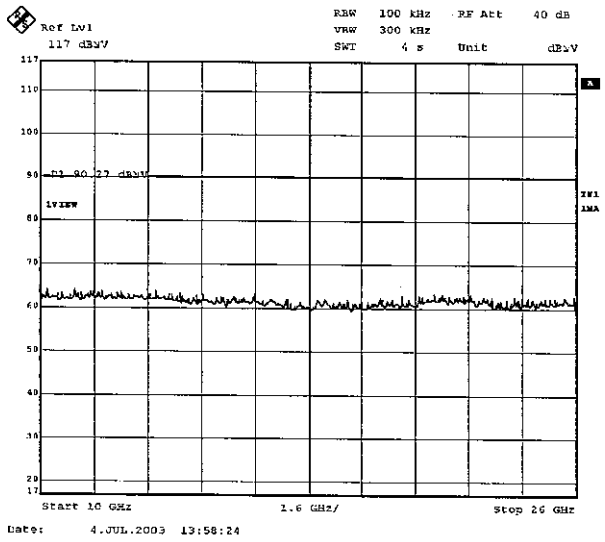


4.


RBW 100 kHz
VBW 300 kHz
SWT 1.75 s
RF Att 40 dB
Unit dBµV
Ref Lvl
117 dBµV
Start 3 GHz
700 MHz/
Stop 10 GHz
Date: 4.JUL.2003 13:57:41

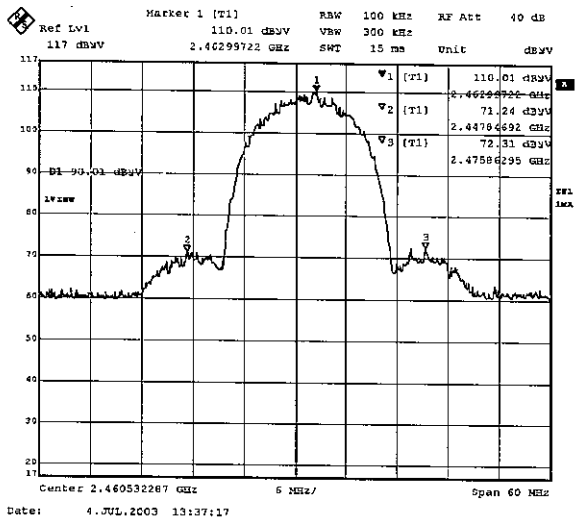
5.


RBW 100 kHz
VBW 300 kHz
SWT 4 s
RF Att 40 dB
Unit dBµV
Ref Lvl
117 dBµV
Start 10 GHz
1.6 GHz/
Stop 26 GHz
Date: 4.JUL.2003 13:58:24

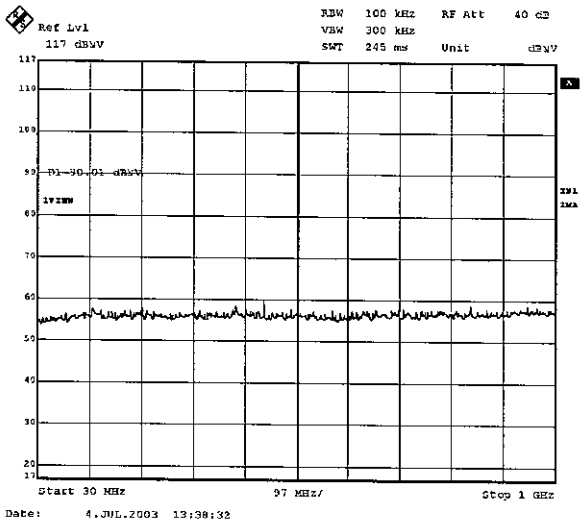
Out of Band Emissions (Conducted): FCC 15.247(c)

Ch 11: 2462MHz

1.



2.



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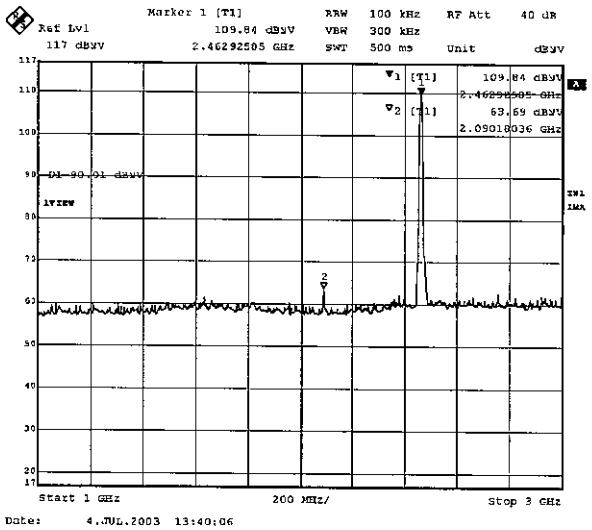
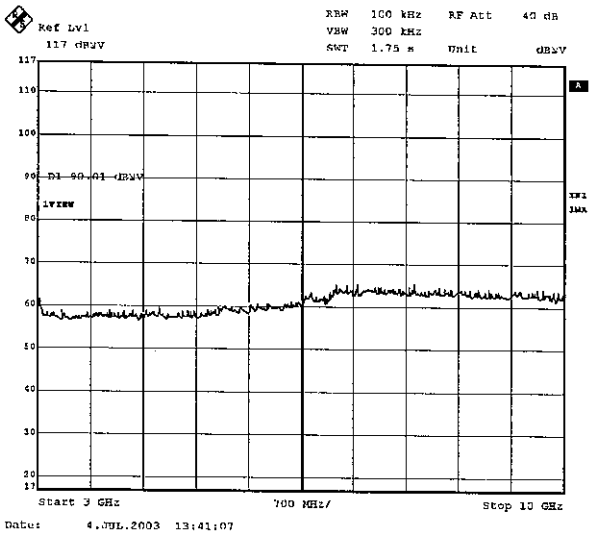
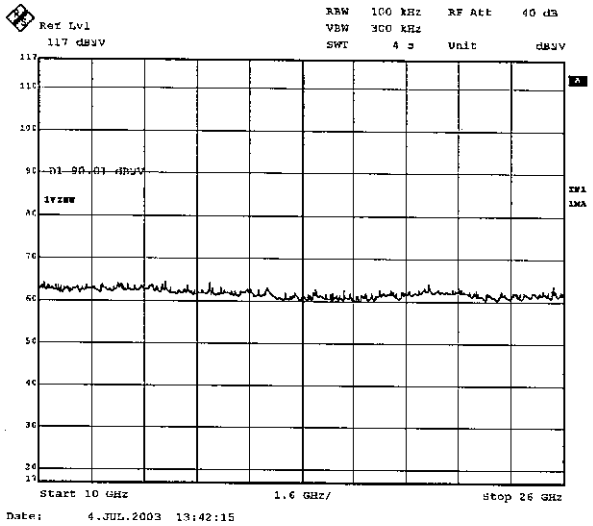


4.


Ref Lvl
117 dBµV
RBW 100 kHz
VBW 300 kHz
SWT 1.75 s
RF Att 40 dB
Unit dBµV
D1 90.01 dBµV
1VIEW
Start 3 GHz
700 MHz/
Stop 10 GHz
Date: 4.JUL.2003 13:41:07

5.


Ref Lvl
117 dBµV
RBW 100 kHz
VBW 300 kHz
SWT 4 s
RF Att 40 dB
Unit dBµV
D1 90.01 dBµV
1VIEW
Start 10 GHz
1.6 GHz/
Stop 26 GHz
Date: 4.JUL.2003 13:42:15

Power Density(Conducted)

UL Apex Co., Ltd.
YAMAKITA EMC NO.1 OPEN SITE

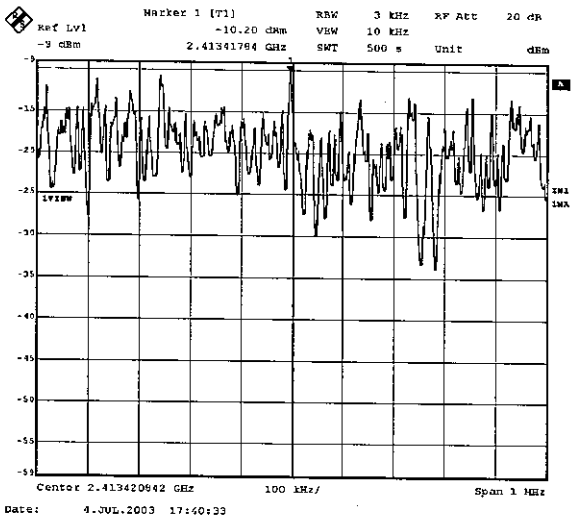
COMPANY : NIHON KOHDEN CORPORAION
EQUIPMENT : Access Point
MODEL : ZR-101AA
FCC ID :B6BZR-101AA
POWER : AC120V/60Hz
Mode : Transmitting

REPORT NO : 23KE0041-YK-2
REGULATION : Fcc Part15SubpartC 247(d)
DATE : 2003/ 07/04
Temp./Humi. : 24℃/59%

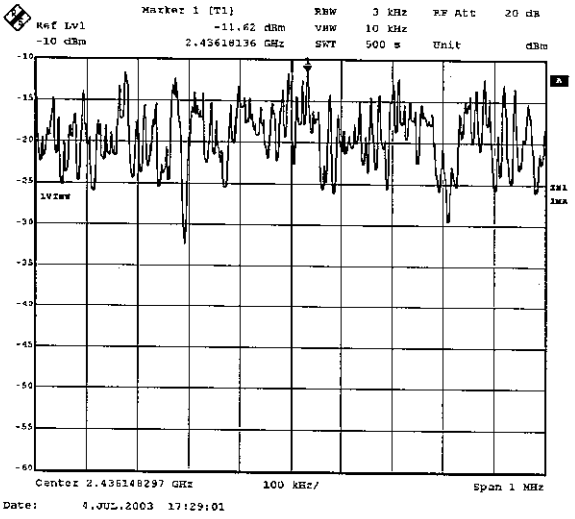
ENGINEER : Ichiro Isozaki

CH	FREQ [GHz]	S/A Reading [dBm]	Cable Loss [dB]	Results [dBm]	Limit [dBm]	MARGIN [dB]
Low	2.413418	-10.20	0.85	-9.35	8.0	17.4
Mid	2.436181	-11.62	0.85	-10.77	8.0	18.8
High	2.461181	-12.06	0.85	-11.21	8.0	19.2

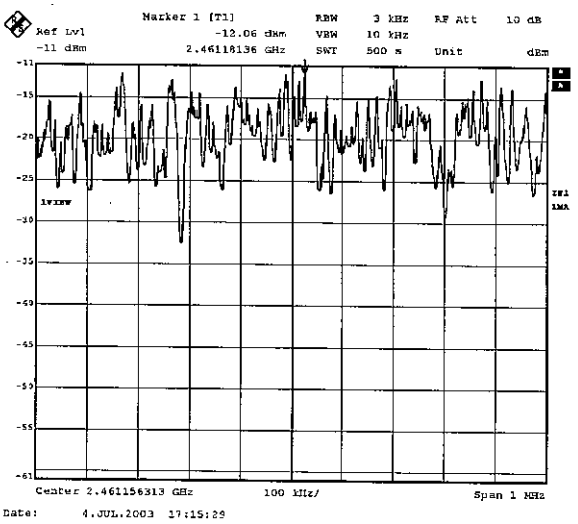
1. ch 1: 2412MHz



2. ch 6: 2437MHz



3. ch 11: 2462MHz



Test Report No : 23KE0041-YK-2

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	2002/08/17 * 12
KLS-01	LISN(AMN)	Schwarzbeck	NSLK8126	CE	2002/08/16 * 12
KSA-01	Spectrum Analyzer	Advantest	R3365	CE/RE	2003/06/09 * 12
KTR-02	Test Receiver	Rohde & Schwarz	ESCS30	CE/RE	2002/11/25 * 12
KTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE/AT	2002/07/22 * 12
KCC-D7	Coaxial Cable	Advantest	A01002	AT	2003/04/18 * 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	2002/08/03 * 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-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/02/06 * 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	2002/08/17 * 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	2002/07/14 * 12
KHA-03	Horn Antenna	EMCO	3160-09	RE	2003/04/23 * 12
KLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/02/19 * 12
KOTS-01	Open Test Site	JSE	30m	RE	2002/08/18 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item:

CE: Conducted emission test
RE: Radiated emission test
AT: Antenna terminal conducted test