

# **EMI TEST REPORT**

**Test Report No. : 22DE0013-YW**

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**Applicant:** OMRON Corporation

**Type of Equipment:** Read/Write Antenna

**Model No.:** V690-HMG01

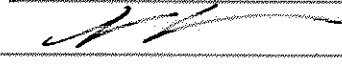

**FCC ID:** E4E 6CY CIDV6900101

**Test standard:** FCC Part 15 Subpart C. 245

**Test Result:** Complied

1. This test report shall not be reproduced in full or partial, without the written approval of A-Pex International Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

**Date of test:** November 11, 12 and 13 2001      **Issued date:** December 7, 2001

**Tested by:**       **Approved by:**   
Naoki Sakamoto      Kazutoyo Nakanishi  
EMC section      Section Manager of EMC section

**NVLAP<sup>®</sup>**  
NVLAP Lab. code : 200109-0

This laboratory is accredited by the NIST/NVLAP, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.

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**A-pex International Co., Ltd.**  
**YOKOWA LAB.**

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MF060b(22.05.01)

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## **SECTION 1: Client information**

Company name : OMRON Corporation  
Address : Shimokaiinji, Nagaokakyo-City, Kyoto, 617-8510 Japan  
Telephone Number : +81-75-957-9849  
Facsimile Number : +81-75-951-5124  
Contact Person : Kazunori Morikawa

## **SECTION 2: Equipment under test (E.U.T.)**

### **2.1 Identification of E.U.T.**

Type of Equipment : Read/Write Antenna  
Model No. : V690-HMG01  
Serial No. : PHASE5-0001  
Condition of EUT : Production prototype  
Country of Manufacture : Japan  
Receipt Date of Sample : November 9, 2001

### **2.2 Product Description**

Model: V690-HMG01, which is referred to as the EUT in this report, is a Read/Write Antenna.  
Specifications is as follows;

Frequency : 2437.5MHz – 2460.0MHz(10 Channels)  
Modulation : ASK  
Output power : 5mW(2m Mode)  
Antenna Gain : 14.5dBi(Max)  
Antenna type : Integral  
\*FccPart15.203 Antenna requirement  
V690-HMG01 complies with this requirement  
CPU : 14.7456MHz  
PLL : 10.0MHz  
Power Supply : DC24V

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### **SECTION 3: Test specification, methods & procedures**

#### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C  
Title : FCC 47CFR Part15 Radio Frequency Device  
Subpart C Intentional Radiators  
§ 15.245 Operation within the Band 2435 – 2465MHz

#### **3.2 Methods & Procedures**

No.	Item	Test Procedure	Specification	Remarks
1	Electric Field Strength of Fundamental Emission	ANSI C63.4:1992	§ 15.245(a)	-
2	Electric Field Strength of Spurious Emission	ANSI C63.4:1992	§ 15.245(b) / § 15.209	-

#### **3.3 Additions or deviations to standards**

No addition, deviation nor exclusion have been made from standards.

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**SECTION 4: Operation of E.U.T. during testing**

**4.1 Operating Modes**

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

The operating mode/system were as follows:

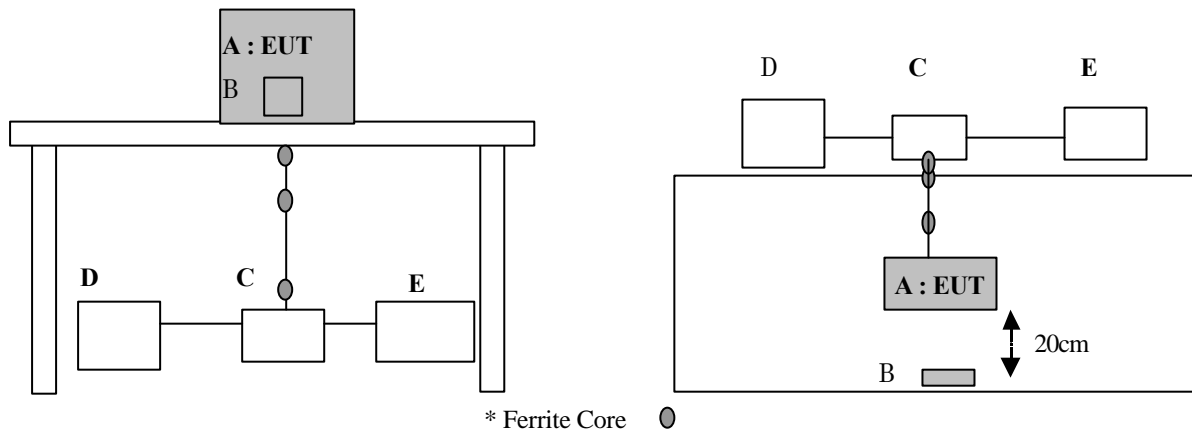
- Operation : Transmitting mode(2m Mode)
  - Low Channel(0) : 2437.5MHz
  - Mid Channel (5) : 2450.0MHz
  - High Channel (9) : 2460.0MHz
- Standby mode

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

**4.2 Configuration and peripherals**

**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	Remark
A	Read/Write Antenna	V690-HMG01	PHASE5-0001	OMRON	E4E 6CY CIDV6900101	EUT
B	ID TAG	V690-D8KR01	12Z000003524	OMRON	N/A	EUT
C	Switching box	N/A	N/A	OMRON	N/A	-
D	Switching Power Supply	S82K-05024	08300(LotNo)	OMRON	N/A	
E	Personal Computer	AL-N2T 515J5	AB0123456789	Panasonic	DOC	-

**List of cables used**

No.	Name	Length (m)	Shield	Backshell Material
	Antenna Cable	6.2	Y	Polyvinyl chloride
	DC Power Cable	0.6	N	Polyvinyl chloride
	D-Sub Cable	1.3	N	Polyvinyl chloride

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**SECTION 5: Summary of test results**

**5.1 Test results**

No.	Item	Test Procedure	Specification	Worst margin	Result	
1	Electric Field Strength of Fundamental Emission	ANSI C63.4:1992	§ 15.245(a)	Ch5(2450MHz) 0.4dB, Horizontal	Complied	
2	Electric Field Strength of Spurious Emission	ANSI C63.4:1992	§ 15.245(b) / § 15.209	30MHz-1GHz	Ch5(64.9MHz) 2.0dB, Vertical	Complied
				1GHz-26GHz (PK)	Ch0(4.8750GHz) 14.4dB, Vertical	
				1GHz-26GHz (AV)	Ch0,5,9 (4.8750GHz) (4.9000GHz) (4.9201GHz) 0.6dB, Vertical	

**A-PEX INTERNATIONAL hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part15 Subpart C.245**

**5.2 Uncertainty**

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was ± 3.3dB.

The data listed in this test report may exceed the test limit because it does not have enough margin (more than 3.3dB).

The data listed in this test report has enough margin, more than 3.3dB.

**5.3 Test equipment used**

See SECTION 6: Test instruments

**5.4 Test Location**

A-PEX International Co.,Ltd. Yokowa No.2 test site  
 108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 Japan  
 Telephone number : +81-596-39-1485  
 Facsimile number : +81-596-39-0232

This site has been fully described in a report submitted to FCC office, and listed on October 26, 2000 (Registration number: 90411).

\*NVLAP Lab. Code : 200109-0

**5.5 Test Configuration Photographs**

See Appendix 1.

**5.6 Data of EMI Test**

See Appendix 2.

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**SECTION 6: Test instruments**

Instrument	Mfr.	Model No.	Control No.	Test Item	Calibration Date / Interval
Pre Amplifier	Anritsu	MH648A	AF-02	RE	2001/ 3/31 1 year
Pre Amplifier	Hewlett Packard	8449B	AF-04	RE	2001/11/ 3 1 year
Biconical Antenna	Schwarzbeck	BBA9106	BA-05	RE	2001/ 5/ 1 1 year
Horn Antenna	A.H.Systems	SAS-200/571	HA-01	RE	2001/ 5/20 1 years
Horn Antenna	Schwarzbeck	BBHA9170	HA-03	RE	2000/11/23 1 years
Logperiodic Antenna	Schwarzbeck	UHALP9108-A	LA-07	RE	2001/ 9/27 1 year
Spectrum Analyzer	Hewlett Packard	8567A	SA-03	RE	2001/ 3/31 1 year
Spectrum Analyzer	Hewlett Packard	8567A	SA-05	RE	2001/ 3/31 1 year
Test Receiver	Rohde & Schwarz	ESVS10	TR-04	RE	2001/ 4/24 1 year

\* Test Item ; RE: Radiated emission

\*All measurement equipment are traceable to national or international standard.

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## **SECTION 7: Radiated emission**

### **7.1 Operating environment**

The test was carried out in an open site.

Temperature : See data

Humidity : See data

### **7.2 Test configuration**

EUT was placed on a table 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.

A drawing of the set up is shown in the photos of Appendix 1.

### **7.3 Test conditions**

Frequency range : 30MHz-26GHz

Test distance : 3m

EUT position : Table top(Center)

### **7.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m. Pre check measurements were performed within a screened room for ambient noise at high-level, especially from 272MHz to 288MHz.

The measuring antenna height was varied between 1 to 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.

The EUT was put into operation at Transmitting mode and Standby mode

The radiated emission measurements were made with the following detector function of the test receiver and Spectrum Analyzer.

	30MHz-1GHz	1GHz-26GHz	1GHz-26GHz
Detector Type	: T/R QP Detect	:S/A PK Detect	:S/A AV Detect
IF Bandwidth	: 120kHz	: RBW and VBW 1MHz	: RBW 1MHz, VBW10Hz

### **7.6 Results**

Summary of the test results: Pass

Date: November 11,12 and 13, 2001

Tested by: N. Sakamoto

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**A-pex International Co., Ltd.**

**YOKOWA LAB.**

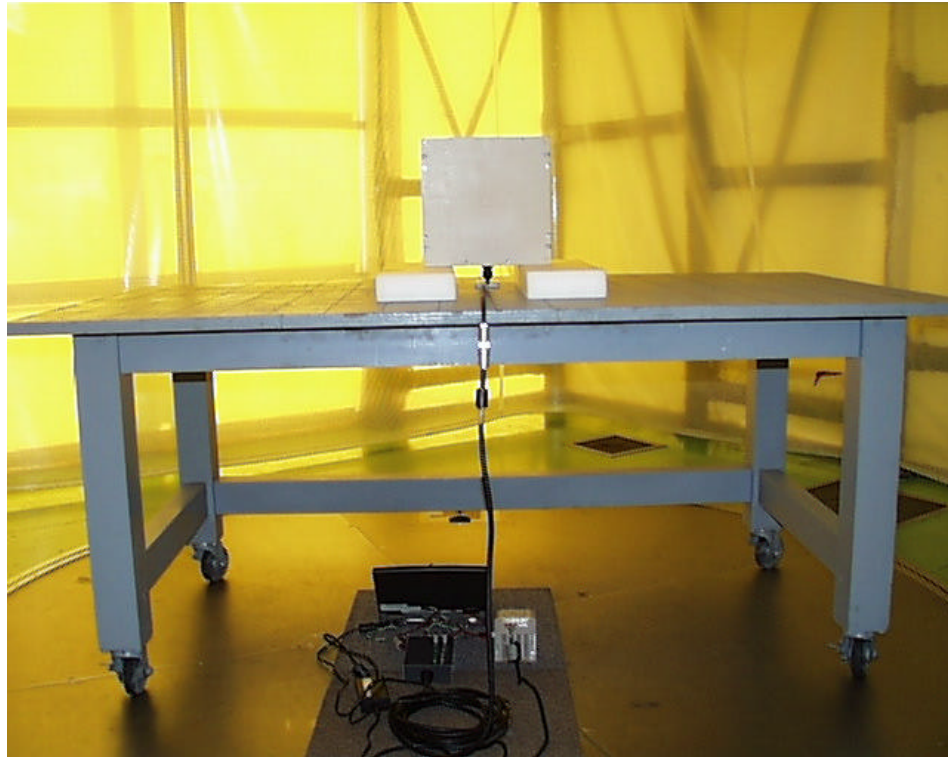
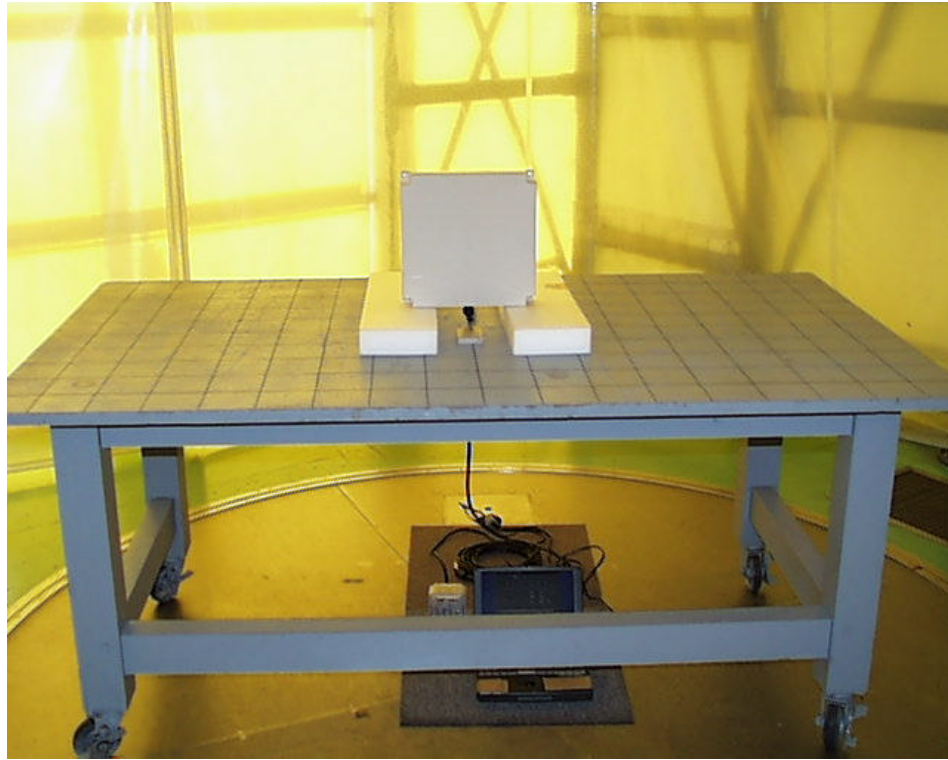
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**APPENDIX 1: Photographs of test setup(Radiated Emission)**



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**APPENDIX 2: Data of EMI test**

This section contains the following data

Page 11 - 17: 15.247(a)Radiated Fundamental emission test

Page 18 - 24: 15.247(b)Radiated Spurious emission test

Page 25 - 27: 6dB Band Width

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# DATA OF FUNDAMENTAL EMISSIONS

A-PEX INTERNATIONAL CO., LTD.  
YOKOWA NO.2 OPEN SITE

COMPANY : OMRON Corporation	REPORT NO : 22DE0013-YW
EQUIPMENT : Read/Write Antenna	REGULATION : Fcc Part15SubpartC 245(a) / 209
MODEL : V690-HMG01	TEST DISTANCE : 3m
FCC ID : E4E 6CY CIDV6900101	DATE : 2001/11/13
POWER : DC24V	Temp./Humi. : 22°C/54%
Mode : Transmitting	

  
 ENGINEER : Naoki. Sakamoto

PK DETECT(S/A : RBW 1MHz and VBW 1MHz)

Ch No.	FREQ [GHz]	S/A READING		ANT Factor	AMP GAIN	CABLE LOSS	ATTEN	RESULT		Limit	MARGIN	
		HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
0	2.4375	106.0	104.9	31.4	34.5	4.6	6.0	113.5	112.4	114.0	0.5	1.6
5	2.4500	106.0	105.0	31.5	34.5	4.6	6.0	113.6	112.6	114.0	0.4	1.4
9	2.4600	105.8	104.6	31.5	34.5	4.7	6.0	113.5	112.3	114.0	0.5	1.7

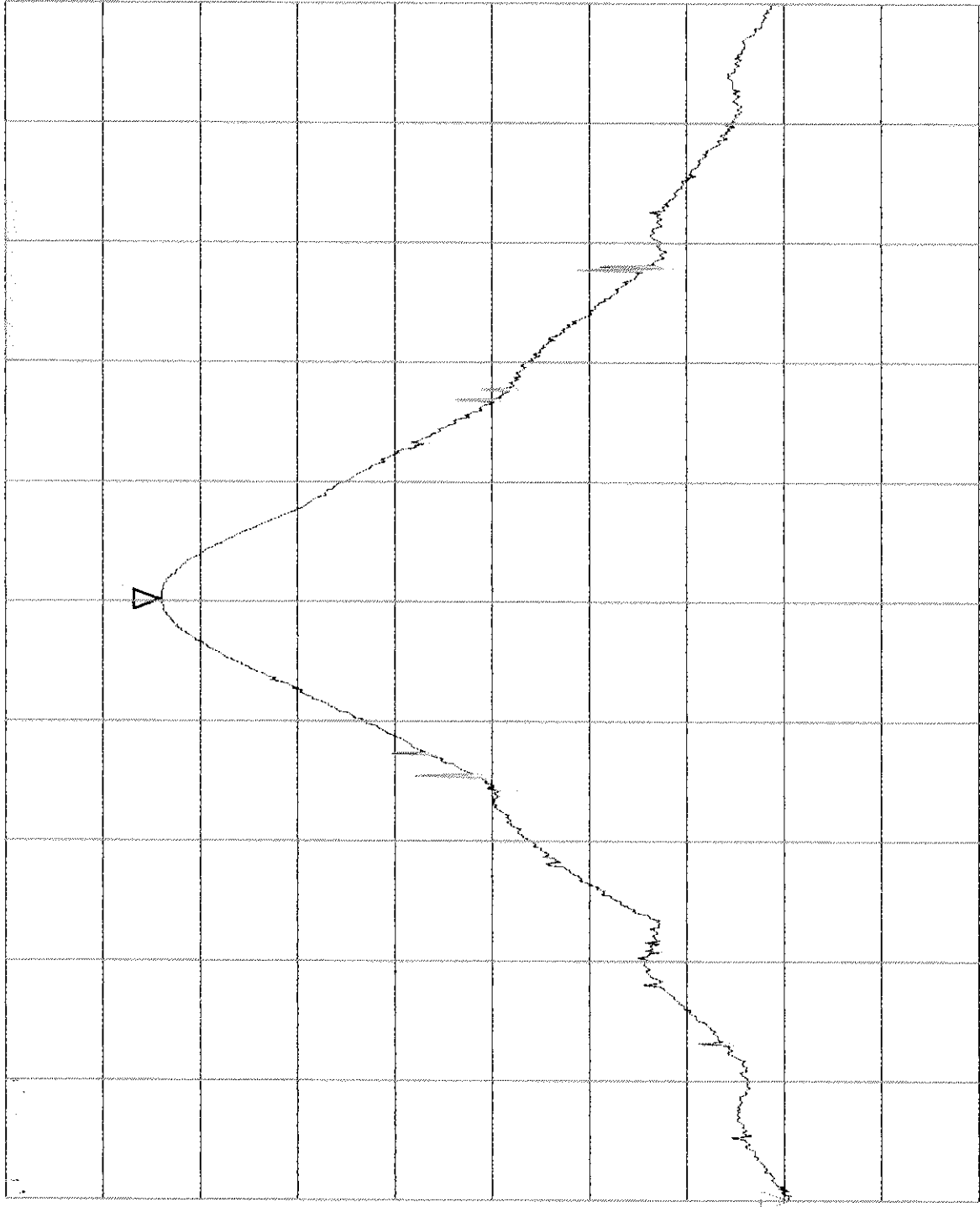
Sample Calculation :

RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + ATTEN.

OMRON/Model: V690-HMG01/FCC ID: E4E 6CY CIDV6900101  
FCC15.245(a)/Ch0/HOR/ReportNo: 22DE0013-YW  
REF 114 dBuV ATT 20 dB

MAKER  
2.4375 GHz  
106.00 dBuV

5dB/



START 2.432490GHZ  
RBW 1MHZ

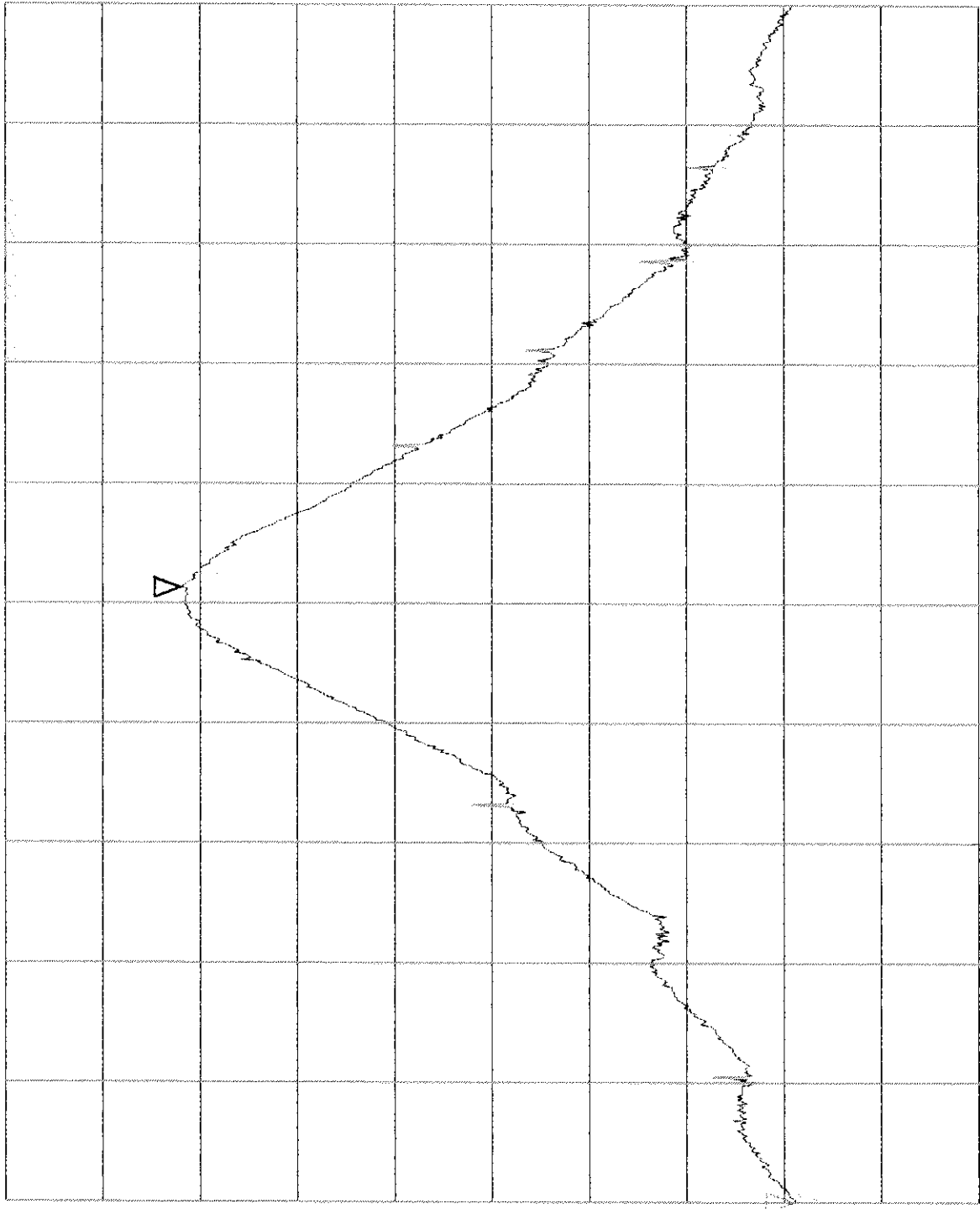
STOP 2.442490GHZ  
SWP 50ms

VBW 1MHZ

OMRON/Model: V690-HMG01/FCC ID: E4E 6CY CIDV6900101  
FCC15.245(a)/Ch0/VER/ReportNo: 22DE0013-YW  
REF 114 dBuV ATT 20 dB

MAKER  
2.4376 GHz  
104.88 dBuV

5dB/



START 2.432490GHZ  
RBW 1MHz

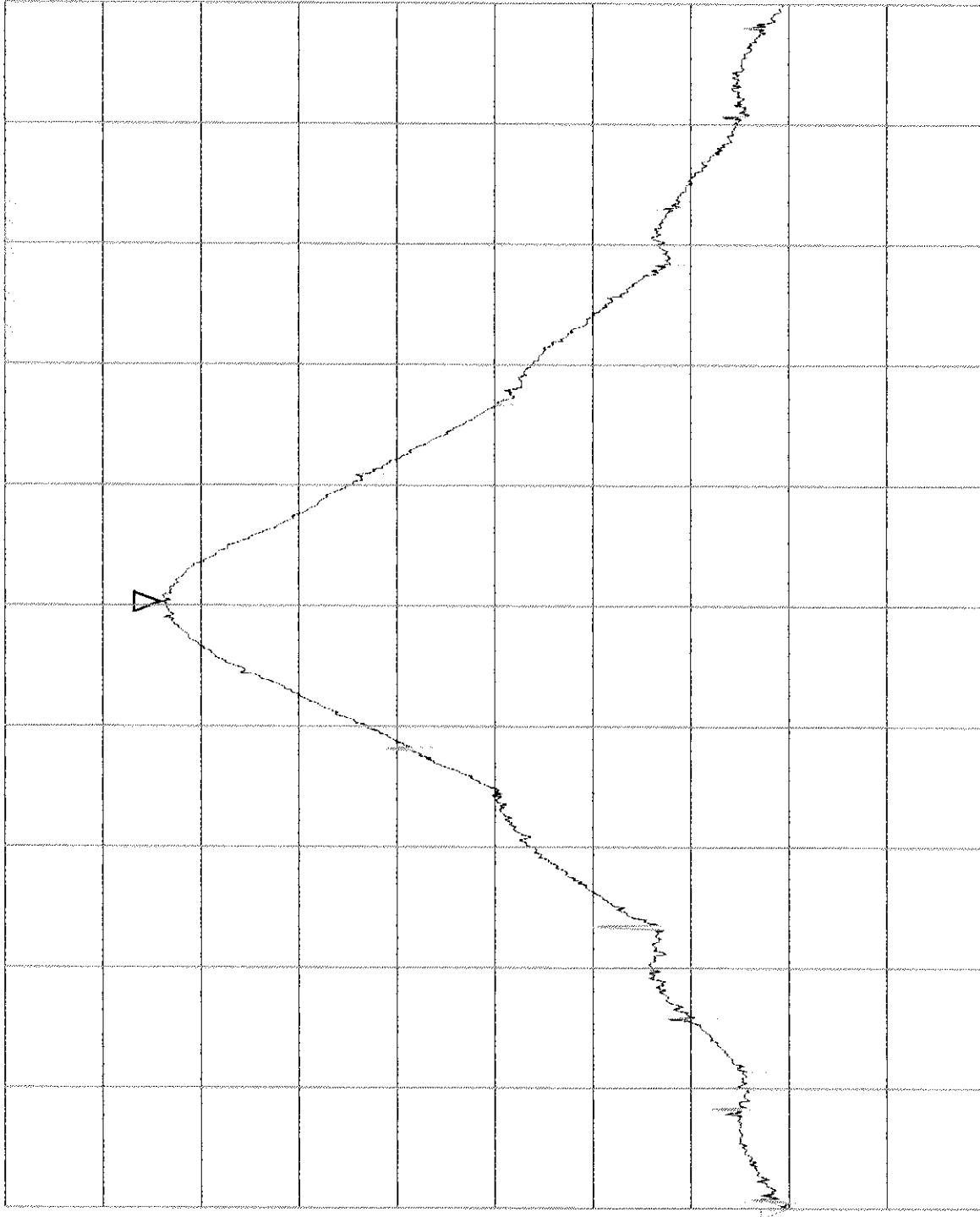
VBW 1MHz

STOP 2.442490GHZ  
SWP 50ms

OMRON/Model: V690-HMG01/FCC ID: E4E 6CY CIDV6900101  
FCC15.245(a)/Ch5/HOR/ReportNo: 22DE0013-YW  
REF 114 dBuV ATT 20 dB

MAKER  
2.4500 GHz  
106.00 dBuV

5dB/



START 2.445000GHZ  
RBW 1MHZ

STOP 2.455000GHZ  
SWP 50ms

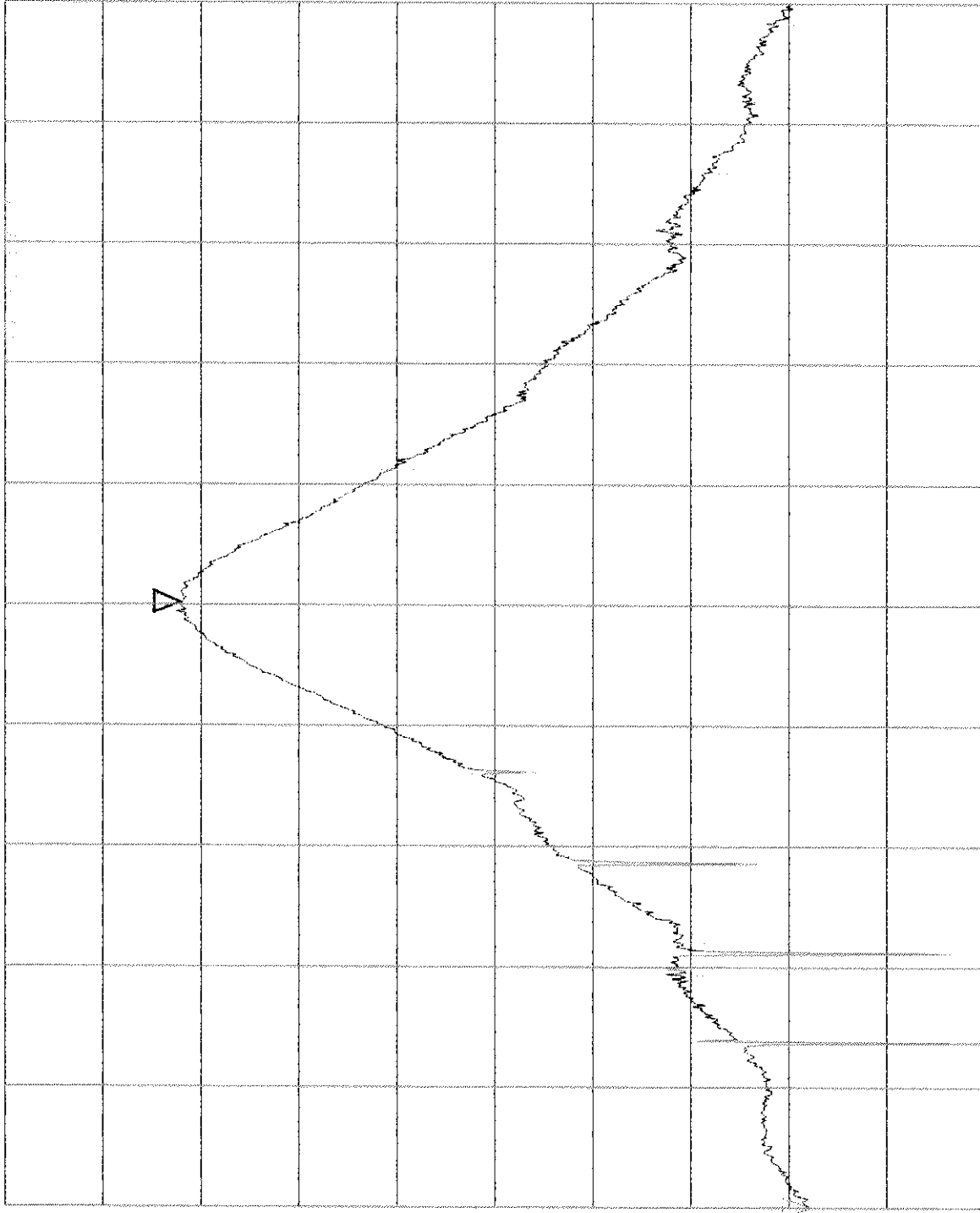
VBW 1MHZ

P 14

OMRON/Model: V690-HMG01/FCC ID: E4E 6CY CIDV6900101  
FCC15.245(a)/Ch5/VER/ReportNo: 22DE0013-YW  
REF 114 dBuV  
ATT 20 dB

NAKER  
2.4500 GHz  
105.00 dBuV

5dB/



START 2.445000GHZ  
RBW 1MHZ

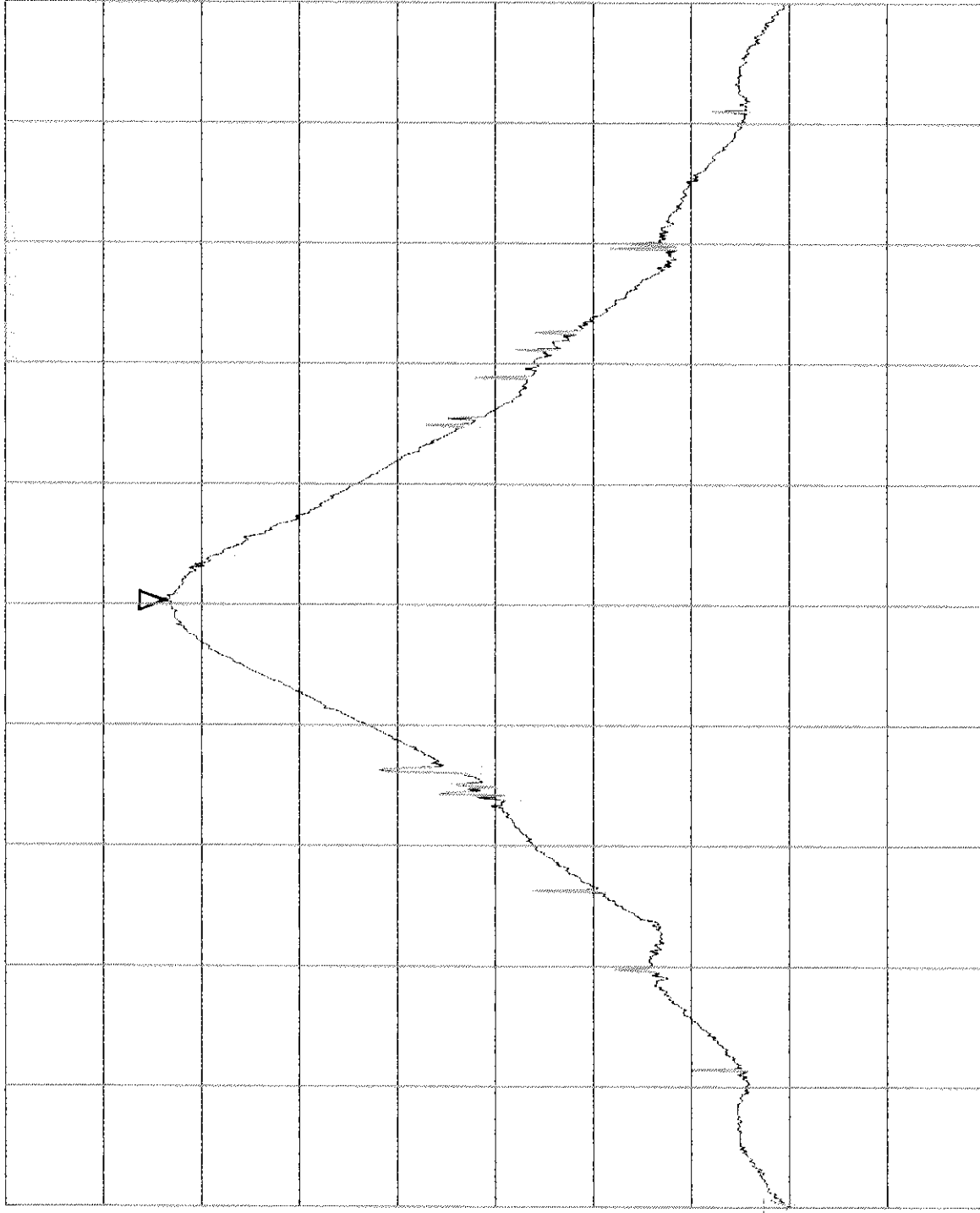
VBW 1MHZ

STOP 2.455000GHZ  
SWP 50ms

OMRON/Model: V690-HMG01/FCC ID: E4E 6CY CIDV6900101  
FCC15.245(a)/Ch9/HOR/ReportNo: 22DE0013-YW  
REF 114 dBuV  
ATT 20 dB

NAKER  
2.4600 GHz  
105.75 dBuV

5dB/



START 2.455000GHZ  
RBW 1MHZ

STOP 2.465000GHZ  
SWP 50ms

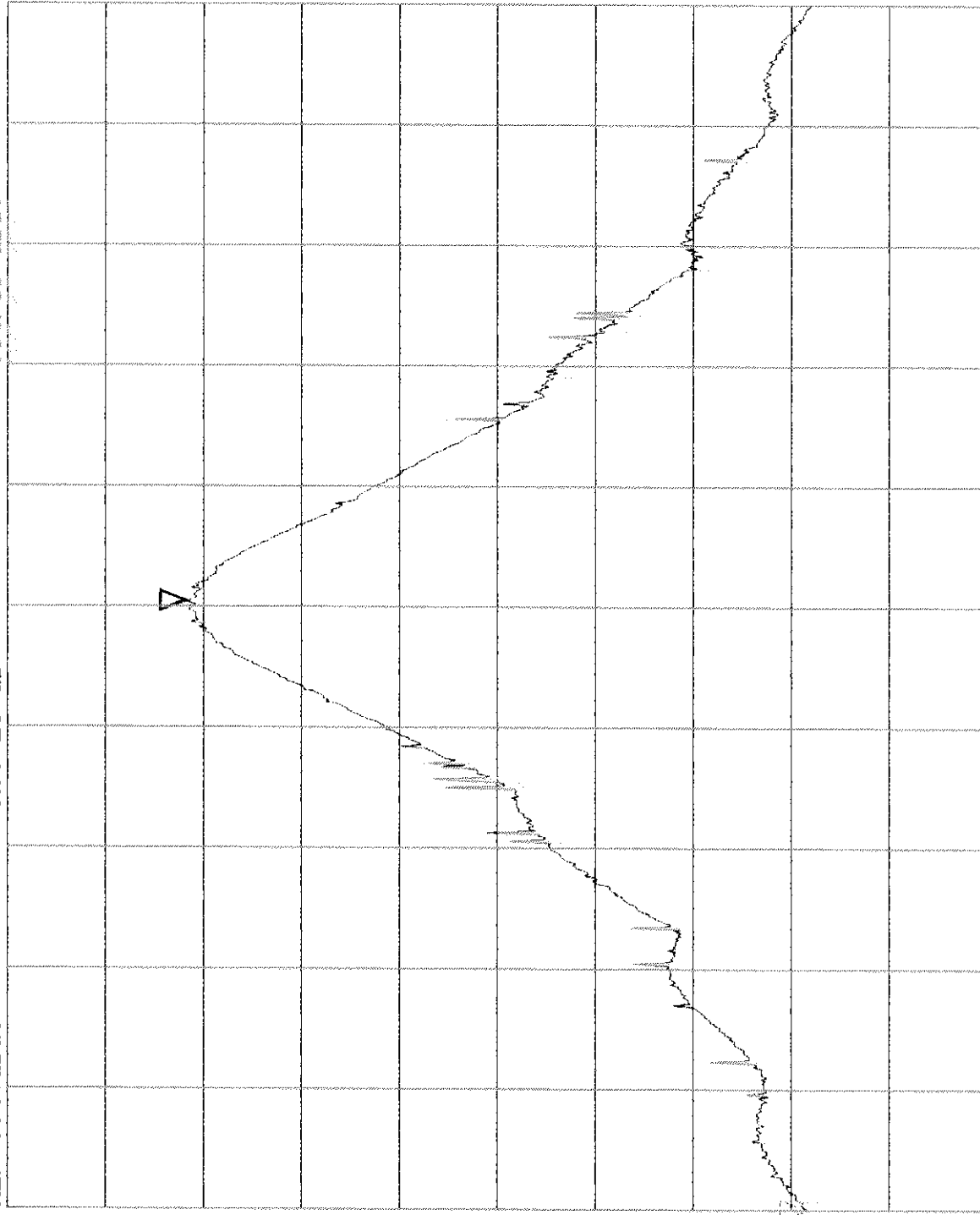
VBW 1MHZ



OMRON/Model: V690-HMG01/FCC ID: E4E 6CY CIDV6900101  
FCC15.245(a)/Ch9/VER/ReportNo: 22DE0013-YW  
REF 114 dBuV ATT 20 dB

NAKER  
2.4600 GHz  
104.65 dBuV

5dB/



START 2.455000GHZ  
RBW 1MHz

STOP 2.465000GHZ  
SWP 50ms

P17

# DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.  
YOKOWA No.2 OPEN TEST SITE  
Report No. : 22DE0013-YW

Applicant : OMRON Corporation  
 Kind of Equipment : Read/Write Antenna  
 Model No. : V690-HMG01  
 Serial No. : PHASE5-0001  
 Power : DC24V  
 Mode : Transmitting (OCh)  
 Remarks : FCC ID : E4E 6CY CIDV6900101  
 Date : 11/11/2001  
 Test Distance : 3 m  
 Temperature : 17 °C  
 Humidity : 48 %  
 Regulation : Fcc 15C § 15. 209 (a)

\_\_\_\_\_  
Engineer : Naoki Sakamoto

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
			HOR [dB μ V]	VER					HOR [dB μ V/m]	VER	HOR [dB]	VER		
1.	43.65	BB	26.1	37.2	13.4	29.8	1.5	6.0	17.2	28.3	40.0	22.8	11.7	
2.	64.92	BB	46.3	53.0	6.9	29.8	1.8	5.8	31.0	37.7	40.0	9.0	2.3	
3.	98.36	BB	32.9	33.7	9.8	29.7	2.2	5.9	21.1	21.9	43.5	22.4	21.6	
4.	240.03	BB	30.5	36.5	16.8	29.7	3.5	5.8	26.9	32.9	46.0	19.1	13.1	
5.	442.35	BB	31.0	27.5	18.7	29.9	5.1	5.8	30.7	27.2	46.0	15.3	18.8	
6.	457.08	BB	31.6	28.4	19.0	29.9	5.2	5.8	31.7	28.5	46.0	14.3	17.5	
7.	908.82	BB	30.8	29.4	24.5	29.1	8.0	6.0	40.2	38.8	46.0	5.8	7.2	

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

All other spurious emissions are more than 20dB below the limits.  
 ANT. TYPE: 30-300MHz Biconical , 300-1000MHz Logperiodic

# DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.  
YOKOWA No.2 OPEN TEST SITE  
Report No. : 22DE0013-YW

Applicant : OMRON Corporation  
 Kind of Equipment : Read/Write Antenna  
 Model No. : V690-HMG01  
 Serial No. : PHASE5-0001  
 Power : DC24V  
 Mode : Transmitting (5Ch)  
 Remarks : FCC ID : E4E 6CY CIDV6900101  
 Date : 11/12/2001  
 Test Distance : 3 m  
 Temperature : 23 °C  
 Humidity : 50 %  
 Regulation : Fcc 15C § 15. 209 (a)

  
 \_\_\_\_\_  
 Engineer : Naoki Sakamoto

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
			HOR [dB μ V]	VER					HOR [dB μ V/m]	VER	HOR [dB]	VER		
1.	43.65	BB	27.6	36.3	13.4	29.8	1.5	6.0	18.7	27.4	40.0	21.3	12.6	
2.	64.92	BB	46.0	53.3	6.9	29.8	1.8	5.8	30.7	38.0	40.0	9.3	2.0	
3.	98.36	BB	32.1	33.8	9.8	29.7	2.2	5.9	20.3	22.0	43.5	23.2	21.5	
4.	240.03	BB	30.2	40.5	16.8	29.7	3.5	5.8	26.6	36.9	46.0	19.4	9.1	
5.	442.35	BB	30.9	25.3	18.7	29.9	5.1	5.8	30.6	25.0	46.0	15.4	21.0	
6.	457.08	BB	31.7	26.2	19.0	29.9	5.2	5.8	31.8	26.3	46.0	14.2	19.7	
7.	908.82	BB	28.8	28.7	24.5	29.1	8.0	6.0	38.2	38.1	46.0	7.8	7.9	

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

All other spurious emissions are more than 20dB below the limits.  
 ANT. TYPE: 30-300MHz Biconical , 300-1000MHz Logperiodic

# DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.  
YOKOWA No.2 OPEN TEST SITE  
Report No. : 22DE0013-YW

Applicant : OMRON Corporation  
 Kind of Equipment : Read/Write Antenna  
 Model No. : V690-HMG01  
 Serial No. : PHASE5-0001  
 Power : DC24V  
 Mode : Transmitting (9Ch)  
 Remarks : FCC ID : E4E 6CY CIDV6900101  
 Date : 11/12/2001  
 Test Distance : 3 m  
 Temperature : 23 °C  
 Humidity : 50 %  
 Regulation : Fcc 15C § 15. 209 (a)

  
 \_\_\_\_\_  
 Engineer : Naoki Sakamoto

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			IIR	VER					IIR	VER		IIR	VER
1.	64.87	BB	45.4	53.0	6.9	29.8	1.8	5.8	30.1	37.7	40.0	9.9	2.3
2.	98.31	BB	31.7	32.8	9.7	29.7	2.2	5.9	19.8	20.9	43.5	23.7	22.6
3.	240.03	BB	27.3	35.8	16.8	29.7	3.5	5.8	23.7	32.2	46.0	22.3	13.8
4.	41.66	BB	28.9	36.8	14.1	29.8	1.4	6.0	20.6	28.5	40.0	19.4	11.5
5.	442.34	BB	28.8	24.1	18.7	29.9	5.1	5.8	28.5	23.8	46.0	17.5	22.2
6.	457.07	BB	31.8	27.0	19.0	29.9	5.2	5.8	31.9	27.1	46.0	14.1	18.9
7.	908.90	BB	27.0	30.4	24.5	29.1	8.0	6.0	36.4	39.8	46.0	9.6	6.2

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

All other spurious emissions are more than 20dB below the limits.  
 ANT. TYPE: 30-300MHz Biconical , 300-1000MHz Logperiodic

# DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.  
YOKOWA No.2 OPEN TEST SITE  
Report No. : 22DE0013-YW

Applicant : OMRON Corporation  
 Kind of Equipment : Read/Write Antenna  
 Model No. : V690-HMG01  
 Serial No. : PHASE5-0001  
 Power : DC24V  
 Mode : Standby  
 Remarks : FCC ID : E4E 6CY CIDV6900101  
 Date : 11/12/2001  
 Test Distance : 3 m  
 Temperature : 23 °C  
 Humidity : 50 %  
 Regulation : Fcc 15C § 15. 209 (a)

  
Engineer : Naoki Sakamoto

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
			IIR	VER					IIR	VER	IIR	VER		
1.	41.66	BB	28.7	36.6	14.1	29.8	1.4	6.0	20.4	28.3	40.0	19.6	11.7	
2.	64.87	BB	45.7	53.0	6.9	29.8	1.8	5.8	30.4	37.7	40.0	9.6	2.3	
3.	98.31	BB	31.6	31.3	9.7	29.7	2.2	5.9	19.7	19.4	43.5	23.8	24.1	
4.	240.03	BB	24.5	27.1	16.8	29.7	3.5	5.8	20.9	23.5	46.0	25.1	22.5	
5.	442.34	BB	27.5	24.2	18.7	29.9	5.1	5.8	27.2	23.9	46.0	18.8	22.1	
6.	457.07	BB	32.8	25.8	19.0	29.9	5.2	5.8	32.9	25.9	46.0	13.1	20.1	

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

All other spurious emissions are more than 20dB below the limits.  
 ANT. TYPE: 30-300MHz Biconical , 300-1000MHz Logperiodic

# DATA OF SUPURIOUS EMISSIONS(1GHz to 26GHz)

A-PEX INTERNATIONAL CO., LTD.  
YOKOWA NO.2 OPEN SITE

COMPANY : OMRON Corporation	REPORT NO : 22DE0013-YW
EQUIPMENT : Read/Write Antenna	REGULATION : Fcc Part15SubpartC 245(b) / 209
MODEL : V690-HMG01	TEST DISTANCE : 3m
FCC ID : E4E 6CY CIDV6900101	DATE : 2001/11/13
POWER : DC24V	Temp. /Humi. : 22°C/54%
Mode : Transmitting(0Ch)	

ENGINEER : Naoki Sakamoto

PK DETECT(S/A : RBW 1MHz and VBW 1MHz)

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN or HPF [dB]	RESULT		Limit PK [dB $\mu$ V/m]	MARGIN	
		HOR [dB $\mu$ V]	VER [dB $\mu$ V]					HOR dB $\mu$ V/m	VER dB $\mu$ V/m		HOR [dB]	VER [dB]
1	2.3900	40.6	40.5	31.3	34.5	4.5	6.0	47.9	47.8	74.0	26.1	26.2
2	4.8750	45.9	49.3	35.6	34.5	8.0	1.2	56.2	59.6	74.0	17.8	14.4
3	7.3212	35.8	36.1	39.2	34.9	10.1	0.9	51.1	51.4	74.0	22.9	22.6
4	9.7500	36.4	36.3	39.2	35.0	11.4	1.1	53.1	53.0	74.0	20.9	21.0
5	12.1876	*	*	43.5	34.4	12.1	1.5	-	-	74.0	-	-
6	14.6251	*	*	42.2	33.1	13.5	1.1	-	-	74.0	-	-
7	17.0626	*	*	43.8	33.4	14.8	1.1	-	-	74.0	-	-
8	19.5001	*	*	38.0	33.4	15.8	1.0	-	-	74.0	-	-
9	21.9376	*	*	37.8	33.0	16.5	0.8	-	-	74.0	-	-
10	24.3752	*	*	39.6	33.2	16.8	0.7	-	-	74.0	-	-

AV DETECT(S/A : RBW 1MHz and VBW 10Hz)

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN or HPF [dB]	RESULT		Limit AV [dB $\mu$ V/m]	MARGIN	
		HOR [dB $\mu$ V]	VER [dB $\mu$ V]					HOR dB $\mu$ V/m	VER dB $\mu$ V/m		HOR [dB]	VER [dB]
1	2.3900	29.2	29.1	31.3	34.5	4.5	6.0	36.5	36.4	54.0	17.5	17.6
2	4.8750	39.6	43.1	35.6	34.5	8.0	1.2	49.9	53.4	54.0	4.1	0.6
3	7.3212	25.5	25.8	39.2	34.9	10.1	0.9	40.8	41.1	54.0	13.2	12.9
4	9.7500	25.9	26.2	39.2	35.0	11.4	1.1	42.6	42.9	54.0	11.4	11.1
5	12.1876	*	*	43.5	34.4	12.1	1.5	-	-	54.0	-	-
6	14.6251	*	*	42.2	33.1	13.5	1.1	-	-	54.0	-	-
7	17.0626	*	*	43.8	33.4	14.8	1.1	-	-	54.0	-	-
8	19.5001	*	*	38.0	33.4	15.8	1.0	-	-	54.0	-	-
9	21.9376	*	*	37.8	33.0	16.5	0.8	-	-	54.0	-	-
10	24.3752	*	*	39.6	33.2	16.8	0.7	-	-	54.0	-	-

Sample Calculation :

RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + ATTEN. Or HPF(High Pass Filter)

Except for the above table : All other spurious emissions are more than 20dB below the limit.

\*Emissions did not detect.

Data No 1 : Atten.

Data No 2 10 : High Pass Filter

# DATA OF SUPURIOUS EMISSIONS(1GHz to 26GHz)

A-PEX INTERNATIONAL CO., LTD.  
YOKOWA NO.2 OPEN SITE

COMPANY : OMRON Corporation	REPORT NO : 22DE0013-YW
EQUIPMENT : Read/Write Antenna	REGULATION : Fcc Part15SubpartC 245(b) / 209
MODEL : V690-HMG01	TEST DISTANCE : 3m
FCC ID : E4E 6CY CIDV6900101	DATE : 2001/11/13
POWER : DC24V	Temp./Humi. : 22°C/54%
Mode : Transmitting (5Ch)	

ENGINEER : Naoki Sakamoto

PK DETECT(S/A : RBW 1MHz and VBW 1MHz)

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	HPF [dB]	RESULT		Limit PK [dB $\mu$ V/m]	MARGIN	
		HOR [dB $\mu$ V]	VER [dB $\mu$ V]					HOR [dB $\mu$ V/m]	VER [dB $\mu$ V/m]		HOR [dB]	VER [dB]
1	4.9000	46.2	48.5	35.7	34.5	8.0	1.2	56.6	58.9	74.0	17.4	15.1
2	7.3500	36.1	36.6	39.2	34.9	10.1	0.9	51.4	51.9	74.0	22.6	22.1
3	9.8000	36.4	36.5	39.2	34.9	11.4	1.1	53.2	53.3	74.0	20.8	20.7
4	12.2500	*	*	43.4	34.3	12.3	1.5	-	-	74.0	-	-
5	14.7000	*	*	42.6	33.1	13.6	1.1	-	-	74.0	-	-
6	17.1500	*	*	43.8	33.2	14.8	1.1	-	-	74.0	-	-
7	19.6000	*	*	38.0	33.4	15.9	1.4	-	-	74.0	-	-
8	22.0500	*	*	37.8	33.0	16.5	0.6	-	-	74.0	-	-
9	24.5000	*	*	39.5	33.2	16.8	0.5	-	-	74.0	-	-

AV DETECT(S/A : RBW 1MHz and VBW 10Hz)

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	HPF [dB]	RESULT		Limit AV [dB $\mu$ V/m]	MARGIN	
		HOR [dB $\mu$ V]	VER [dB $\mu$ V]					HOR [dB $\mu$ V/m]	VER [dB $\mu$ V/m]		HOR [dB]	VER [dB]
1	4.9000	40.0	43.0	35.7	34.5	8.0	1.2	50.4	53.4	54.0	3.6	0.6
2	7.3500	25.8	25.9	39.2	34.9	10.1	0.9	41.1	41.2	54.0	12.9	12.8
3	9.8000	26.1	26.0	39.2	34.9	11.4	1.1	42.9	42.8	54.0	11.1	11.2
4	12.2500	*	*	43.4	34.3	12.3	1.5	-	-	54.0	-	-
5	14.7000	*	*	42.6	33.1	13.6	1.1	-	-	54.0	-	-
6	17.1500	*	*	43.8	33.2	14.8	1.1	-	-	54.0	-	-
7	19.6000	*	*	38.0	33.4	15.9	1.4	-	-	54.0	-	-
8	22.0500	*	*	37.8	33.0	16.5	0.6	-	-	54.0	-	-
9	24.5000	*	*	39.5	33.2	16.8	0.5	-	-	54.0	-	-

Sample Calculation :

RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + HPF(High Pass Filter)

Except for the above table : All other spurious emissions are more than 20dB below the limit.

\*Emissions did not detect.

# DATA OF SUPURIOUS EMISSIONS(1GHz to 26GHz)

A-PEX INTERNATIONAL CO., LTD.  
YOKOWA NO.2 OPEN SITE

COMPANY : OMRON Corporation	REPORT NO : 22DE0013-YW
EQUIPMENT : Read/Write Antenna	REGULATION : Fcc Part15SubpartC 245(b) / 209
MODEL : V690-HMG01	TEST DISTANCE : 3m
FCC ID : E4E 6CY CIDV6900101	DATE : 2001/11/13
POWER : DC24V	Temp. /Humi. : 22°C/54%
Mode : Transmitting(9Ch)	

ENGINEER : Naoki Sakamoto

PK DETECT(S/A : RBW 1MHz and VBW 1MHz)

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN or HPF [dB]	RESULT		Limit PK [dB $\mu$ V/m]	MARGIN	
		HOR [dB $\mu$ V]	VER [dB $\mu$ V]					HOR [dB $\mu$ V/m]	VER [dB $\mu$ V/m]		HOR [dB]	VER [dB]
1	2.4835	49.2	47.6	31.6	34.5	4.7	6.0	57.0	55.4	74.0	17.0	18.6
2	4.9201	45.5	48.3	35.8	34.5	8.0	1.2	56.0	58.8	74.0	18.0	15.2
3	7.3802	36.0	36.5	39.2	34.9	10.1	0.9	51.3	51.8	74.0	22.7	22.2
4	9.8403	35.9	36.1	39.2	34.9	11.4	1.1	52.7	52.9	74.0	21.3	21.1
5	12.3003	*	*	43.3	34.2	12.3	1.5	-	-	74.0	-	-
6	14.7604	*	*	42.9	33.0	13.7	1.2	-	-	74.0	-	-
7	17.2205	*	*	43.9	33.1	14.8	0.8	-	-	74.0	-	-
8	19.6805	*	*	38.0	33.4	16.0	1.6	-	-	74.0	-	-
9	22.1406	*	*	38.3	33.0	16.5	0.7	-	-	74.0	-	-
10	24.6007	*	*	39.4	33.2	16.8	0.6	-	-	74.0	-	-

AV DETECT(S/A : RBW 1MHz and VBW 10Hz)

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN or HPF [dB]	RESULT		Limit AV [dB $\mu$ V/m]	MARGIN	
		HOR [dB $\mu$ V]	VER [dB $\mu$ V]					HOR [dB $\mu$ V/m]	VER [dB $\mu$ V/m]		HOR [dB]	VER [dB]
1	2.4835	38.1	36.8	31.6	34.5	4.7	6.0	45.9	44.6	54.0	8.1	9.4
2	4.9201	39.3	42.9	35.8	34.5	8.0	1.2	49.8	53.4	54.0	4.2	0.6
3	7.3802	26.0	25.9	39.2	34.9	10.1	0.9	41.3	41.2	54.0	12.7	12.8
4	9.8403	26.1	26.0	39.2	34.9	11.4	1.1	42.9	42.8	54.0	11.1	11.2
5	12.3003	*	*	43.3	34.2	12.3	1.5	-	-	54.0	-	-
6	14.7604	*	*	42.9	33.0	13.7	1.2	-	-	54.0	-	-
7	17.2205	*	*	43.9	33.1	14.8	0.8	-	-	54.0	-	-
8	19.6805	*	*	38.0	33.4	16.0	1.6	-	-	54.0	-	-
9	22.1406	*	*	38.3	33.0	16.5	0.7	-	-	54.0	-	-
10	24.6007	*	*	39.4	33.2	16.8	0.6	-	-	54.0	-	-

Sample Calculation :

RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + ATTEN. Or HPF(High Pass Filter)

Except for the above table : All other spurious emissions are more than 20dB below the limit.

\*Emissions did not detect.

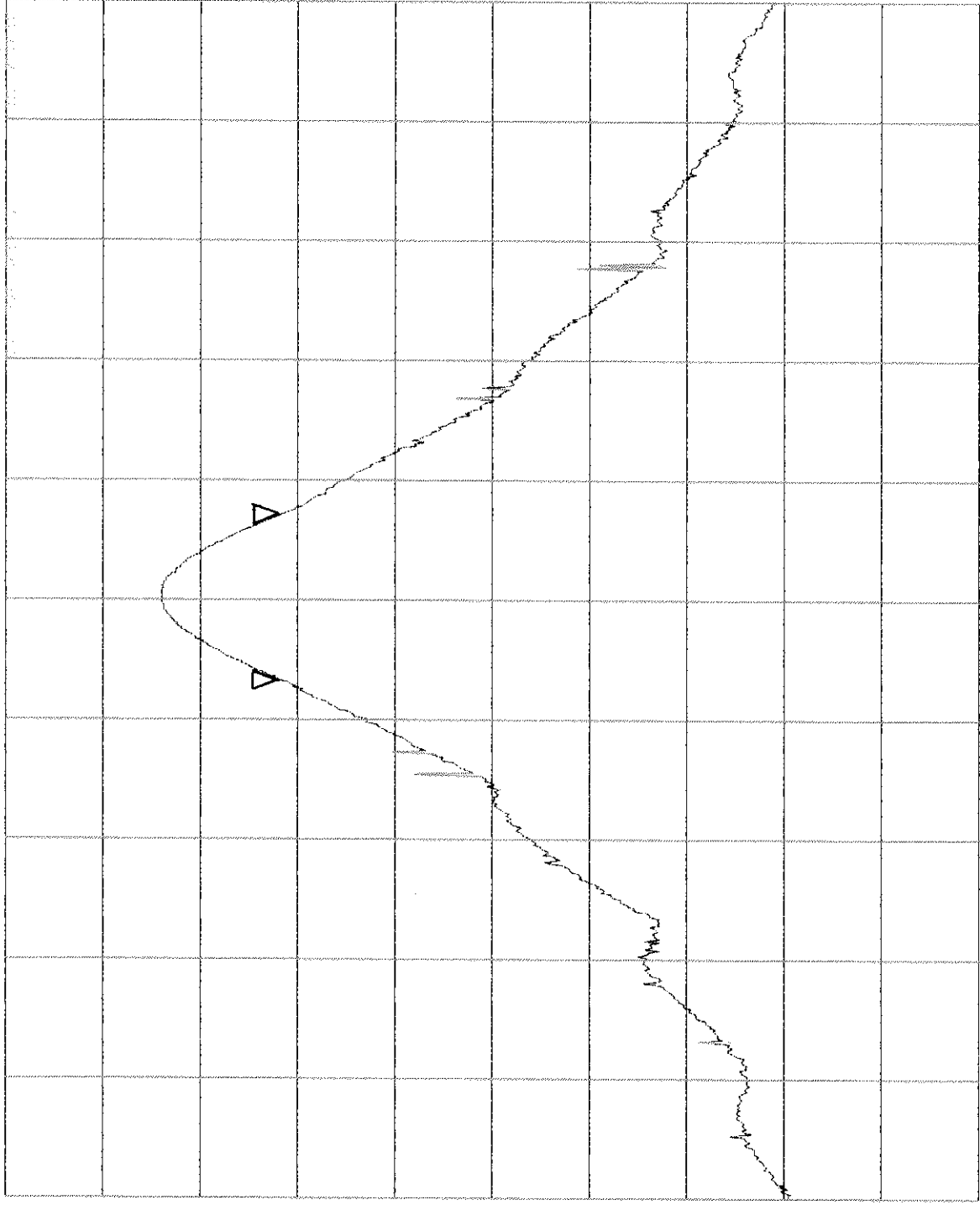
Data No 1 : Atten.

Data No 2-10 : High Pass Filter



OMRON/Model: V690-HMG01/FCC ID: E4E 6CY CIDV6900101  
6dB Bandwidth/Ch0/HOR/ReportNo: 22DE0013-YW  
REF 114 dBuV ATT 20 dB  
MAKER 2.4368 GHz  
Δ MAKER 1.3857 MHz  
99.88 dBuV .00 dBuV

5dB/



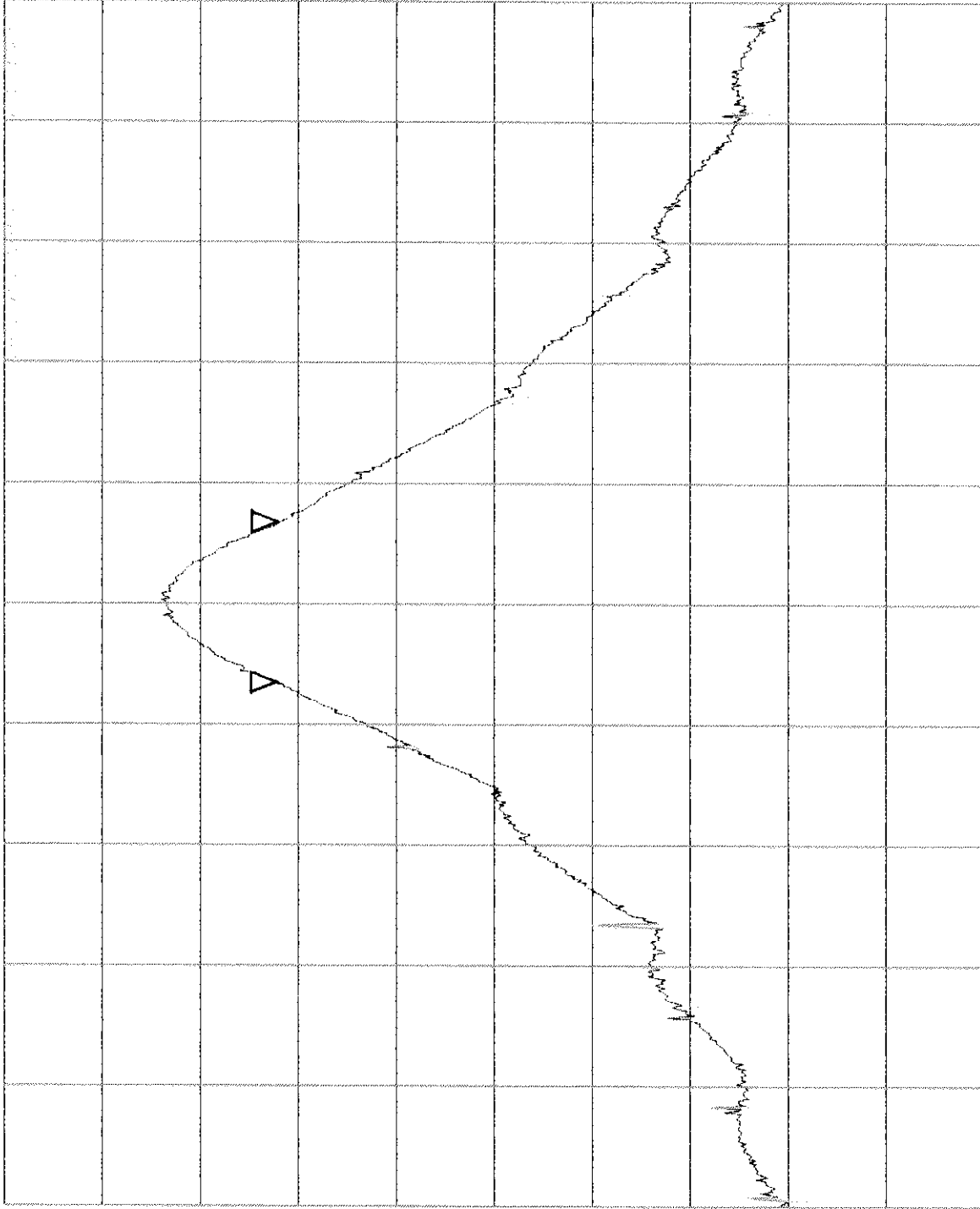
START 2.432490GHZ  
RBW 1MHZ

STOP 2.442490GHZ  
SWP 50ms

OMRON/Model: V690-HMG01/FCC ID: E4E 6CY CIDV6900101  
6dB Bandwidth/Ch5/HOR/ReportNo: 22DE0013-YW  
REF 114 dBuV ATT 20 dB

NAVER 2.4493 GHz 100.00 dBuV  
ΔNAVER 1.3286 MHz .00 dBuV

5dB/



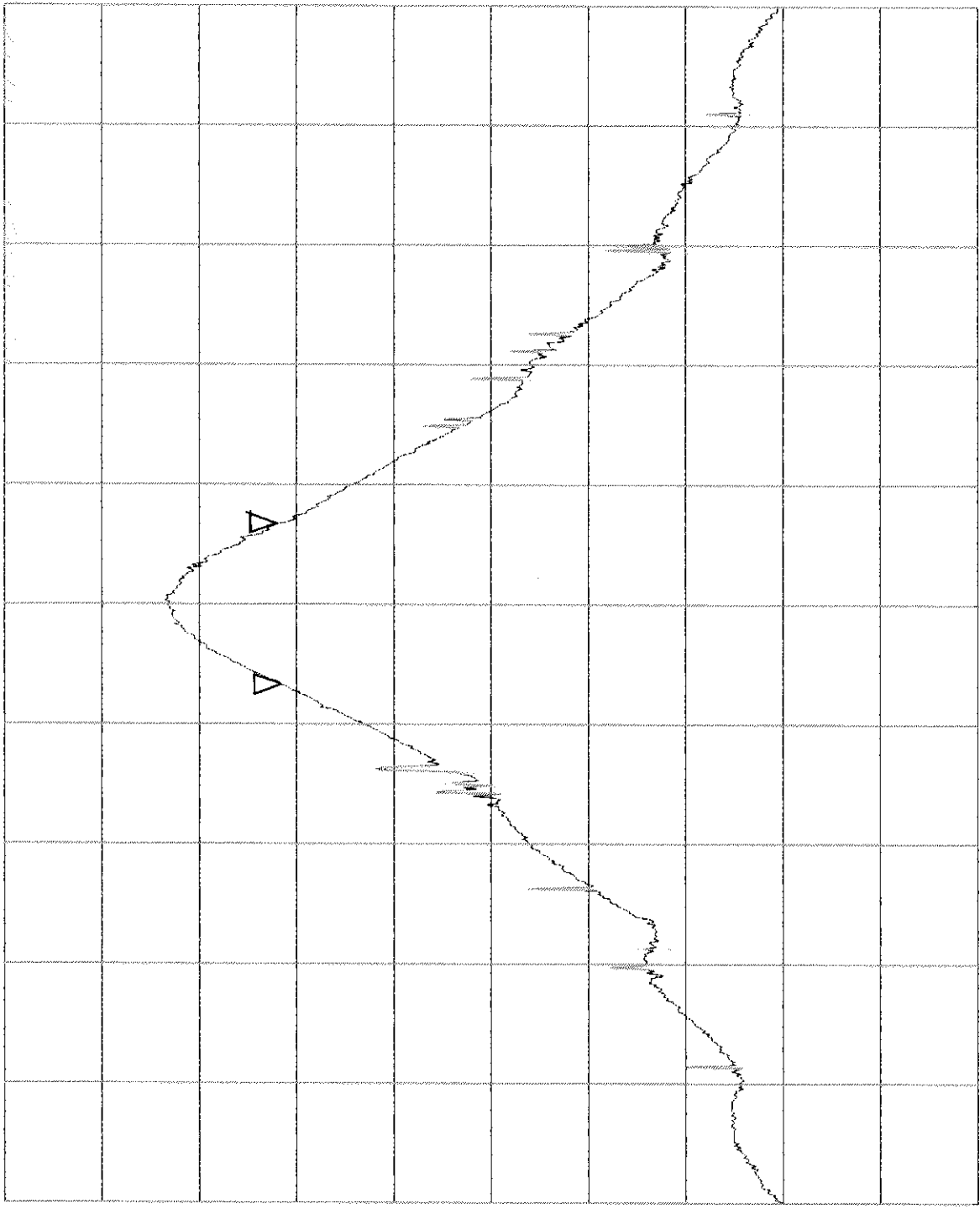
START 2.445000GHZ  
RBW 1MHZ

STOP 2.455000GHZ  
SMP 50ms

VBW 1MHZ

OMRON/Model: V690-HMG01/FCC ID: E4E 6CY CIDV6900101  
6dB Bandwidth/Ch9/HOR/ReportNo: 22DE0013-YW  
REF 114 dBuV  
ATT 20 dB  
NAKER  
2.4607 GHz  
100.00 dBuV  
ΔMAKER  
-1.3429 MHz  
-25 dBuV

5dB/



START 2.455000GHz RBW 1MHz  
STOP 2.465000GHz SWP 50ms  
VBW 1MHz