

15.247 Certification  
FCC ID : IMKRL26307M

EMI TEST REPORT

On

RangeLAN2 6307-05  
Mini ISA Design-in Card

With

Centurion CXR-2.4 GHz-TNSP 1.0 dBi antenna  
Intermec 248X SMB 1.0 dBi Antenna  
Intermec 2.4 GHz SMB 1.5 dBi antenna  
Intermec 2.4 GHz TNC 1.0 dBi antenna  
Intermec 2.4 GHz SMC1.0 dBi Antenna  
Norand F – Styl e 1.0 dBi Antenna

Prepared for

Proxim, Inc.  
295 N. Bernardo Ave  
Mountain View, CA 94043  
Tel : (650)960-1630  
Fax: (650)960-1984

Prepared by

Electronic Compliance Laboratories Inc.  
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Sunnyval e, CA 94089  
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Test Report Number: A812004  
Date of Test: December 9 and 14, 1998

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## 1.0 TEST FACILITY

Name: Electronic Compliance Laboratories  
Location: 1249 Birchwood Dr.  
Sunnyvale, CA 94089  
Site Filing: A site description is on file at the Federal Communications  
Commission  
P.O. Box 429  
Columbia, MD 21045  
NVLAP LAB CODE: 200089  
Types of Sites: Open Field Radiated and Indoor Screen Room (Line  
Conducted). All sites are constructed and calibrated to  
meet ANSI C63.4-1994 requirements.

## 2.0 TEST EQUIPMENT

Description	Manufacturer	Model	SN
EMI Receiver	HP	8546A	3325A00137
Spectrum Analyzer	HP	8563A	3137A01183
Preamp	HP	8447F	3113A05849
Preamp	HP	8449B	3008A00527
LISN	EM	ANS-25/2	2532
Biconical Antenna	EM	EM 6912	414
Log Periodic Ant	EM	EM 6950	311
Double Ridge Horn	EM	EM 6961	6231
Filter BP 1.2-45 GHz	FSY	HM 1160-1155	001
Filter BP 4-10 GHz	FSY	HM 2950-1565	001
Filter BP 10-18 GHz	FSY	HP 8601- 7SS	001

## 3.0 EUT

RangeLAN2 6307-05

Model Number - 6307  
Serial Number - 8FFB  
FCC ID: - IMKRL26307M

Centurion CXR-2.4 GHz-TNSP 1.0 dBi Antenna P/N CAF28771  
Intermec 248X SMB 1.0 dBi Antenna P/N 066147  
Intermec 2.4 GHz SMB 1.5 dBi Antenna P/N 063825  
Intermec 2.4 GHz TNC 1.0 dBi Antenna P/N 060751  
Intermec 2.4 GHz SMC1.0 dBi Antenna P/N 060750  
Norand F – Style 1.0 dBi Antenna P/N 650-277

## 4.0 SUPPORT EQUIPMENT

Dell Computer - M/N 466LN S/N 5Q8D4  
Logitech Mouse - M/N M-S34-6MD S/N LZA54637080  
Packard Bell Keyboard - M/N 7939 S/N 841180007  
KFC Monitor - M/N CA1511 S/N A4KKU4931207

## 5.0 EQUIPMENT CONFIGURATION

The RangeLAN2 6307-05 Mini ISA Design-in card was designed to be a drop-in spread spectrum device that has already been FCC certified so that customers purchasing the product would not have to apply for an intentional radiator certification.

In order to prove the module will pass all requirements in a stand alone configuration a desktop PC was used to provide DC power and to allow test commands to be sent and data received. The card was placed outside of the PC shell.

All of the equipment and cables were placed in worst case positions to maximize emissions.

Interconnecting cables were of the type and length specified in the individual equipment requirements.

Grounding was in accordance with the manufacturer requirements and conditions for intended use.

## 6.0 SUMMARY OF TESTS

The RangeLAN2 6307-05 is a mini ISA card with a low power frequency hopping spread spectrum (FHSS) radio system operating in the 2400-2483.5 MHz band. Tests were performed with one antenna. Test firmware resident in the EUT and RL2DIAG.exe were used to do the test.

### 6.1 15.247(a)(1) FREQUENCY HOPPING SYSTEMS

RangeLAN2 - 6307 uses 79 channels, each 1 MHz wide. The system hops over one of 15 pseudorandom sequences. On average, each channel is used equally. Please refer to " RangeLAN 2 Frequency Hopping Theory of Operation" attached to this submission for more details.

#### 6.1.1 15.247(a)(1)(ii) CHANNEL UTILIZATION

A spectrum analyzer plots labeled "Channel Utilization". The total number of channels is 79. The channels used have nominal center frequencies of 2402 through 2480 MHz. Three spectrum analyzer MAX HOLD plots labeled "20 dB Bandwidth" show the 20 dB bandwidth of the hopping channel to be < 1 MHz (.95 / .99 / .94 MHz) at the low / midband / high frequencies of 2.402 / 2.440 / 2.480 GHz. **Test Plots are shown in Appendix A.**

Zero span spectrum analyzer plot labeled "Dwell Time" shows Worst case transmission time in a given slot: 18 ms elapsed time, <100 % duty  
Maximum allowed: 400 msec.

**Test Data in Appendix A.**

#### 6.1.2 15.247(b) MAXIMUM PEAK OUTPUT POWER

The three spectrum analyzer plots labeled " Output Power" show the maximum power of the hopping channel to be 27.1 dBm or 516 mW. The EUT was made to transmit uninterrupted random data on each of the low/mid/high channels. **Test Plots are shown in Appendix A.**

The output was taken from an N connector, through 3 feet of RG 142 cable, to Spectrum Analyzer set on Max Hold with no additional attenuation.

Power = 26.83 dBm (peak reading) +0.3dB cable loss = +27.1 dBm / 516 mW EIRP  
Limit: +30 dBm / 1 W maximum power

Intermec 2.4 GHz SMB 1.5 dBi Antenna  
EIRP = +27.1 (peak power) +1.5 (peak gain, dBi) = +28.6 dBm / 724 mW EIRP  
Limit: +36 dBm / 4 W maximum EIRP

### 6.1.3 15.247(c) OUT OF BAND EMISSIONS

The spectrum analyzer plots titled "Out of Band - Band Edges" shows the output spectrum of the EUT while hopping one of the pseudorandom sequences and continuously transmitting packetized data. The analyzer was placed in MAX HOLD mode, and individual sweeps were recorded continually for 10 minutes with the same spectrum analyzer connection as was used for peak output power. The resultant plot shows that the EUT emissions remain inside the 2400 - 2483.5 MHz band when measured in  $\geq 100$  kHz bandwidth during operation.

The spectrum analyzer plots labeled "Out of Band 30 to 1000 MHz", "Out of Band 1 to 2.75 GHz", and "Out of Band 2.75 to 26.5 GHz" show that emissions measured in  $\geq 100$  kHz bandwidth are more than 20 dB below the highest level of the desired power outside of the 2400 - 2483.5 MHz band. **Test Plots are shown in Appendix A.**

### 6.1.4 15.203 ANTENNA REQUIREMENT

This product has uses an MCX type antenna connector to provide a unique coupling to the intentional radiator. The Manufacturer's control drawings, and the antenna drawings are in **Appendix B.**

### 6.1.5 15.205 RESTRICTED BAND RADIATION LIMITS

The EUT was placed on a wooden table resting on a turntable. The wooden table was approximately 1 meter above the groundplane of the 3 meter test site. The search antenna was moved in to 1 meter when necessary to improve the noise floor, and the appropriate range factor was applied. While the EUT was transmitting uninterrupted random data on each of the low/mid/high channels and with the spectrum analyzer on MAX HOLD, the turntable was rotated, and the search antenna raised and lowered in an attempt to maximize the received radiated emission level. **Test results are attached in Appendix C** in tabular form showing that no spurious signals were detected above the 74 dBuV/m peak/54dBuV/m average limits. Peak measurements were made with a RBW and VBW = 1 MHz. Average measurements were made with a RBW = 1 MHz and a VBW = 10 Hz.

6.1.6 **15.207 AC LINE CONDUCTED EMISSIONS**

The RF line conducted levels for emissions in the 0.45 - 30 MHz band must not exceed 250  $\mu$ V when measured with a LISN. Attached graphs and tabular data show that emissions are below the 250  $\mu$ V (48 dB $\mu$ V) maximum allowed level. **Test Data is in Appendix D.**

6.1.7 **15.209 RADIATED EMISSIONS**

with The attached table shows that the Class B radiated limits from 30 - 1000 MHz are not exceeded by the EUT. The EUT was operating normally a combination of transmission and reception and hopping one of the fifteen pseudorandom sequences during this test. The EUT was placed near one edge of a wooden table resting on a turntable. The wooden table was approximately 1 meter above the groundplane of the 3 meter test site. The search antennas were located at 3 meters. Measurements were made in accordance with ANSI C63.4-1994. **Test Data is in Appendix E.**

Electronic Compliance Laboratories

\_\_\_\_\_  
Chris Byleckie  
Technical Director

\_\_\_\_\_  
Date

**APPENDIX A**  
**SPREAD SPECTRUM PLOTS**

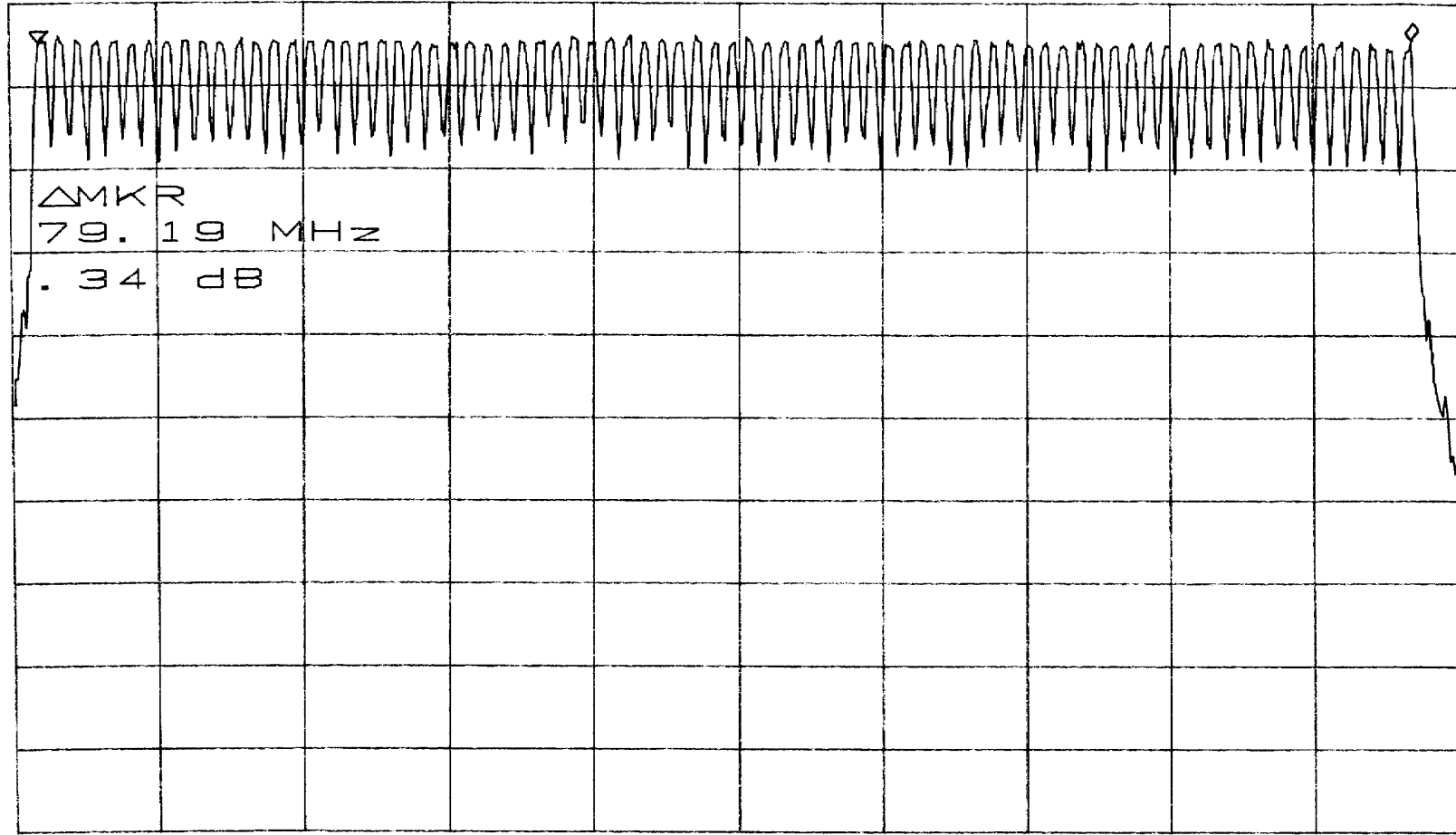


# Channel Utilization

ATTN 40dB  
RL 30.0dBm

10dB/

$\Delta$ MKR .34dB  
79.19MHz



START 2.40000GHz

STOP 2.48350GHz

-RBW 100kHz

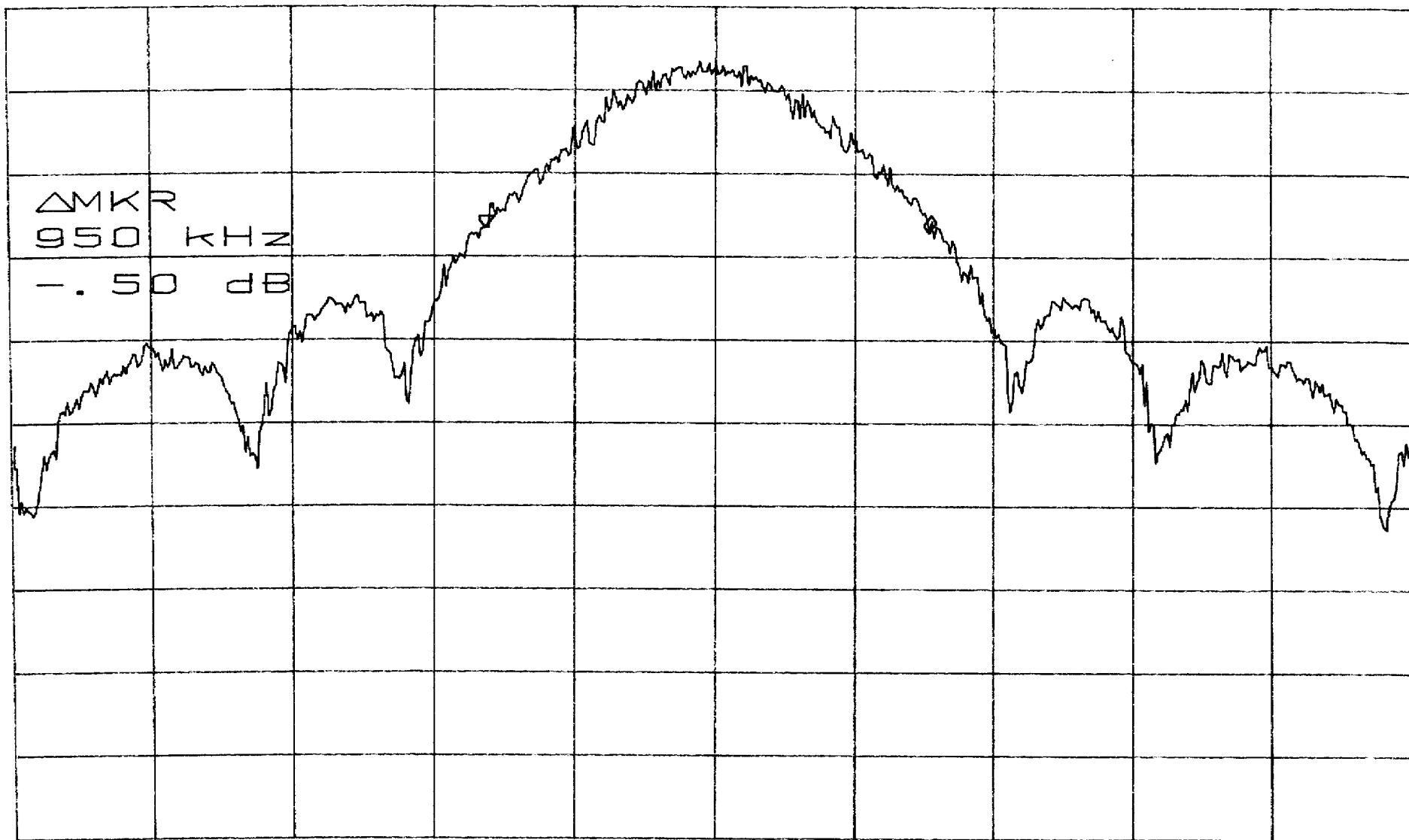
VBW 100kHz

SWP 50ms

20 dB Bandwidth

ATTEN 40dB  
RL 30.0dBm

$\Delta$ MKR -.50dB  
950kHz



CENTER 2.402000GHz

SPAN 3.000MHz

RBW 30kHz

VBW 30kHz

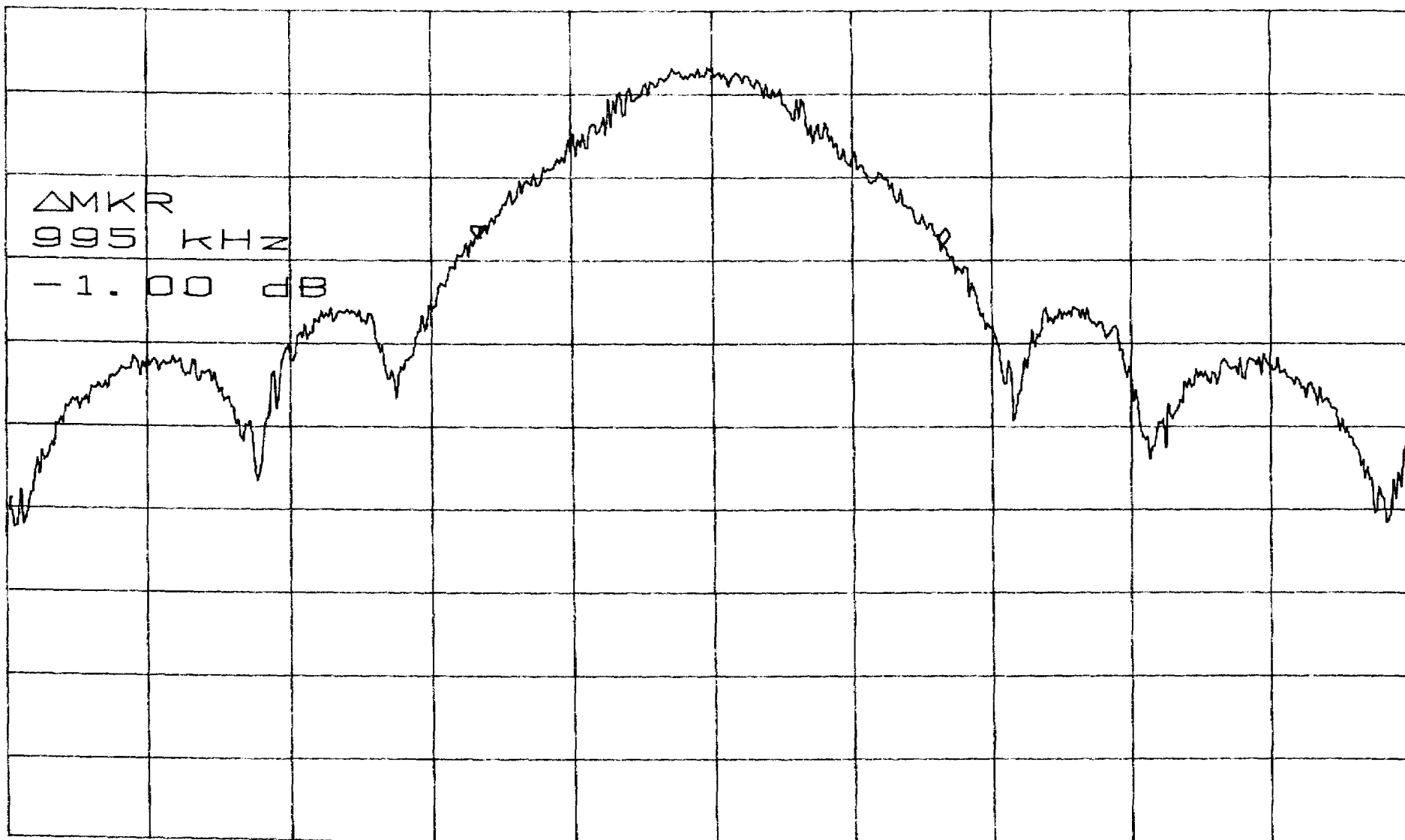
SWP 50ms

20 dB Bandwidth

ATTN 40dB  
RL 30.0dBm

$\Delta$ MKR -1.00dB  
995kHz

10dB/



CENTER 2.440000GHz

SPAN 3.000MHz

RBW 30kHz

VBW 30kHz

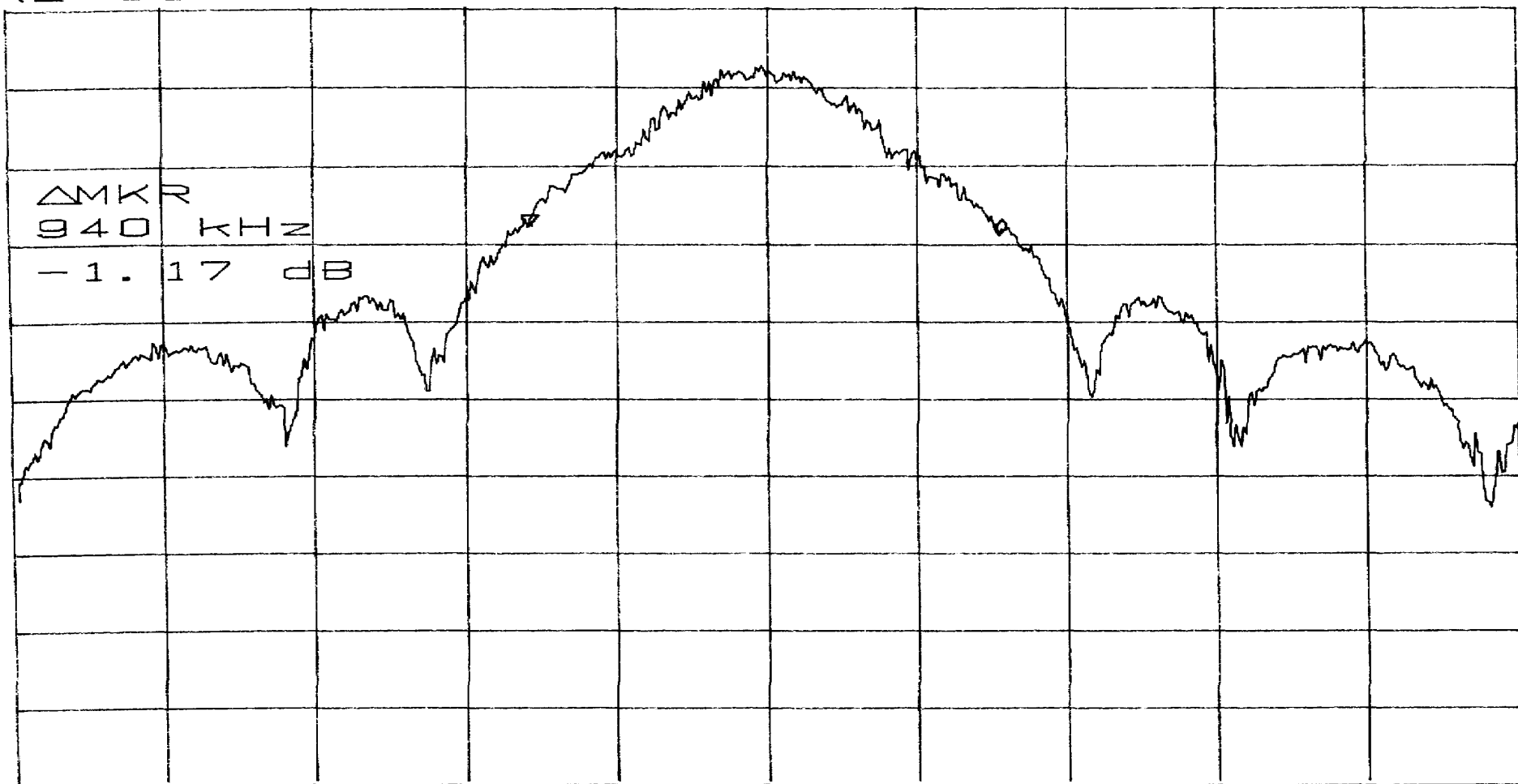
SWP 50ms

20 dB Bandwidth

ATTEN 40dB  
RL 30.0dBm

ΔMKR -1.17dB  
940KHz

10dB/



CENTER 2.480000GHz  
RBW 30kHz VBW 30kHz

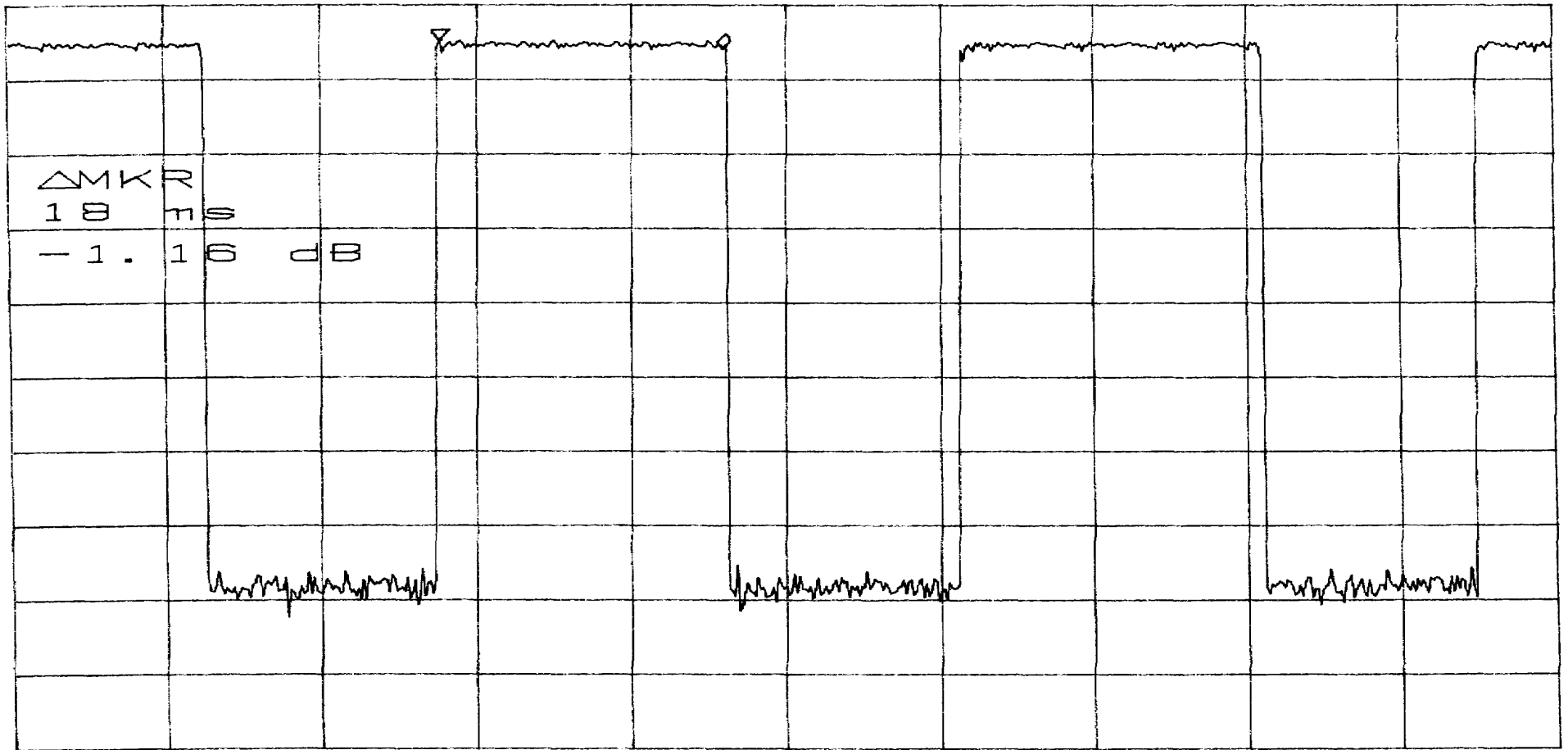
SPAN 3.000MHz  
SWP 50ms

Dwell Time

ATTEN 40dB  
RL 30.0dB

10dB/

$\Delta MKR -1.16dB$   
18ms



CENTER 2.4800000000GHZ

SPAN 0Hz

-RBW 100kHz

VBW 100kHz

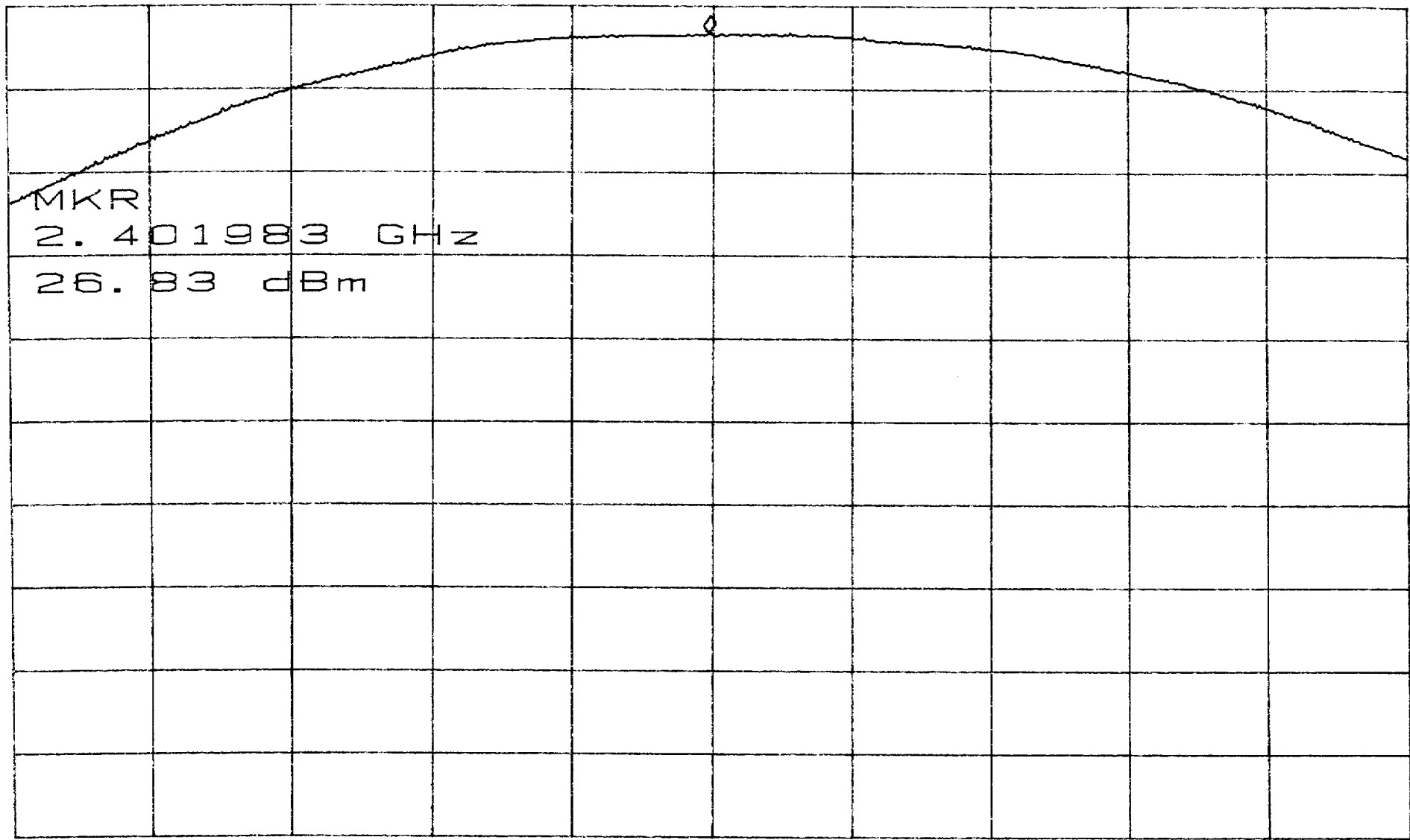
\*SWP 100ms

Output Power

ATTEN 40dB  
RL 30.0dBm

MKR 26.83dBm  
2.401983GHz

10dB/



CENTER 2.402000GHz

SPAN 5.000MHz

RBW 2.0MHz

VBW 3.0MHz

SWP 50ms

Output Power

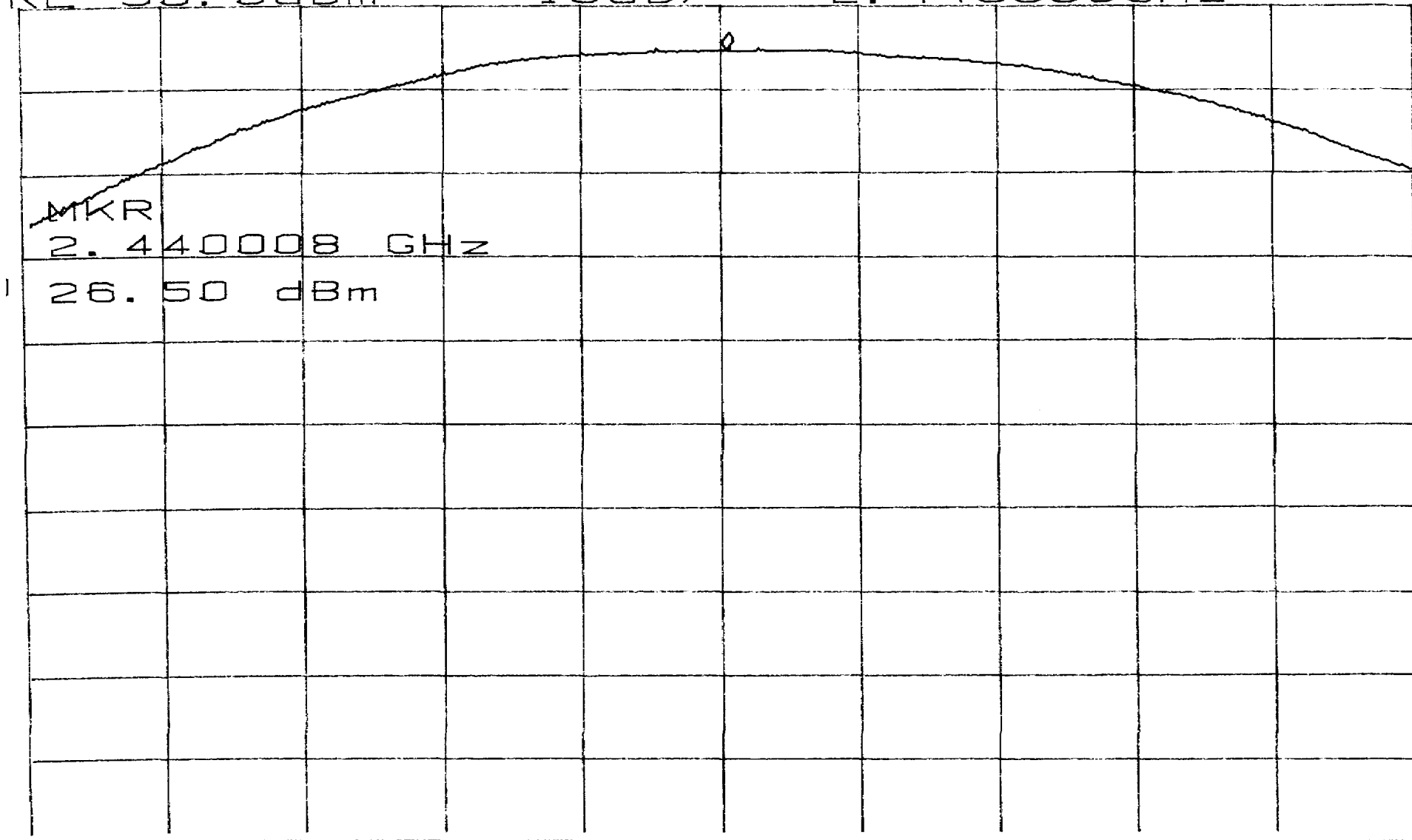
ATTEN 40dB

MKR 26.50dBm

RL 30.0dBm

10dB/

2.440008GHz



CENTER 2.440000GHz

SPAN 5.000MHz

RBW 2.0MHz

VBW 3.0MHz

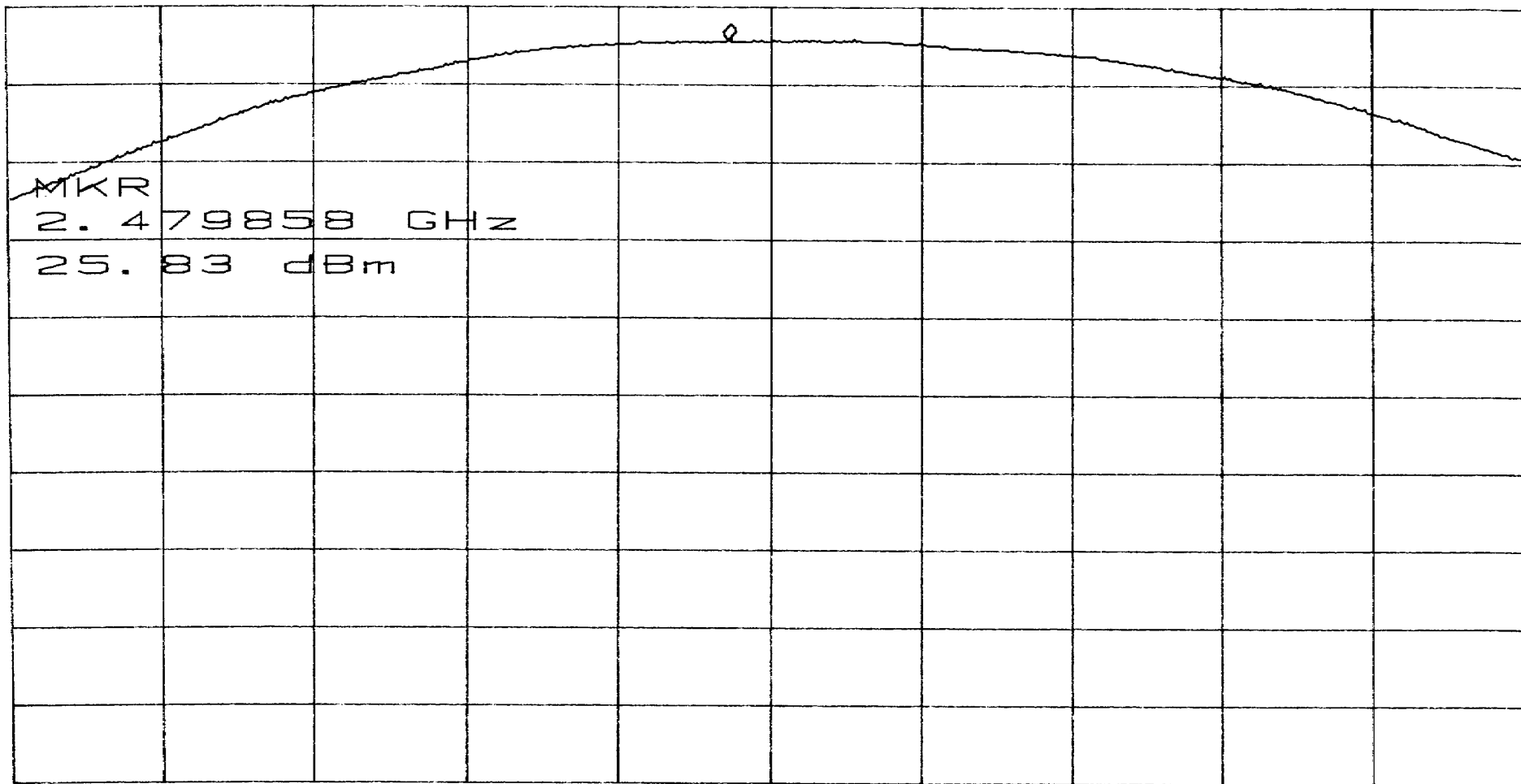
SWP 50ms

Output Power

ATTEN 40dB  
RL 30.0dBm

10dB/

MKR 25.83dBm  
2.479858GHz



CENTER 2.480000GHz  
RBW 2.0MHz VBW 3.0MHz

SPAN 5.000MHz  
SWP 50ms

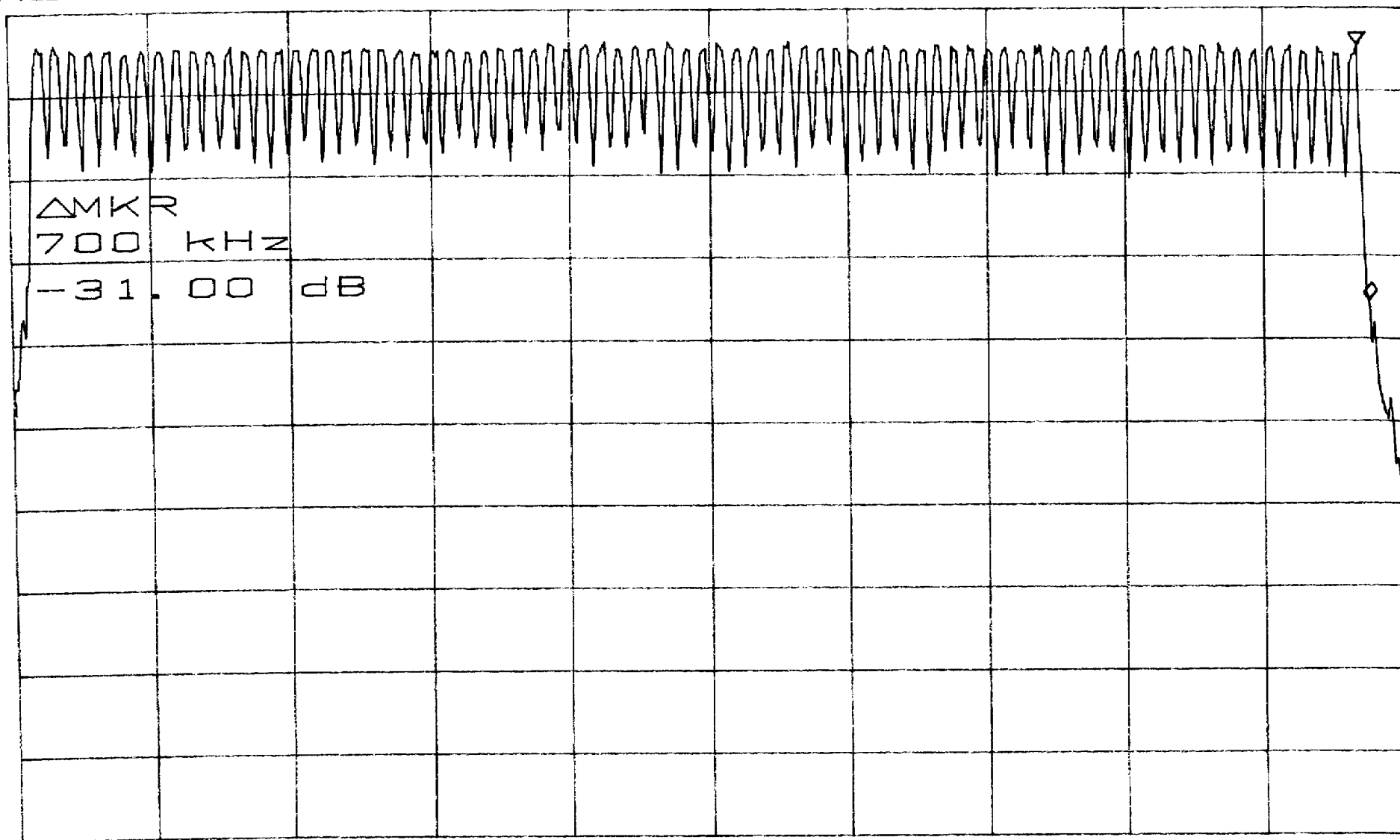


Out Of Band - Band Edges

ATTEN 40dB  
RL 30.0dB

$\Delta$ MKR -31.00dB  
700kHz

1dB/



START 2.40000GHz

STOP 2.48350GHz

\*RBW 100kHz

VBW 100kHz

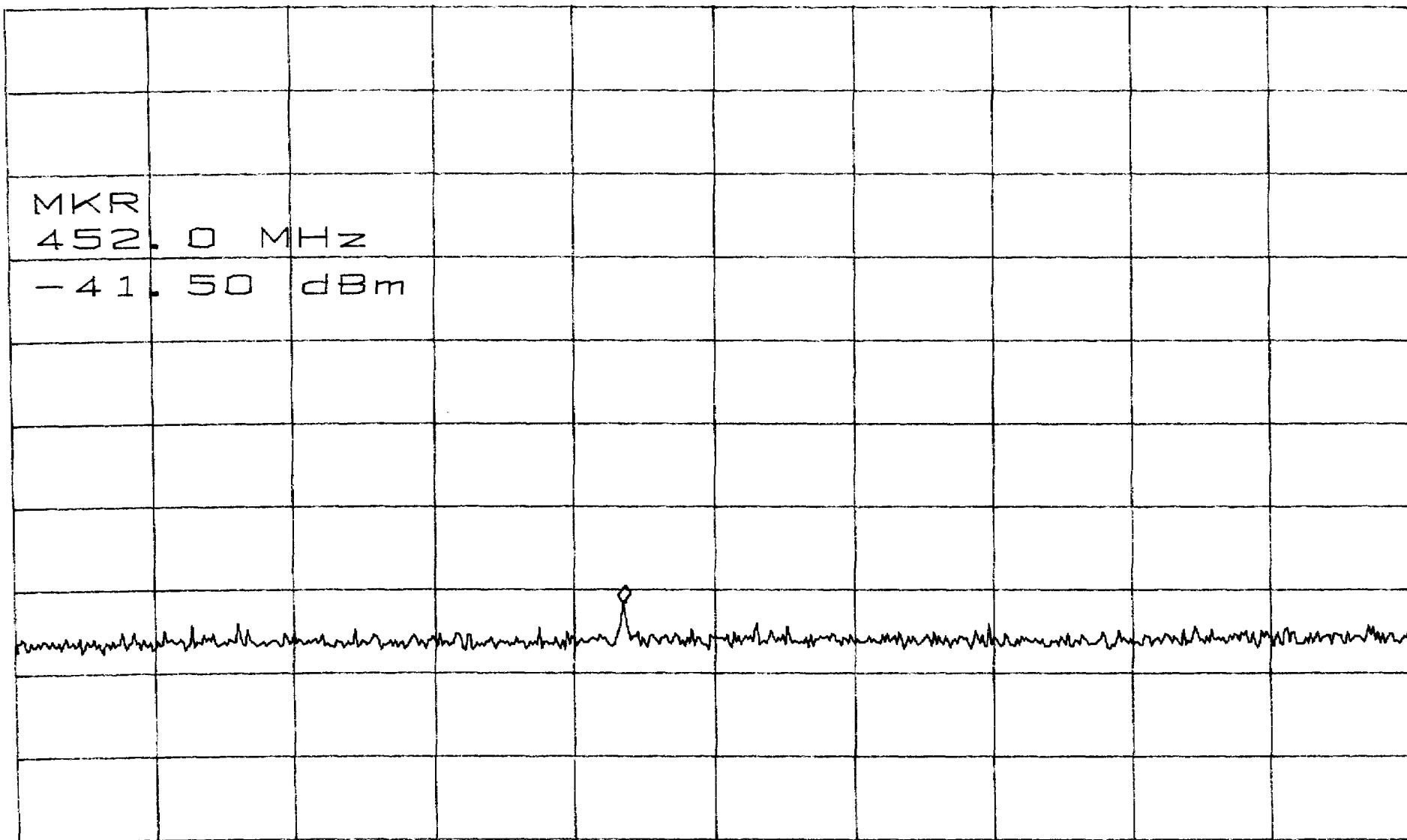
SWP 50ms

Out Of Band 30 to 1000 MHz

ATTEN 40dB  
RL 30.0dBm

10dB/

MKR -41.50dBm  
452.0MHz



START 30.0MHz

STOP 1.0000GHz

-RBW 100kHz

VBW 100kHz

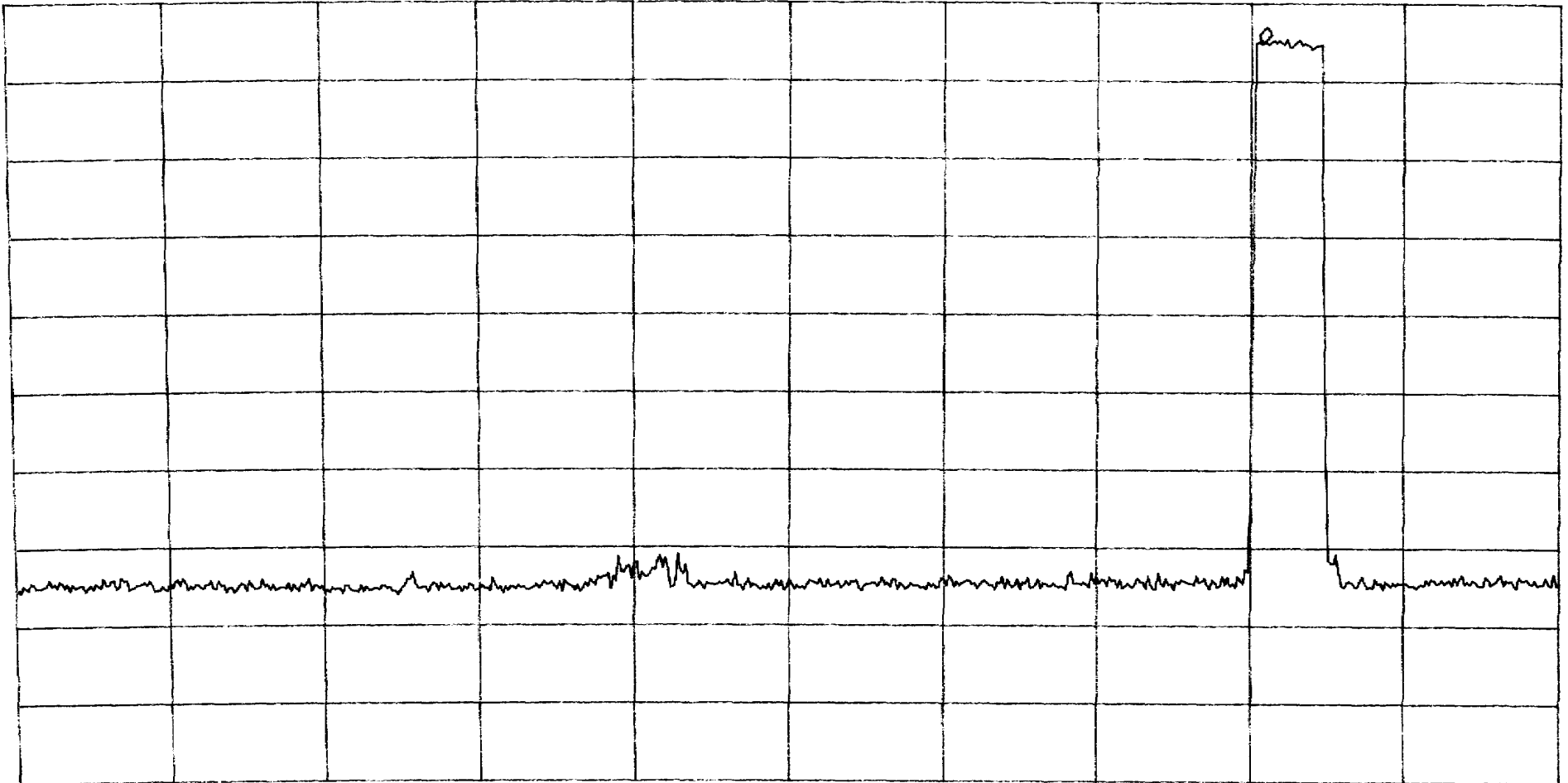
SWP 250ms

Out Of Band 1 to 2.75 GHz

ATTEN 40dB  
RL 30.0dBm

10dB/

MKR 25.00dBm  
2.415GHz



START 1.000GHz

STOP 2.750GHz

RBW 100kHz

VBW 100kHz

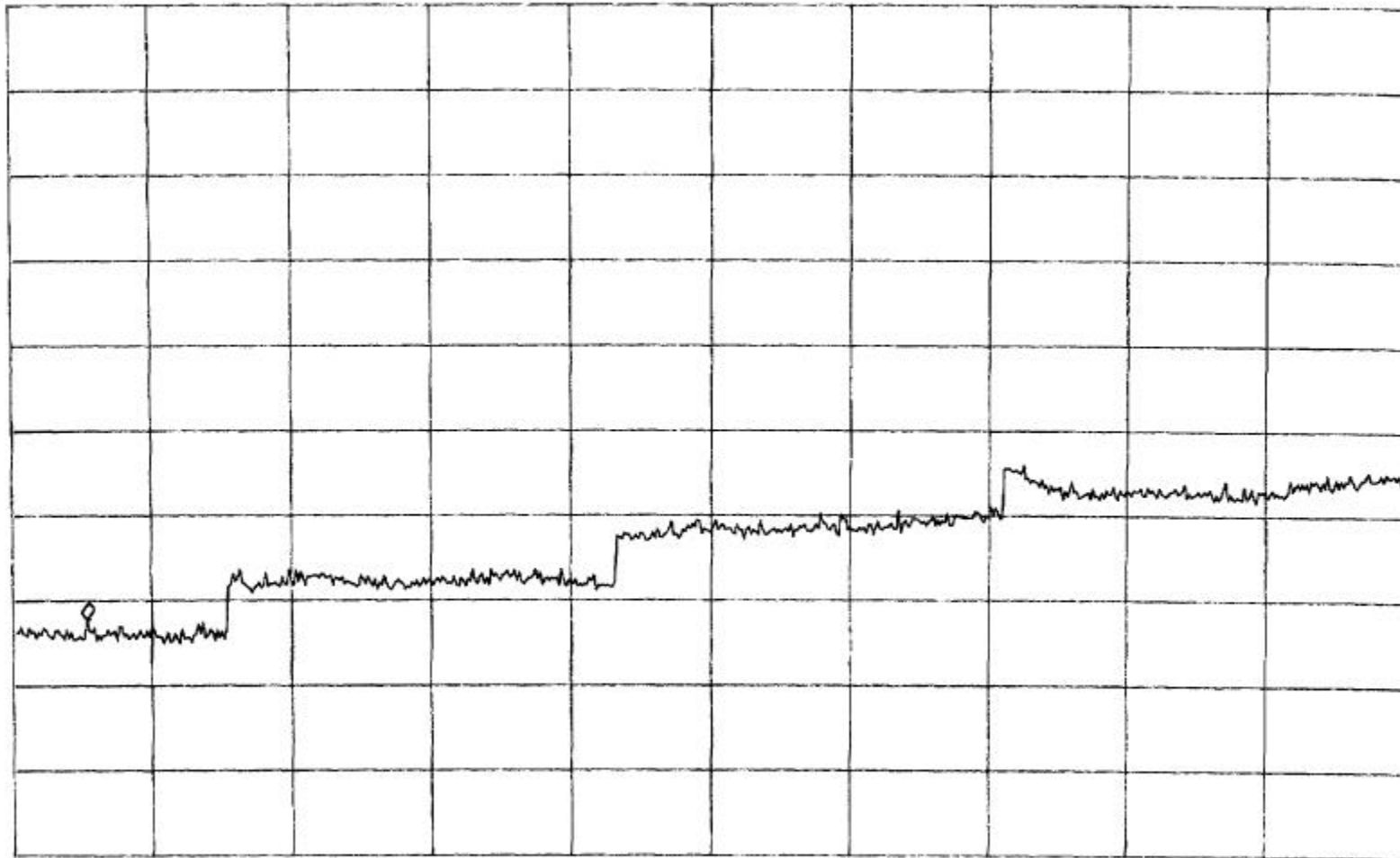
SWP 440ms

Out of Band 2.75 to 26.5 GHz

ATTEN 40dB  
RL 30.0dBm

10dB/

MKR -42.17dBm  
4.02GHz



START 2.75GHz

STOP 26.50GHz

RBW 100kHz

VBW 100kHz

SWP 6.0sec

**APPENDIX B**  
**RESTRICTED BAND DATA**

**FCC RADIATED DATA SHEET**

DATE: DEC. 9, 1998  
 CUSTOMER NAME: PROXIM  
 WORK ORDER: 8120901  
 FILE: 8120901A

EUT: DESIGN-IN MOD. 6307  
 S/N: 8FFB  
 RULE PART: 15.247

ANTENNA: HORN  
 MODULATION TYPE:  
 TESTED BY SHAWN  
 COMMENTS:

OTHER CAL FACTORS: ATTN dB: 0  
 DUTY dB: 0  
 HP IL dB: 0  
 DIST dB: 0

FREQ.	READING	Pk, QP, or Av	A.F. dB	Cable loss dB	AMP dB	O.C.F. dB	TOTAL, dB(uV/m)	LIMIT dB(uV/m)	DELTA dB
<b>Fund = 2402.0</b>									
4804	48.3	Pk	34.2	11.0	35.0	0.0	58.5	74.0	-15.5
4804	39.1	Avg	34.2	11.0	35.0	0.0	49.3	54.0	-4.7
12010	36.0	Pk	42.6	23.5	35.0	0.0	67.1	74.0	-6.9
12010	19.5	Avg	42.6	23.5	35.0	0.0	50.6	54.0	-3.4
<b>Fund = 2440.0</b>									
4880	45.8	Pk	34.2	11.2	35.0	0.0	56.2	74.0	-17.8
4880	36.5	Avg	34.2	11.2	35.0	0.0	46.9	54.0	-7.1
7320	46.9	Pk	36.8	16.0	35.0	0.0	64.7	74.0	-9.3
7320	31.5	Avg	36.8	16.0	35.0	0.0	49.3	54.0	-4.7
12200	35.4	Pk	42.6	24.0	35.0	0.0	67.0	74.0	-7.0
12200	18.2	Avg	42.6	24.0	35.0	0.0	49.8	54.0	-4.2
<b>Fund = 2480.0</b>									
4960	48.1	Pk	34.2	11.0	35.0	0.0	58.3	74.0	-15.7
4960	39.2	Avg	34.2	11.0	35.0	0.0	49.4	54.0	-4.6
7440	47.0	Pk	36.8	15.9	35.0	0.0	64.7	74.0	-9.3
7440	32.0	Avg	36.8	15.9	35.0	0.0	49.7	54.0	-4.3
12400	34.9	Pk	42.6	24.5	35.0	0.0	67.0	74.0	-7.0
12400	17.6	Avg	42.6	24.5	35.0	0.0	49.7	54.0	-4.3

**APPENDIX C**  
**15.207 CONDUCTED EMISSIONS**

Electronic Compliance Laboratories, Inc.  
 1249 Birchwood Ave.  
 Sunnyvale, CA

Conducted Emissions  
 Frequency range: 450KHz-30MHz

Government Agency and Limit: FCC Class B  
 -----

QP = Quasi-Peak    Note: Ignore peak readings when Quasi-Peak reading exists  
 PK = Peak

Customer:                    PROXIM                                    Operator:                    SHAWN  
 Date:                        12-09-1998                              Time:                        14:35:53  
 Temperature Range:        72                                        Deg F                        Percent Humidity: 45  
 E.U.T.:                      DESIGN-IN MOD. 6307  
 Serial Number:              8FFB  
 Support Devices:            DELL CPU, MONITOR, KEYBOARD, MOUSE  
 Exercise Program:         rl2diag.exe  
 Modifications:              None  
 Report File Name:         F:\TESTDATA\8120901A.F

TEST FREQ	TEST dBuV	CLASS B LIMIT	VERSUS B LIMIT	CONDUCTOR	TYPE
=====	=====	=====	=====	=====	=====
0.670	24.8	48.0	-23.2	LINE	PK
6.880	34.6	48.0	-13.4	LINE	PK
12.120	48.0	48.0	0.0	LINE	PK
16.920	47.6	48.0	-0.4	LINE	PK
25.790	31.8	48.0	-16.2	LINE	PK
28.820	31.1	48.0	-16.9	LINE	PK
12.120	35.3	48.0	-12.7	LINE	QP
16.920	36.0	48.0	-12.0	LINE	QP
0.890	15.5	48.0	-32.5	NEUTRAL	PK
6.510	31.9	48.0	-16.1	NEUTRAL	PK
13.160	51.8	48.0	3.8	NEUTRAL	PK
16.920	49.1	48.0	1.1	NEUTRAL	PK
25.570	29.8	48.0	-18.2	NEUTRAL	PK
28.820	37.9	48.0	-10.1	NEUTRAL	PK
13.160	38.6	48.0	-9.4	NEUTRAL	QP
16.920	36.6	48.0	-11.4	NEUTRAL	QP



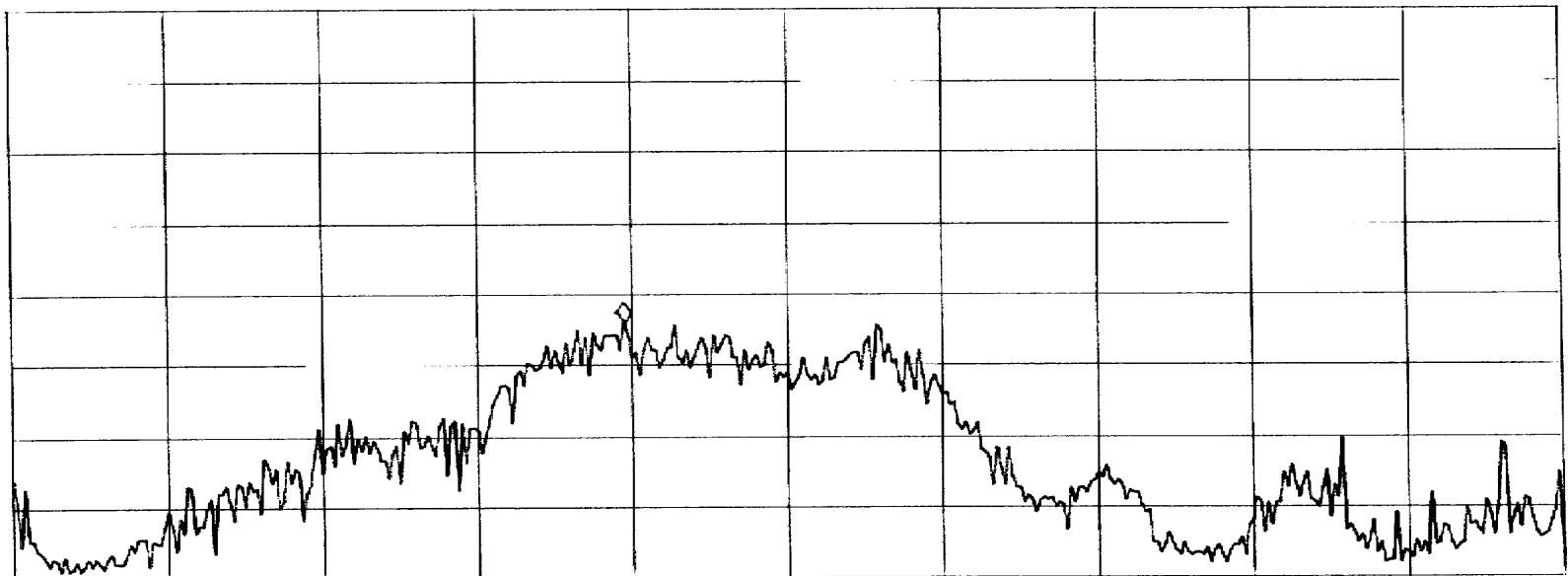
(HP) 14:42:41 DEC 09, 1998  
8120901A LINE

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 12.12 MHz  
47.97 dB $\mu$ V

LOG REF 92.0 dB $\mu$ V

10  
dB/  
ATN  
10 dB

WA SB  
SC FS  
ACORR



START 450 kHz IF BW 9.0 kHz AVG BW 30 kHz STOP 30.00 MHz  
SWP 2.46 sec

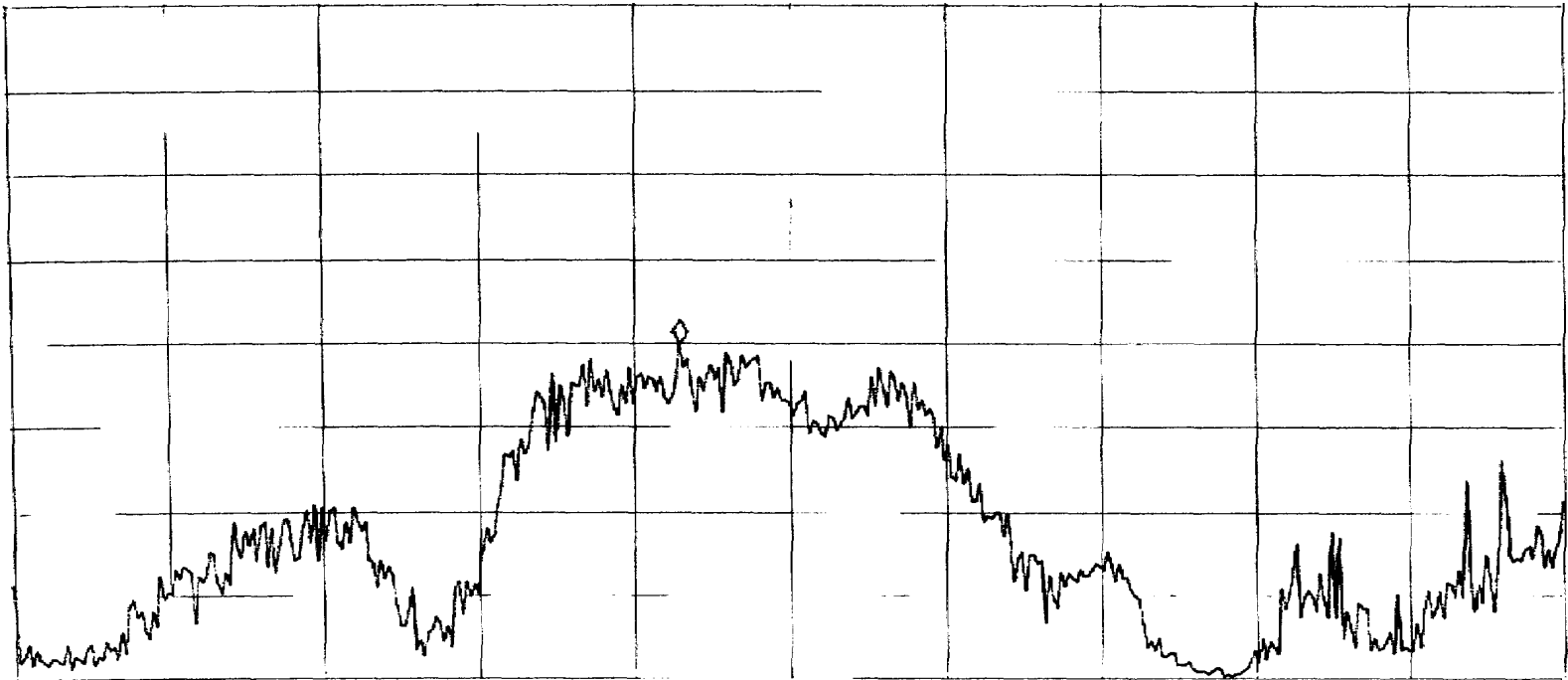
(HP) 14:55:14 DEC 09, 1998  
8120901ANEUTRAL

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 13.16 MHz  
51.84 dB $\mu$ V

LOG REF 92.0 dB $\mu$ V

10  
dB/  
ATN  
10 dB

WA SB  
SC FS  
ACORR



START 450 kHz IF BW 9.0 kHz AVG BW 30 kHz STOP 30.00 MHz  
SWP 2.46 sec

**APPENDIX D**  
**15.209 RADIATED EMISSIONS**

Electronic Compliance Laboratories, Inc.  
 1249 Birchwood Ave.  
 Sunnyvale, CA

Radiated Emissions  
 Frequency range: 30MHz-1000MHz

3 Meter Open Site  
 Site Calibrated: June 1997  
 Government Agency and Limit: FCC Class B

QP = Quasi-Peak      Note: Ignore peak readings when Quasi-Peak reading exists  
 PK = Peak

Customer:                    PROXIM                                    Operator:                    SHAWN  
 Date:                        12-09-1998                                Time:                        13:35:50  
 Temperature Range:        58    Deg F                        Percent Humidity: 44  
 E.U.T.:                      DESIGN-IN MOD 6307  
 Serial Number:              PROTO  
 Support Devices:            DELL CPU, MONITOR, KEYBOARD, MOUSE  
 Exercise Program:          rl2diag.exe  
 Modifications:              None  
 Report File Name:          F:\TESTDATA\8120901A.RF

Antenna Type:              LOG PERIODIC

TEST FREQ	TEST dBuV	ACTUAL dBuV/m	CLASS B LIMIT	VERSUS B LIMIT	TABLE DEGREES	ANTENNA HEIGHT	POLAR- IZATION	DETECTOR Type
=====	=====	=====	=====	=====	=====	=====	=====	=====
304.000	30.0	21.2	46.0	-24.8	340	1.5	V	PK
336.000	37.6	28.6	46.0	-17.4	270	1.5	V	PK
352.000	35.0	26.3	46.0	-19.7	270	2.0	V	PK
384.000	40.5	32.6	46.0	-13.4	270	2.0	V	PK
400.000	33.0	25.5	46.0	-20.5	300	2.0	V	PK
416.000	34.0	26.7	46.0	-19.3	270	1.5	V	PK
448.000	35.0	28.2	46.0	-17.8	270	2.0	V	PK
448.000	33.0	26.2	46.0	-19.8	260	3.0	H	PK
432.000	32.0	24.9	46.0	-21.1	250	3.0	H	PK
400.000	36.0	28.5	46.0	-17.5	260	3.0	H	PK
384.000	36.5	28.6	46.0	-17.4	280	2.5	H	PK
368.000	34.0	25.7	46.0	-20.3	270	2.5	H	PK
352.000	29.9	21.2	46.0	-24.8	270	2.5	H	PK
336.000	38.7	29.7	46.0	-16.3	300	2.0	H	PK
320.000	38.5	29.3	46.0	-16.7	300	2.5	H	PK
304.000	34.0	25.2	46.0	-20.8	300	2.0	H	PK

CHANGED ANTENNA TO BICONICAL

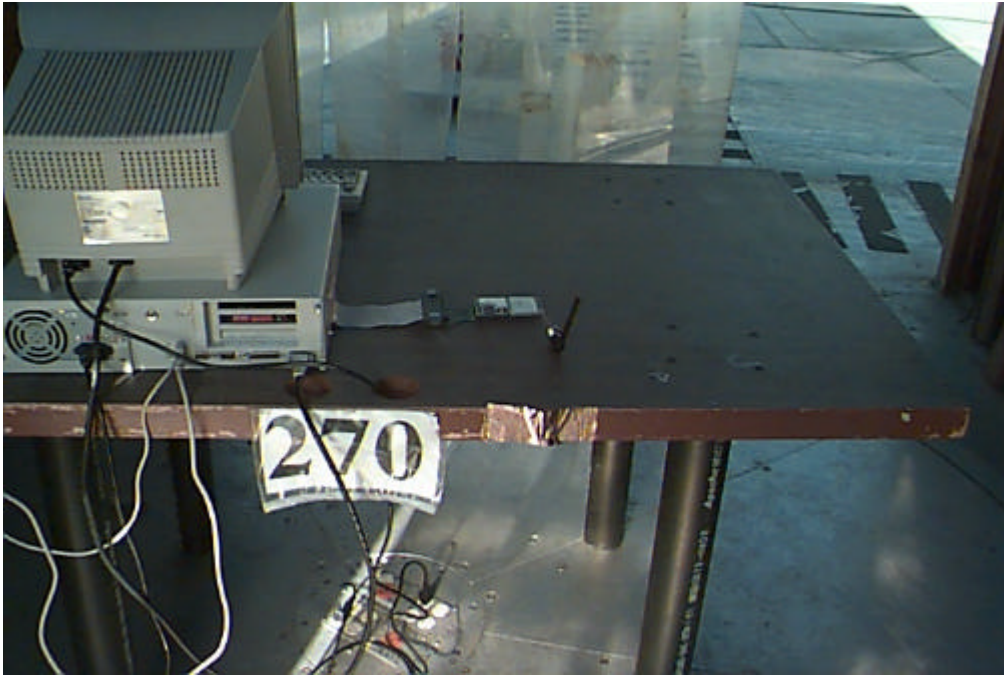
64.000	46.2	29.3	40.0	-10.7	250	2.0	V	PK
128.000	45.2	35.0	43.5	-8.5	250	2.0	V	PK
144.000	42.3	32.7	43.5	-10.8	270	2.5	V	PK
176.000	39.6	30.7	43.5	-12.8	270	2.5	V	PK
208.000	41.0	33.1	43.5	-10.4	250	2.5	V	PK
240.000	40.0	32.5	46.0	-13.5	0	2.5	V	PK
256.000	32.3	25.0	46.0	-21.0	340	2.5	V	PK
272.000	38.7	32.5	46.0	-13.5	270	2.0	V	PK

288.000 36.3 32.2 46.0 -13.8 280 2.0 V PK

Date: 12-09-1998  
 E.U.T.: DESIGN-IN MOD 6307  
 Serial Number: PROTO  
 Antenna Type: BICONICAL

TEST FREQ	TEST dBuV	ACTUAL dBuV/m	CLASS B LIMIT	VERSUS B LIMIT	TABLE DEGREES	ANTENNA HEIGHT	POLAR- IZATION	DETECTOR Type
=====	=====	=====	=====	=====	=====	=====	=====	=====
288.000	39.0	34.9	46.0	-11.1	300	2.0	H	PK
272.000	39.6	33.4	46.0	-12.6	320	2.5	H	PK
160.000	49.2	40.2	43.5	-3.3	0	2.5	H	PK
160.000	47.4	38.4	43.5	-5.1	0	2.5	H	QP
144.000	48.6	39.0	43.5	-4.5	350	2.5	H	PK
144.000	46.0	36.4	43.5	-7.1	350	2.5	H	QP
112.000	45.5	33.6	43.5	-9.9	0	2.5	H	PK
64.000	46.8	29.9	40.0	-10.1	340	2.5	H	PK

**APPENDIX E**  
**SET-UP PHOTOS**



**FCC 15.209 Class B  
Radiated Emissions**

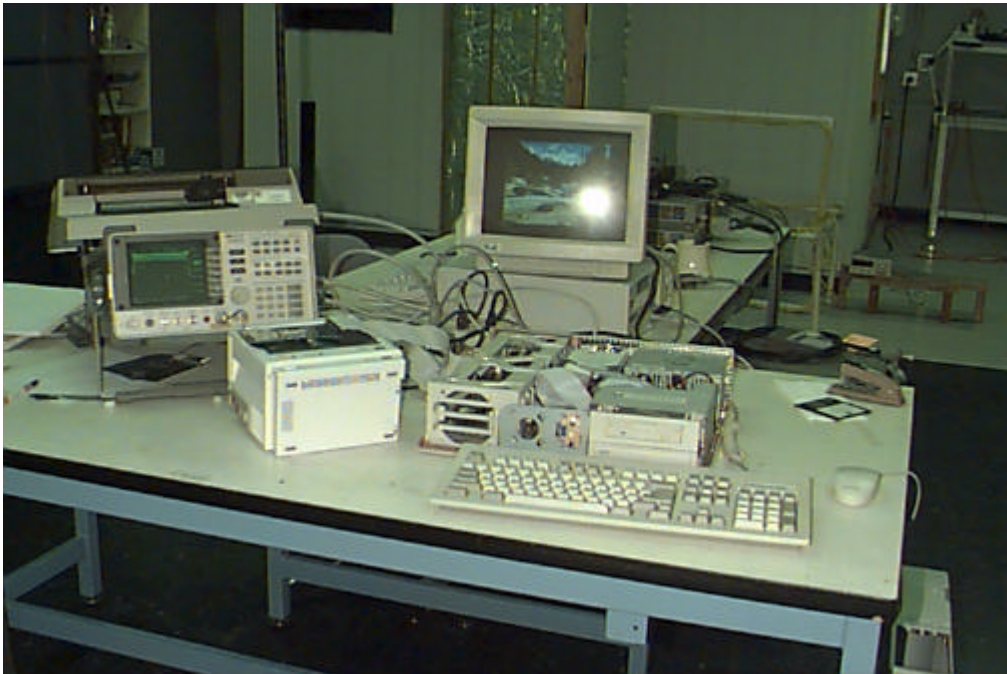


**FCC 15.207 Class B  
Conducted Emissions**



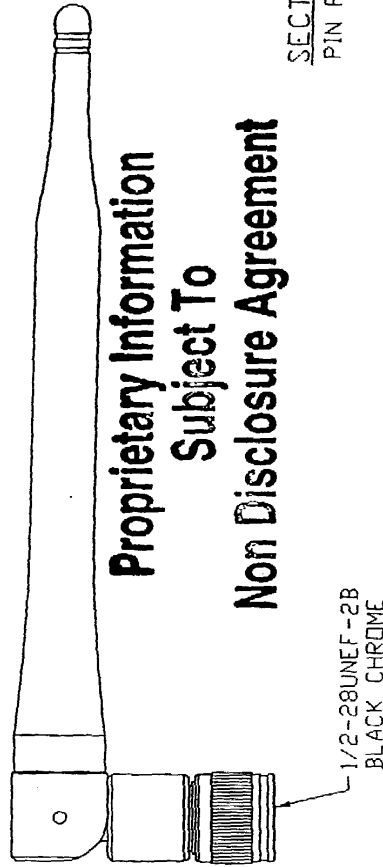
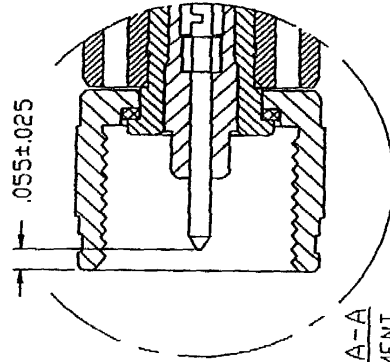
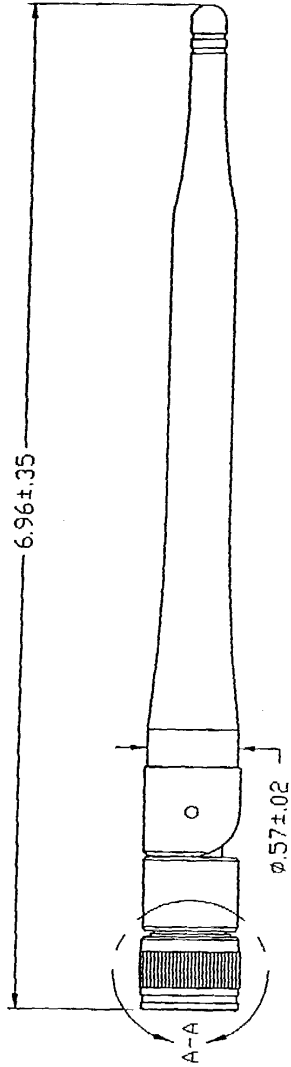


**FCC 15.247 Restricted Band**



**FCC 15.247 Conducted RF**

**APPENDIX F**  
**ANTENNA DRAWINGS**



**Proprietary Information  
Subject To  
Non Disclosure Agreement**

**NOTES:**

**1 SPECIFICATIONS:**

- GAIN: 10 dBi
- OPERATING TEMPERATURE: -40°C TO +85°C
- FLEX TEST: PER 0EA0014
- PULL TEST: 20 lbs. LINEAR PULL
- TORQUE TEST: 20 in-lbs.
- POWER RATING: 50 WATTS
- VSWR 1.5:1 MAX. AT RESONANCE

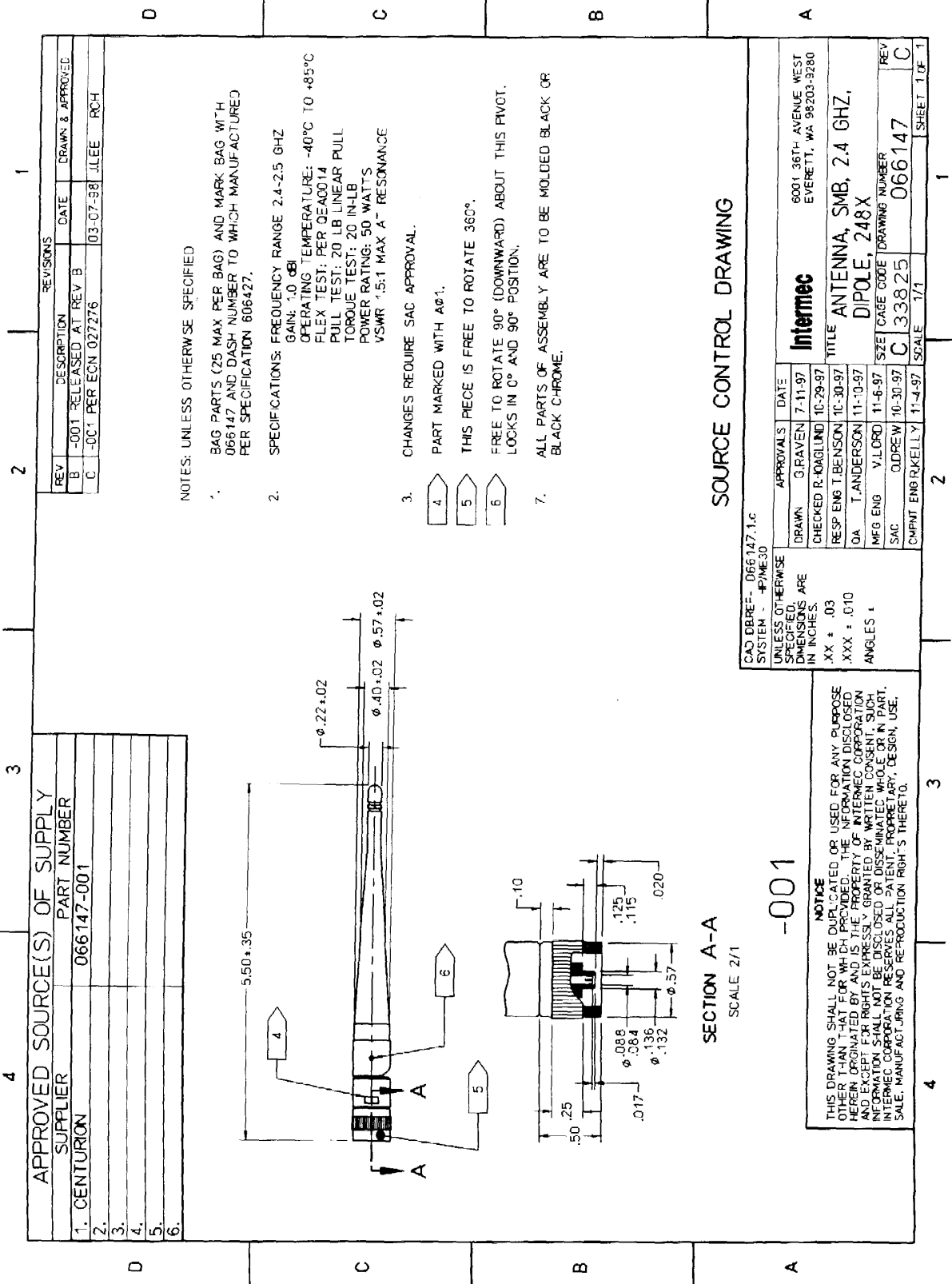
PART NO.	CUSTOMER	FREQUENCY	FREQUENCY RANGE
CAF28771	905-486-001	2.4 GHZ	2.4-2.5GHZ

ALL DIMENSIONS ARE IN INCHES

LET	REVISION	DATE	CK	APP	SCALE:	1:1	TOL. UNLESS NOTED:
X1	PROT6032	10/95	DR: JB	CK:			.XX = ± .010 .XXX = ± .005 ANGULAR ± .30'
A	ECD951263	10/95					PL: 402-457-4191 FAX: 402-457-4328 P.O. BOX 82846 LINCOLN, NE 68501
B	ECD9653	01/96					CENTURION INT. INC. ANT, CXR-2.4GHZ-TNSP
							MATERIAL: N/A
							DATE: 10/13/95 DWG NO: CAF28771 PG: REV 1/6 B

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CENTURION INTERNATIONAL



APPROVED SOURCE(S) OF SUPPLY	
SUPPLIER	PART NUMBER
1. CENTURION	066147-001
2.	
3.	
4.	
5.	
6.	

REVISIONS		
REV	DESCRIPTION	DATE
B	-001 RELEASED AT REV B	
C	-001 PER ECN 027276	03-07-98

DRAWN & APPROVED  
J.LEE RCH

NOTES: UNLESS OTHERWISE SPECIFIED

- BAG PARTS (25 MAX PER BAG) AND MARK BAG WITH 066147 AND DASH NUMBER TO WHICH MANUFACTURED PER SPECIFICATION 606427.
- SPECIFICATIONS: FREQUENCY RANGE 2.4-2.5 GHZ  
GAIN: 1.0 dBi  
OPERATING TEMPERATURE: -40°C TO +85°C  
FLEX TEST: PER DEAN0014  
PULL TEST: 20 LB LINEAR PULL  
TORQUE TEST: 20 IN-LB  
POWER RATING: 50 WATTS  
VSWR 1.5:1 MAX A\* RESONANCE
- CHANGES REQUIRE SAC APPROVAL.
  - 4 PART MARKED WITH A01.
  - 5 THIS PIECE IS FREE TO ROTATE 360°.
  - 6 FREE TO ROTATE 90° (DOWNWARD) ABOUT THIS PIVOT. LOCKS IN 0° AND 90° POSITION.
- ALL PARTS OF ASSEMBLY ARE TO BE MOLDED BLACK OR BLACK CHROME.

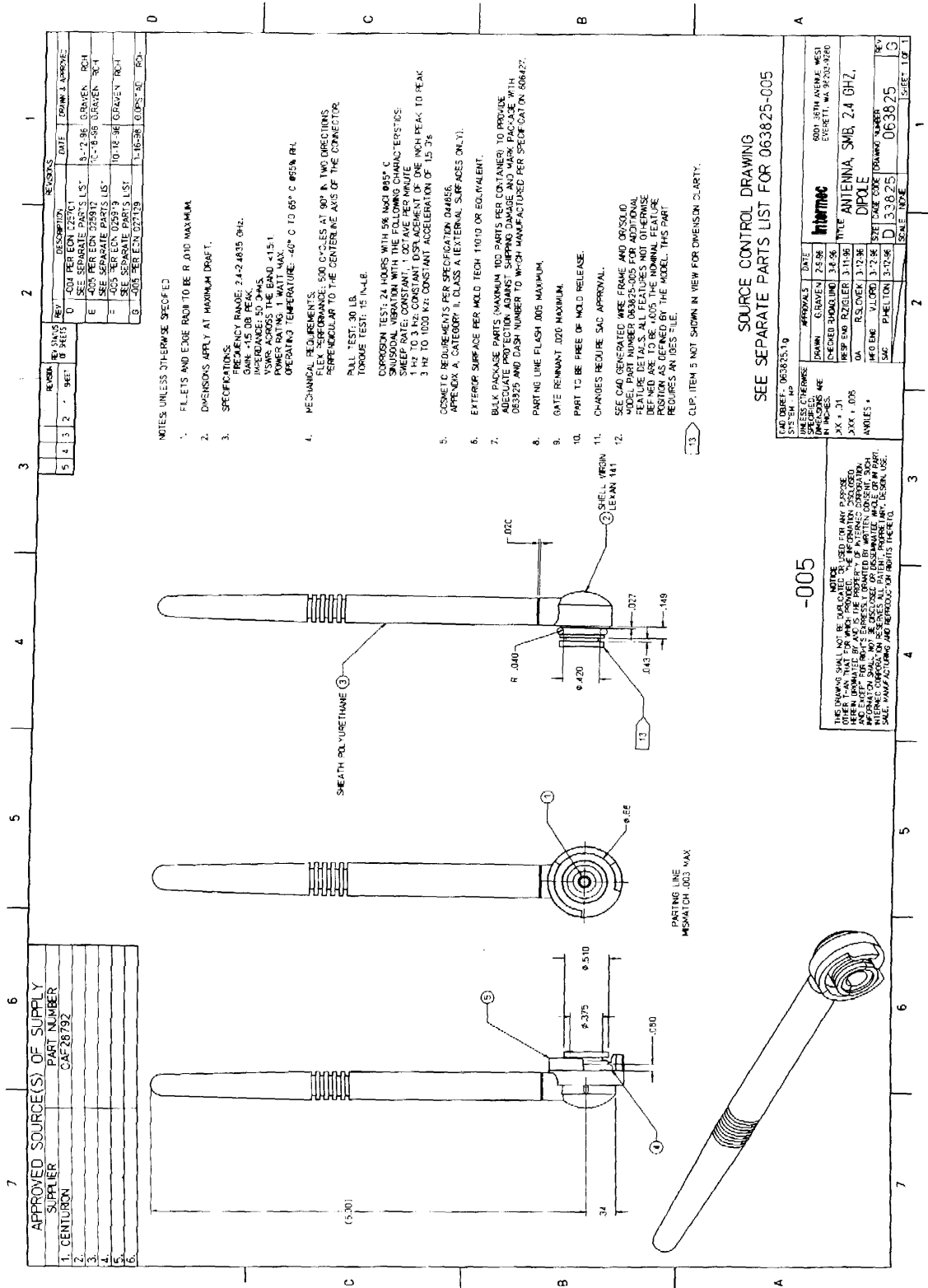
SOURCE CONTROL DRAWING

CAD DBREF - D66147.1.c		APPROVALS		DATE	
SYSTEM - P/ME-30		DRAWN	G.GRAVEN	7-11-97	
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES.		CHECKED	R.KAGLIND	10-29-97	
.XX ± .03		RESP ENG	T.BENSON	11-10-97	
.XXX ± .010		QA	T.ANDERSON	11-10-97	
ANGLES :		MFG ENG	V.LORD	11-6-97	
		SAC	OLDREW	10-30-97	
		CMPT	EMBRKELLY	11-4-97	

Intermec		8001 36TH AVENUE, WEST EVERETT, WA 98203-9280	
TITLE		ANTENNA, SMB, 2.4 GHZ, DIPOLE, 248X	
CAGE CODE	DRAWING NUMBER	REV	
C 33825	066147	C	
SCALE	1/1	SHEET	1 OF 1

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APPROVED SOURCE(S) OF SUPPLY

1. CENTURION	SUPPLIER	CAC28792
2.		
3.		
4.		
5.		
6.		

REV	DESCRIPTION	DATE	DRAWN BY	APPROVED
0	INITIAL DESIGN			
1	SEE SEPARATE PARTS LIST	8-10-86	GRAVEN	ROH
2	400 PER EON 25517	10-1-86	GRAVEN	ROH
3	SEE SEPARATE PARTS LIST	10-18-86	GRAVEN	ROH
4	400 PER EON 02519			
5	SEE SEPARATE PARTS LIST	1-16-88	COOPER	ROH
6	400 PER EON 02718			

- NOTES: UNLESS OTHERWISE SPECIFIED
1. FLEETS AND EDGE ROUN TO BE R.010 MAXIMUM
  2. DIMENSIONS APPLY AT MAXIMUM DRAFT.
  3. SPECIFICATIONS:  
 FREQUENCY RANGE: 2.4-2.4835 GHz;  
 GAIN: +15 DB PEAK;  
 IMPEDANCE: 50 OHMS;  
 SWR MAX: 1.5;  
 POWER RATING: 10 WATT;  
 OPERATING TEMPERATURE: -40° C TO 65° C @50% RH.
  4. MECHANICAL REQUIREMENTS:  
 SURFACE FINISH: 500 CIRCLES AT 90° A, TWO DIRECTIONS  
 REFERENCE TO THE CENTERLINE AXIS OF THE CONNECTOR.  
 PULL TEST: 30 LB.  
 TORQUE TEST: 15 IN-LB.  
 CORROSION TEST: 24 HOURS WITH 5% NaCl BRINE C  
 SINOUSOIDAL VIBRATION WITH THE FOLLOWING CHARACTERISTICS:  
 SWEEP RATE: CONSTANT, 1 OCTAVE PER MINUTE  
 1 Hz TO 1000 Hz CONSTANT ACCELERATION OF ONE INCH PEAK TO PEAK  
 3 Hz TO 1000 Hz CONSTANT ACCELERATION OF 15 Gs
  5. COSMETIC REQUIREMENTS PER SPECIFICATION 04868.  
 APPENDIX A, CATEGORY 1, CLASS A EXTERNAL SURFACES ONLY).
  6. EXTERIOR SURFACE PER MOLD TECH 11010 OR EQUIVALENT.
  7. BULK PACKAGE PARTS (MAXIMUM 100 PARTS PER CONTAINER) TO PROVIDE  
 ADEQUATE PROTECTION AGAINST SHIPPING DAMAGE AND MARK PACKAGE WITH  
 063825 AND CASH NUMBER TO WHICH MANUFACTURED PER SPECIFICATION 60842.
  8. PARTING LINE FLASH .005 MAXIMUM.
  9. DATE REMAINT .020 MAXIMUM.
  10. PART TO BE FREE OF MOLD RELEASE.
  11. CHANGES REQUIRE SAC APPROVAL.
  12. SEE CAD GENERATED WIRE FRAME AND OR SOLID  
 MODEL. PART NUMBER 063825-005 FOR ADDITIONAL  
 FEATURE DETAILS. ALL FEATURES NOT OTHERWISE  
 SPECIFIED ARE TO BE .005, THE NOMINAL FEATURE  
 DIMENSIONS ARE UNLESS OTHERWISE SPECIFIED BY THE MODEL. THIS PART  
 REQUIRES AN IDEAS FILE.

SEE SEPARATE PARTS LIST FOR 063825-005

APPROVALS	DATE	TITLE
GRAVEN	2-26-88	INTERNET
CHECKED	3-24-88	
DESIGNED	3-11-88	
QA	3-17-88	
WEG	3-23-88	
SAC	3-23-88	

6001 38TH AVENUE WEST  
 EVERETT, WA 98203-3700

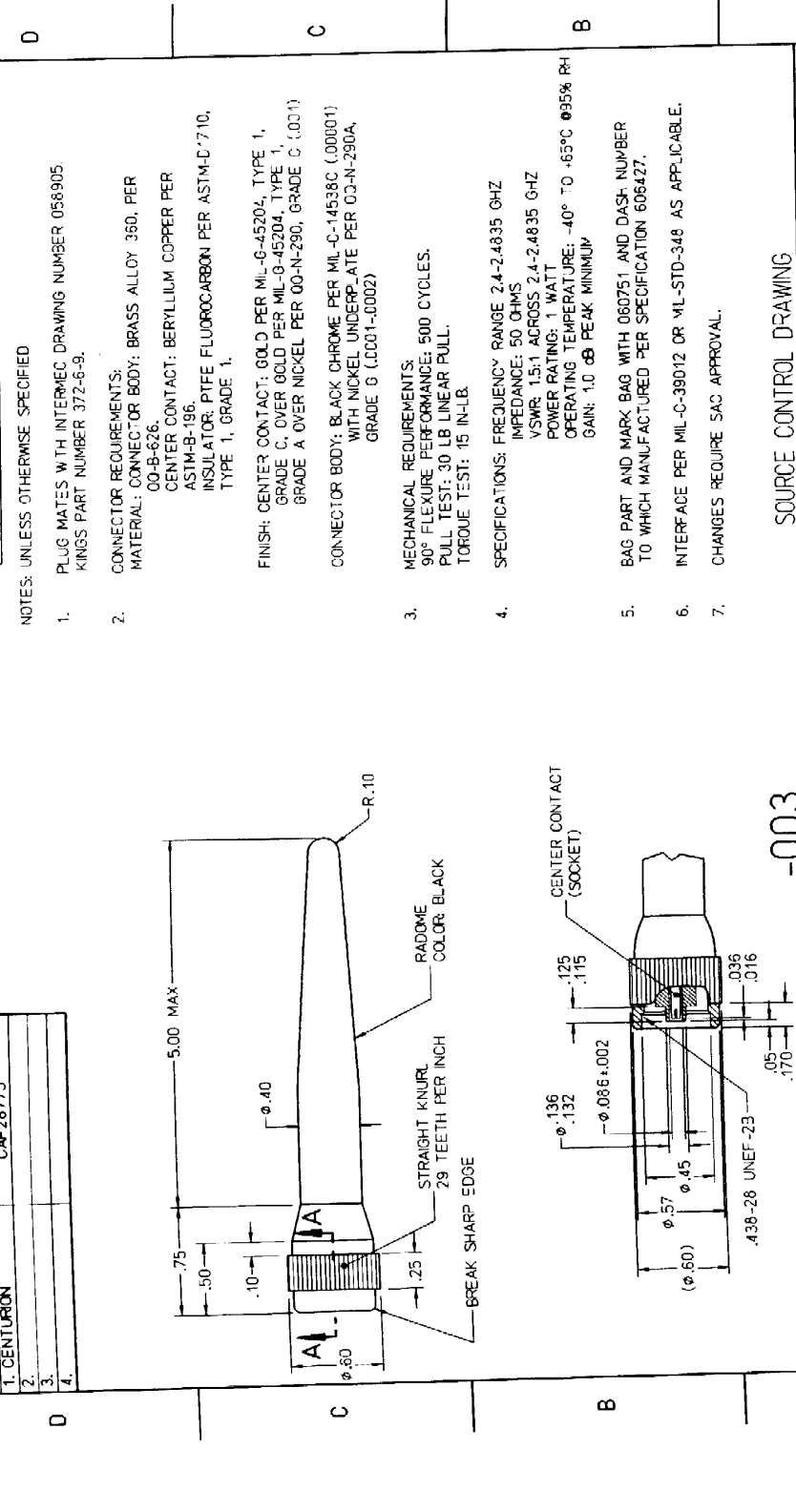
ANTENNA, SMB, 2.4 GHz,  
 DIPLE

063825

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-005

APPROVED SOURCE(S) OF SUPPLY		REVISIONS		DRAWN & APPROVED	
SUPPLIER	PART NUMBER	REV	DESCRIPTION	DATE	
1. CENTURION	CAF28775	C	-001 RELEASED AT REV C	12-16-94	GRAVEN RCH
2.		D	-002 PER ECN 023493	12-22-95	JFOOT RCH
3.		E	-003 PER ECN 024930		
4.					



CAD DBREF - /ccocserv/rel/060751.1.e		APPROVALS		DATE	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	DRAWN	GRAVEN	4-9-94	Intermec	
.XX ± .02	CHECKED	RHDAS LIND	8-2-94	6001 36TH AVENUE WEST EVERETT, WA 98203-9280	
.XXX ± .010	RESP ENG	M. SHAVER	8-5-94	TITLE ANTENNA, TNC, 2.4 GHZ	
ANGLES ± 1°	QA	K.CANTRELL	8-11-94	DIPOLE	
	MFG ENG	M.SALATINO	8-4-94	SIZE (CASE CODE)	DRAWING NUMBER
	SAC	PHELTON	8-3-94	C 13825	060751
				SCALE	2/1
					SHEET 1 OF 1

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- NOTES: UNLESS OTHERWISE SPECIFIED
1. PLUG MATES WITH INTERMEC DRAWING NUMBER 058905. KINGS PART NUMBER 372-6-9.
  2. CONNECTOR REQUIREMENTS:  
MATERIAL: CONNECTOR BODY: BRASS ALLOY 360, PER QQ-B-626.  
CENTER CONTACT: BERYLLIUM COPPER PER ASTM-B-196.  
INSULATOR: PTFE FLUOROCARBON PER ASTM-D-710, TYPE 1, GRADE 1.
  3. FINISH: CENTER CONTACT: GOLD PER MIL-G-45204, TYPE 1, GRADE C. OVER GOLD PER MIL-G-45204, TYPE 1, GRADE A OVER NICKEL PER QQ-N-290, GRADE C (.001)
  4. CONNECTOR BODY: BLACK CHROME PER MIL-C-14538C (.00001) WITH NICKEL UNDERPLATE PER QQ-N-290A, GRADE G (.0001-.0002)
  5. MECHANICAL REQUIREMENTS:  
90° FLEXURE PERFORMANCE: 500 CYCLES.  
PULL TEST: 30 LB LINEAR PULL.  
TORQUE TEST: 15 IN-LB.
  6. SPECIFICATIONS: FREQUENCY RANGE 2.4-2.4835 GHZ  
IMPEDANCE: 50 OHMS  
VSWR: 1.5:1 ACROSS 2.4-2.4835 GHZ  
POWER RATING: 1 WATT  
OPERATING TEMPERATURE: -40° TO +65°C @95% RH  
GAIN: 1.0 dB MINIMUM
  7. BAG PART AND MARK BAG WITH 060751 AND DASH NUMBER TO WHICH MANUFACTURED PER SPECIFICATION 606427.
  8. INTERFACE PER MIL-C-39012 OR MIL-STD-348 AS APPLICABLE.
  9. CHANGES REQUIRE SAC APPROVAL.

SOURCE CONTROL DRAWING

SECTION A-A

-003

SECTION A-A

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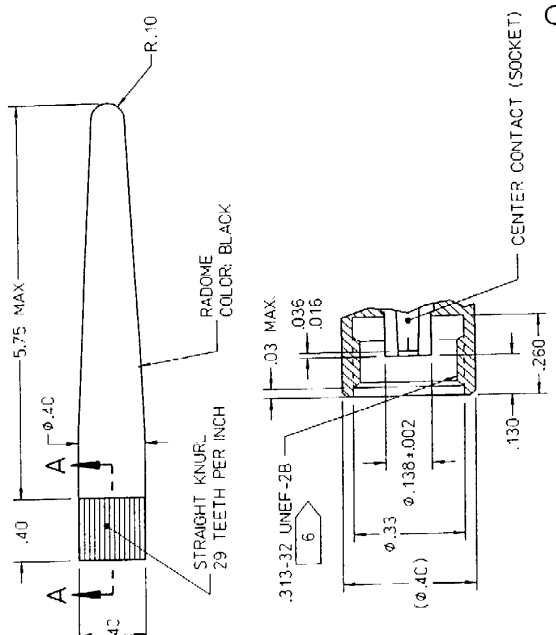
**APPROVED SOURCE(S)  
OF SUPPLY**

SUPPLIER	PART NUMBER
1. CENTURION	CAF28776
2.	
3.	
4.	

REV	STATUS	REV	DESCRIPTION	DATE	DRAWN	APPROVED
5	4	3	2	1	SHEET	
C	-001	RELEASED	AT REV C			
D	-002	PER ECN	023493	12-15-94	G.RAVEN	RCH
E	-003	PER ECN	024930	12-21-95	J.F.O'T	RCH

NOTES: UNLESS OTHERWISE SPECIFIED

- BAG PART AND MARK BAG WITH 060750 AND DASH NUMBER TO WHICH MANUFACTURED PER SPECIFICATION 606427.
- SPECIFICATIONS:
  - FREQUENCY RANGE: 2.4-2.4835 GHz
  - GAIN: 1.0 dB PEAK MINIMUM
  - IMPEDANCE: 50 OHMS
  - VSWR MAX: 1.5:1 ACROSS 2.4-2.4835 GHz
  - POWER RATING: 1 WATT
  - OPERATING TEMPERATURE: -40° TO +65° C @95% RH
- CONNECTOR REQUIREMENTS:
  - MATERIAL: CONNECTOR BODY: BRASS ALLOY 360, PER QQ-B-626
  - CENTER CONTACT: BERYLIUM COPPER PER ASTM-B196
  - INSULATOR: PIPE FLUOROCARBON PER ASTM-D1710, TYPE 1, GRADE 1.
  - FINISH: CENTER CONTACT: GOLD PER MIL-G-45204, TYPE 1, GRADE C; OVER GOLD PER MIL-G-45204, TYPE 1, GRADE A OVER NICKEL PER QQ-N-290, GRADE C (0001)
  - CONNECTOR BODY: BLACK CHROME PER MIL-C-14538C (000001) WITH NICKEL UNDERPLATE PER QQ-N-290A, GRADE G (0001-0002)
- MECHANICAL REQUIREMENTS:
  - 90° FLEXURE PERFORMANCE: 500 CYCLES
  - PULL TEST: 30 LB LINEAR PULL
  - TORQUE TEST: 15 IN-LB
- PLUG MATES WITH INTERMEC DRAWING NUMBER 562223, ITT SEAELECTRO PART NUMBER 050-827-0019-910.
- CONNECTOR PLUG WITH STANDARD 75 OHM SCREW ON INTERFACE AND 50 OHM LINE IMPEDANCE.
- CHANGES REQUIRE SAC APPROVAL.



-003

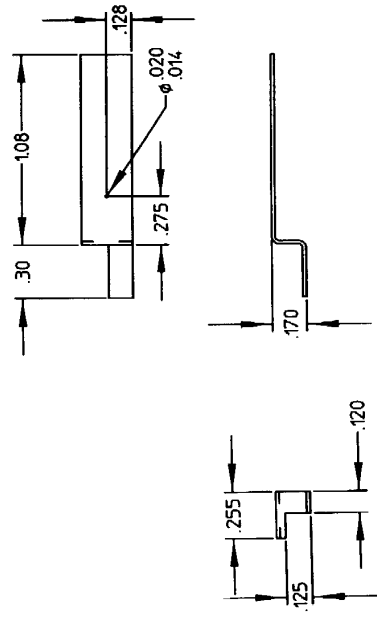
**SECTION A-A**  
SCALE 4/1

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CAD DB REF: /codserv/ecn/060750.1.e		SYSTEM - HP	
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES.	APPROVALS	DATE	
XX = 02	DRAWN	G.RAVEN	4-9-94
XXX = 01C	CHECKED	RHD/BLND	8-2-94
ANGLES = 1°	RESP ENG	M.SHAVER	8-5-94
	CA	K.DANTRELL	8-11-94
	INFO ENG	M.SALATINO	8-4-94
	SAC	P.HELTON	8-1-94
	TITLE		ANTENNA, SMC, 2.4 GHz
	DRAWING NUMBER		060750
	SIZE		C 3.38 2.5
	SHEET		1 OF 1
	COMPANY		Intermec
	ADDRESS		6001 361 <sup>st</sup> AVENUE WEST EVERETT, WA 98203-9280

**SOURCE CONTROL DRAWING**

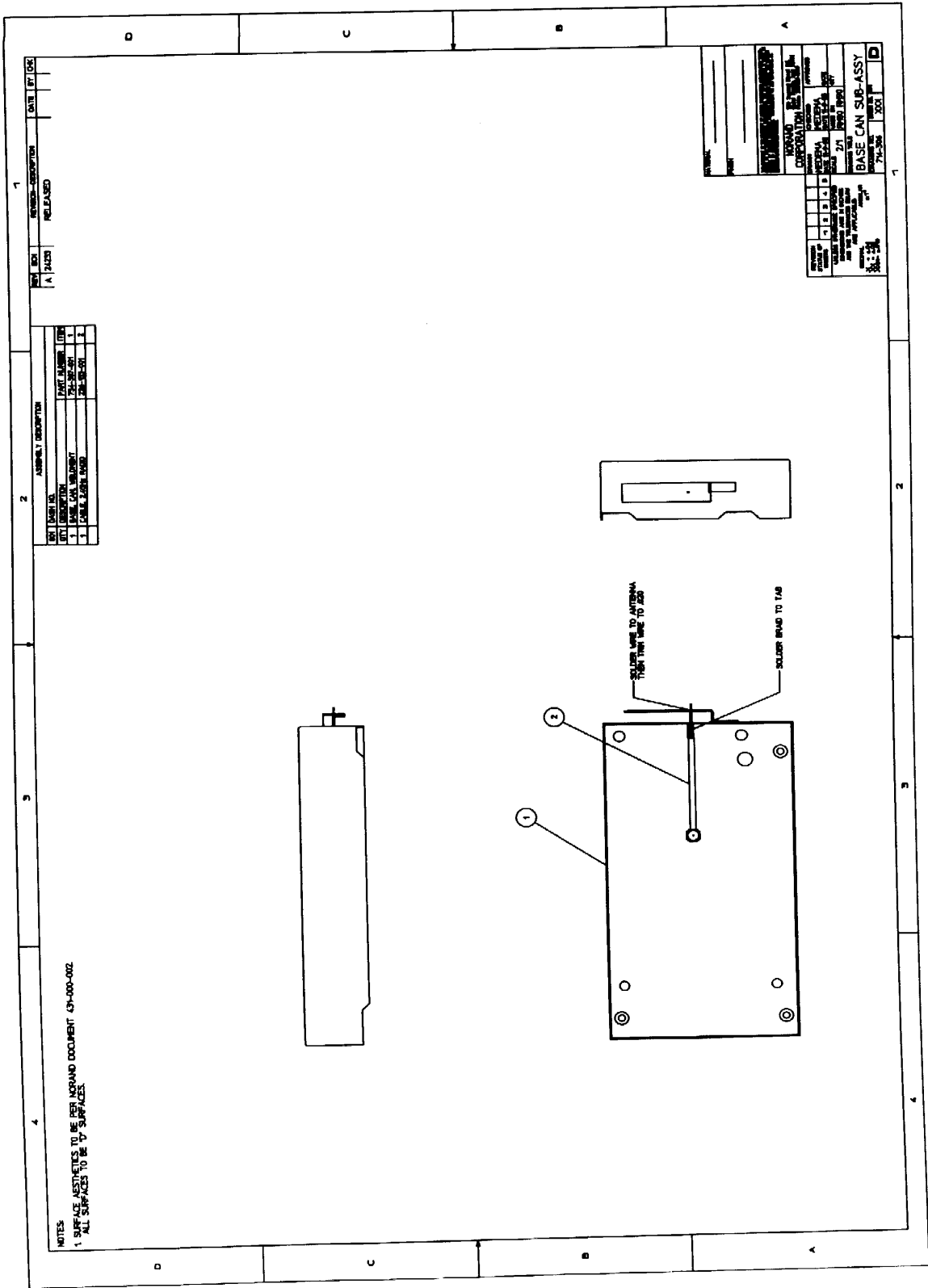
REV	ECN	REVISION--DESCRIPTION	DATE	BY	CHK
A	24233	RELEASED 1) MATERIAL WAS 26 Ga. CRS.			



MATERIAL	26 Ga. CRS 300 (.0179 THK)	
FINISH	NONE	
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<b>NORAND CORPORATION</b> 550 Second Street S.E. Cedar Rapids, Iowa 52401 Phone: 319/390-5900		
DRAWN	CHECKED	APPROVED
MEDEMA	MEDEMA	
DATE 11-3-95	DATE 11-3-95	DATE
SCALE 2/1	USED ON RM800/RM90	QTY
DRAWING TITLE		
F - STYLE ANTENNA		
DRAWING NO. 650-277	DASH NO. 001	1 OF 1
		<b>B</b>

REVISION STATUS OF SHEETS	1	2	3	4	5
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND THE TOLERANCES BELOW ARE APPLICABLE:					
DECIMAL	±.01				
ANGULAR	±1°				
X	±.04				
XX	±.02				
XXX	±.010				





NOTES:  
 1 SURFACE ASSEMBLY TO BE PER INSTRUCTION DOCUMENT 434-000-002  
 ALL SURFACES TO BE D SURFACES

REV	DATE	DESCRIPTION	DATE BY / DC
A	1/2/50	RELEASED	

REV	DATE	DESCRIPTION	DATE BY / DC
1	1/2/50	RELEASED	

REVISED	DATE	BY	DC
1	1/2/50		

REVISED	DATE	BY	DC
1	1/2/50		

BASE CAN SUB-ASSY  
 74-305 200 1

