



EMI TEST REPORT

Test Report No. : 23GE0033-YK

Applicant: FUKUDA DENSHI CO., LTD.
Type of Equipment: ECG, Respiration and SpO₂ Transmitter
Model No.: LX-5630
FCC ID: DV8LX5630
Test standard: FCC Part 95 Subpart H, Section 95.1115
(Except FCC 95.1115 (e) Frequency Stability)
FCC Part 2 Subpart J, Section 2.1049 and 2.1051
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:

EMI: April 25, June 4, 5 and 6, 2003

Tested by:

EMI:

T. Imamura
Toyokazu Imamura

Approved by:

O. Watatani
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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MF060b(23.04.02)

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1 GENERAL INFORMATION

Company Name : FUKUDA DENSHI CO., LTD.
Address : 2-35-8 Hongo, Bunkyo-ku, Tokyo, 113-8420 JAPAN
Telephone Number : +81 3 5684 1337
Facsimile Number : +81 3 5684 1321
Contact Person : Tamotsu Toya
Type of Equipment : ECG, Respiration and SpO2 Transmitter
Model Number : LX-5630
Serial Number : 2003020602
Rating : DC 3.0V, battery operation
Condition of EUT : Production prototype
Country of Manufacture : Japan
Receipt Date of Sample : April 10 and June 4, 2003
Regulation(s) : FCC Part95 Subpart H ,Section 95.1115
(Except FCC 95.1115(e) Frequency stability)
FCC Part2 Subpart J, Section 2.1049 and 2.1051
Test Site : UL Apex Yamakita EMC Lab. No.1 Open Test Site and No.4 Shielded Room

1.1 Tested Methodology

The measurement was performed according to the procedures in ANSI C63.4 (2001).

1.2 Test Facility

This site has been fully described in a report submitted to FCC office, and accepted on December 8, 2000.
(No.1 Open Test Site Registration No.: 99354)
NVLAP Lab. code : 200441-0

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2 PRODUCT DESCRIPTION

FUKUDA DENSHI CO., LTD., Model: LX-5630 (referred to as the EUT in this report) is an ECG, Respiration and SpO2 Transmitter.

Frequency Characteristics	: 608.0125MHz through 613.9875MHz
Reference for Carrier Frequency	: 608-614MHz
Reference For Carrier Frequency Fixed Crystal Oscillator TCXO	: 9.600MHz
No. of Channels and channel Spacing	: 445 channels/ 12.5kHz channel spacing
Modulation	: Digital Frequency Shift Keying
Antenna Type	: Integrated antenna
Antenna Gain	: 2.15dBi
Temperature Range	: 10 to 40 deg. C.
Power supply	: DC 3.0V, battery operation
ITU Emission Code(s)	: 8K50F1DAN
Clock for Gate Array	: 84kHz
Clock For CPU	: 4.000MHz

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3 SYSTEM TEST CONFIGURATION

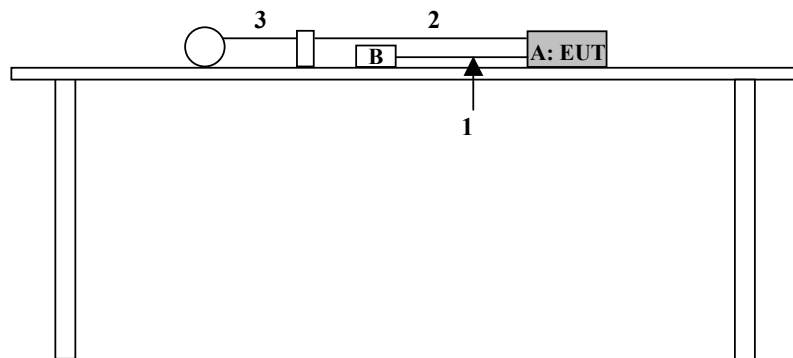
3.1 Justification

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

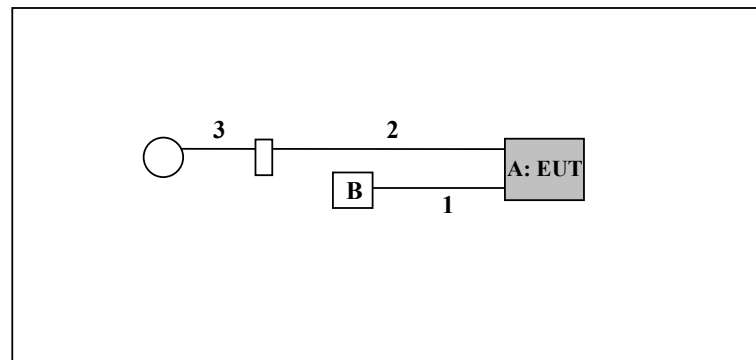
Test mode: Transmitting mode
The EUT transmits under constant modulation.

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	Remark	FCC ID
A	ECG, Respiration and SpO ₂ Transmitter	LX-5630	2003020602	FUKUDA DENSHI CO., LTD.	EUT.	DV8LX5630
B	Simulator PCB board	-	-	FUKUDA DENSHI CO., LTD.	Not EUT.	-

List of cables used

No.	Name	Model number	Length (m)	Shield	Backshell material	Remark
1	ECG cable	CM-85C	0.75	Shielded	Polyvinyl chloride	EUT.
2	SpO ₂ Interconnection cable	CI-128A	1.2	Shielded	Polyvinyl chloride	EUT.
3	SpO ₂ probe	SR-5C	0.26	Shielded	Polyvinyl chloride	EUT.

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4 MEASUREMENT UNCERTAINTY

Radiated emission test

The measurement uncertainty (with 95% confidence level) for this test using Biconical antenna is $\pm 4.8\text{dB}$.

The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is $\pm 5.2\text{dB}$.

The measurement uncertainty (with 95% confidence level) for this test using Horn antenna is $\pm 6.6\text{dB}$.

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

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5 SUMMARY OF TESTS

5.1 § 95.1115 (a) Filed Strength (Radiated)

Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. 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 to find that Y axis was worst under the vertical antenna polarization and that Z axis was worst under the horizontal antenna polarization.

The position in which the maximum noise occurred was chosen to put into measurement.

See the photographs in page 12.

Maximum Filed Strength (Radiated)

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.

Measurement range: CISPR QP Detector, IF BW 120kHz

Test data : APPENDIX Page13 to 15

Photographs of test setup: Page 11

Test result : Pass

Test instruments : KCC-10/11/12/13/18, KLA-01, KAF-01, KAT6-01, KTR-01, KOTS-01

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5.2 § 95.1115 (b) 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. 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 below 1GHz, Y axis was worst under the vertical antenna polarization and Z axis was worst under the horizontal antenna polarization. In above 1GHz, X axis was worst under both of the horizontal and vertical antenna polarization.

The position in which the maximum noise occurred was chosen to put into measurement.

See the photographs in page 12.

Radiated Spurious emissions

The result was also satisfied the general limits specified in Sec.95.1115 (b).

To determine the level of band-edge spurious, we use the following procedure:

Set the resolution bandwidth to 1kHz in the peak detector mode. Measure the maximum level of the in-band channel closest to the band edge and the maximum level of the out-of-band emissions close to the same band edge. Determine the ratio of the in-band signal to the out-of-band emissions. Then, measure the level of the in-band channel in CISPR quasi-peak mode with 120kHz bandwidth. Using the ratio obtained, we calculate the equivalent level of the out-of-band emissions to determine compliance with the limits.

The emission tests, except for the band edge, were performed with the quasi-peak mode of the test receiver.

(Bandwidth: 120kHz)

Measurement range: 30MHz to 1000MHz CISPR QP Detector, IF BW 120kHz

: 1GHz to 7GHz AV Detector

Test data : APPENDIX Page 16 to 21 (30 –1000MHz)
: APPENDIX Page 22 to 27 (1 – 7GHz)
: APPENDIX Page 28 to 31 (Band Edges: 608MHz/614MHz, Restricted band Charts)

Photographs of test setup : Page 11

Test result : Pass

Test instruments : KCC-10/11/12/13/18, KCC-D11/D12, KBA-03, KLA-01, KHA-01, KAF-01, KAF-02, KAT10-S1, KAT6-01, KFL-01, KTR-01, KOTS-01

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5.3 § 2.1049 Bandwidth (Antenna Port Conducted)

Test Procedure

The minimum 26dB bandwidth was measured with a spectrum analyzer connected to the antenna port.
The measurement was performed according to the procedures in ANSI C63.4-13.1.7 (2001).

Occupied Bandwidth (99%)

1. 608.0125MHz (Low): 7.5669kHz
2. 611.00MHz (Mid): 7.5482kHz
3. 613.9875MHz (High): 7.5855kHz

26dB Bandwidth

1. 608.0125MHz (Low): 43.5872kHz
2. 611.00MHz (Mid): 43.5872kHz
3. 613.9875MHz (High): 43.5872kHz

Test data : APPENDIX Page 32 to 33

Test instruments : KTR-01, KCC-A3

5.4 § 2.1051 Out of Band Emissions (Antenna Port Conducted)

Test Procedure

The Out of Band Emissions (Conducted) was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX Page 34 to 39

Test result : Pass

Test instruments : KTR-01, KCC-A3

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APPENDIX 1: Photographs of test setup

- 1. Page 11 : Radiated emission
- 2. Page 12 : Pre check of worse-case position

APPENDIX 2: Test Data

- 1. Page 13 - 15: Filed Strength (Radiated)
- 2. Page 16 - 31: Out of Band Emissions (Radiated)
- 3. Page 32 : Occupied Bandwidth (Antenna Port Conducted)
- 4. Page 33 : 26dB Bandwidth (Antenna Port Conducted)
- 5. Page 34 - 39: Out Band Emissions (Antenna Port Conducted)

APPENDIX 3: Test instruments

- Page 40 : Test instruments

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Radiated emission



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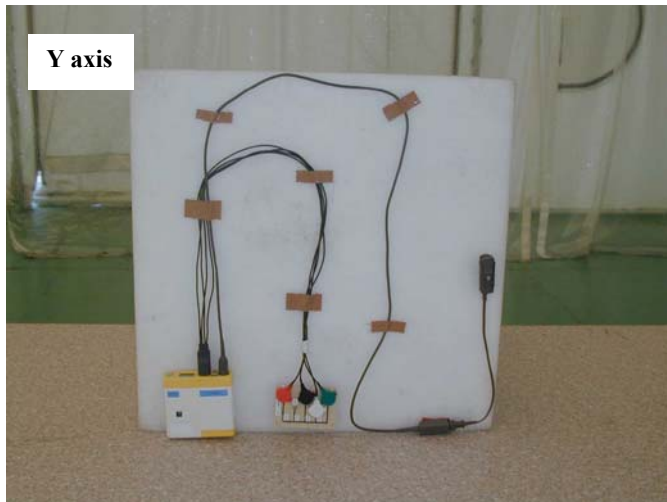
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Pre check of worse-case position

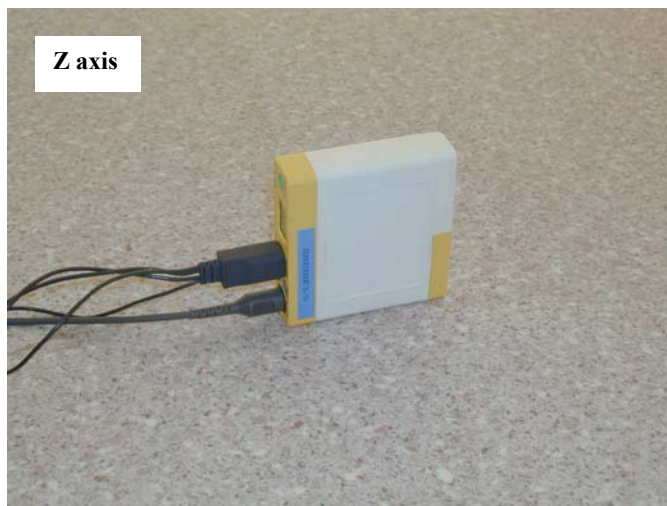
X axis



Y axis



Z axis



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Yamakita No.1 Open Test Site

Report No. : 23GE0033-YK

Applicant : FUKUDA DENSHI CO., LTD.
Kind of Equipment : ECG・RESPIRATION & SpO2 TRANSMITTER
Model No. : LX-5630
Serial No. : 2003020602
Power : DC3.0V
Mode : Transmitting (608.0125MHz)
Remarks :
Date : 6/5/2003
Test Distance : 3 m
Temperature : 36 °C
Humidity : 59 %
Regulation : FCC Part95H § 95.1115(a)


Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	608.01	BB	89.5	89.1	19.5	29.5	7.0	6.1	92.6	92.2	106.0	13.4	13.8

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

■ANTENNA:KBA-03 (VHA9103) 30-299.99MHz/KLA-01 (USLP9143) 300-1000MHz

■CABLE:KCC-10/11/12/13/18 ■PREAMP:KAF-01 (8447D) ■EMI RECEIVER:KTR-01 (ES140)

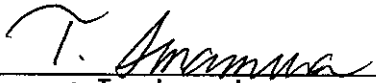
DATA OF RADIATION TEST

UL Apex Co., Ltd.

Yamakita No.1 Open Test Site

Report No. : 23GE0033-YK

Applicant : FUKUDA DENSHI CO., LTD.
Kind of Equipment : ECG + RESPIRATION & SpO2 TRANSMITTER
Model No. : LX-5630
Serial No. : 2003020602
Power : DC3.0V
Mode : Transmitting (611MHz)
Remarks :
Date : 6/5/2003
Test Distance : 3 m
Temperature : 36 °C
Humidity : 59 %
Regulation : FCC Part95H § 95.1115(a)


Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	611.00	BB	90.2	87.9	19.5	29.5	7.0	6.1	93.3	91.0	106.0	12.7	15.0

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

■ANTENNA:KBA-03 (VHA9103) 30-299.99MHz/KLA-01 (USLP9143) 300-1000MHz

■CABLE:KCC-10/11/12/13/18 ■PREAMP:KAF-01 (8447D) ■EMI RECEIVER:KTR-01 (ES140)

DATA OF RADIATION TEST

UL Apex Co., Ltd.

Yamakita No.1 Open Test Site

Report No. : 23GE0033-YK

Applicant : FUKUDA DENSHI CO., LTD.
Kind of Equipment : ECG - RESPIRATION & SpO2 TRANSMITTER
Model No. : LX-5630
Serial No. : 2003020602
Power : DC3.0V
Mode : Transmitting (613.9875MHz)
Remarks :
Date : 6/5/2003
Test Distance : 3 m
Temperature : 36 °C
Humidity : 59 %
Regulation : FCC Part95H § 95.1115(a)

Engineer :  Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	613.99	BB	88.7	89.5	19.5	29.5	7.0	6.1	91.8	92.6	106.0	14.2	13.4

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

■ ANTENNA: KBA-03 (VHA9103) 30-299.99MHz/KLA-01 (USLP9143) 300-1000MHz

■ CABLE: KCC-10/11/12/13/18 ■ PREAMP: KAF-01 (8447D) ■ EMI RECEIVER: KTR-01 (ES140)

DATA OF RADIATION TEST

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Yamakita No.1 Open Test Site

Report No. : 23GE0033-YK

Applicant : FUKUDA DENSHI CO., LTD.
 Kind of Equipment : ECG・RESPIRATION & SpO2 TRANSMITTER
 Model No. : LX-5630
 Serial No. : 2003020602
 Power : DC3.0V
 Mode : Transmitting (608.0125MHz)
 Remarks :
 Date : 6/5/2003
 Test Distance : 3 m
 Temperature : 36 °C
 Humidity : 59 %
 Regulation : FCC Part95H § 95.1115(b) (1)


 Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	32.00	BB	23.3	23.8	17.8	28.4	1.4	6.0	20.1	20.6	46.0	25.9	25.4
2.	40.00	BB	24.4	27.7	14.7	28.5	1.6	6.0	18.2	21.5	46.0	27.8	24.5
3.	53.05	BB	23.6	23.7	10.4	28.6	1.8	6.0	13.2	13.3	46.0	32.8	32.7
4.	225.00	BB	22.5	22.8	16.8	28.0	3.9	6.1	21.3	21.6	46.0	24.7	24.4
5.	320.00	BB	22.8	22.6	15.1	27.9	4.8	6.1	20.9	20.7	46.0	25.1	25.3
6.	608.00	BB	36.6	36.2	19.5	29.5	7.0	6.1	39.7	39.3	46.0	6.3	6.7

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

■ANTENNA: KBA-03 (VHA9103) 30-299.99MHz/KLA-01 (USLP9143) 300-1000MHz

■CABLE: KCC-10/11/12/13/18 ■PREAMP: KAF-01 (8447D) ■EMI RECEIVER: KTR-01 (ES140)

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Model No. : LX-5630
Serial No. : 2003020602
Power : DC3.0V
Mode : Transmitting (608.0125MHz)
Remarks :
Date : 6/5/2003
Test Distance : 3 m
Temperature : 36 °C
Humidity : 59 %
Regulation : FCC Part95H § 95.1115(b) (1)

Engineer :  Toyokazu Imamura

Emission Level [dB μ V/m]

☐ Horizontal

☒ Vertical

70

60

50

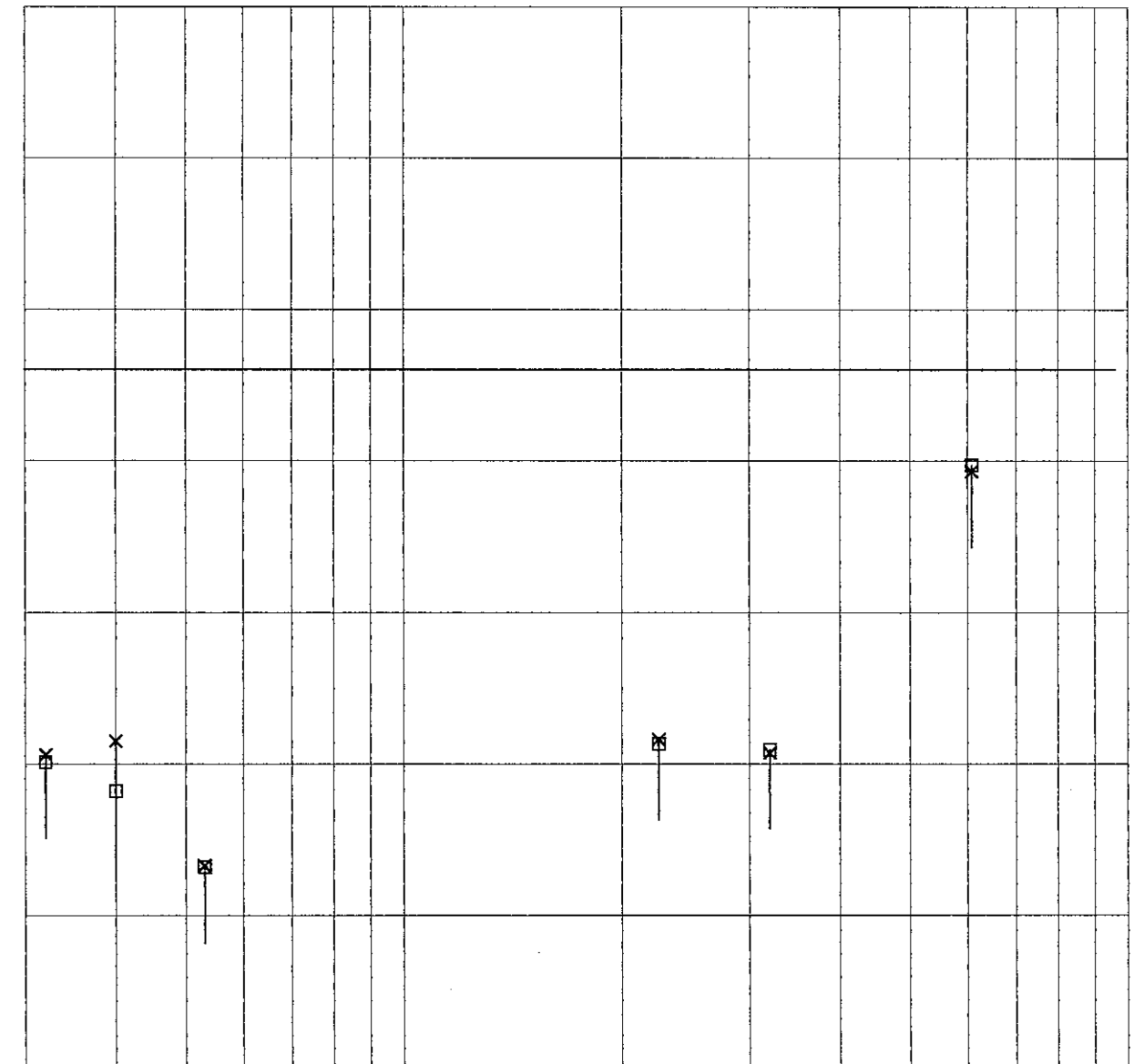
40

30

20

10

0



30

100

Frequency [MHz]

500

1000

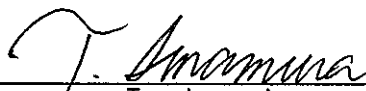
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Yamakita No.1 Open Test Site

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Applicant : FUKUDA DENSHI CO., LTD.
 Kind of Equipment : ECG・RESPIRATION & SpO2 TRANSMITTER
 Model No. : LX-5630
 Serial No. : 2003020602
 Power : DC3.0V
 Mode : Transmitting (611MHz)
 Remarks :
 Date : 6/5/2003
 Test Distance : 3 m
 Temperature : 36 °C
 Humidity : 59 %
 Regulation : FCC Part95H § 95.1115 (b) (1)


 Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	32.00	BB	23.8	25.9	17.8	28.4	1.4	6.0	20.6	22.7	46.0	25.4	23.3
2.	40.00	BB	24.5	27.4	14.7	28.5	1.6	6.0	18.3	21.2	46.0	27.7	24.8
3.	53.05	BB	23.7	24.0	10.4	28.6	1.8	6.0	13.3	13.6	46.0	32.7	32.4
4.	96.00	BB	25.3	24.1	9.3	28.4	2.5	6.0	14.7	13.5	46.0	31.3	32.5
5.	225.03	BB	22.5	22.9	16.8	28.0	3.9	6.1	21.3	21.7	46.0	24.7	24.3
6.	320.00	BB	22.5	22.6	15.1	27.9	4.8	6.1	20.6	20.7	46.0	25.4	25.3

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

■ ANTENNA: KBA-03 (VHA9103) 30-299.99MHz/KLA-01 (USLP9143) 300-1000MHz

■ CABLE: KCC-10/11/12/13/18 ■ PREAMP: KAF-01 (8447D) ■ EMI RECEIVER: KTR-01 (ES140)

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Kind of Equipment : ECG · RESPIRATION & SpO2 TRANSMITTER
Model No. : LX-5630
Serial No. : 2003020602
Power : DC3.0V
Mode : Transmitting (611MHz)
Remarks :
Date : 6/5/2003
Test Distance : 3 m
Temperature : 36 °C
Humidity : 59 %
Regulation : FCC Part95H § 95.1115 (b) (1)


Engineer : Toyokazu Imamura

Emission Level [dB μ V/m]

□ Horizontal

× Vertical

70

60

50

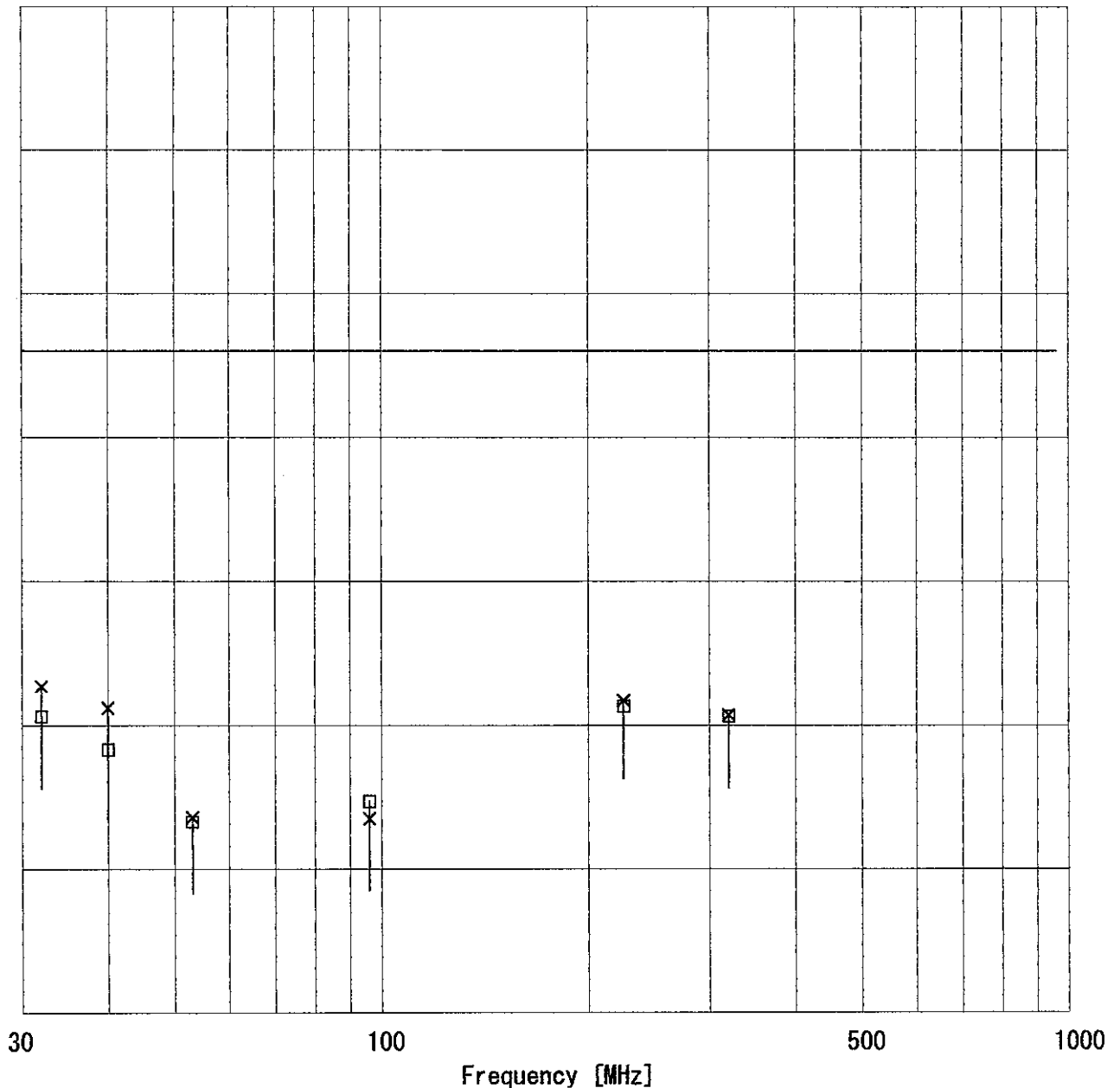
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10

0



DATA OF RADIATION TEST

UL Apex Co., Ltd.

Yamakita No.1 Open Test Site

Report No. : 23GE0033-YK

Applicant : FUKUDA DENSHI CO., LTD.
 Kind of Equipment : ECG・RESPIRATION & SpO2 TRANSMITTER
 Model No. : LX-5630
 Serial No. : 2003020602
 Power : DC3.0V
 Mode : Transmitting(613.9875MHz)
 Remarks :
 Date : 6/5/2003
 Test Distance : 3 m
 Temperature : 36 °C
 Humidity : 59 %
 Regulation : FCC Part95H § 95.1115(b) (1)


 Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	32.00	BB	23.4	24.4	17.8	28.4	1.4	6.0	20.2	21.2	46.0	25.8	24.8
2.	40.00	BB	24.0	27.6	14.7	28.5	1.6	6.0	17.8	21.4	46.0	28.2	24.6
3.	53.05	BB	23.8	24.3	10.4	28.6	1.8	6.0	13.4	13.9	46.0	32.6	32.1
4.	96.00	BB	24.8	24.1	9.3	28.4	2.5	6.0	14.2	13.5	46.0	31.8	32.5
5.	225.03	BB	22.5	22.7	16.8	28.0	3.9	6.1	21.3	21.5	46.0	24.7	24.5
6.	320.00	BB	22.4	22.6	15.1	27.9	4.8	6.1	20.5	20.7	46.0	25.5	25.3
7.	614.00	BB	34.8	33.5	19.5	29.5	7.0	6.1	37.9	36.6	46.0	8.1	9.4

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

■ANTENNA:KBA-03 (VHA9103) 30-299.99MHz/KLA-01 (USLP9143) 300-1000MHz

■CABLE:KCC-10/11/12/13/18■PREAMP:KAF-01 (8447D) ■EMI RECEIVER:KTR-01 (ES140)

DATA OF RADIATION TEST

UL Apex Co., Ltd.

Yamakita No.1 Open Test Site

Report No. : 23GE0033-YK

Applicant : FUKUDA DENSHI CO., LTD.
Kind of Equipment : ECG - RESPIRATION & SpO2 TRANSMITTER
Model No. : LX-5630
Serial No. : 2003020602
Power : DC3.0V
Mode : Transmitting (613.9875MHz)
Remarks :
Date : 6/5/2003
Test Distance : 3 m
Temperature : 36 °C
Humidity : 59 %
Regulation : FCC Part95H § 95.1115(b) (1)


Engineer : Toyokazu Imamura

Emission Level [dB μ V/m]

□ Horizontal

× Vertical

70

60

50

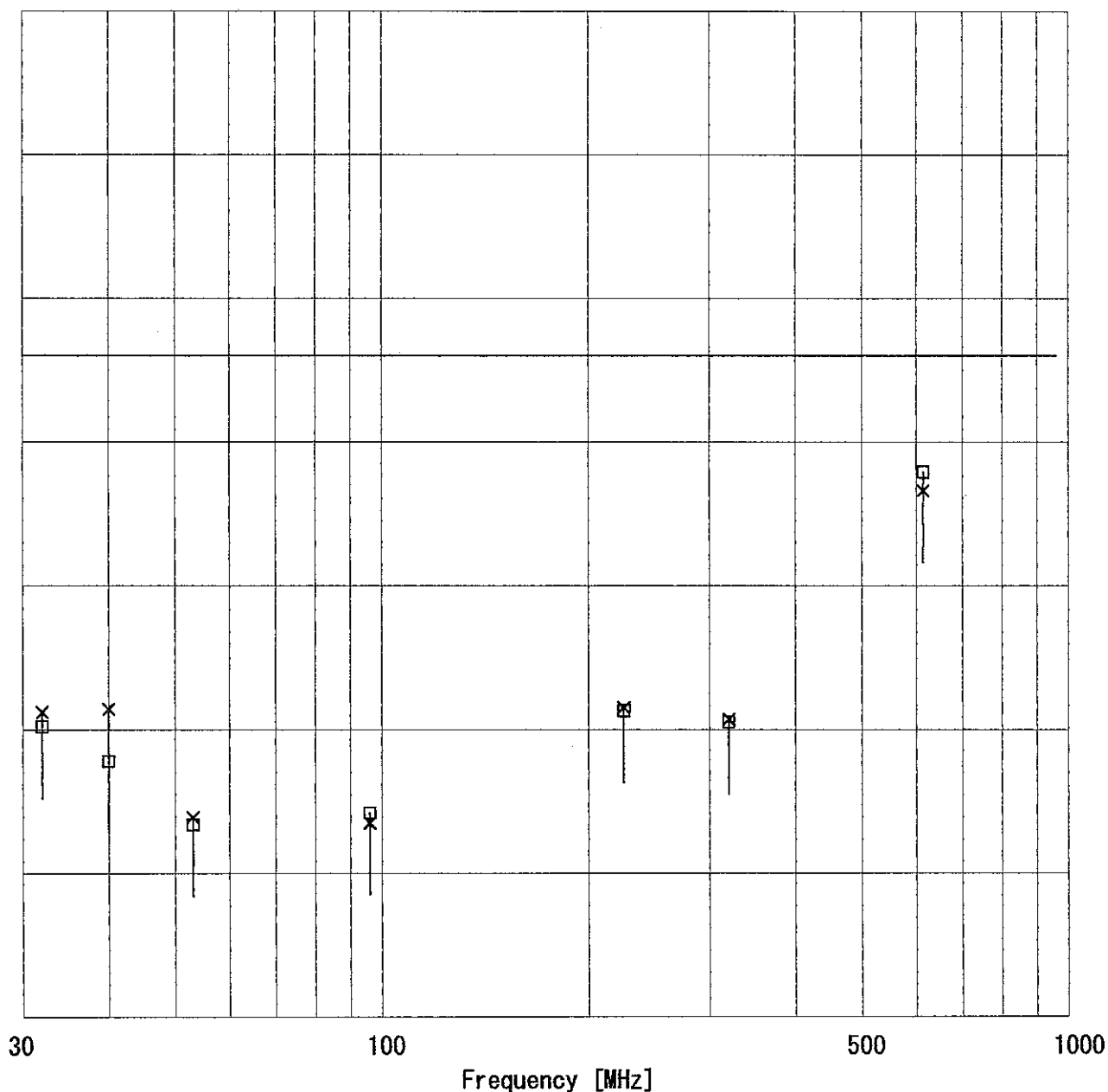
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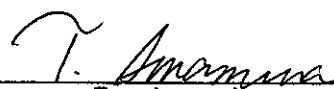
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DATA OF RADIATION TEST

UL Apex Co., Ltd.
Yamakita No.1 Open Test Site
Report No. : 23GE0033-YK

Applicant : FUKUDA DENSHI CO., LTD.
Kind of Equipment : ECG - RESPIRATION & SpO2 TRANSMITTER
Model No. : LX-5630
Serial No. : 2003020602
Power : DC3.0V
Mode : Transmitting (608.0125MHz)
Remarks :
Date : 6/6/2003
Test Distance : 3 m
Temperature : 36 °C
Humidity : 52 %
Regulation : FCC Part95H § 95.1115 (b) (2)


Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	1216.03	BB	36.8	36.0	25.2	38.0	3.4	10.0	37.4	36.6	53.9	16.5	17.3
2.	1824.04	BB	35.3	35.9	29.1	37.1	4.2	10.0	41.5	42.1	53.9	12.4	11.8
3.	2432.05	BB	32.8	34.3	30.6	36.9	4.9	10.0	41.4	42.9	53.9	12.5	11.0
4.	3040.06	BB	32.6	33.6	30.9	37.0	5.5	10.0	42.0	43.0	53.9	11.9	10.9
5.	3648.08	BB	37.0	37.0	31.9	36.7	6.0	0.9	39.1	39.1	53.9	14.8	14.8
6.	4256.09	BB	31.2	31.1	32.9	35.8	6.6	0.7	35.6	35.5	53.9	18.3	18.4
7.	4864.10	BB	30.9	30.9	35.0	35.2	7.0	0.6	38.3	38.3	53.9	15.6	15.6
8.	5472.11	BB	31.4	31.4	35.8	36.3	7.5	0.9	39.3	39.3	53.9	14.6	14.6
9.	6080.13	BB	33.1	33.1	37.0	36.4	7.9	0.5	42.1	42.1	53.9	11.8	11.8

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

■ ANTENNA: KHA-01 (SAS-200 571) 1-18GHz

■ CABLE: KCC-D11/D12 ■ PREAMP: KAF-02 (8449B) ■ EMI RECEIVER: KTR-01 (ES140)

DATA OF RADIATION TEST

UL Apex Co., Ltd.

Yamakita No.1 Open Test Site

Report No. : 23GE0033-YK

Applicant : FUKUDA DENSHI CO., LTD.
Kind of Equipment : ECG - RESPIRATION & SpO2 TRANSMITTER
Model No. : LX-5630
Serial No. : 2003020602
Power : DC3.0V
Mode : Transmitting (608.0125MHz)
Remarks :
Date : 6/6/2003
Test Distance : 3 m
Temperature : 36 °C
Humidity : 52 %
Regulation : FCC Part95H § 95.1115(b) (2)


Engineer : Toyokazu Imamura

Emission Level [dB μ V/m]

□ Horizontal

× Vertical

70

60

50

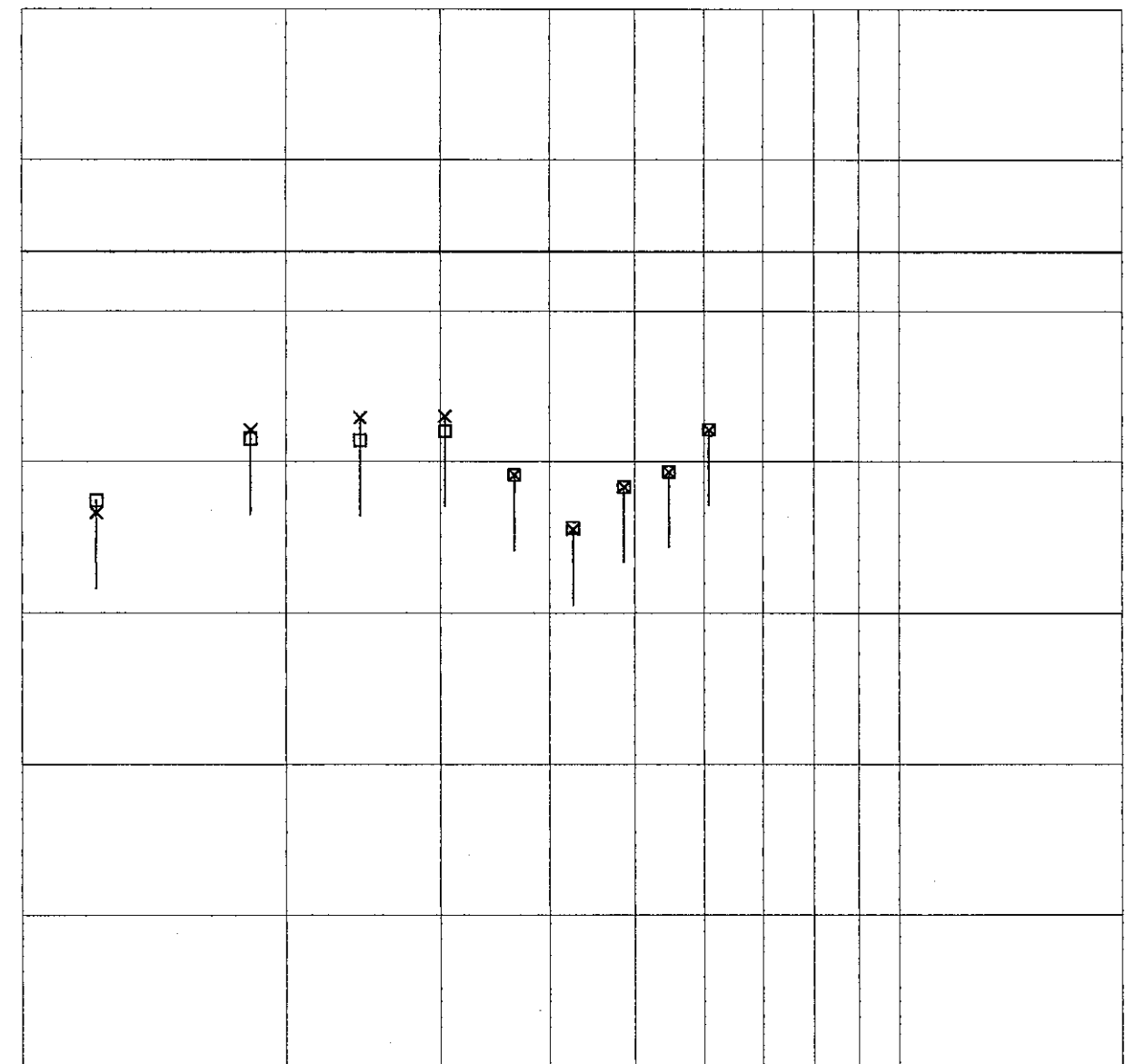
40

30

20

10

0



1000

2000

5000

10000

18000

Frequency [MHz]

DATA OF RADIATION TEST

UL Apex Co., Ltd.
Yamakita No.1 Open Test Site
Report No. : 23GE0033-YK

Applicant : FUKUDA DENSHI CO., LTD.
Kind of Equipment : ECG・RESPIRATION & SpO2 TRANSMITTER
Model No. : LX-5630
Serial No. : 2003020602
Power : DC3.0V
Mode : Transmitting(611MHz)
Remarks :
Date : 6/6/2003
Test Distance : 3 m
Temperature : 36 °C
Humidity : 52 %
Regulation : FCC Part95H § 95.1115(b) (2)


Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	1222.00	BB	36.5	35.6	25.2	38.0	3.4	10.0	37.1	36.2	53.9	16.8	17.7
2.	1833.00	BB	35.5	36.2	29.2	37.1	4.2	10.0	41.8	42.5	53.9	12.1	11.4
3.	2444.00	BB	33.0	33.7	30.6	36.9	4.9	10.0	41.6	42.3	53.9	12.3	11.6
4.	3055.00	BB	32.8	32.9	31.0	37.0	5.5	10.0	42.3	42.4	53.9	11.6	11.5
5.	3666.00	BB	35.4	34.2	31.9	36.7	6.0	0.9	37.5	36.3	53.9	16.4	17.6
6.	4277.00	BB	31.1	31.4	32.9	35.7	6.6	0.7	35.6	35.9	53.9	18.3	18.0
7.	4888.00	BB	30.9	30.9	35.1	35.2	7.0	0.6	38.4	38.4	53.9	15.5	15.5
8.	5499.00	BB	31.8	31.8	35.8	36.3	7.5	0.9	39.7	39.7	53.9	14.2	14.2
9.	6110.00	BB	33.1	33.0	37.0	36.4	7.9	0.4	42.0	41.9	53.9	11.9	12.0

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

■ANTENNA:KHA-01(SAS-200 571)1-18GHz

■CABLE:KCC-D11/D12■PREAMP:KAF-02(8449B) ■EMI RECEIVER:KTR-01(ES140)

DATA OF RADIATION TEST

UL Apex Co., Ltd.

Yamakita No.1 Open Test Site

Report No. : 23GE0033-YK

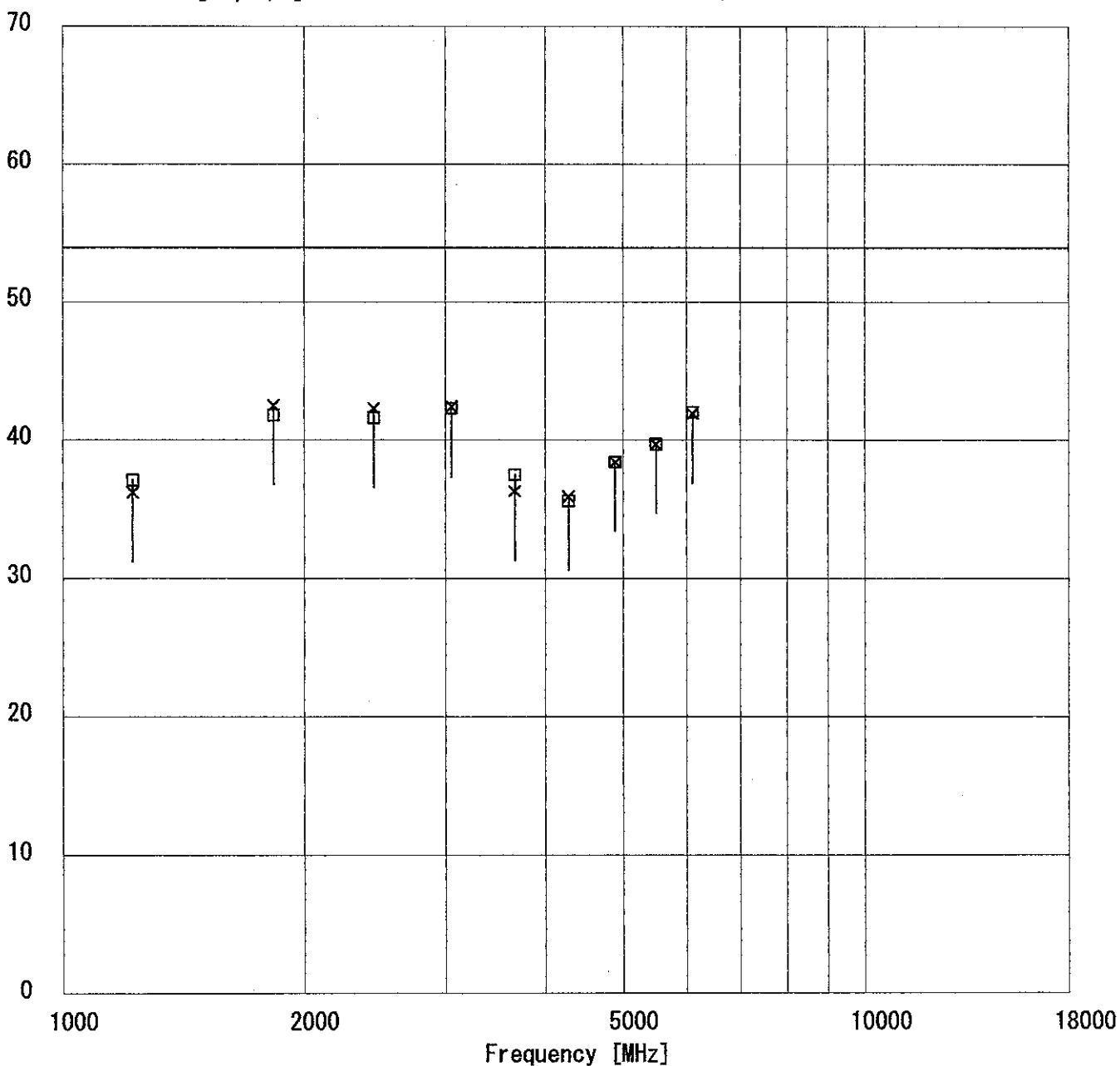
Applicant : FUKUDA DENSHI CO., LTD.
Kind of Equipment : ECG · RESPIRATION & SpO2 TRANSMITTER
Model No. : LX-5630
Serial No. : 2003020602
Power : DC3.0V
Mode : Transmitting (611MHz)
Remarks :
Date : 6/6/2003
Test Distance : 3 m
Temperature : 36 °C
Humidity : 52 %
Regulation : FCC Part95H § 95.1115 (b) (2)


Engineer : Toyokazu Imamura

Emission Level [dB μ V/m]

□ Horizontal

× Vertical



DATA OF RADIATION TEST

UL Apex Co., Ltd.

Yamakita No.1 Open Test Site

Report No. : 23GE0033-YK

Applicant : FUKUDA DENSHI CO., LTD.
 Kind of Equipment : ECG・RESPIRATION & SpO2 TRANSMITTER
 Model No. : LX-5630
 Serial No. : 2003020602
 Power : DC3.0V
 Mode : Transmitting (613.9875MHz)
 Remarks :
 Date : 6/6/2003
 Test Distance : 3 m
 Temperature : 36 °C
 Humidity : 52 %
 Regulation : FCC Part95H § 95.1115(b) (2)


 Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	1227.98	BB	35.4	34.7	25.2	38.0	3.4	10.0	36.0	35.3	53.9	17.9	18.6
2.	1841.96	BB	34.8	36.1	29.3	37.1	4.2	10.0	41.2	42.5	53.9	12.7	11.4
3.	2455.95	BB	32.6	34.0	30.6	36.9	4.9	10.0	41.2	42.6	53.9	12.7	11.3
4.	3069.94	BB	32.6	32.4	31.0	37.0	5.5	10.0	42.1	41.9	53.9	11.8	12.0
5.	3683.93	BB	37.0	36.8	32.0	36.6	6.1	0.9	39.4	39.2	53.9	14.5	14.7
6.	4297.91	BB	31.6	31.6	32.9	35.7	6.6	0.7	36.1	36.1	53.9	17.8	17.8
7.	4911.90	BB	31.1	31.1	35.3	35.2	7.0	0.5	38.7	38.7	53.9	15.2	15.2
8.	5525.89	BB	32.1	32.1	35.9	36.3	7.5	0.9	40.1	40.1	53.9	13.8	13.8
9.	6139.88	BB	33.1	33.1	37.0	36.4	7.9	0.4	42.0	42.0	53.9	11.9	11.9

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

■ANTENNA: KHA-01 (SAS-200 571) 1-18GHz

■CABLE: KCC-D11/D12 ■PREAMP: KAF-02 (8449B) ■EMI RECEIVER: KTR-01 (ES140)

DATA OF RADIATION TEST

UL Apex Co., Ltd.
Yamakita No.1 Open Test Site
Report No. : 23GE0033-YK

Applicant : FUKUDA DENSHI CO., LTD.
Kind of Equipment : ECG・RESPIRATION & SpO2 TRANSMITTER
Model No. : LX-5630
Serial No. : 2003020602
Power : DC3.0V
Mode : Transmitting(613.9875MHz)
Remarks :
Date : 6/6/2003
Test Distance : 3 m
Temperature : 36 °C
Humidity : 52 %
Regulation : FCC Part95H § 95.1115(b) (2)

T. Imamura
Engineer : Toyokazu Imamura

Emission Level [dB μ V/m]

□ Horizontal

× Vertical

70

60

50

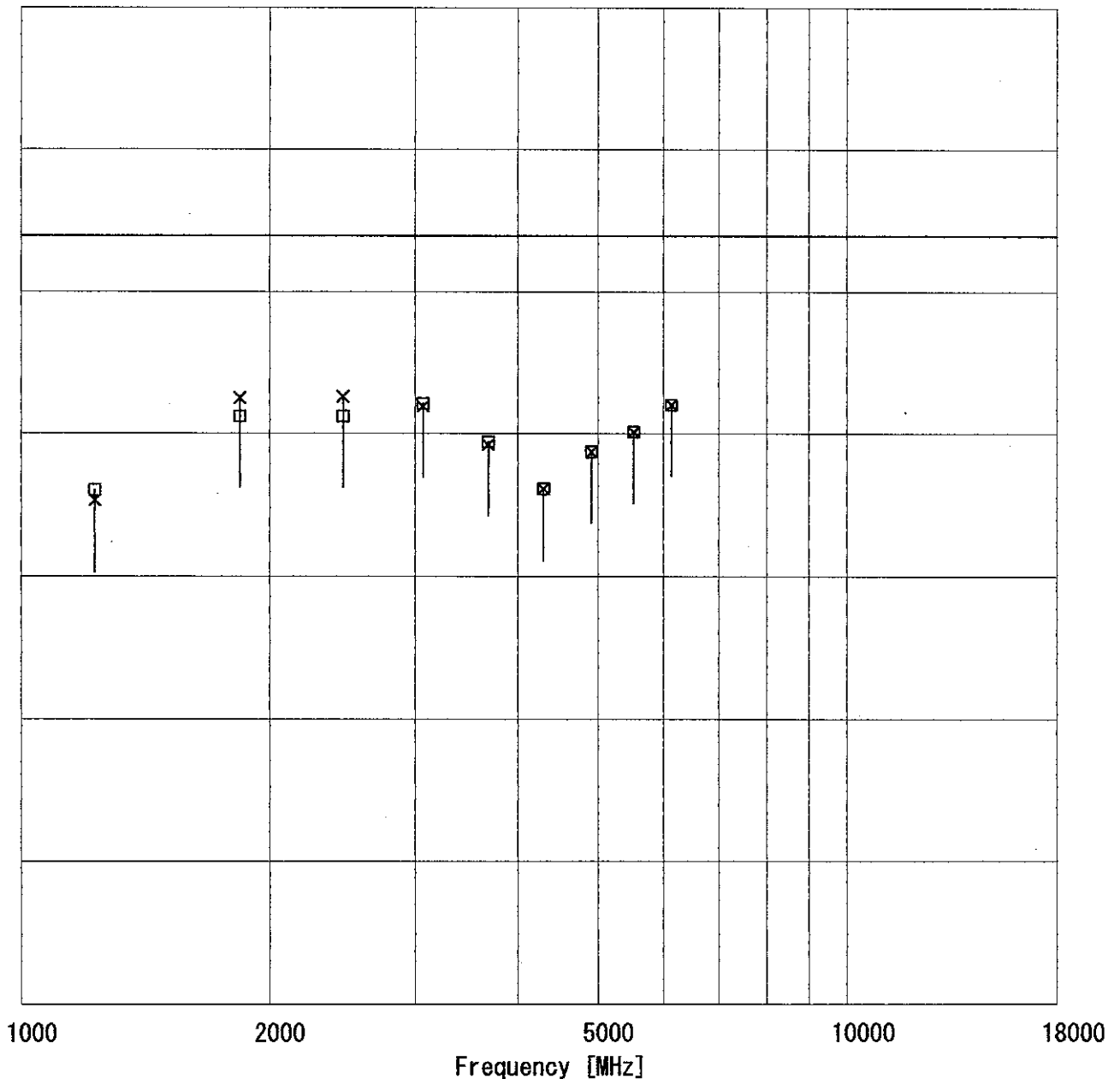
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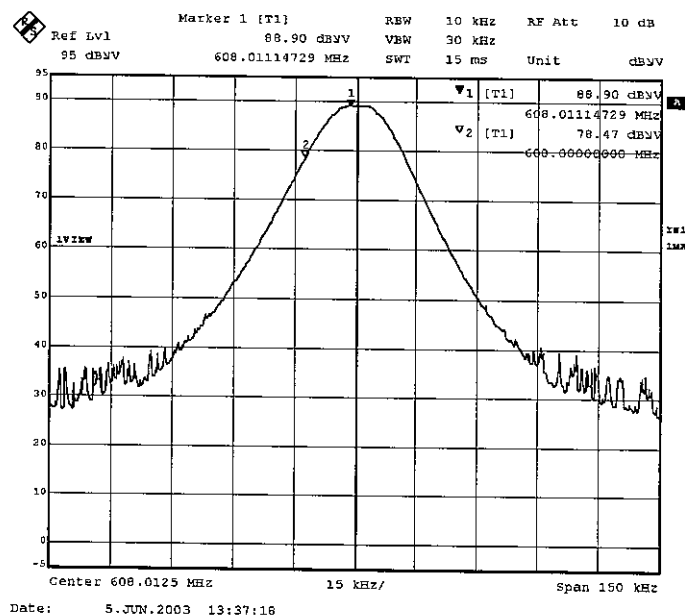
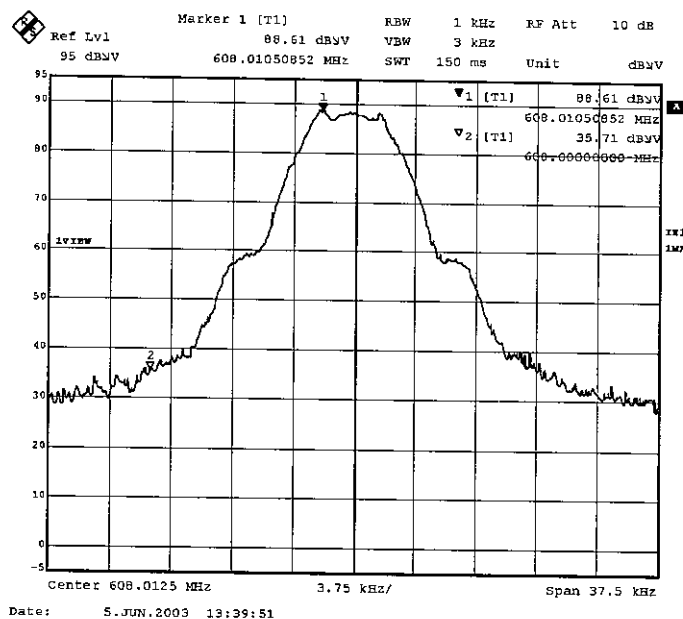
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608.00MHz

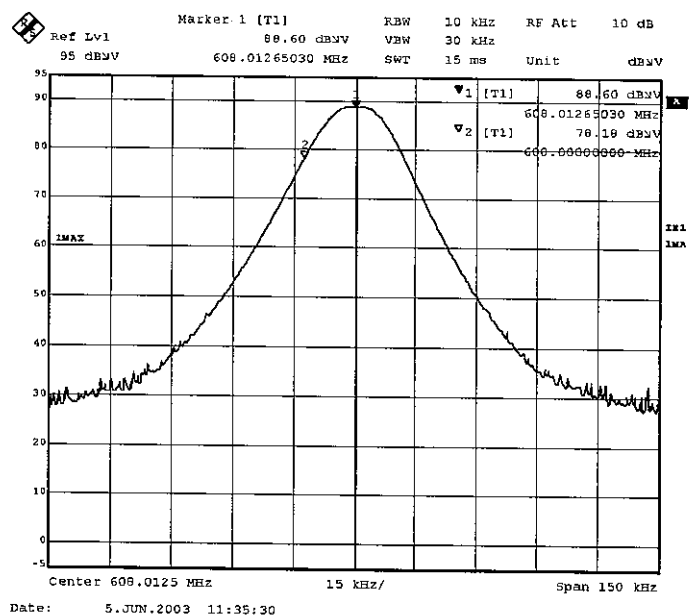
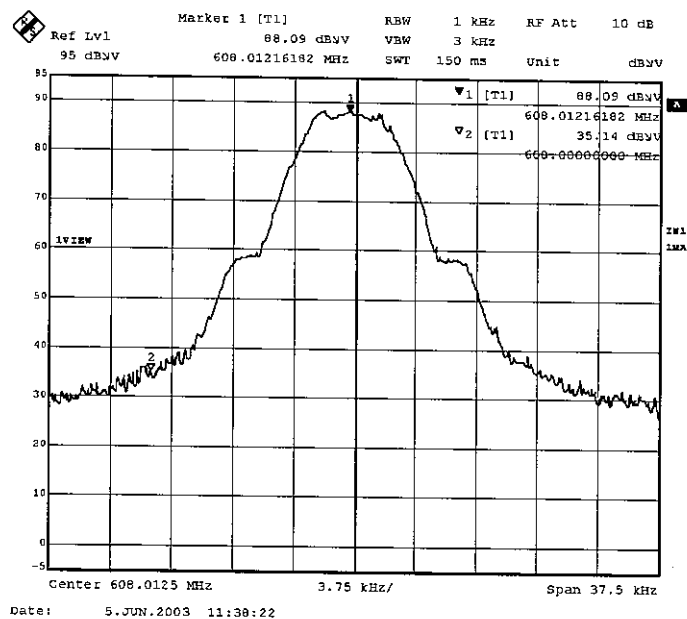
1. Horizontal/PK

T. Imamura



2. Vertical/PK

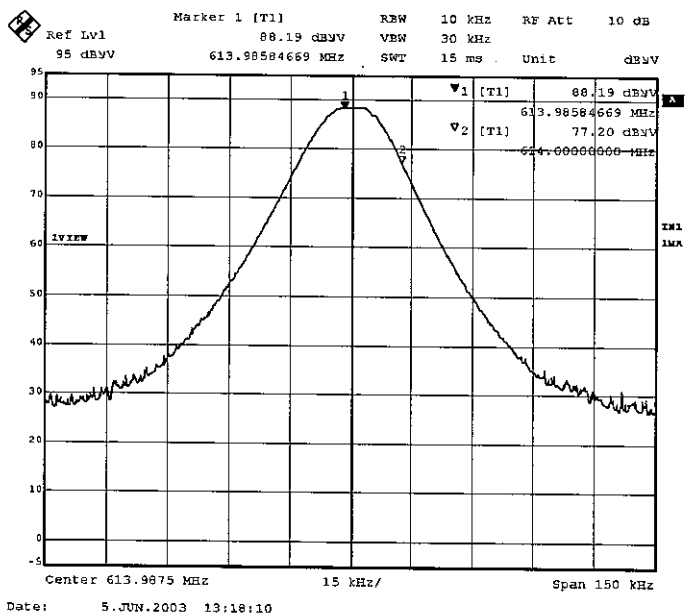
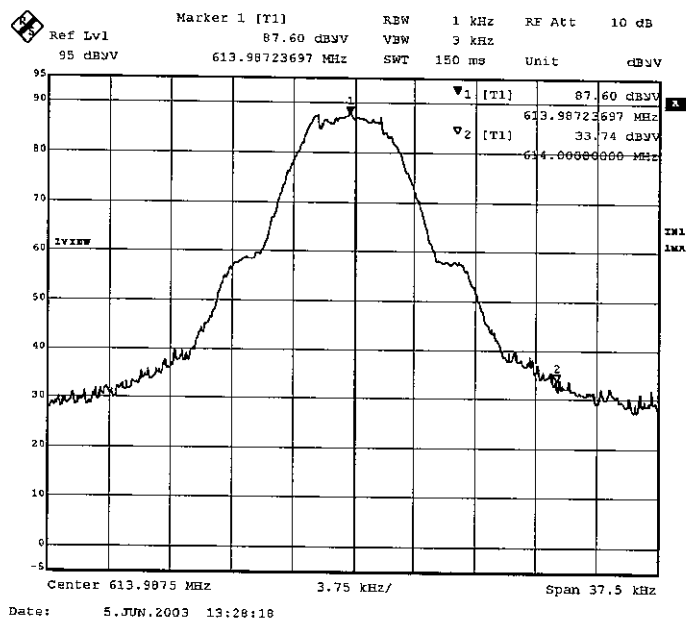
T. Imamura



614.00MHz

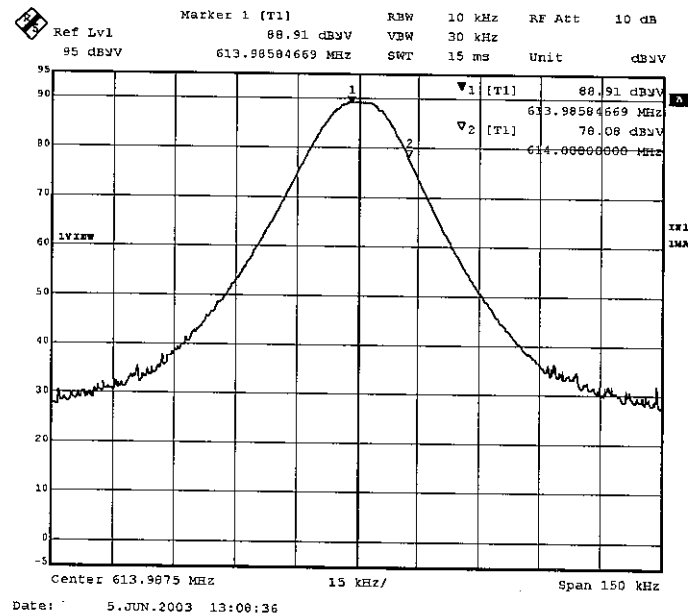
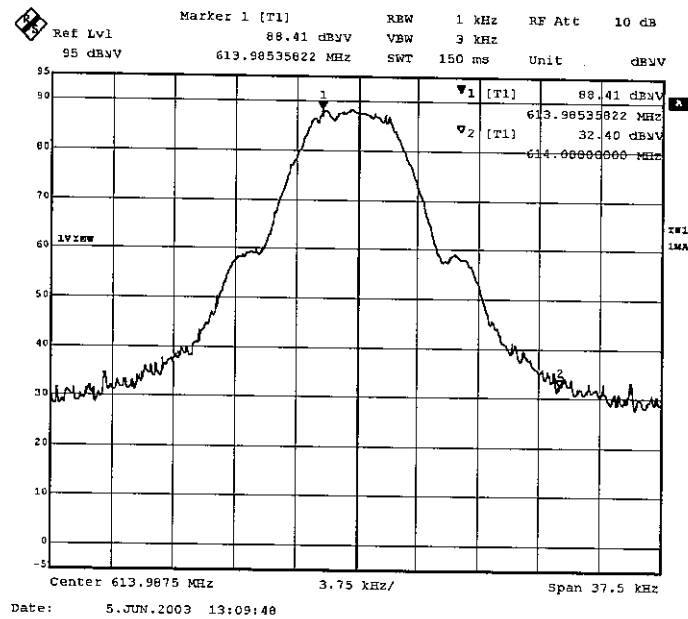
1. Horizontal/PK

T. Amamura

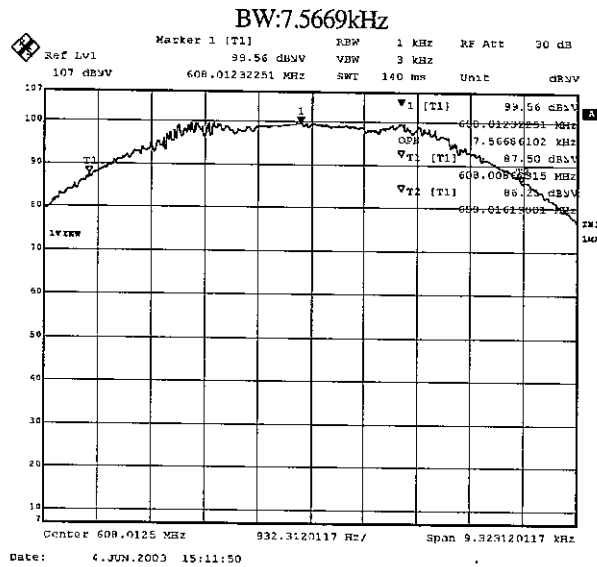


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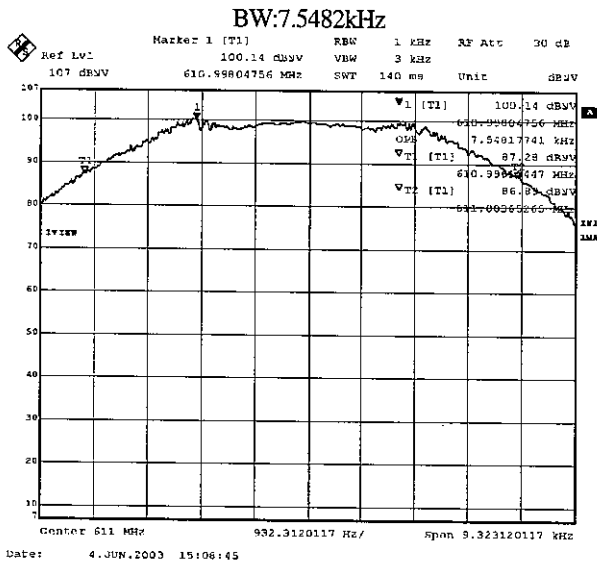
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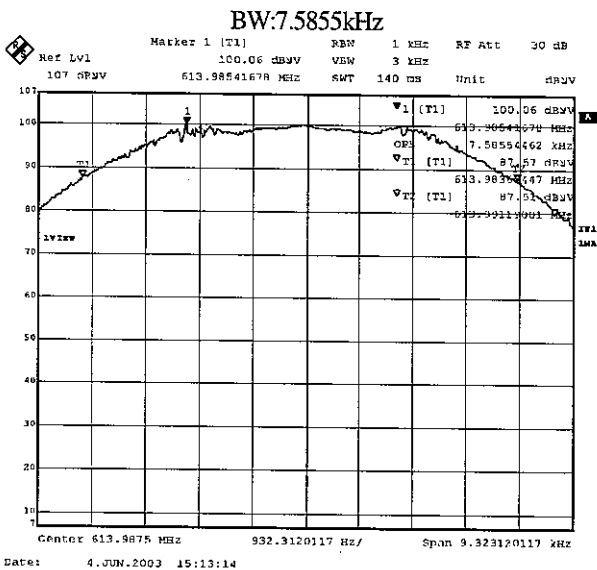
1. ch : 608.0125MHz



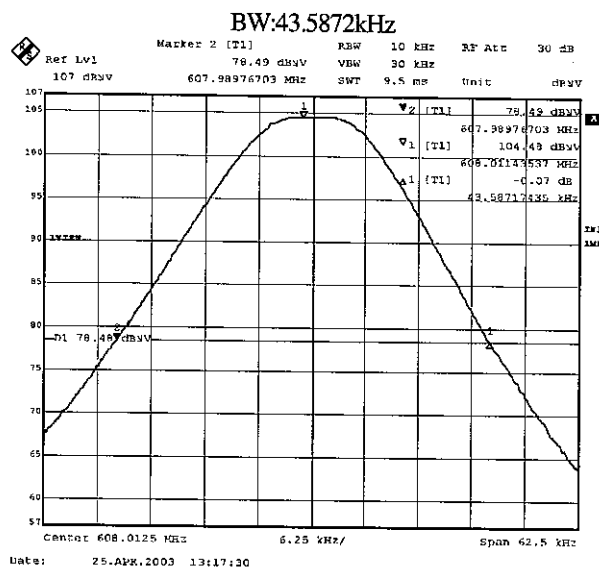
2. ch : 611.00MHz



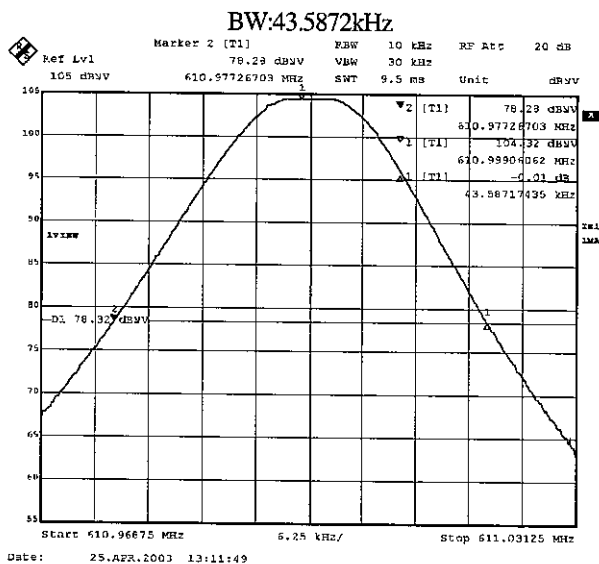
3. ch : 613.9875MHz



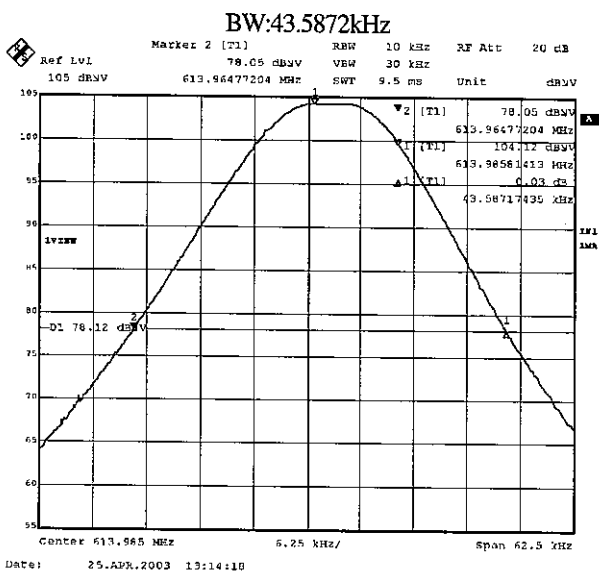
1. ch : 608.0125MHz



2. ch : 611.00MHz



3. ch : 613.9875MHz

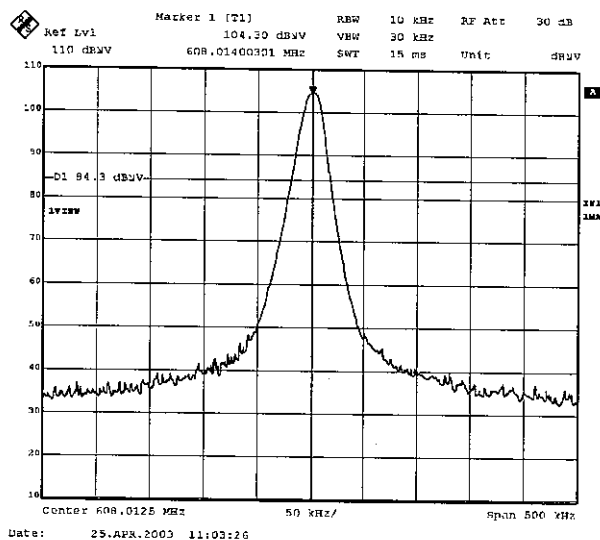


T. Imamura

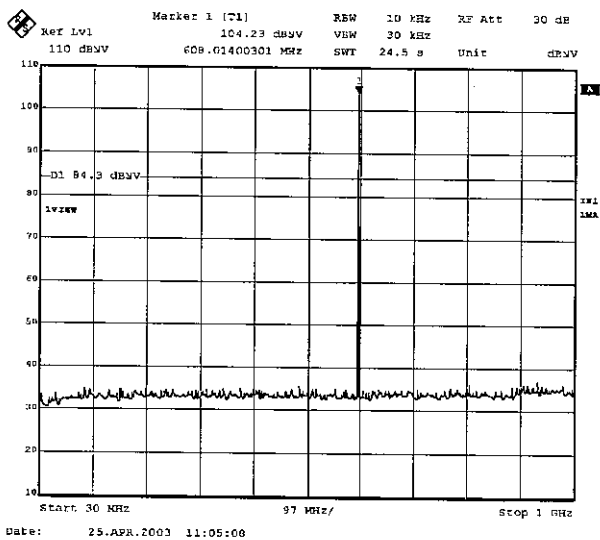
Ch 608.0125MHz

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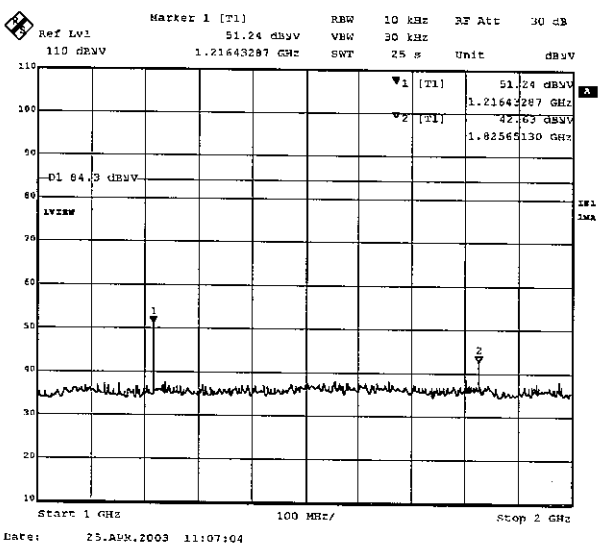
T. Amanna



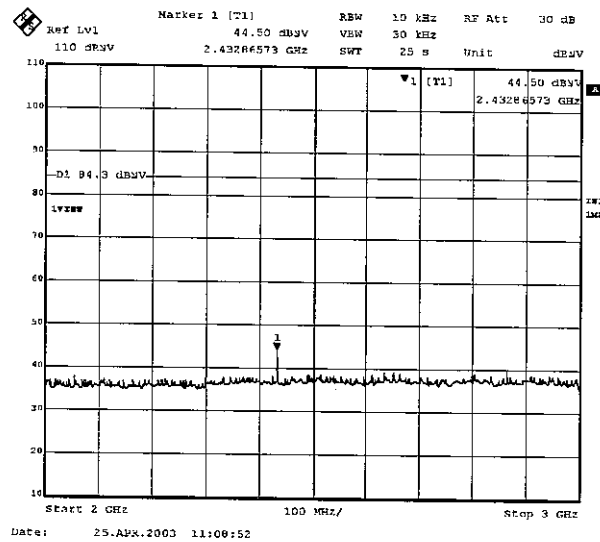
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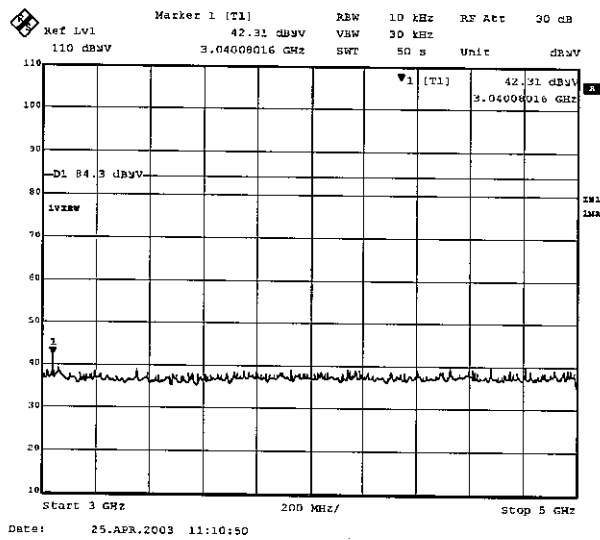


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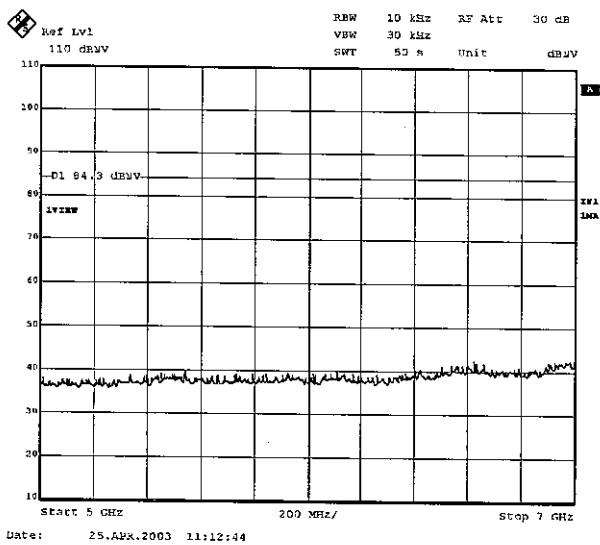


T. Amanna

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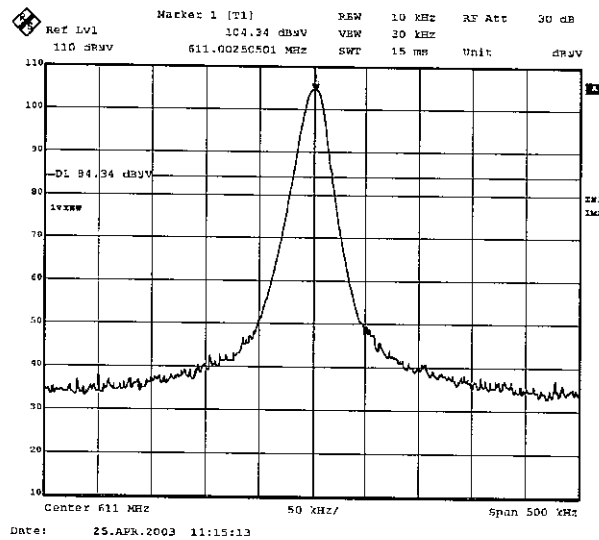
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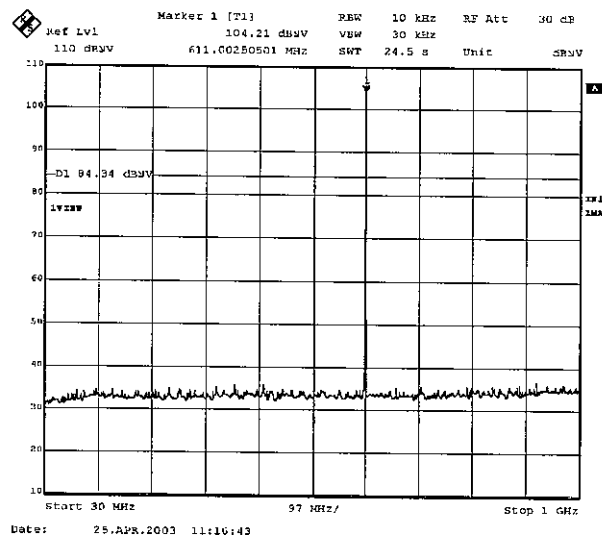
Ch 611.0000MHz

1.

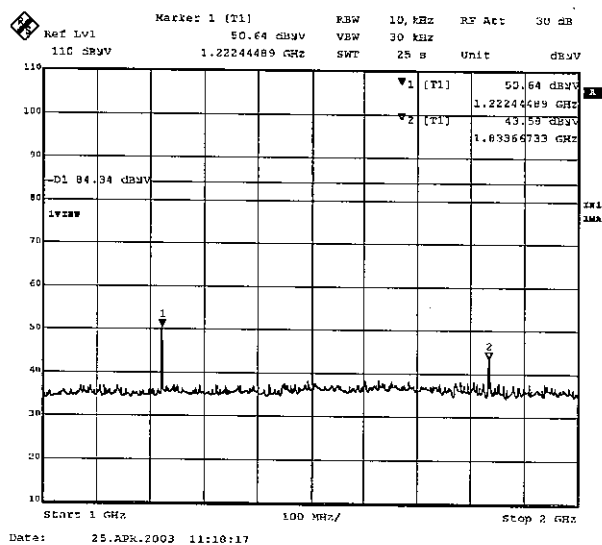
T. Imamura



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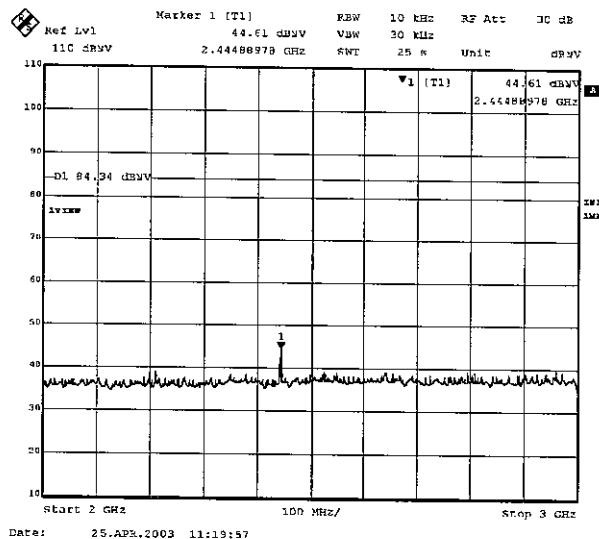


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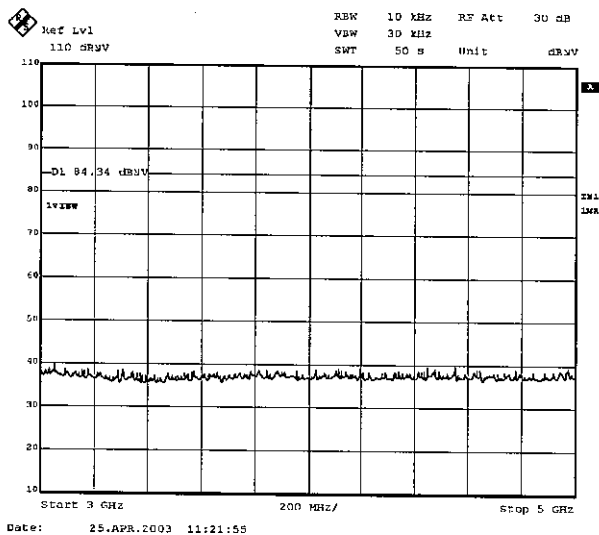


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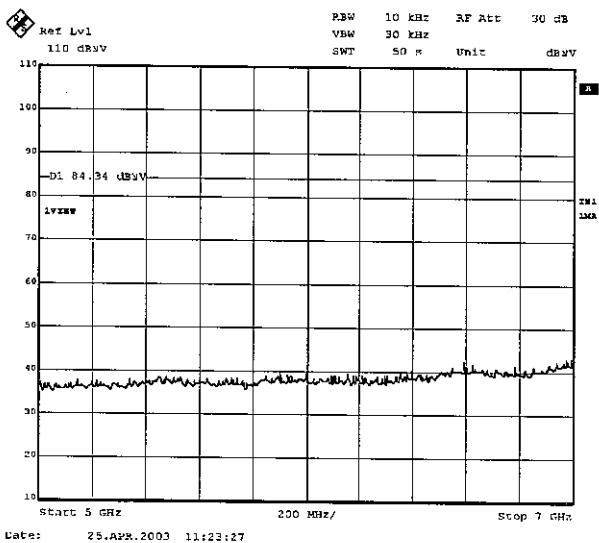
T. Amamura



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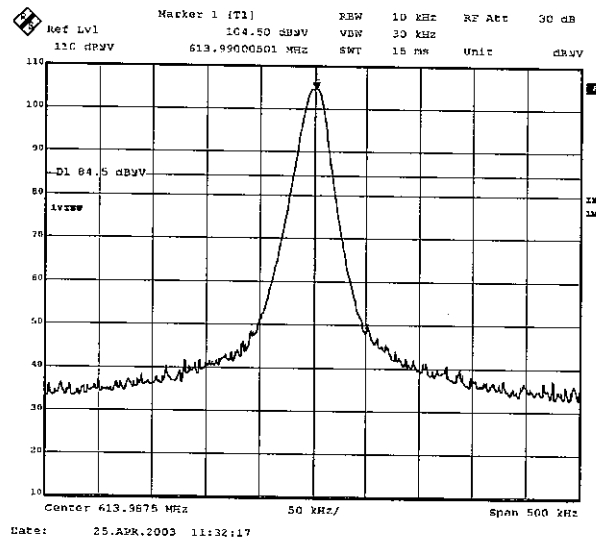
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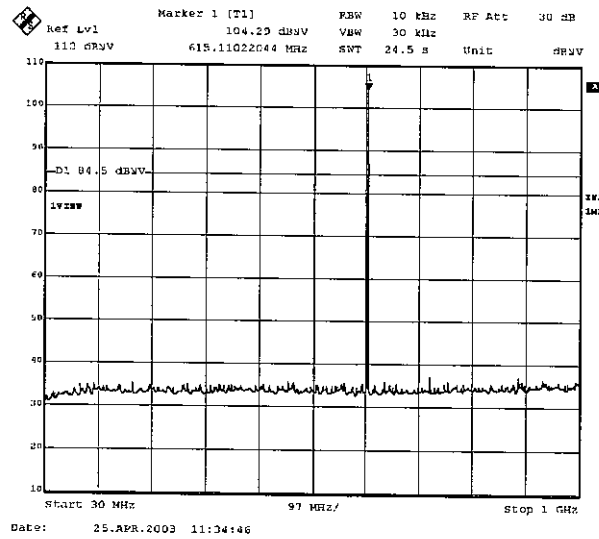
Ch 613.9875MHz

1.

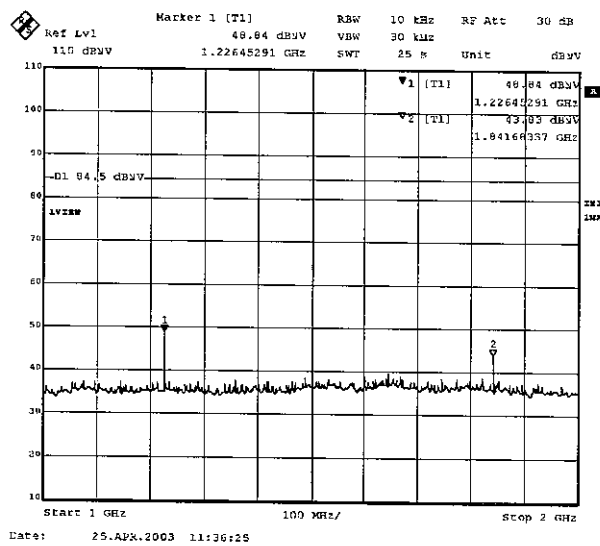
T. Amamura



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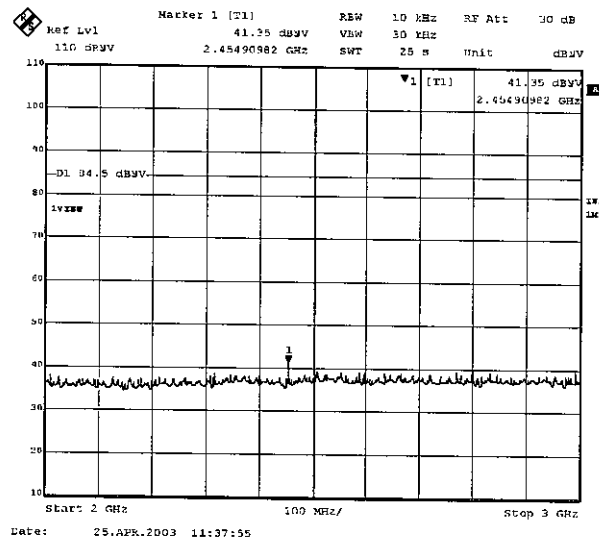


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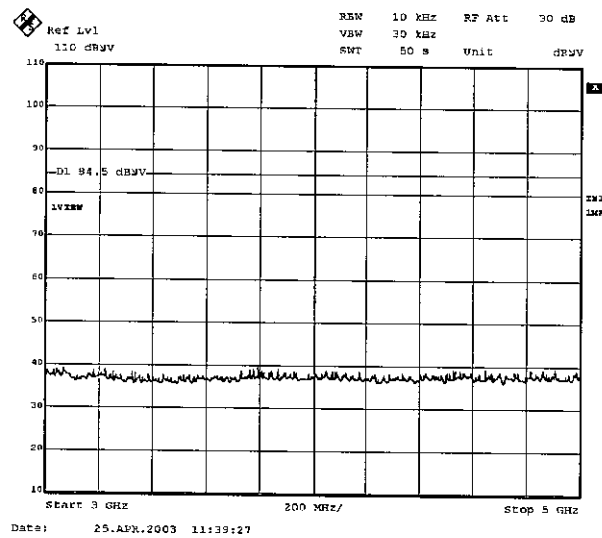


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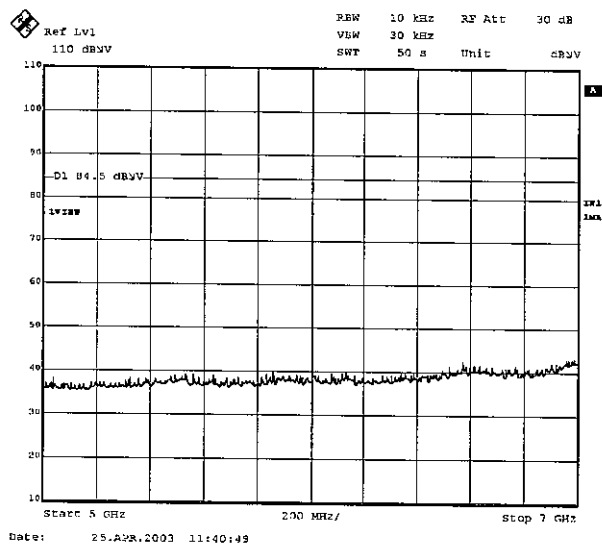
Y. Imamura



5.



6.



Test Report No :23GE0033-YK

APPENDIX 3 Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No.	Test Item	Calibration Date * Interval(month)
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
KAT6-01	Attenuator	INMET	18N-6dB	RE	2003/05/12 * 12
KBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/02/06 * 12
KCC-10/11/12/1 3/18	Coaxial Cable	Fujikura/Suhner	8D-2W/12D-SF A/S04272B/S0 4272B/S04272B	RE	2002/08/17 * 12
KCC-D11/D12	Coaxial cable	Suhner/storm	SCOFLEX103/ 90-388-020	RE	2002/11/25 * 12
KFL-01	Highpass Filter	Hewlett Packard	84300 80038	RE	2003/04/18 * 12
KHA-01	Horn Antenna	A.H.Systems	SAS-200/571	RE	2002/07/14 * 12
KLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/02/19 * 12
KOTS-01	Open Test Site	JSE	30m	RE	2002/08/18 * 12
KTR-01	Test Receiver	Rohde & Schwarz	ES140	RE/AT	2002/07/22 * 12
KCC-A3	Coaxial Cable	Fujikura	5D-2W	AT	2002/08/17 * 12

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

Test Item:

RE: Radiated emission test

AT: Antenna terminal conducted test