



**CFR TITLE 47 PART 15.247
CLASS II PERMISSIVE CHANGE TO APPLICATION
FCC ID# IMKRL81PC**

EMI TEST REPORT

ON

**PROXIM, INC.
RANGELAN802 WIRELESS PCMCIA ADAPTER**

**MAXRAD MPA-2450 2 DBI OMNIDIRECTIONAL ANTENNA
LARSEN FB 42400 5 DBI OMNIDIRECTIONAL ANTENNA
CUSHCRAFT S2403BP 12NF 3DBD PATCH ANTENNA
CUSHCRAFT S2307AMP 10SMF 7.5DBI OMNIDIRECTIONAL ANTENNA
NCC N2400SM9B 2 DBI OMNIDIRECTIONAL ANTENNA
LARSEN KDMU2400 RSM HW 3 DBI OMNIDIRECTIONAL ANTENNA**

PREPARED FOR

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PREPARED BY

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TEST REPORT NUMBER: P804014

DATE OF TEST: APRIL 27, 1998

**IF THIS DOCUMENT IS REPRODUCED IT MUST BE
REPRODUCED IN ITS ENTIRETY**

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1.0 Verification of Compliance

Purpose of Test: To validate compliance of six additional antennas used with the RangelAN802 PCMCIA Card

- ✓ MAXRAD MPA-2450 2 dBi Omnidirectional Antenna
- ✓ Larsen FB 42400 5 dBi Omnidirectional Antenna
- ✓ Cushcraft S2403BP12NF 3dBd Patch Antenna
- ✓ Cushcraft S2307AMP10SMF 7.5dBi Omnidirectional Antenna
- ✓ NCC N2400SM9B 2 dBi Omnidirectional Antenna
- ✓ Larsen KDMU2400 RSM HW 3 dBi Omnidirectional Antenna

Description: Wireless PCMCIA card adapter.

Model Number: 84XX

Serial Number: 0020A6324BC5

Applicant: Proxim, Inc.

Type of Test: CFR 47 Part 15.247; Class II Permissive Change Addendum to Application for FCC ID# IMKRL1PC

Date of Test: April 27, 1998

Tested By: Chris Byleckie

The above equipment was tested by Electronic Compliance Laboratories, Inc. and found to be in compliance with the requirements set forth in the FCC Rules and Regulations, Part 15, Subpart B. The equipment, Test in the configuration described in this report, shows that the maximum emission levels emanating from this equipment are within the compliance requirements.

 Chris Byleckie
 Technical Director
 Date: _____

2.0 Test Facility

Name: Electronic Compliance Laboratories

Location: 1249 Birchwood Drive
Sunnyvale, CA 94089

Site Filing: A site description is on file at the Federal Communications Commission
P.O. Box 429
Columbia, MD 21045

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.
Test facility is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations.

NVLAP Code: 20089 effective through: March 31, 1998

3.0 Test Equipment

The following list contains equipment used at EC Laboratories, Inc. for compliance testing. The equipment conforms to the American National Standard Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1000 MHz.

Description	Manufacturer	S/N	Model No.
EMI Receiver	HP	3325A00137	8456A
Pre-amp	HP	3008A00527	8449B
Spectrum Analyzer	HP	3137A01183	8563A
Plotter	HP	2644V00365	7470A
Filter BP 1.2 - 4 GHz	FSY	001	HM 1160-1155
Filter BP 4 - 10 GHz	FSY	001	HM 2950-1565
Filter 10 - 18 GHz	FSY	001	HP 8601-7SS

HP = Hewlett Packard
EM = Electro Metrics

The antenna used at the time the data was taken is indicated on each data page. The antenna height and polarization are also noted on the data pages.

The calibration of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

4.0 Data Reporting Format

The measurement results are expressed in accordance with FCC Part-15, Subpart C; Class B limits, where applicable, are presented in tabular or graphical form.

5.0 Detector Functions

On any frequency or frequencies below or equal to 1000 MHz, the limits shown below are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths.

On any frequency or frequencies above 1000 MHz, the radiated limits shown below are based on the use of measuring equipment employing an average detector function.

EC Laboratories uses the Peak detection mode for normal testing and initial screening of the EUT. The Peak detection mode will produce a measurement value that is always greater than, or equal to, the quasi-peak or average detection mode. Whenever the measurement value is 6 dB below the applicable limit or greater, the appropriate detector function will be employed and recorded.

6.0 Frequency Range of Investigation

The spectrum was investigated up to the frequency specified in the following table according to the highest clock frequency generated in the device.

<u>Highest Frequency Used (Clock)</u>	<u>Upper Limit of Range Measured</u>
Below 1.705 MHz	30 MHz
1.705 to 108 MHz	1000 MHz
108 to 500 MHz	2000 MHz
500 to 1000 MHz	5000 MHz
Above 1000 MHz	5th Harmonic or 40 GHz (Whichever is Lower)

7.0 Summary of Measurements

Summary of Measurements for a Spread Spectrum System, 2400 - 2483.5 MHz

CFR Title 47, Parts 15.247

Manufacturer: Proxim, Inc.
295 North Bernardo Ave
Mountain View, CA 94043
Contact: Carmelo Amarena
FCC ID: IMKRL81PC
Test Report Number: P804014

Pass/Fail: Passed

15.247 Operation within the 2400 - 2483.5 MHz Band:

The EUT was placed on a wooden table, approx. 1 meter tall, with the search antenna located 1 meter away. With the spectrum analyzer in Max. Hold the table was rotated and the antenna raised and lowered to maximize emission levels.

15.247 (b) Maximum Peak Ouptu Power

Power = 23.0 dBm (peak reading) + 1.0dB cable loss = +24.0 dBm / 251 mW EIRP
Limit: +30 dBm / 1 W maximum power

MAXRAD MPA-2450 2 dBi Omnidirectional Antenna

EIRP = +24.0 (peak power) + 2.0 (peak gain, dBi) = + 26.0 dBm / 398mW EIRP
Limit: +36 dBm / 4 W maximum EIRP

Larsen FB 42400 5 dBi Omnidirectional Antenna

EIRP = +24.0 (peak power) + 5.0 (peak gain, dBi) = + 29.0 dBm / 794mW EIRP
Limit: +36 dBm / 4 W maximum EIRP

Cushcraft S2403BP12NF 3dBd Patch Antenna

EIRP = +24.0 (peak power) + 3.0 (peak gain, dBi) = + 27.0 dBm / 500 mW EIRP
Limit: +36 dBm / 4 W maximum EIRP

Cushcraft S2307AMP10SMF 7.5dBi Omnidirectional Antenna

EIRP = +24.0 (peak power) + 7.5 (peak gain, dBi) = + 31.5 dBm / 1.41W EIRP
Limit: +36 dBm / 4 W maximum EIRP

NCC N2400SM9B 2 dBi Omnidirectional Antenna

EIRP = +24.0 (peak power) + 2.0 (peak gain, dBi) = + 26.0 dBm / 398mW EIRP
Limit: +36 dBm / 4 W maximum EIRP

Larsen KDMU2400 RSM HW 3 dBi Omnidirectional Antenna

EIRP = +24.0 (peak power) + 3.0 (peak gain, dBi) = + 27.0 dBm / 500mW EIRP
Limit: +36 dBm / 4 W maximum EIRP

APPENDIX A
Restricted Band Emissions Data

FCC RADIATED DATA SHEET

EUT:	RangeLAN802 PCMCIA	DATE:	4/27/98
S/N:		CUSTOMER NAME:	Proxim
RULE PART:	15.247	WORK ORDER:	8041602
		FILE:	8041602c
ANTENNA	Horn	OTHER CAL FACTOR	ATTN dB: 0
MODULATION TYPE:			DUTY dB: 0
TESTED BY:	Chris		HP IL dB: 0
COMMENTS:	✓ Larsen KDMU2400RSM Antennas.		DIST dB: 10

FREQ	EADING	Pk, QP,	A.F.	able los	AMP	O.C.F.	TOTAL	LIMIT	DELTA
MHz	dB(uV)	or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB
Fund = 2402									
4804	52.8	Pk	32.8	7.0	35.0	10.0	47.6	74.0	-26.4
4804	41.7	Avg	32.8	7.0	35.0	10.0	36.5	54.0	-17.5
12010	48.2	Pk	39.3	13.6	35.0	10.0	56.1	74.0	-18.0
12010	37.5	Avg	39.3	13.6	35.0	10.0	45.4	54.0	-8.7
Fund = 2440									
4880	51.3	Pk	32.8	7.0	35.0	10.0	46.1	74.0	-27.9
4880	42.0	Avg	32.8	7.0	35.0	10.0	36.8	54.0	-17.2
7320	56.5	Pk	36.0	10.6	35.0	10.0	58.1	74.0	-15.9
7320	37.3	Avg	36.0	10.6	35.0	10.0	38.9	54.0	-15.1
12200	49.5	Pk	39.3	13.6	35.0	10.0	57.4	74.0	-16.7
12200	37.8	Avg	39.3	13.6	35.0	10.0	45.7	54.0	-8.4
Fund = 2480									
4960	54.8	Pk	32.8	7.0	35.0	10.0	49.6	74.0	-24.4
4960	42.0	Avg	32.8	7.0	35.0	10.0	36.8	54.0	-17.2
7440	57.6	Pk	36.0	10.6	35.0	10.0	59.2	74.0	-14.8
7440	37.5	Avg	36.0	10.6	35.0	10.0	39.1	54.0	-14.9
12400	48.1	Pk	39.3	13.6	35.0	10.0	56.0	74.0	-18.1
12400	37.5	Avg	39.3	13.6	35.0	10.0	45.4	54.0	-8.7

FCC RADIATED DATA SHEET

EUT:	RangeLAN802 PCMCIA	DATE:	4/27/98
S/N:		CUSTOMER NAME:	Proxim
RULE PART:	15.247	WORK ORDER:	8041602
		FILE:	804160k
ANTENNA:	Horn	OTHER CAL FACTOR:	ATTN dB: 0
MODULATION TYPE:			DUTY dB: 0
TESTED BY:	Chris		HP IL dB: 0
COMMENTS:	✓1 NCC N2400SM9B Antenna		DIST dB: 10

FREQ.	EADING	Pk, QP,	A.F.	able los	AMP	O.C.F.	TOTAL	LIMIT	DELTA
MHz	dB(uV)	or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB
Fund = 2402									
4804	54.0	Pk	32.8	7.0	35.0	10.0	48.8	74.0	-25.2
4804	42.0	Avg	32.8	7.0	35.0	10.0	36.8	54.0	-17.2
12010	48.8	Pk	39.3	13.6	35.0	10.0	56.7	74.0	-17.3
12010	37.8	Avg	39.3	13.6	35.0	10.0	45.7	54.0	-8.3
Fund = 2440									
4880	53.8	Pk	32.8	7.0	35.0	10.0	48.6	74.0	-25.4
4880	41.8	Avg	32.8	7.0	35.0	10.0	36.6	54.0	-17.4
7320	58.5	Pk	36.0	10.6	35.0	10.0	60.1	74.0	-13.9
7320	37.5	Avg	36.0	10.6	35.0	10.0	39.1	54.0	-14.9
12200	49.8	Pk	39.3	13.6	35.0	10.0	57.7	74.0	-16.3
12200	37.8	Avg	39.3	13.6	35.0	10.0	45.7	54.0	-8.3
Fund = 2480									
4960	53.5	Pk	32.8	7.0	35.0	10.0	48.3	74.0	-25.7
4960	41.8	Avg	32.8	7.0	35.0	10.0	36.6	54.0	-17.4
7440	60.2	Pk	36.0	10.6	35.0	10.0	61.8	74.0	-12.3
7440	37.7	Avg	36.0	10.6	35.0	10.0	39.3	54.0	-14.8
12400	48.5	Pk	39.3	13.6	35.0	10.0	56.4	74.0	-17.7
12400	37.7	Avg	39.3	13.6	35.0	10.0	45.5	54.0	-8.5

FCC RADIATED DATA SHEET

EUT:	RangeLAN802 PCMCIA	DATE:	4/27/98
S/N:		CUSTOMER NAME:	Proxim
RULE PART:	15.247	WORK ORDER:	8041602
		FILE:	8041602j
ANTENNA	Horn	OTHER CAL FACTOR	ATTN dB: 0
MODULATION TYPE:			DUTY dB: 0
TESTED BY:	Chris		HP IL dB: 0
COMMENTS:	✓ S2307AMP10SMF Antenna		DIST dB: 10

FREQ	EADING	Pk, QP,	A.F.	able los	AMP	O.C.F.	TOTAL	LIMIT	DELTA
MHz	dB(µV)	or Av	dB	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
Fund = 2402									
4804	53.0	Pk	32.8	7.0	35.0	10.0	47.8	74.0	-26.2
4804	41.7	Avg	32.8	7.0	35.0	10.0	36.5	54.0	-17.5
12010	48.7	Pk	39.3	13.6	35.0	10.0	56.5	74.0	-17.5
12010	37.8	Avg	39.3	13.6	35.0	10.0	45.7	54.0	-8.3
Fund = 2440									
4880	53.3	Pk	32.8	7.0	35.0	10.0	48.1	74.0	-25.9
4880	42.0	Avg	32.8	7.0	35.0	10.0	36.8	54.0	-17.2
7320	58.0	Pk	36.0	10.6	35.0	10.0	59.6	74.0	-14.4
7320	37.7	Avg	36.0	10.6	35.0	10.0	39.3	54.0	-14.8
12200	50.0	Pk	39.3	13.6	35.0	10.0	57.9	74.0	-16.2
12200	37.8	Avg	39.3	13.6	35.0	10.0	45.7	54.0	-8.3
Fund = 2480									
4960	52.5	Pk	32.8	7.0	35.0	10.0	47.3	74.0	-26.7
4960	41.7	Avg	32.8	7.0	35.0	10.0	36.5	54.0	-17.5
7440	58.5	Pk	36.0	10.6	35.0	10.0	60.1	74.0	-13.9
7440	41.8	Avg	36.0	10.6	35.0	10.0	43.4	54.0	-10.6
12400	49.5	Pk	39.3	13.6	35.0	10.0	57.4	74.0	-16.7
12400	37.8	Avg	39.3	13.6	35.0	10.0	45.7	54.0	-8.3

FCC RADIATED DATA SHEET											
EUT:	RangelAN802 PCMCIA	S/N:	15.247	FILE:	8041602g	DATE:	4/27/98	CUSTOMER NAME:	Proxim	WORK ORDER:	8041602
RULE PART:	15.247	ANTENNA	Horn	OTHER CAL FACTOR	ATTN DB: 0	MODULATION TYPE:	Chrs	TESTED BY:	Chrs	COMMENTS:	✓ Cushman S2403BP12NF Antenna
FREQ	EADING	PK OP	A.F.	able los	AMP	O.C.F.	TOTAL	LIMIT	DELTA		
MHZ	dB(W)	or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB		
Fund = 2402											
4804	52.3	PK	32.8	7.0	35.0	10.0	47.1	74.0	-26.9		
4804	42.0	Avg	32.8	7.0	35.0	10.0	36.8	54.0	-17.2		
12010	49.7	PK	39.3	13.6	35.0	10.0	57.5	74.0	-16.5		
12010	37.7	Avg	39.3	13.6	35.0	10.0	45.5	54.0	-8.5		
Fund = 2440											
4880	53.3	PK	32.8	7.0	35.0	10.0	48.1	74.0	-25.9		
4880	42.0	Avg	32.8	7.0	35.0	10.0	36.8	54.0	-17.2		
7320	59.0	PK	36.0	10.6	35.0	10.0	60.6	74.0	-13.4		
7320	37.3	Avg	36.0	10.6	35.0	10.0	38.9	54.0	-15.1		
12200	49.2	PK	39.3	13.6	35.0	10.0	57.0	74.0	-17.0		
12200	37.7	Avg	39.3	13.6	35.0	10.0	45.5	54.0	-8.5		
Fund = 2480											
4960	53.2	PK	32.8	7.0	35.0	10.0	48.0	74.0	-26.0		
4960	42.0	Avg	32.8	7.0	35.0	10.0	36.8	54.0	-17.2		
7440	59.5	PK	36.0	10.6	35.0	10.0	61.1	74.0	-12.9		
7440	37.7	Avg	36.0	10.6	35.0	10.0	39.3	54.0	-14.8		
12400	49.7	PK	39.3	13.6	35.0	10.0	57.5	74.0	-16.5		
12400	37.7	Avg	39.3	13.6	35.0	10.0	45.5	54.0	-8.5		

FCC RADIATED DATA SHEET

EUT: RangeLAN802 PCMCIA
 S/N:
 RULE PART: 15.247

DATE: 4/27/98
 CUSTOMER NAME: Proxim
 WORK ORDER: 8041602
 FILE: 8041602h

ANTENNA: Horn
 MODULATION TYPE:
 TESTED BY: Chris
 COMMENTS: ✓ Larsen FB2400 Antenna

OTHER CAL FACTOR ATTN dB: 0
 DUTY dB: 0
 HP IL dB: 0
 DIST dB: 10

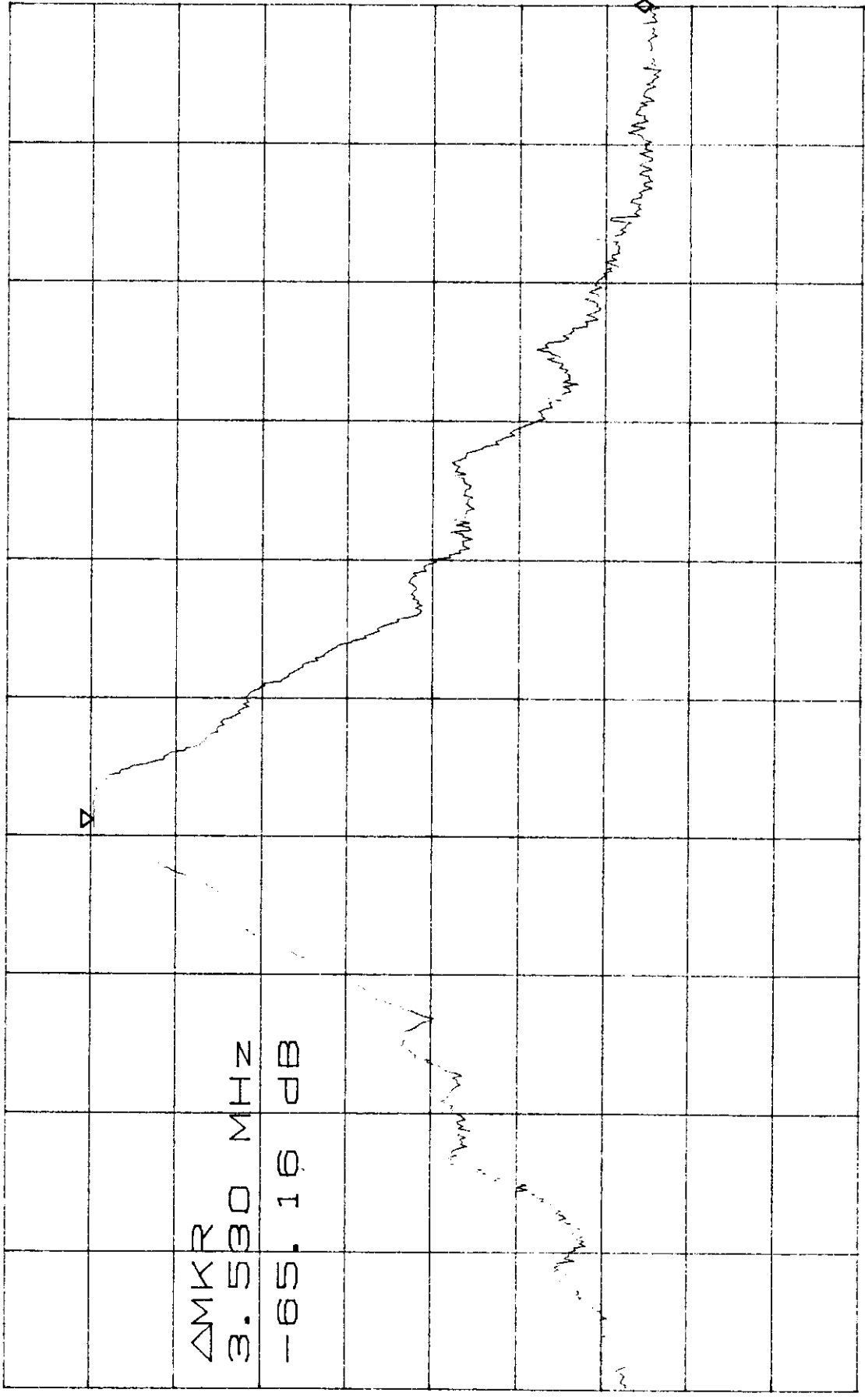
FREQ.	EADING	Pk, QP,	A.F.	able los	AMP	O.C.F.	TOTAL	LIMIT	DELTA
MHz	dB(uV)	or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB
Fund = 2402									
4804	53.3	Pk	32.8	7.0	35.0	10.0	48.1	74.0	-25.9
4804	41.7	Avg	32.8	7.0	35.0	10.0	36.5	54.0	-17.5
12010	49.3	Pk	39.3	13.6	35.0	10.0	57.2	74.0	-16.8
12010	38.0	Avg	39.3	13.6	35.0	10.0	45.9	54.0	-8.2
Fund = 2440									
4880	51.8	Pk	32.8	7.0	35.0	10.0	46.6	74.0	-27.4
4880	41.7	Avg	32.8	7.0	35.0	10.0	36.5	54.0	-17.5
7320	57.3	Pk	36.0	10.6	35.0	10.0	58.9	74.0	-15.1
7320	37.5	Avg	36.0	10.6	35.0	10.0	39.1	54.0	-14.9
12200	47.8	Pk	39.3	13.6	35.0	10.0	55.7	74.0	-18.3
12200	37.7	Avg	39.3	13.6	35.0	10.0	45.5	54.0	-8.5
Fund = 2480									
4960	53.7	Pk	32.8	7.0	35.0	10.0	48.5	74.0	-25.5
4960	41.7	Avg	32.8	7.0	35.0	10.0	36.5	54.0	-17.5
7440	58.3	Pk	36.0	10.6	35.0	10.0	59.9	74.0	-14.1
7440	37.5	Avg	36.0	10.6	35.0	10.0	39.1	54.0	-14.9
12400	49.2	Pk	39.3	13.6	35.0	10.0	57.0	74.0	-17.0
12400	37.7	Avg	39.3	13.6	35.0	10.0	45.5	54.0	-8.5

FCC RADIATED DATA SHEET

EUT:	RangeLAN802 PCMCIA	DATE:	4/27/98
S/N:		CUSTOMER NAME:	Proxim
RULE PART:	15.247	WORK ORDER:	8041602
		FILE:	8041602d
ANTENNA	Horn	OTHER CAL FACTOR	ATTN dB: 0
MODULATION TYPE:			DUTY dB: 0
TESTED BY:	Chris		HP IL dB: 0
COMMENTS:	↙ MAXRAD MPA2450 Reverse Antenna.		DIST dB: 10

FREQ.	EADING	Pk, QP, or Av	A.F. dB	able los dB	AMP dB	O.C.F. dB	TOTAL dB(uV/m)	LIMIT dB(uV/m)	DELTA dB
Fund = 2402									
4804	52.5	Pk	32.8	7.0	35.0	10.0	47.3	74.0	-26.7
4804	41.5	Avg	32.8	7.0	35.0	10.0	36.3	54.0	-17.7
12010	48.8	Pk	39.3	13.6	35.0	10.0	56.7	74.0	-17.4
12010	37.8	Avg	39.3	13.6	35.0	10.0	45.7	54.0	-8.4
Fund = 2440									
4880	53.8	Pk	32.8	7.0	35.0	10.0	48.6	74.0	-25.4
4880	41.8	Avg	32.8	7.0	35.0	10.0	36.6	54.0	-17.4
7320	58.2	Pk	36.0	10.6	35.0	10.0	59.8	74.0	-14.3
7320	37.5	Avg	36.0	10.6	35.0	10.0	39.1	54.0	-14.9
12200	49.3	Pk	39.3	13.6	35.0	10.0	57.2	74.0	-16.9
12200	38.0	Avg	39.3	13.6	35.0	10.0	45.9	54.0	-8.2
Fund = 2480									
4960	52.8	Pk	32.8	7.0	35.0	10.0	47.6	74.0	-26.4
4960	41.7	Avg	32.8	7.0	35.0	10.0	36.5	54.0	-17.5
7440	58.3	Pk	36.0	10.6	35.0	10.0	59.9	74.0	-14.1
7440	37.5	Avg	36.0	10.6	35.0	10.0	39.1	54.0	-14.9
12400	48.5	Pk	39.3	13.6	35.0	10.0	56.4	74.0	-17.7
12400	37.8	Avg	39.3	13.6	35.0	10.0	45.7	54.0	-8.4

ATTEN 40dB
RL 137.0dBμV 10dB/ 3.530MHz



START 2.477500GHZ STOP 2.483500GHZ
*RBW 100KHZ VBW 100KHZ SWP 50ms
P804014.DOC 14

APPENDIX B
Support Equipment

Equipment Type:	Laptop Computer
Model Number:	T19005
Serial Number:	11453067
FCC ID Number:	FKGP66
Manufacturer:	Toshiba

APPENDIX C

Set-up Photographs

APPENDIX D

Antenna and Conector Drawings

APPENDIX D

Antenna and Conector Drawings

MAXRAD Portable Antennas
MPA Series

MAXRAD now offers a series of portable antennas for the emerging DCS, PCS and Wireless Data markets. Using proven design technologies, the MAXRAD MPA series is the answer for even the most discriminating portable antenna user. This series is available with several different connector options.

Electrical Specifications

Gain:

Unity

VSWR at Resonant Point:

<1.5:1

Nominal Impedance:

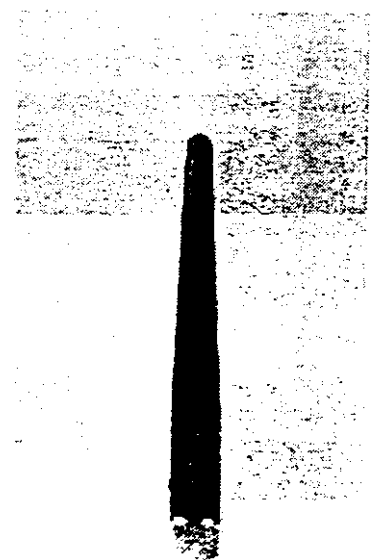
50 Ohms

Antenna Type:

Coaxial dipole

Available Connectors:

BNC, TNC, male SMA, female SMA



MPA-2450

MPA Series

Model #	Connector Options	Frequency Range	Factory Tuned Frequency	Gain	List Price
MPA-1750*	*PL* = Mini-UHF *BN* = BNC	1.71-1.88 GHz	1.8 GHz	Unity	\$30.25
MPA-1850*	*C* = TNC *FSMA* = female SMA	1.85-1.99 GHz	1.9 GHz	Unity	\$30.25
MPA-2450*	*MSMA* = male SMA	2.4-2.5 GHz	2.45 GHz	Unity	\$30.25

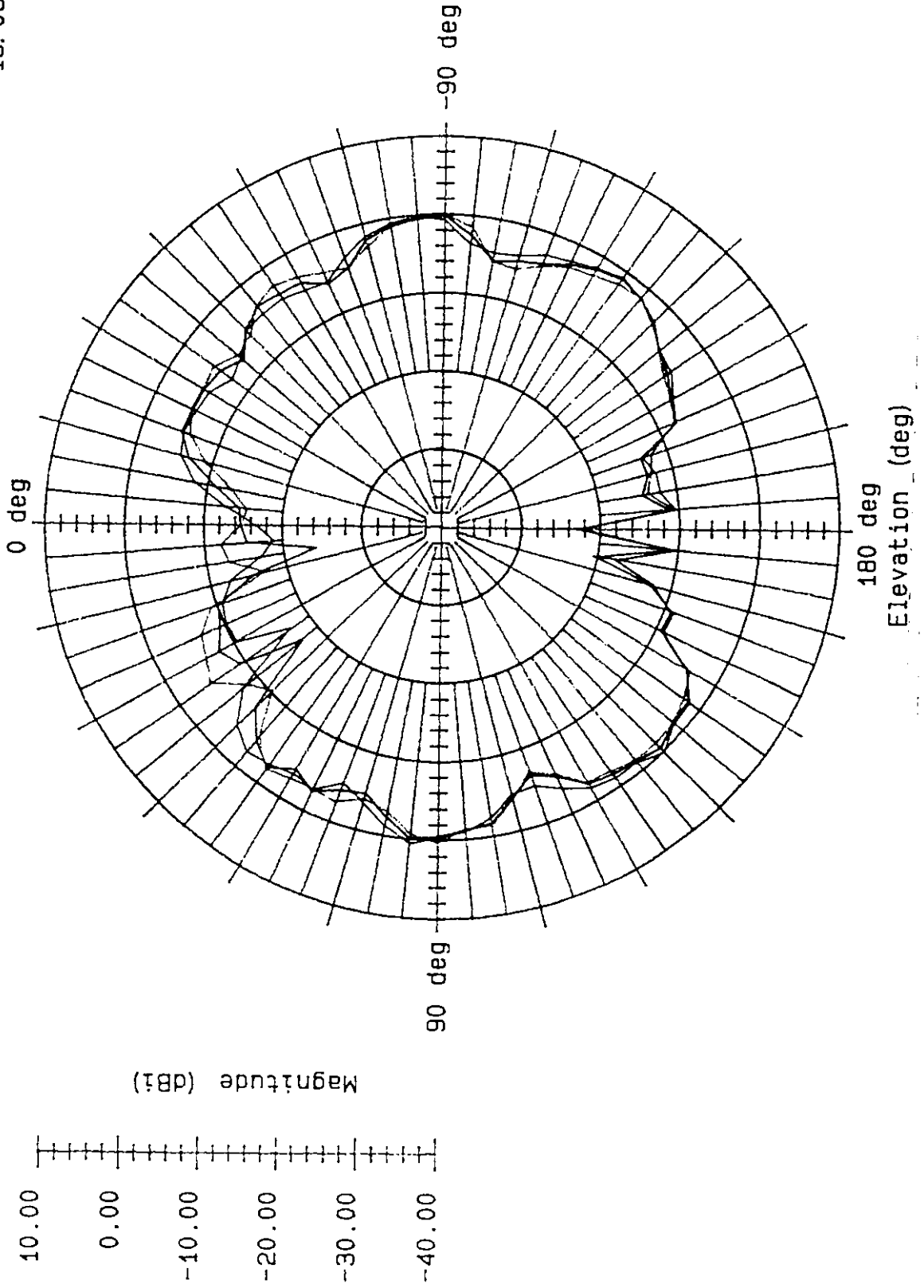
*Please specify connector option when ordering

For SMA connectors - add \$5.25

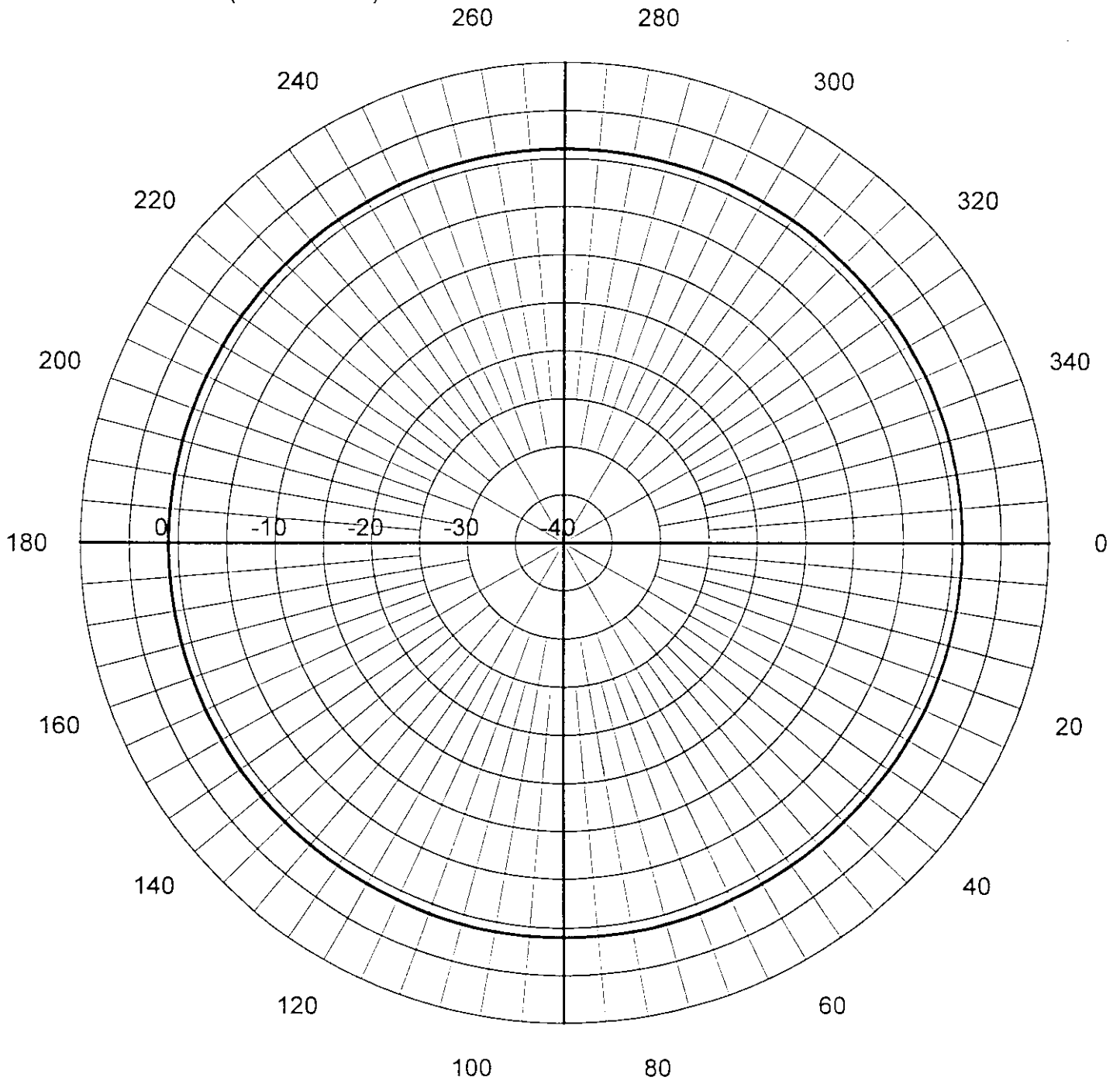
MAXRAD_TEST_5_1.DAT
MAXRAD_CAL_V
4-NOV-97
15: 08: 16

--- Antenna Measurement ---
0.000 deg 0.000 deg
0.000 deg 0.000 deg
2.45 GHz 2.50 GHz

Az = 0.000 deg
Pol = 0.000 deg
Freq = 2.40 GHz



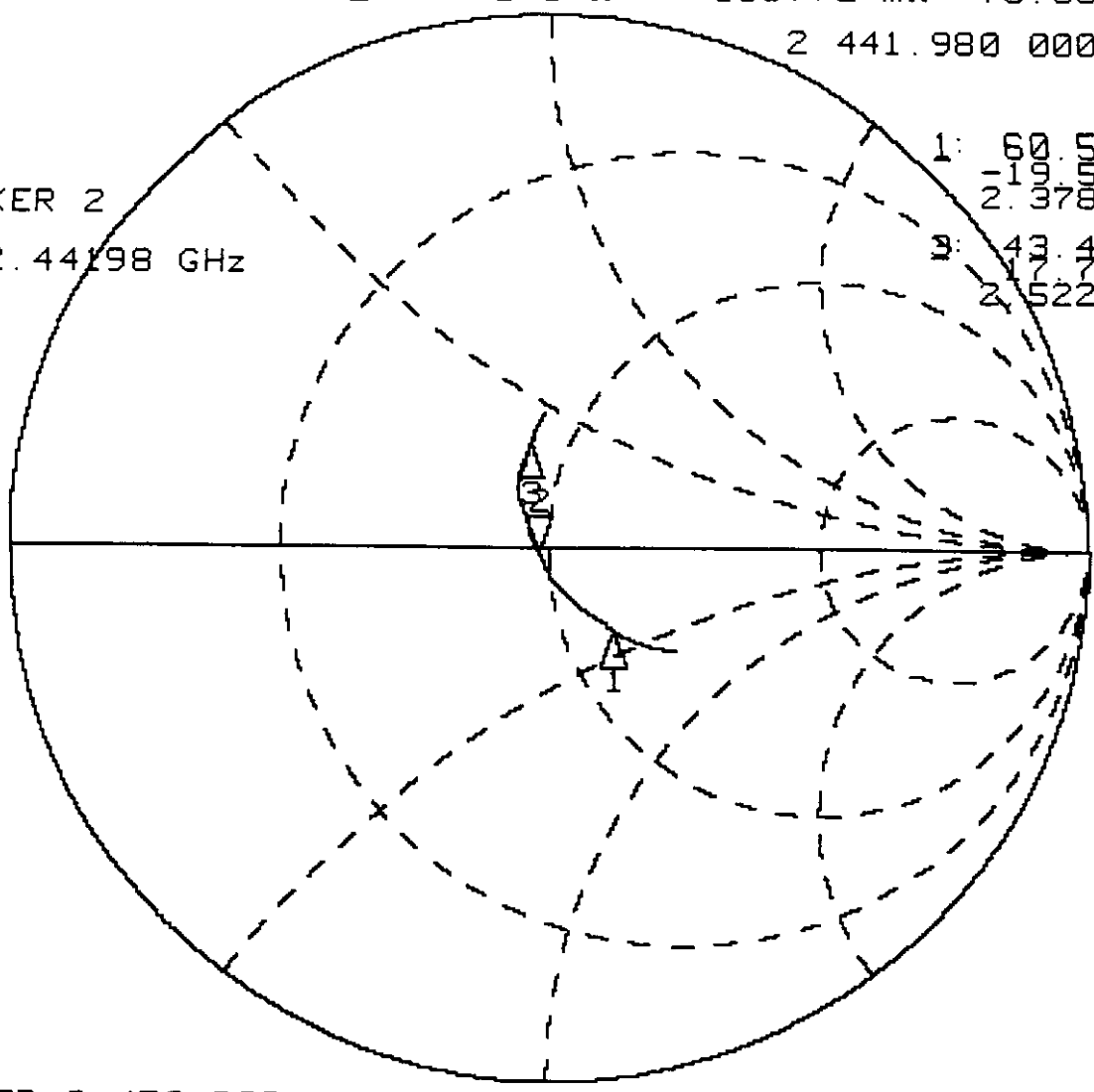
Maxrad MPA-2450 (Azimuth Cut)



CH1 S₁₁ 1 UFS 2: 48.248 Ω -886.72 mΩ 73.501 pF
hp 2 441.980 000 MHz

Cor
MARKER 2
2.44198 GHz

1: 60.525 Ω
-19.559 Ω
2.378 GHz
3: 43.457 Ω
-17.795 Ω
2.522 GHz

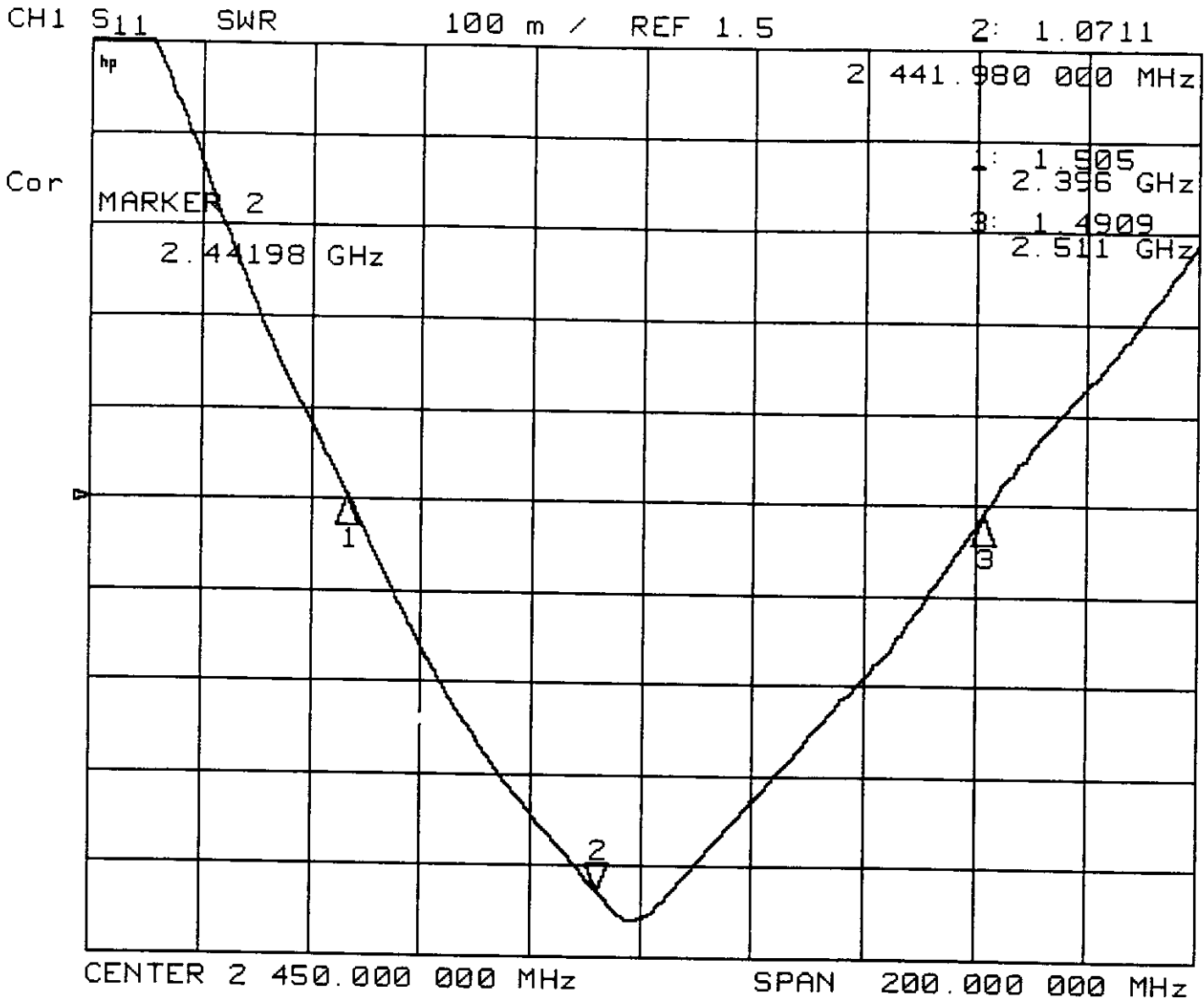


CENTER 2 450.000 000 MHz SPAN 200.000 000 MHz

*PN: N24005M3B
REV. SMA, 2.4 GHz
AIR-TUNED
2/24/98*

NCC, INC.
18385 Parkman-Nelson Road
P.O. Box 736
Parkman, OH 44080

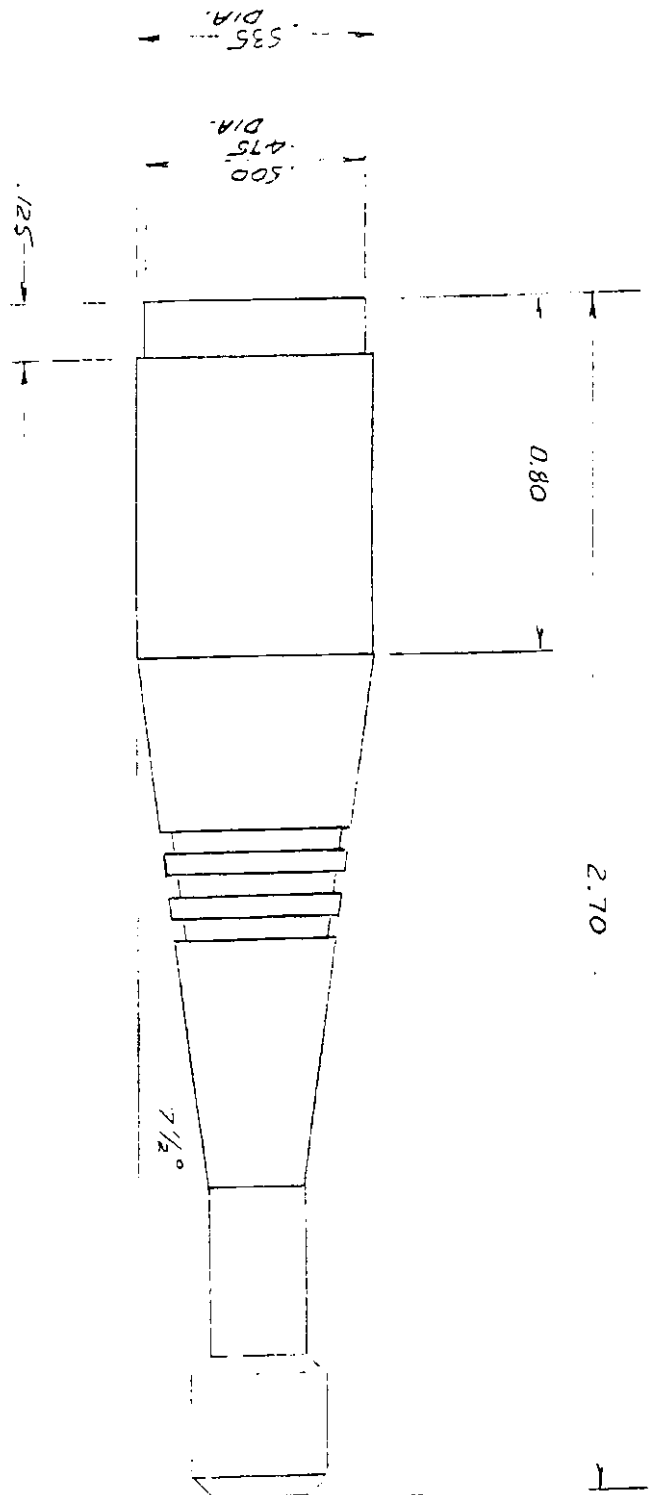
FIG 2 OF 2



P/N: N2400SM8B
 REV. SMA, 2.4GHz
 AIR-TUNED
 2/24/98

NCO, INC.
 18385 Parkman-Nelson Road
 P.O. Box 736
 Parkman, OH 44080

DE 1002



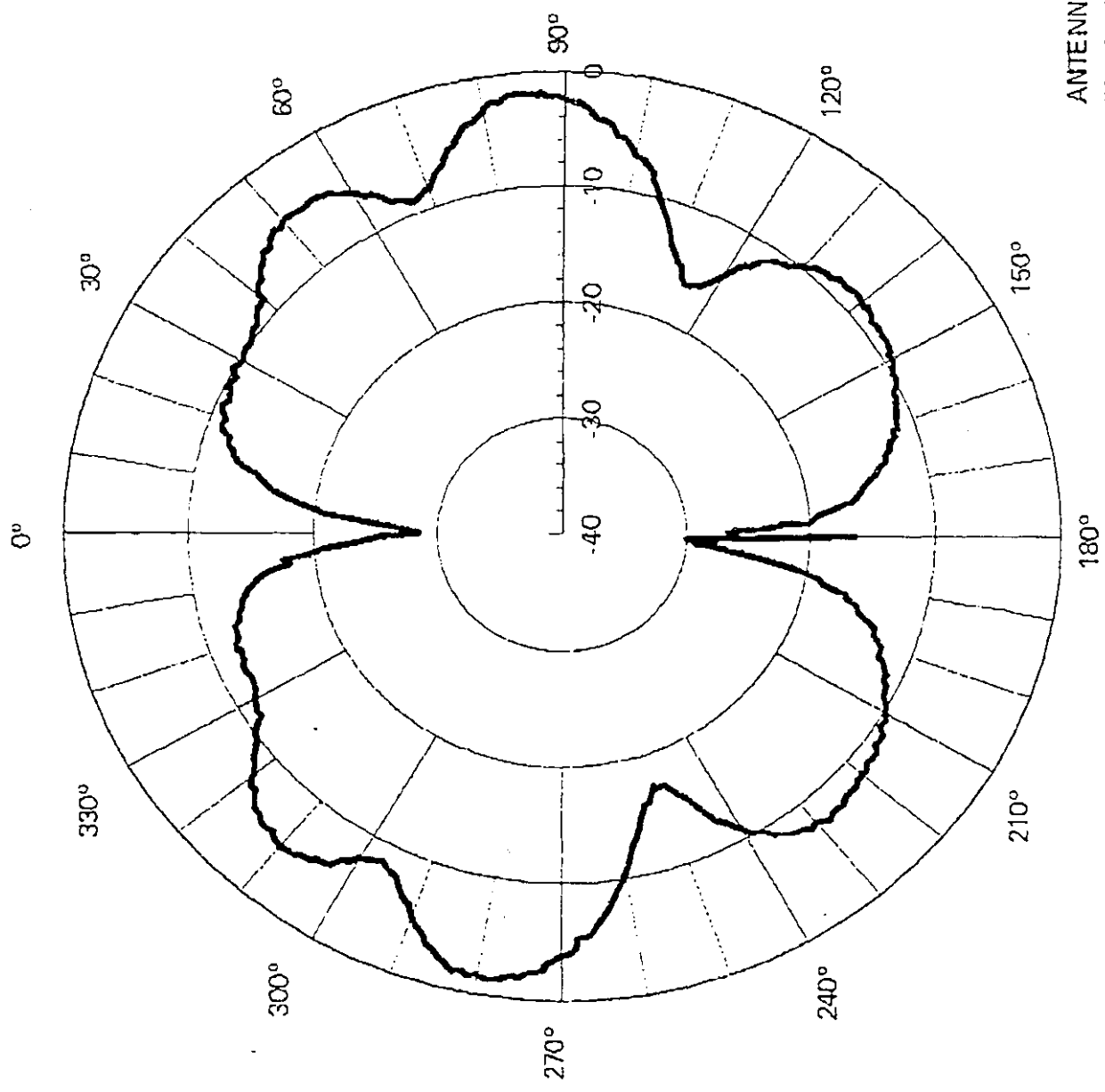
SPECIFICATIONS

- Frequency - 2.4 GHz - 2.5 GHz
- Bandwidth - 75 MHz <1.5:1
- VSWR - <1.5:1
- Impedance - Nominally 50 Ohms
- Polarity - Vertical
- Gain - 2 dBi
- Connector - R SMA
- Length - Nominally 3 inches
- Material - Flexible Vinyl

<p>MODEL N2400SM9 "2.4 GHz CURRENT FEED HALF-WAVE ANTENNA WITH REVERSE SMA CONNECTOR"</p>		<p>DRAWN BY 476</p>	
<p>SCALE 3:1</p>	<p>APPROVED BY</p>	<p>REVISI</p>	
<p>DATE 03-20-98</p>	<p>PARKMAN, OHIO</p>		
<p>DRAWING NUMBER N2400SM9</p>			

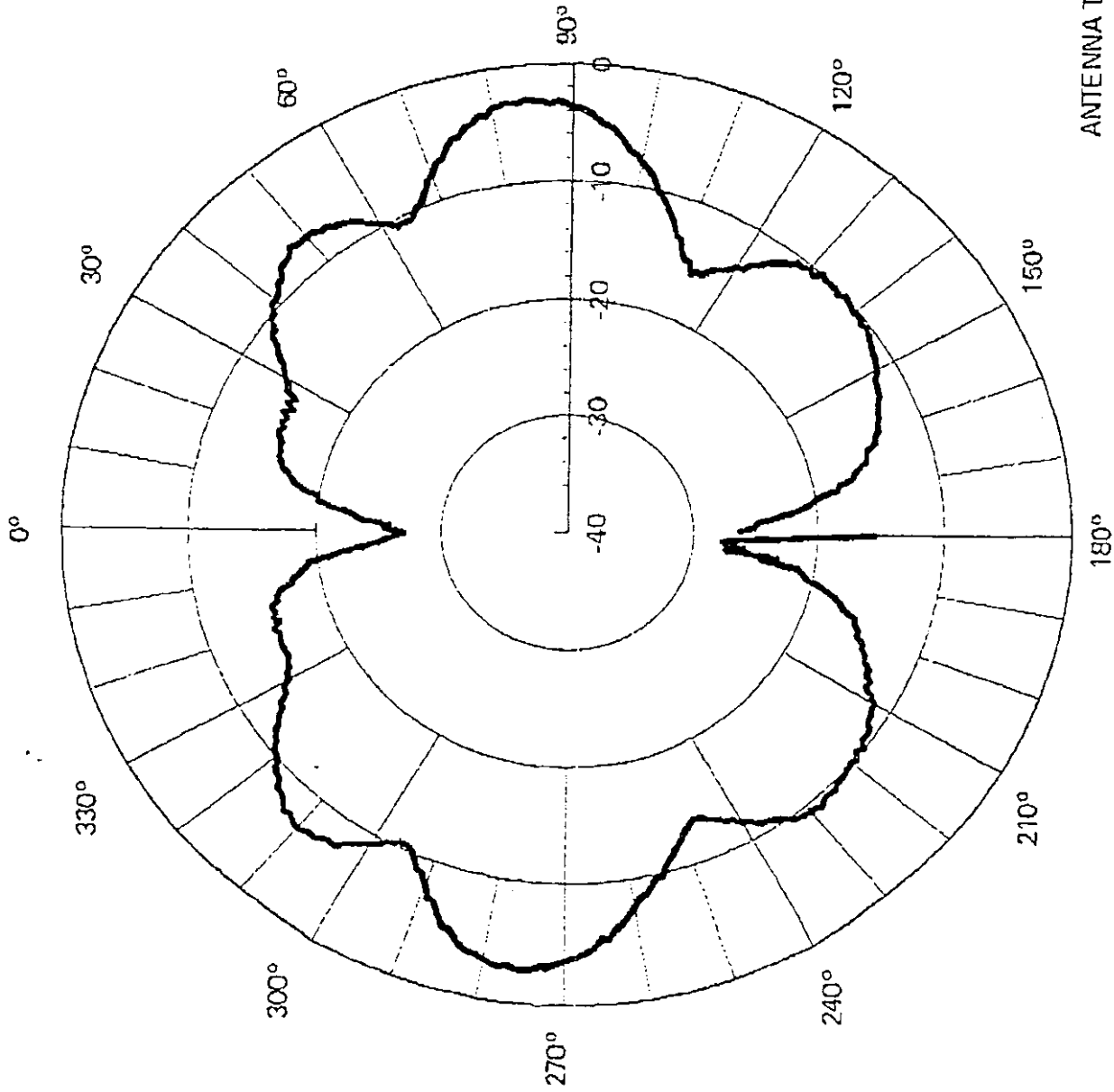
Post-It® Fax Note	7671	Date	# of pages
To	DENVISE	From	PALL T.
Co./Dept.		Co.	
Phone #		Phone #	
Fax #	615.830.9426	Fax #	

FB3 2400
 LATER CHANGED TO
 FB4 2400



LARSEN ELECTRONICS
 ANTENNA TYPE; Collinear G/P MODEL No. FB3-2400
 FREQ; 2.485 GHZ POLARIZATION; HORIZONTAL
 FILE No. FB324002 DATE; 3-19-96 ENG; JBV
 NOTES; E-PLANE GAIN; RELATIVE

5 dB



LARSEN ELECTRONICS

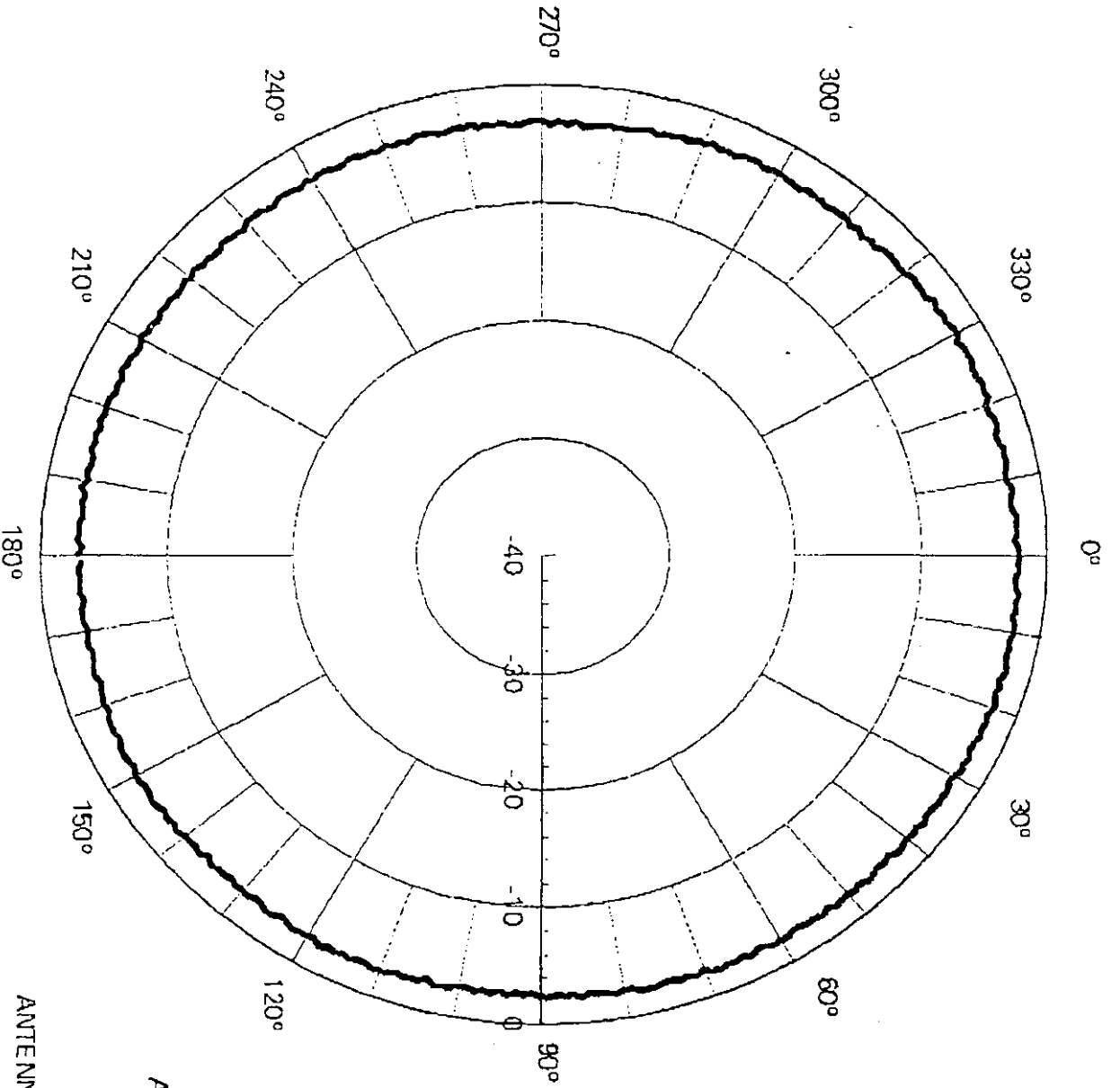
ANTENNA TYPE; Collinear G/P MODEL No. FB3-2400

FREQ; 2.40 GHZ POLORIZATION; HORIZONTAL

FILE No. FB324001 DATE; 3-19-96 ENG; JBV

NOTES; E-PLANE GAIN; RELATIVE

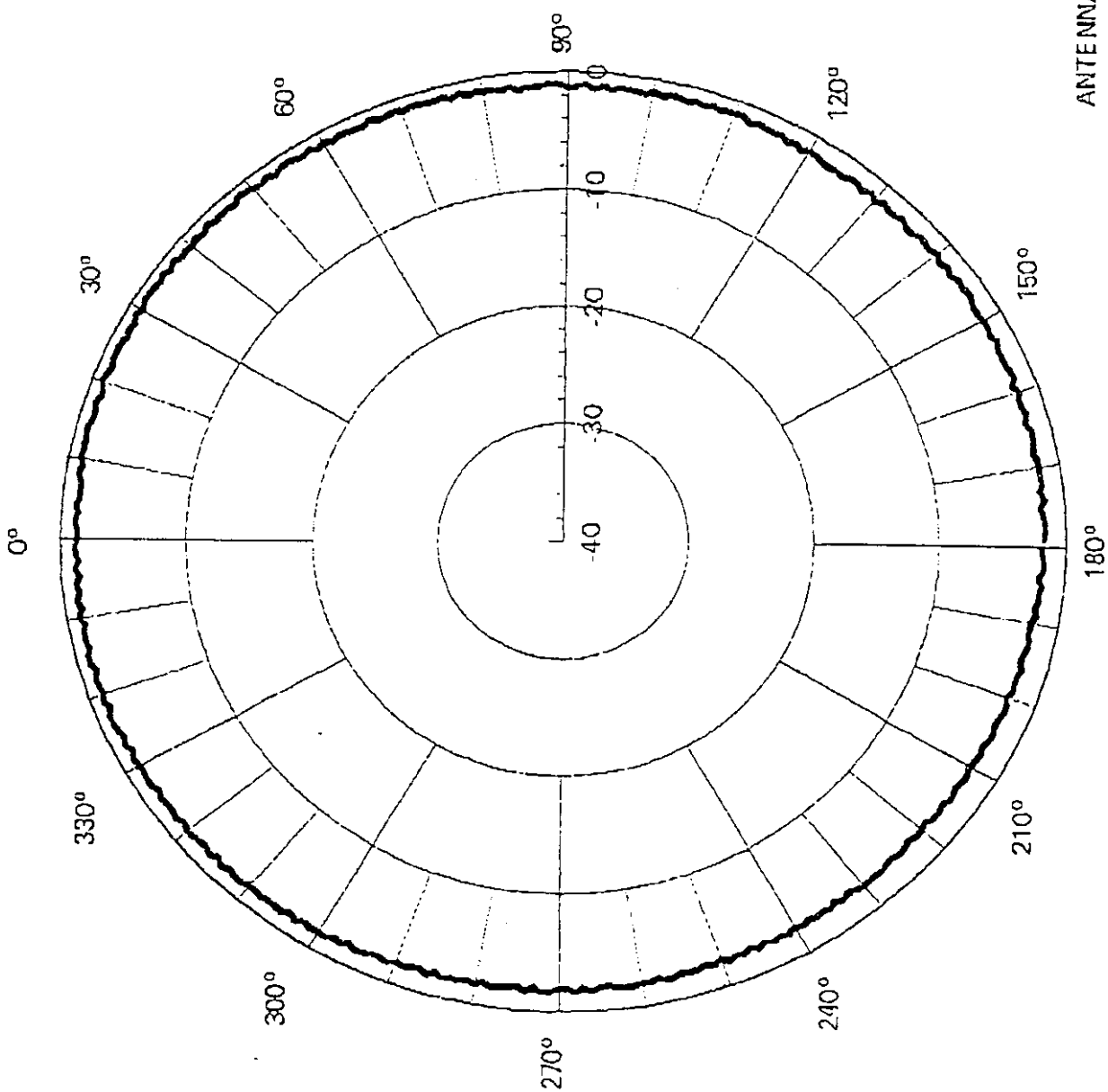
Handwritten notes and signatures in the top right corner, including a signature that appears to be 'J. B. V.' and some illegible text.



AVG. REL. GAIN: -27DB

LARSEN ELECTRONICS

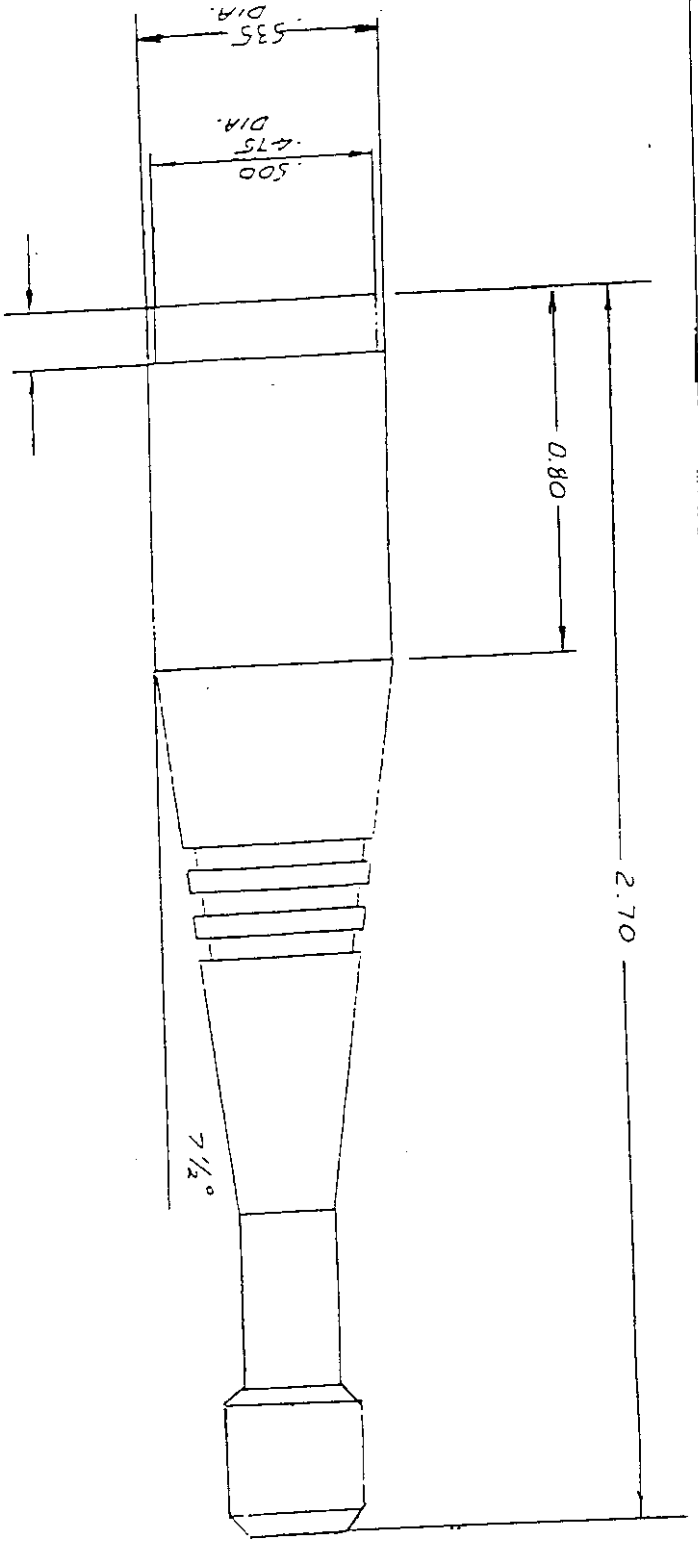
ANTENNA TYPE: Collinear G/P MODEL No. FB3-2400
 FREQ: 2.40GHZ POLARIZATION: VERTICAL
 FILE No. FB324003 DATE: 3-19-96 ENG: JBV
 NOTES: H-PLANE GAIN: RELATIVE



AVG. REL. GAIN; -1.5DB

LARSEN ELECTRONICS

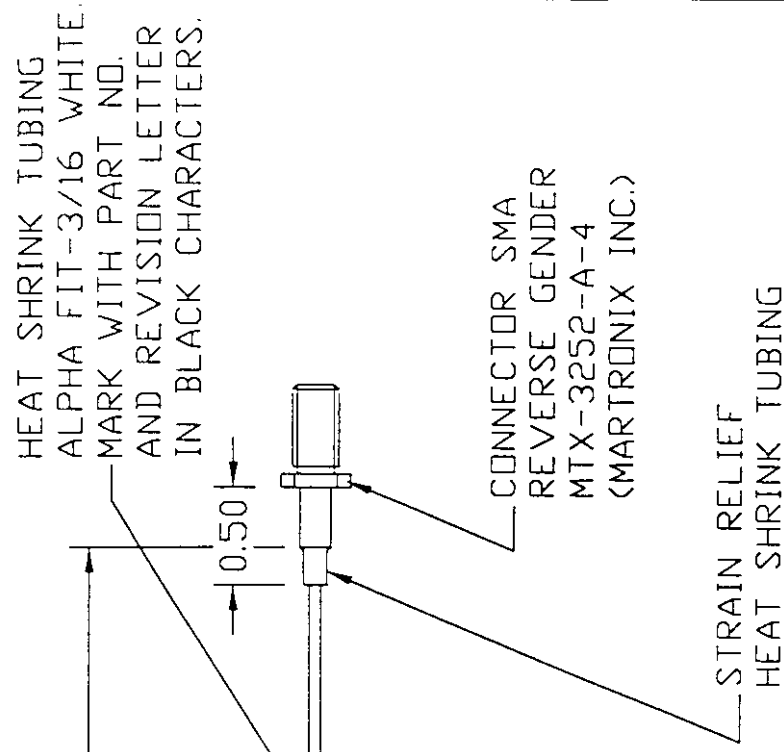
ANTENNA TYPE; Collinear G/P MODEL No. FB3-2400
 FREQ; 2.485 GHZ POLORIZATION; VERTICAL
 FILE No. FB324004 DATE; 3-19-96 ENG; JBV
 NOTES; H-PLANE GAIN; RELATIVE



SPECIFICATIONS

- Frequency - 2.4 GHz - 2.5 GHz
- Bandwidth - 75 MHz < 1.5:1
- VSWR - < 1.5:1
- Impedance - Nominally 50 Ohms
- Polarity - Vertical
- Gain - 2 dBi
- Connector - B SMA
- Length - Nominally 3 inches
- Material - Flexible Vinyl

<p>MODEL N2400SM9B 2.4 GHz CURRENT FED HORN ANTENNA WITH REVERSE SMA CONNECTOR</p>		<p>APPROVED BY</p>	<p>DRAWN BY</p>
<p>SCALE 3:1</p>	<p>DATE 03-20-98</p>	<p>NCC, INC.</p>	<p>476</p>
<p>PARKMAN, OHIO</p>		<p>REVISION</p>	
<p>DRAWING: ILLU IN</p>		<p>N2400SM9</p>	



CONNECTOR MMCX PLUG
JOHNSON P/N 135-3402-101

CABLE RG 178/U

CONNECTOR SMA
REVERSE GENDER
MTX-3252-A-4
(MARTRONIX INC.)

STRAIN RELIEF
HEAT SHRINK TUBING

NOTES:

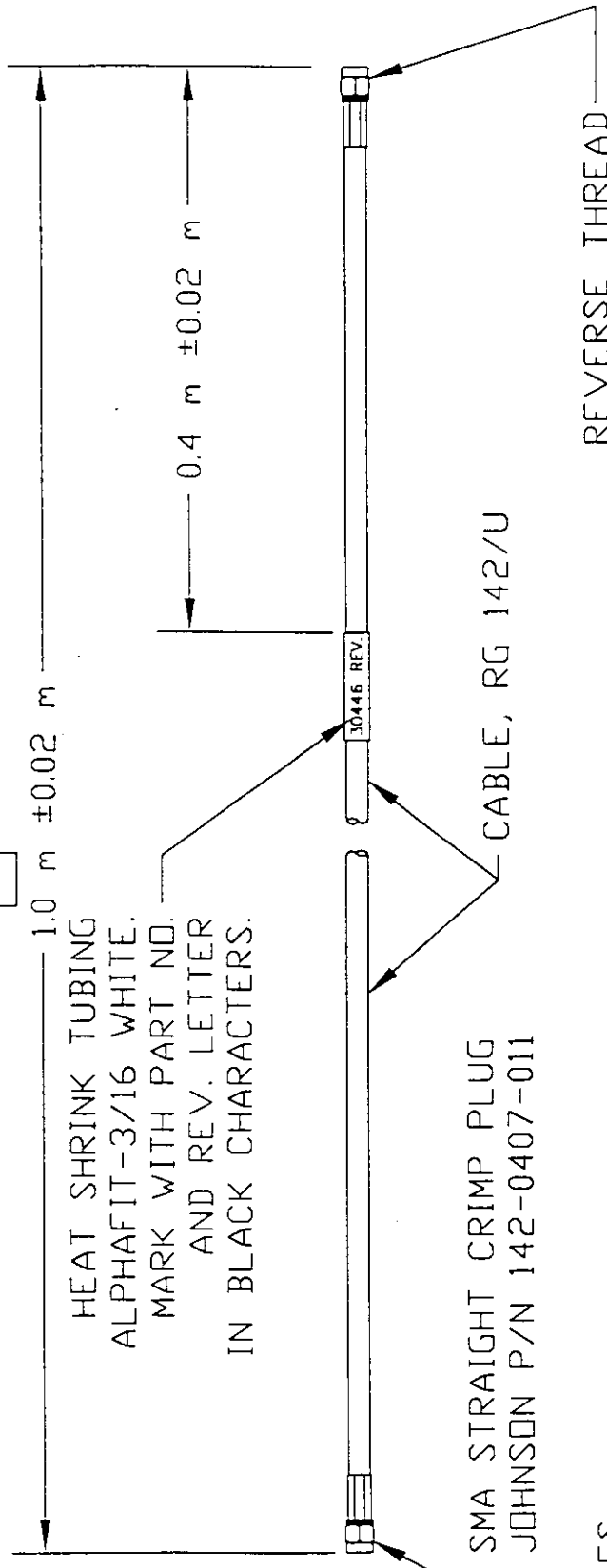
- 1 THIS DIMENSION IS CONSIDERED INSPECTABLE.
2. CONNECTORS ARE TO BE INSTALLED PER THE CONNECTOR MANUFACTURER'S INSTRUCTIONS.
3. CABLE LENGTH IS NOT TO SCALE.

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES		SIGNATURES		DATE
TOLERANCES:		DRAWN	M. SITCHON	98/03/30
X ±		CHND.	APPD.	
XX ± 0.12		PROD. ENG.		
XXX ±		PROJ. ENG.		
ANGLES ±		MECH. ENG.		
MATERIAL:		ELEC. ENG.		
FINISH:		DO NOT SCALE		
ECO:		DRAWING		
REL. DATE		CODE IDENT. NO.	SIZE	DRAWING NO.
		38481	A	20666
		SCALE	1/1	SHEET
			2	OF
			2	2
			REV.	A

TEKLOGIX TEKLOGIX INC.
MISSISSAUGA ONTARIO

ASSY., CABLE, 7035
ANTENNA 1, 2.4 GHZ, MMCX,
REVERSE GENDER

1



HEAT SHRINK TUBING
ALPHAFIT-3/16 WHITE.
MARK WITH PART NO.
AND REV. LETTER
IN BLACK CHARACTERS.

SMA STRAIGHT CRIMP PLUG
JOHNSON P/N 142-0407-011

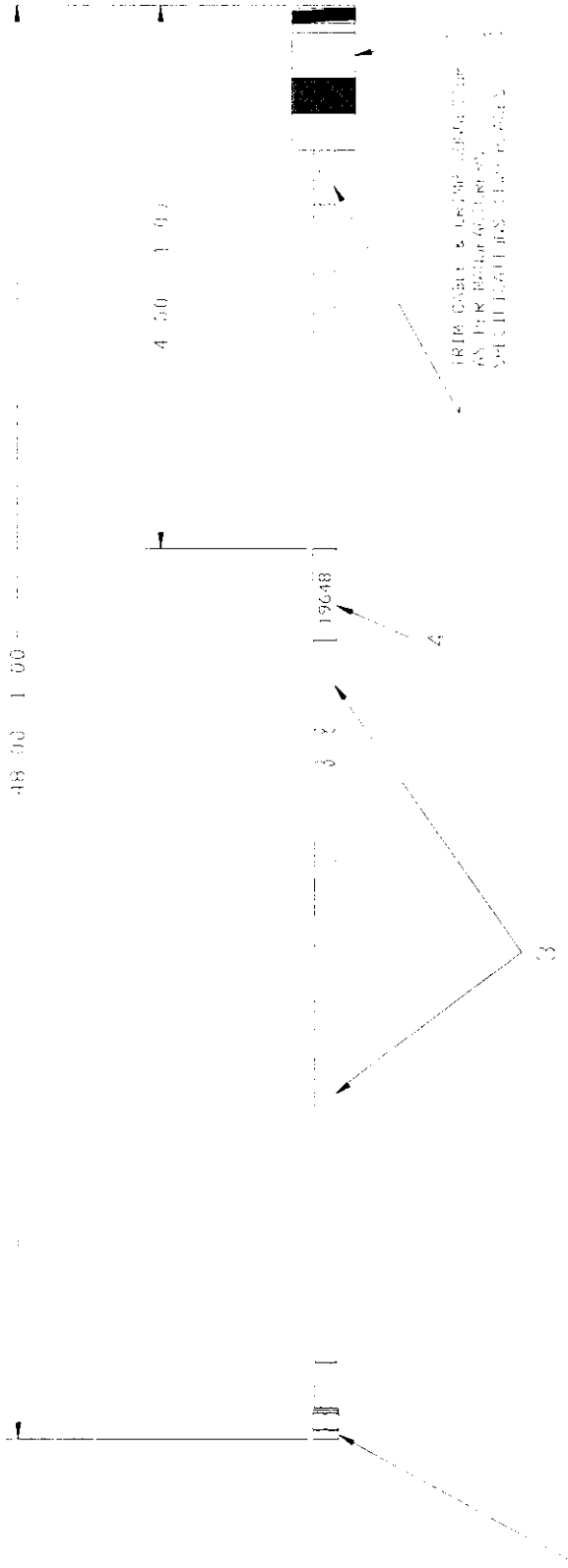
CABLE, RG 142/U

REVERSE THREAD
SMA STRAIGHT
CRIMP PLUG
JOHNSON P/N 142-0407-016-L

NOTES:

1. THIS DIMENSION IS CONSIDERED INSPECTABLE.
2. CONNECTORS ARE TO BE INSTALLED PER THE CONNECTOR MANUFACTURER'S INSTRUCTIONS.
3. CABLE LENGTH IS NOT TO SCALE.

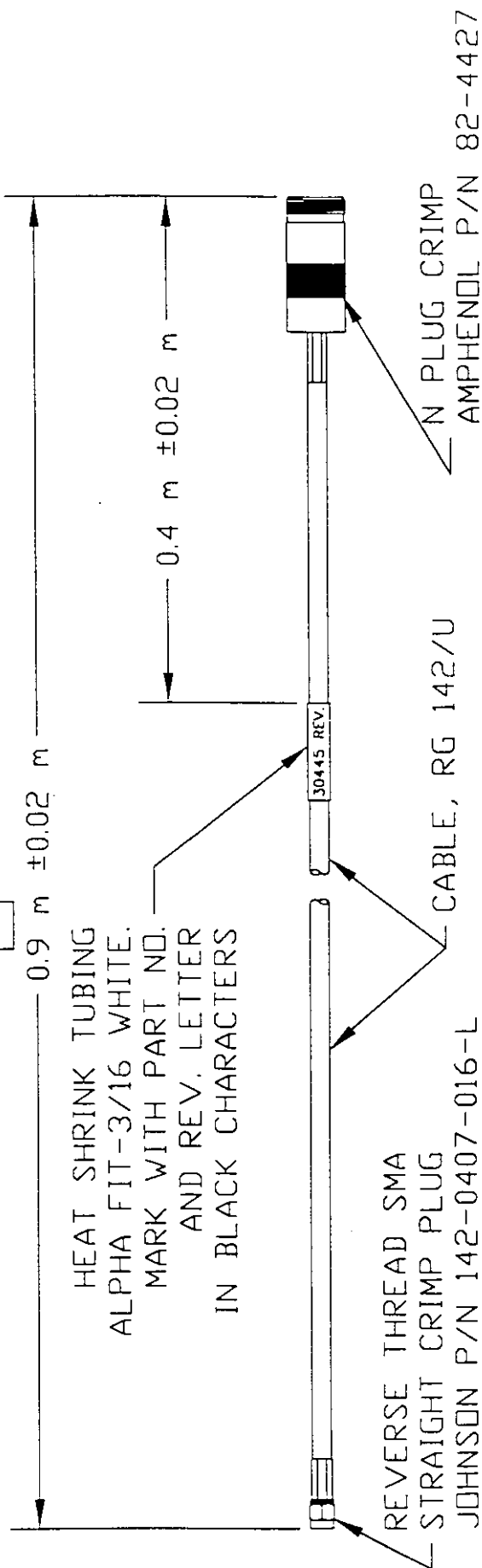
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES		SIGNATURES		DATE	
TOLERANCES:		DRAWN M. SITCHON		98/03/30	
XX		CHKD.		APPR.	
XXX		PROD. ENG.			
XXX		PROJ. ENG.			
ANGLES ±		MECH. ENG.			
MATERIAL:		ELEC. ENG.			
FINISH:		DO NOT SCALE DRAWING			
ECO:					
REL. DATE		TEKLOGIX TEKLOGIX INC. MISSISSAUGA ONTARIO			
		ASSY, CABLE, PATCH ANTENNA ADAPTOR 2.4GHZ		CODE IDENT. NO.	REV.
				38481 A	A
		SCALE N.T.S.		SIZE	DRAWING NO.
		2		A	30446
		SHEET		2	OF
		2		2	



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		SIGNATURES		DATE	
DESIGNED BY	CHKD BY	E. CAMPBELL	9/17/06	TEKLOGIX INC.	
DRAWN BY	APPROVED BY	J. D. TAPPAN	9/18/06	MISSISSAUGA, ONTARIO	
CHECKED BY	DATE	J. E.	9/18/06	ASSISTANT GENERAL MANAGER	
SCALE	PROJECT	MILTON ENG	9/18/06	38431	
		ELEC ENG		19648A	
		P. BRU...		SHEET 2	
		DIP NUT SHOWN		DRAWING	
		DRAWING		19648A	

VERSION: 1034
DATE: 96-06-26

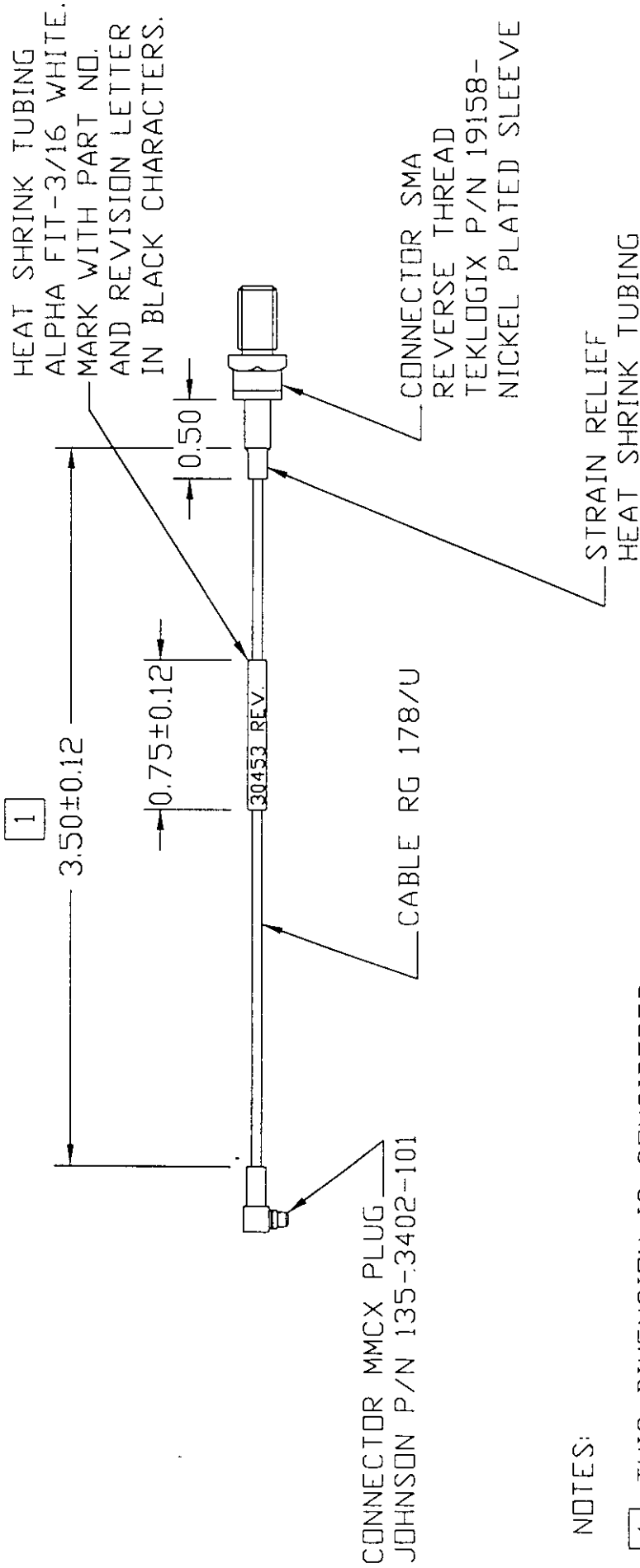
1



NOTES:

1. THIS DIMENSION IS CONSIDERED INSPECTABLE.
2. CONNECTORS ARE TO BE INSTALLED PER THE CONNECTOR MANUFACTURER'S INSTRUCTIONS.
3. CABLE LENGTH IS NOT TO SCALE.

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES: XX ± XXX ± ANGLES ± MATERIAL: FINISH: ECO: REL. DATE	 3rd 3rd	SIGNATURES DRAWN M. SITCHON CHKD. APPD. PROD. ENG. PROJ. ENG. MECH. ENG. ELEC. ENG.	DATE 98/03/30	TEKLOGIX TEKLOGIX, INC. MISSISSAUGA ONTARIO	
				ASSY, CABLE, ANTENNA ADAPTOR REVERSE SMA, N-PLUG	
DO NOT SCALE DRAWING		CODE IDENT. NO. 38481	SIZE A	DRAWING NO. 30445	REV. A
SCALE N.T.S.		SHEET 2	OF 2		



NOTES:

- 1 THIS DIMENSION IS CONSIDERED INSPECTABLE.
- 2 CONNECTORS ARE TO BE INSTALLED PER THE CONNECTOR MANUFACTURE'S INSTRUCTIONS.
3. CABLE LENGTH IS NOT TO SCALE.

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES		SIGNATURES		DATE	
TOLERANCES:		DRAWN J. PEARSON		98-03-04	
xx		CHKD.		APPRO.	
xx ± 0.12		PROD. ENG.			
xxxx ±		PROJ. ENG.			
ANGLES ±		MECH. ENG.			
MATERIAL:		ELEC. ENG.			
FINISH:		DO NOT SCALE DRAWING			
ECO:					
REL. DATE		CODE IDENT. NO. 30453		SIZE A	DRAWING NO. 30453
		SCALE 1/1		SHEET 2	OF 2
		TEKLOGIX		TEKLOGIX INC. MISSISSAUGA ONTARIO	
		ASSY., CABLE, 9150, ANTENNA 1, 2.4 GHZ, REVERSE THREAD		REV. P1	

LOCTITE											
705 North Mountain Road Hartford, Connecticut 06111											
Telephone (203) 278-1280											
Telex 378207											
Teletype 203200668											
May 1991											
		Technical Data Sheet Product 410									

PRODUCT DESCRIPTION

LOCTITE® PRISM™ 410 is a single component, black, cyanoacrylate instant adhesive toughened with elastomers for impact, peel and improved resistance to humid or damp environments.

TYPICAL APPLICATIONS

- For most rubber, plastic or metal substrates
- For slower fixture/cure speeds
- Where thermal cycling resistance is required
- For parts subjected to shock and vibration

TYPICAL PROPERTIES OF UNCURED MATERIAL

Chemical type:	Ethyl cyanoacrylate
Appearance:	Black liquid
Specific gravity, 77°F (25°C):	1.05
Viscosity @ 77°F, cP (25°C, mPa.s)	
2.5 rpm:	3500
ASTM 1084, Method B	
Flash point (COC):	>176°F (>80°C)
Vapor pressure, mbar:	<1

USE AND APPLICATION

SURFACE PREPARATION

To ensure a good bond, the surface must be clean and free from rust inhibitors, mold release agents, grease, oil and other contaminants. Bond strength on painted parts may be determined by how well the paint adheres to the substrate.

ADHESIVE APPLICATION

Optimum results with cyanoacrylate adhesives are obtained with the minimum quantity of adhesive needed to fill the joint. In general, one free-falling drop spreads over one square inch. Apply firm pressure to mated surfaces until adhesive sets.

BOND DURABILITY

Bond durability is affected by surface conditions, bond areas, service temperature, environment and stress. Each application must be evaluated individually. Moisture and temperature resistance are dependent on the surfaces bonded.

POLYOLEFIN BONDING

Loctite PRISM Primers are single component materials which dry rapidly at room temperature and make polyolefin and other low energy surfaces suitable for bonding with Loctite cyanoacrylate adhesives. Primer may be applied by spraying, brushing or dipping. Excess primer should be avoided. When polyolefin substrates are bonded to other substrates, only the polyolefin should be primed.

CLEAN-UP / DEBONDING

Equipment may be cleaned by flushing with Loctite Equipment Flushing Solvent #12121. Excess adhesive can be dissolved with Loctite X-NMS™ 768 Clean-Up Solvent, nitromethane or acetone.

DISPENSING EQUIPMENT

Semi-automated and fully automatic dispensing equipment designed specifically for use with these adhesives is available from Loctite Corporation. Consult your Loctite Catalog or contact your Loctite Representative for details.

FIXTURING TIME

This is defined as the number of seconds after assembly when the PRISM 410 joint develops a shear strength of 14.5 lb./in.² or 0.1 N/mm² measured at 72°F (22°C), 50% relative humidity according to ASTM D1002 and DIN 53283. The cure speed is affected by the nature of the substrate, ambient humidity and temperature. In general, the thinner the bond line, the faster the fixture.

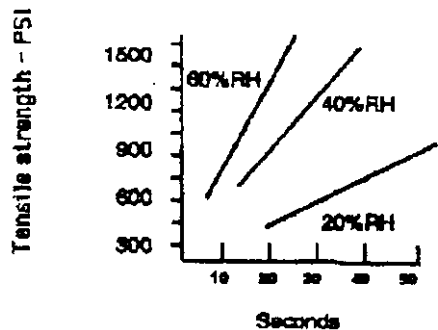
Performance of Loctite PRISM 410 on metallic and non-metallic substrates:

Substrate	Typical Fixturing Time (seconds)
Steel (degreased):	90
Aluminum (degreased):	20
Zinc dichromate:	100
Neoprene rubber:	20
Nitrile rubber:	20
ABS:	35
PVC:	75
Polycarbonate:	60
Phenolic materials:	40

All surfaces were cleaned by isopropyl alcohol wipe. Times and strengths can vary considerably for different grades of plastics, rubber and plated metals.

Note: Strong bonds are initially formed on glass, ceramic and stone, but often decrease in strength.

The effect of relative humidity on cure speed is shown in the graph, for PRISM 410 cyanoacrylate adhesive to Buna N rubber.



CURING INFORMATION

When fixture/cure speed is inadequate, due to low relative humidity or large gaps, Loctite Accelerator 711 or Loctite Tak Pak® 710 Accelerator may be used. This can, however, lead to a reduction in eventual strength of the bond; careful testing is recommended before use in production. Although full functional strength is developed in a relatively short time, curing continues for at least 24 hours before full chemical and solvent resistance is developed.

Weakly alkaline materials, such as the surface moisture present on most parts, initiate the hardening process. The type of material being bonded can significantly affect fixture/cure speed. Additionally, fixture/cure speed decreases when ambient humidity decreases (optimum is 40 - 60 % RH); the bond-line gap is increased; or a change is made to a higher viscosity cyanoacrylate adhesive. Fixture/cure speed can be increased by using an accelerator.

BLOOMING / CHLOROSIS:

Vapor generated by uncured liquid adhesive can deposit on nearby surfaces leaving a white residue. This condition can be reduced by one or more of the following methods:

- Reduce quantity of adhesive used
- Increase air flow over the parts
- Use accelerator to speed fixture/cure of exposed wet adhesive
- Deposit can be removed with Loctite X-NMS™ 768 Clean-Up Solvent

STRESS CRACKING:

Uncured liquid adhesives can cause cracking of some plastics when they are in a stressed condition. Examples are polycarbonate, acrylic and polysulfone. The possibility of stress cracking can be reduced by the following:

- Close joints quickly to avoid prolonged exposure to liquid adhesive
- Use accelerator to speed fixture/cure of adhesive
- Use reinforced grades of plastic which are more resistant to chemical attack

TYPICAL PROPERTIES OF CURED MATERIAL

Coefficient of thermal expansion, ASTM D698, 1/*K: 100 X 10⁻⁶

Coefficient of thermal conductivity, ASTM C177, W/m*K: 0.1

$\frac{BTU \cdot in}{hr \cdot ft^2 \cdot ^\circ F}$ 2.1

Normal operating temperature range: -65 to +223°F (-54 to +106 °C)

Maximum gap: 0.008 in. (0.2mm)

ELECTRICAL PROPERTIES:

Dielectric constant, ASTM D150
 100 Hz: 2.3
 1 kHz: 2.3
 10 kHz: 2.3

Dissipation factor, ASTM D150
 100 Hz: <0.02
 1 kHz: <0.02
 10 kHz: <0.02

Volume resistivity, ASTM D257
 $\Omega \cdot cm \times 10^{12}$: 1
 Surface resistivity $\Omega \times 10^{12}$: 4
 Dielectric strength, ASTM D149, KV/mm: 25
 V/ml: 636

**TYPICAL PERFORMANCE OF CURED MATERIAL
FOR PRISM 410**

Shear strength, ASTM D1002 (DIN 53283)
Cure procedure: 1 week at 72°F (22°C)

	PSI	N/mm ²
Grit blasted steel:	3200	22
Etched aluminum:	2200	15
Zinc dichromate:	2500	17
ABS:	850*	6*
PVC:	850*	6*
Polycarbonate:	700*	5*
Phenolic:	1450	10
Neoprene rubber:	1450*	10*
Nitrile rubber:	1450*	10*
G-10	1750	12

Peel strength, ASTM D1876 (DIN53282)

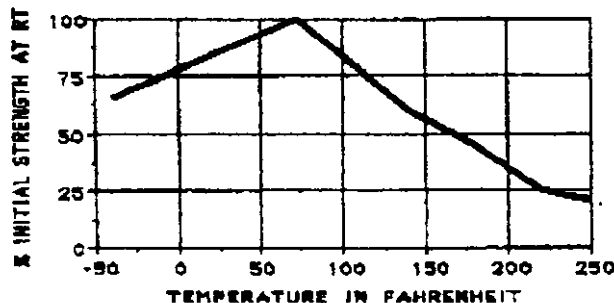
	PIW	N/mm
Degreased steel:	17	3

* Adhesive exceeds strength of bonded material

ENVIRONMENTAL RESISTANCE

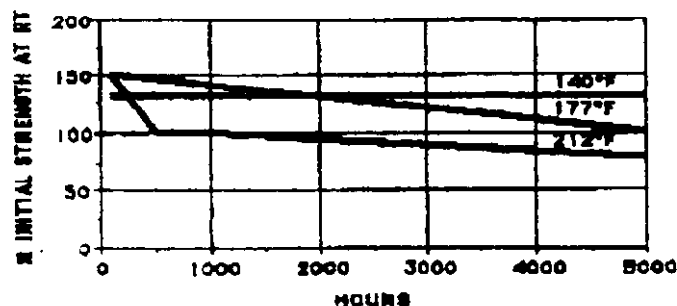
HOT STRENGTH:

Shear strength test procedure: ASTM D1002 (DIN 53283)
Substrate: Grit blasted mild steel
Cure procedure: 1 week at 72°F (22°C)



HEAT AGING:

Shear strength test procedure: ASTM D1002 (DIN 53283)
Substrate: Grit blasted mild steel
Cure procedure: 1 week at 72°F (22°C)



CHEMICAL / SOLVENT RESISTANCE

Solvent	Temperature		% Initial strength at		
	°F	°C	100	500	1,000
Motor oil (10W30):	104	40	85	85	85
Gasoline:	72	22	90	70	70
Isopropanol:	72	22	75	75	75
Ethanol:	72	22	85	85	80
Freon® TA:	72	22	90	90	85
1,1,1-Trichloroethane:	72	22	80	70	50

Strength test procedure: ASTM D1002 (DIN 53283)
Substrate: Grit blasted mild steel
Cure procedure: 1 week at 72°F (22°C)

SAFETY DATA

Handling Precautions:

Loctite Instant Adhesives are non-toxic. The vapors can cause eye irritation in poorly ventilated areas or low humidity environments.

Accidental skin bonding is best handled by passive, non-surgical first aid. Hot soapy water aids separation of skin tissue. Use peeling, not pulling action to separate bonded tissue.

A comprehensive safety leaflet is available upon request. In case of emergency, call Loctite Corporation at (203) 278-1280.

When large quantities of Instant Adhesive are accidentally spilled, the area should be flooded with water which will cause the liquid to cure. The cured material can then be scraped from the surface.

(NOTE: The liquid adhesive should not be wiped up with rags or tissue. The fabric will cause polymerization and large quantities of adhesive will generate heat on cure causing smoke and strong, irritating vapors. Always flood with excess water to clean up spill conditions.)

EYE IRRITANT. BONDS SKIN IN SECONDS. Contains cyanoacrylate ester. Apply only to surfaces to be bonded. In case of skin contact, flush with water. In case of eye or mouth contact, hold eyelid or mouth open and flush with water; call a physician immediately. If fingers become bonded, immerse in warm soapy water and gently roll or peel skin surfaces apart. Get immediate medical attention for any eye or internal contact. Use with adequate ventilation. **KEEP OUT OF REACH OF CHILDREN.**

**USE IN ACCORDANCE WITH
MATERIAL SAFETY DATA SHEET**

STORAGE CONDITIONS

For maximum shelf life, cyanoacrylate adhesives must be stored under refrigeration at a temperature of 40°F (+/- 5°F). Allow material to return to room temperature before opening. TO PREVENT CONTAMINATION OF UNUSED MATERIAL, DO NOT RETURN ANY PRODUCT TO ITS ORIGINAL CONTAINER.

FOR SPECIFIC SHELF LIFE/RECERTIFICATION POLICY INFORMATION, CONTACT THE LOCTITE CORPORATION, QUALITY DEPARTMENT, NEWINGTON, CT 06111; TELEPHONE: (203) 278-1280 X4401.

PRODUCT SPECIFICATIONS

THE TECHNICAL DATA CONTAINED HEREIN ARE INTENDED FOR REFERENCE ONLY. PLEASE CONTACT THE LOCTITE CORPORATION, QUALITY DEPARTMENT, NEWINGTON, CT 06111 (PHONE: (203) 278-1280, X4401) FOR ASSISTANCE AND RECOMMENDATIONS ON SPECIFICATIONS FOR THIS PRODUCT.

FOR THE NAME OF YOUR NEAREST LOCTITE DISTRIBUTOR CALL: (800) 562-0580
FOR THE NAME OF YOUR NEAREST LOCTITE MARKETING REPRESENTATIVE CALL: (800) 323-5106
FOR TECHNICAL PRODUCT ASSISTANCE CALL: (800) LOC-TITE

LOCTITE TECHNICAL SERVICE CENTERS

Loctite Corporation
705 North Mountain Road
Newington, CT 06111
(203) 278-1280
Telex 275207
Telefax 2032808858

Loctite Corporation
One Northfield Plaza
5800 Crocker Road, Suite 106
Troy, MI 48068
(313) 628-8000
Telefax 3138289009

Loctite Canada Inc.
270 Britannia Road East
Mississauga, Ontario L4Z 1B6
(416) 800-6511
Telex 3686861251
Telefax 4168906522

Loctite Company de Mexico, S.A. de C.V.
Boques de Ciruelos No. 130-11 PISO
Boques de las Lomas, 11700 Mexico, D.F.
(011) 625-896-4511
Telex 3831781125 LOCTME
Telefax 0115252513882

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TDS 410

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