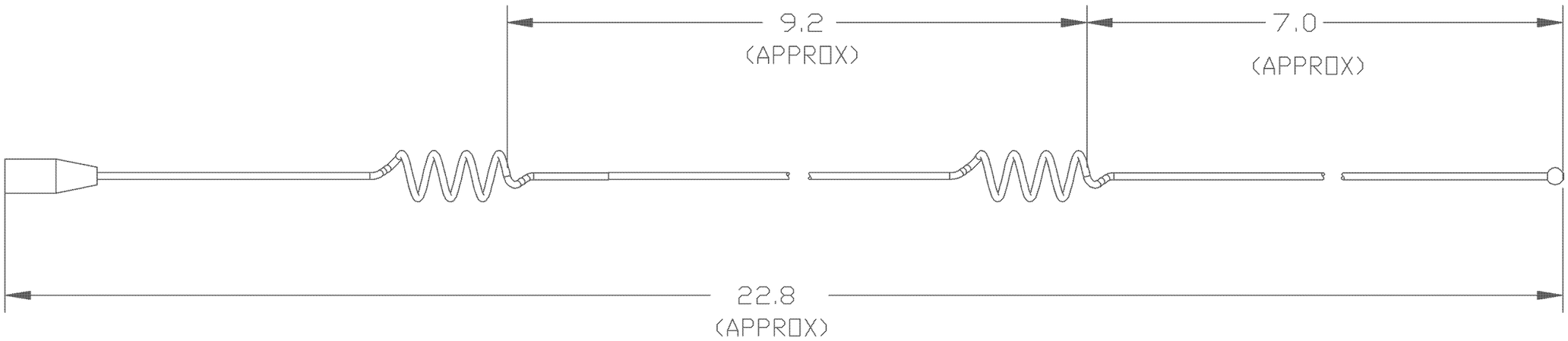
REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
	2	NOTES AMENDED	4/10/97	
6121	A	RELEASE TO PRODUCTION	6/12/97	T.SERKSNIS
C00298	B	9.2 WAS 6.5/22.8 WAS 20.8	9/5/00	D.BUTLER



NOTES:
1. INDIVIDUALLY PACKAGE WITH TNL PART NUMBER AND CURRENT REV LEVEL.
2. CORRESPONDS TO ANTENNA SPECIALISTS P/N KG905ZTNL
3. GAIN: 5dB MIN OVER 890-960 MHz
4. ITEMS TO BE INCLUDED IN ASSEMBLY 5dB GAIN WHIP
5. ANTENNA SHOULD NOT INCLUDE ANY TRADE MARK IDENTIFICATION OF ANY KIND

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
.XX ±0.01
.XXX ±0.001

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

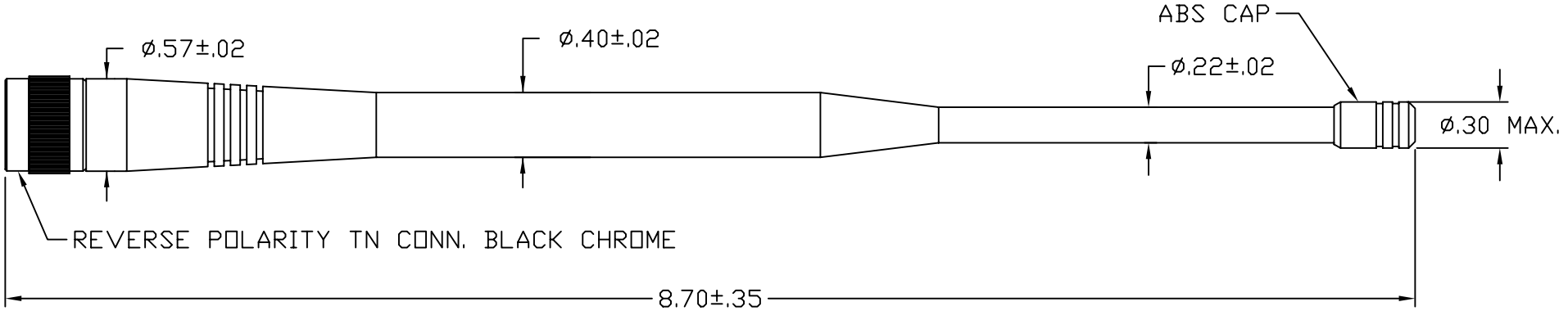
APPROVALS	DATE
DRAWN W BURT	
CHECKED	
ISSUED	

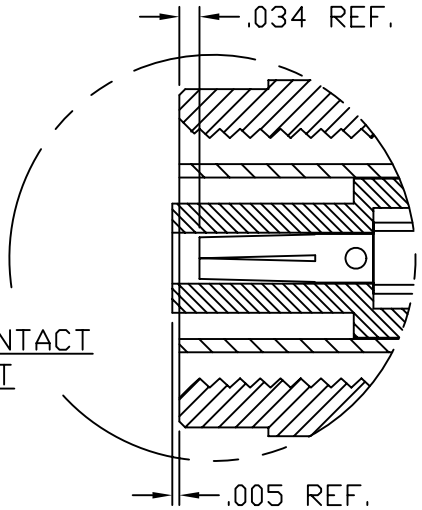
Trimble

WHIP, 5dB ANTENNA

SIZE	FSCM NO.	DWG NO.	REV
B		32318	B

SCALE NTS SHEET 1 OF 1





INSULATOR/CONTACT PLACEMENT

APPROVED

NOTES:

1 SPECIFICATIONS:
- GAIN: 2.5db OVER A 1/4 WAVE
- PULL TEST: 20 lbs. LINEAR PULL
- OPERATING TEMPERATURE: -40°C TO +85°C
- TORQUE TEST: 20 in-lbs
- POWER RATING: 50 WATTS
- VSWR 1.5:1 MAX. AT RESONANCE
- LEAD FREE SOLDER USED IN THE MANUFACTURING PROCESS
- ANTENNA IS NOT RoHS COMPLIANT

2

CENTURION PART NO.	FREQ. RANGE	COLOR CODE
CAF28717	896-940MHZ	GREEN

ALL DIMENSIONS ARE IN INCHES

LET	REVISION	DATE	CK	APP
D	ECO951305	10/95	EJC	CBP
E	ECO96281	03/96	CBP	DW
C1	ECO06636	08/06		

SCALE: 1:1 | DR: TB | CK: DW

TOL. UNLESS NOTED:
.XX = ± .010
.XXX = ± .005
ANGULAR ± 30'

CENTURION WIRELESS TECHNOLOGIES, INC.
PH. (402) 467-4491 FAX. (402) 467-4528
P.O. BOX 82846 LINCOLN, NE 68501

ANT,EXE-902-TNSP

MATERIAL: N/A

DATE:	DWG NO.:	PG:	REV.
10/28/94	CAF28717	1/5	C1

Model ASPG915TNL
NPRR K009R
Eng. Approval _____ Date: 2/27/97
Prod. Mgr. _____ Date: 2/27/97

ANTENNA PRODUCT SALES DATA AND TECHNICAL SPECIFICATIONS

HOUSE PRODUCT LINE CODE NO: _____
PRODUCT CODE NO: _____ DESCRIPTION: Elevated Feed Base Assembly for 902-928 MHz*

ELECTRICAL	MOBILE DATA	MECHANICAL (Base Station)
Frequency Range 890-960 MHz	Mount Type: Positive Male-Female Contact	Total Length in m
VSWR Bandwidth @ ** MHz	Mounting Diameter 1.25 in 31.8 mm	Mounting Length in mm Mounting mat'l Dia in mm
Power Rating (CW) 40** W	Cable Length ft m	Weight lb kg
Input Impedance 50 ohms	Cable Type:	Cable Length: ft m
Polarization:	Connector:	Radiator Material:
Gain: **	Max whip Length in mm	Reflector Size x in x mm
Azimuthal Variation -- dB	Whip Material:	Reflector Material
RADIATION PATTERN	Whip Diameter in mm	Weather Protection: Fiberglass Radome
E-Plane beamwidth @-3dB **°	Spring Material: Stainless Steel Black Duracoat™	
H-Plane beamwidth @-3dB Omnidirectional	Spring Diameter .700 in 17.8 mm	Turning Radius _____ ft _____ m
Beamtilt @ bandwidth limits Low N/A ° High N/A °	Spring length 2 in 50.8 mm	**RS-329 WINDLOAD DATA**
Relative level of largest sidelobe from major lobe dB	Mount Insulation:	**NO ICE** RS-329 Velocity ____ mi/h ____ km/h Fatal Velocity ____ mi/h ____ km/h Windload Area (EFP) _____ ft^2 _____ m^2
Front-to-back ratio -- dB	**SHIPPING WEIGHT** lb kg **SHIPPING DIMENSIONS** ____ in x ____ in x ____ in ____ mm ____ mm x ____ mm **(OR)** _____ dia x _____ in _____ dia x _____ mm	**NO ICE (At Rated Velocity)** Lateral Thrust _____ lb _____ kg Bending Moment _____ ft-lb _____ N-m Torque Moment _____ ft-lb _____ N-m
Wide angle radiation level -- dB		**NO ICE (At 100 mi/h (161 km/h))** Lateral Thrust _____ lb _____ kg Bending Moment _____ ft-lb _____ N-m torque Moment _____ ft-lb _____ N-m
		1/2" ICE RS-329 Velocity _____ mi/h _____ km/h Fatal Velocity _____ mi/h _____ km/h Windload Area (EFP) _____ ft^2 _____ m^2
		1/2" ICE (At Rated Velocity) Lateral Thrust _____ lb _____ kg Bending Moment _____ ft-lb _____ N-m Torque Moment _____ ft-lb _____ N-m
		NO ICE (At 100 mi/h (161 km/h)) Lateral Thrust _____ lb _____ kg Bending Moment _____ ft-lb _____ N-m Torque Moment _____ ft-lb _____ N-m

OPERATING PRINCIPLES:

- Elevated feed design/end fed
- Ground plane independent
- Designed for unity or collinear array element attachment

FEATURES:

1. Black Duracoat™ finish
2. No ground plane required for installation
3. Mobile and fixed point applications
4. Positive male-female contact design ensures consistent noise free performance

NOTES:
* Includes base/mount, o-rings, no A/S logo, instruction sheet, no whips
** See associated whips KG900ZTNL, RG903ZTNL, KG905ZTNL

Model KG900ZTNL
NPRR K009R
Eng. Approval [signature] Date: 2/25/97
Prod. Mgr. [signature] Date: 2/27/97

ANTENNA PRODUCT SALES DATA AND TECHNICAL SPECIFICATIONS

HOUSE PRODUCT LINE CODE NO:
PRODUCT CODE NO: DESCRIPTION: Unity Gain Whip Assembly to mate with ASPG915TNL

ELECTRICAL	MOBILE DATA	MECHANICAL (Base Station)
Frequency Range 902-928 MHz	Mount Type:	Total Length in m
VSWR Bandwidth @ 1.7:1 26 MHz RL (Max) = -11.7 dB	Mounting Diameter in mm	Mounting Length in mm Mounting mat'l Dia in mm
Power Rating (CW) 40 W	Cable Length ft m	Weight lb kg
Input Impedance 50 ohms	Cable Type:	Cable Length ft m
Polarization: Vertical	Connector:	Radiator Material:
Gain: Unity omni	Max-whip Length 4.28 in 108.7 mm	Reflector Size x in x mm
Azimuthal Variation – dB	Whip Material: 17-7 Stainless Steel	Reflector Material
RADIATION PATTERN	Whip Diameter .100 in 2.54 mm	Weather Protection: Fiberglass Radome
E-Plane beamwidth @-3dB 80°	Spring Material:	
H-Plane beamwidth @-3dB Omnidirectional	Spring Diameter in mm	Turning Radius ____ ft ____ m
Beamtilt @ bandwidth limits Low ____° High ____°	Spring length in mm	**RS-329 WINDLOAD DATA**
Relative level of largest sidelobe from major lobe dB	Mount Insulation:	**NO ICE** RS-329 Velocity ___ mi/h ___ km/h Fatal Velocity ___ mi/h ___ km/h Windload Area (EFF) ___ ft² ___ m²
Front-to-back ratio dB	**SHIPPING WEIGHT** lb kg **SHIPPING DIMENSIONS** ___ in x ___ in x ___ in ___ mm ___ mm x ___ mm (OR) ___ dia x ___ in ___ dia x ___ mm	**NO ICE (At Rated Velocity)** Lateral Thrust ___ lb ___ kg Bending Moment ___ ft-lb ___ N-m Torque Moment ___ ft-lb ___ N-m
Wide angle radiation level dB		**NO ICE (At 100 mi/h (161 km/h):** Lateral Thrust ___ lb ___ kg Bending Moment ___ ft-lb ___ N-m torque Moment ___ ft-lb ___ N-m
OPERATING PRINCIPLES: • End fed unity gain 1/2 wave radiator		**1/2" ICE** RS-329 Velocity ___ mi/h ___ km/h Fatal Velocity ___ mi/h ___ km/h Windload Area (EFF) ___ ft² ___ m²
FEATURES: 1. Interchangeable with: KG903ZTNL : KG905ZTNL When using mount/base ASPG915TNL		**1/2" ICE (At Rated Velocity)** Lateral Thrust ___ lb ___ kg Bending Moment ___ ft-lb ___ N-m Torque Moment ___ ft-lb ___ N-m
		NO ICE (At 100 mi/h (161 km/h): Lateral Thrust ___ lb ___ kg Bending Moment ___ ft-lb ___ N-m Torque Moment ___ ft-lb ___ N-m

NOTES:

Model KG903ZTNL
NPRR K009R
Eng. Approval _____ Date: 2/25/97
Prod. Mgr. _____ Date: 2/27/97

ANTENNA PRODUCT SALES DATA AND TECHNICAL SPECIFICATIONS

HOUSE PRODUCT LINE CODE NO:
PRODUCT CODE NO: DESCRIPTION: 3 dB Gain Whip Assembly to mate with ASPG915TNL

ELECTRICAL	MOBILE DATA	MECHANICAL (Base Station)
Frequency Range 902-928 MHz	Mount Type:	Total Length in m
VSWR Bandwidth @ 1.5:1 26 MHz RL (Max) = -14 dB	Mounting Diameter in mm	Mounting Length in mm Mounting mat'l Dia in mm
Power Rating (CW) 40 W	Cable Length ft m	Weight lb kg
Input Impedance 50 ohms	Cable Type:	Cable: Length ft m
Polarization: Vertical	Connector:	Radiator Material: Brass and Copper
Gain: 2-1/2 ± 1/2 dBd omni	Max-whip Length 13.25 in 336.5 mm	Reflector Size x in x mm
Azimuthal Variation -- dB	Whip Material: 17-7 Stainless Steel	Reflector Material
RADIATION PATTERN	Whip Diameter .100 in 2.54 mm	Weather Protection: Fiberglass Radome
E-Plane beamwidth @-3dB 35°	Spring Material:	
H-Plane beamwidth @-3dB Omnidirectional	Spring Diameter in mm	Turning Radius ____ ft ____ m
Beamtilt @ bandwidth limits Low __-10__° High __-2-1/2__ °	Spring length in mm	**RS-329 WINDLOAD DATA**
Relative level of largest sidelobe from major lobe - 7dB	Mount Insulation:	**NO ICE** RS-329 Velocity ___ mi/h ___ km/h Fatal Velocity ___ mi/h ___ km/h Windload Area (EFP) ___ ft² ___ m²
Front-to-back ratio -- dB	**SHIPPING WEIGHT lb** **kg** **SHIPPING DIMENSIONS** ___ in x ___ in x ___ in ___ mm ___ mm x ___ mm (OR) ___ dia x ___ in ___ dia x ___ mm	**NO ICE (At Rated Velocity)** Lateral Thrust ___ lb ___ kg Bending Moment ___ ft-lb ___ N-m Torque Moment ___ ft-lb ___ N-m
Wide angle radiation level -- dB		**NO ICE (At 100 mi/h (161 km/h))**: Lateral Thrust ___ lb ___ kg Bending Moment ___ ft-lb ___ N-m torque Moment ___ ft-lb ___ N-m
OPERATING PRINCIPLES: • End fed two element collinear array of two 1/2 wave radiators		**1/2" ICE** RS-329 Velocity ___ mi/h ___ km/h Fatal Velocity ___ mi/h ___ km/h Windload Area (EFP) ___ ft² ___ m²
FEATURES: 1. Interchangeable with: KG900ZTNL : KG905ZTNL When using mount/base ASPG915TNL		**1/2" ICE (At Rated Velocity)** Lateral Thrust ___ lb ___ kg Bending Moment ___ ft-lb ___ N-m Torque Moment ___ ft-lb ___ N-m
		NO ICE (At 100 mi/h (161 km/h)): Lateral Thrust ___ lb ___ kg Bending Moment ___ ft-lb ___ N-m Torque Moment ___ ft-lb ___ N-m

NOTES:

Model KG905ZTNL
NPRR K009R
Eng. Approval [illegible] Date: 2/25/97
Prod. Mgr. [illegible] Date: 2/25/97

ANTENNA PRODUCT SALES DATA AND TECHNICAL SPECIFICATIONS

HOUSE PRODUCT LINE CODE NO:
PRODUCT CODE NO: DESCRIPTION: 5 dB Gain Whip Assembly to mate with ASPG915TNL

ELECTRICAL	MOBILE DATA	MECHANICAL (Base Station)
Frequency Range 902-928 MHz	Mount Type:	Total Length in m
VSWR Bandwidth @ 1.5:1 26 MHz RL (Max) = -14 dB	Mounting Diameter in mm	Mounting Length in mm Mounting mat'l Dia in mm
Power Rating (CW) 40 W	Cable Length ft m	Weight lb kg
Input Impedance 50 ohms	Cable Type:	Cable Length ft m
Polarization: Vertical	Connector:	Radiator Material: Brass and Copper
Gain: 4 ± 1/2 dBd omni	Max-whip Length 23.125 in 587.4 mm	Reflector Size x in x mm
Azimuthal Variation -- dB	Whip Material: 17-7 Stainless Steel	Reflector Material
RADIATION PATTERN	Whip Diameter .100 in 2.54 mm	Weather Protection: Fiberglass Radome
E-Plane beamwidth @-3dB 22°	Spring Material:	
H-Plane beamwidth @-3dB Omnidirectional	Spring Diameter in mm	Turning Radius ____ ft ____ m
Beamtilt @ bandwidth limits Low -7 ° High -2-1/2 °	Spring length in mm	**RS-329 WINDLOAD DATA**
Relative level of largest sidelobe from major lobe -6 dB	Mount Insulation:	**NO ICE** RS-329 Velocity ____ mi/h ____ km/h Fatal Velocity ____ mi/h ____ km/h Windload Area (EFP) ____ ft^2 ____ m^2
Front-to-back ratio -- dB	**SHIPPING WEIGHT lb** **kg** **SHIPPING DIMENSIONS** ____ in x ____ in x ____ in ____ mm ____ mm x ____ mm **(OR)** ____ dia x ____ in ____ dia x ____ mm	**NO ICE (At Rated Velocity)** Lateral Thrust ____ lb ____ kg Bending Moment ____ ft-lb ____ N-m Torque Moment ____ ft-lb ____ N-m
Wide angle radiation level -- dB		**NO ICE (At 100 mi/h (161 km/h):** Lateral Thrust ____ lb ____ kg Bending Moment ____ ft-lb ____ N-m torque Moment ____ ft-lb ____ N-m
OPERATING PRINCIPLES: • End fed three element collinear array of three 1/2 wave radiators		**1/2" ICE** RS-329 Velocity ____ mi/h ____ km/h Fatal Velocity ____ mi/h ____ km/h Windload Area (EFP) ____ ft^2 ____ m^2
FEATURES: 1. Interchangeable with: KG900ZTNL : KG903ZTNL When using mount/base ASPG915NL		**1/2" ICE (At Rated Velocity)** Lateral Thrust ____ lb ____ kg Bending Moment ____ ft-lb ____ N-m Torque Moment ____ ft-lb ____ N-m
		NO ICE (At 100 mi/h (161 km/h): Lateral Thrust ____ lb ____ kg Bending Moment ____ ft-lb ____ N-m Torque Moment ____ ft-lb ____ N-m

NOTES:

February 26, 1997

To: Linda Sell @ Trimble Navigation Fax: (408) 481-6866
From: Robert Truthan @ Antenna Specialists
Re: Electrical Specifications for the KG900ZTNL, KG903ZTNL, KG905ZTNL

Linda,

We are still finalizing the specification data sheets that will be mailed directly to you in the next few days. However, so that you have the electrical data to review, I have tabulated it below. The antenna models below are to be mated with the ASPG915TNL, elevated feed base:

A/S Model Number	Return Loss (max)	Power Rating	Gain
KG900ZTNL	-11.7 dB	40 W	Unity
KG903ZTNL	-14 dB	40 W	2.5+/- 0.5 dBd
KG905ZTNL	-14 dB	40 W	4 +/- 0.5 dBd

If you need any further information, please contact me at (216) 349-8736.

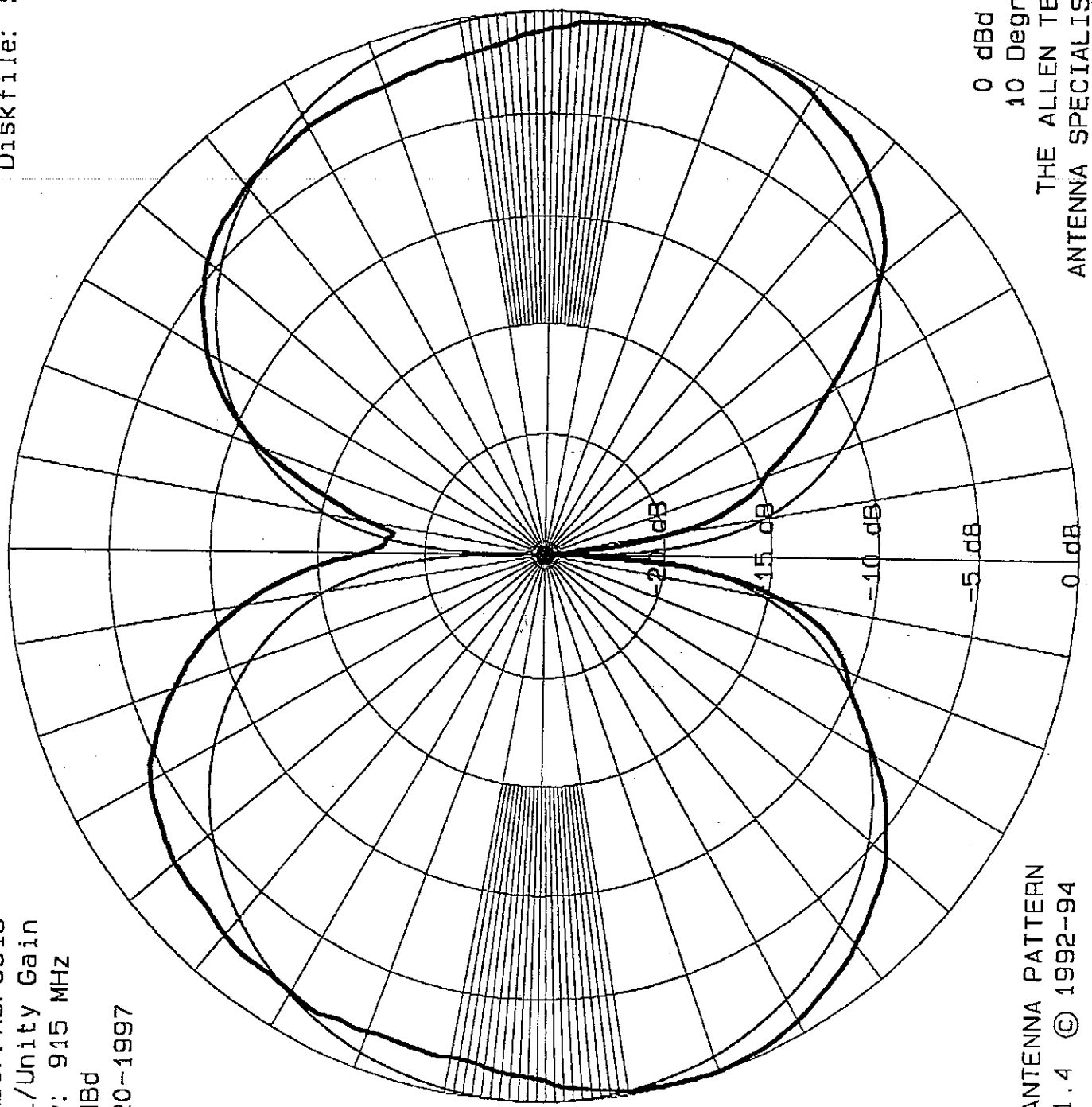
Typical Return Loss plots and patterns are provided for your review.

Thank you for considering Antenna Specialists for your wireless antenna applications.

cc:

T Tober
Kim Goryance
Ted Browne
Joe Hrabak

CC:
Bryn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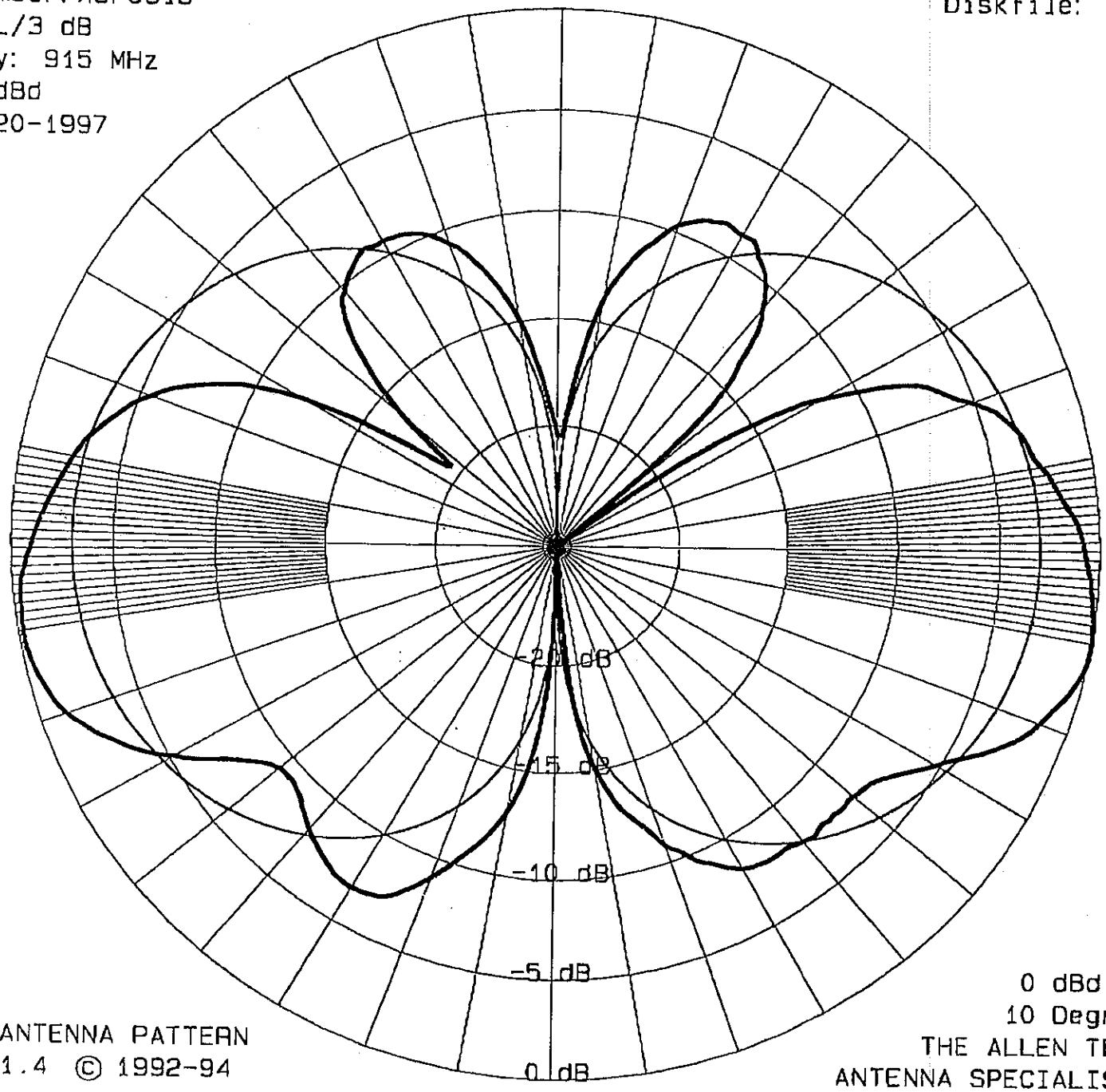
0 dBd Reference
10 Degree Radials
THE ALLEN TELECOM GROUP
ANTENNA SPECIALISTS DIVISION
-20 dB
-15 dB
-10 dB
-5 dB
0 dB
>Model Number: ASPG915
>KG900ZTNL/Unity Gain
>Frequency: 915 MHz
>Gain: 0 dBd
>Date: 02-20-1997
>E Plane
02-20-1997
DIGITIZED ANTENNA PATTERN
PATPLOT v.1.4 © 1992-94

>Model Number: ASPG915
>KG903ZTNL/3 dB
>Frequency: 915 MHz
>Gain: 3 dBd
>Date: 02-20-1997
>E Plane

Diskfile: S_G915VM.915

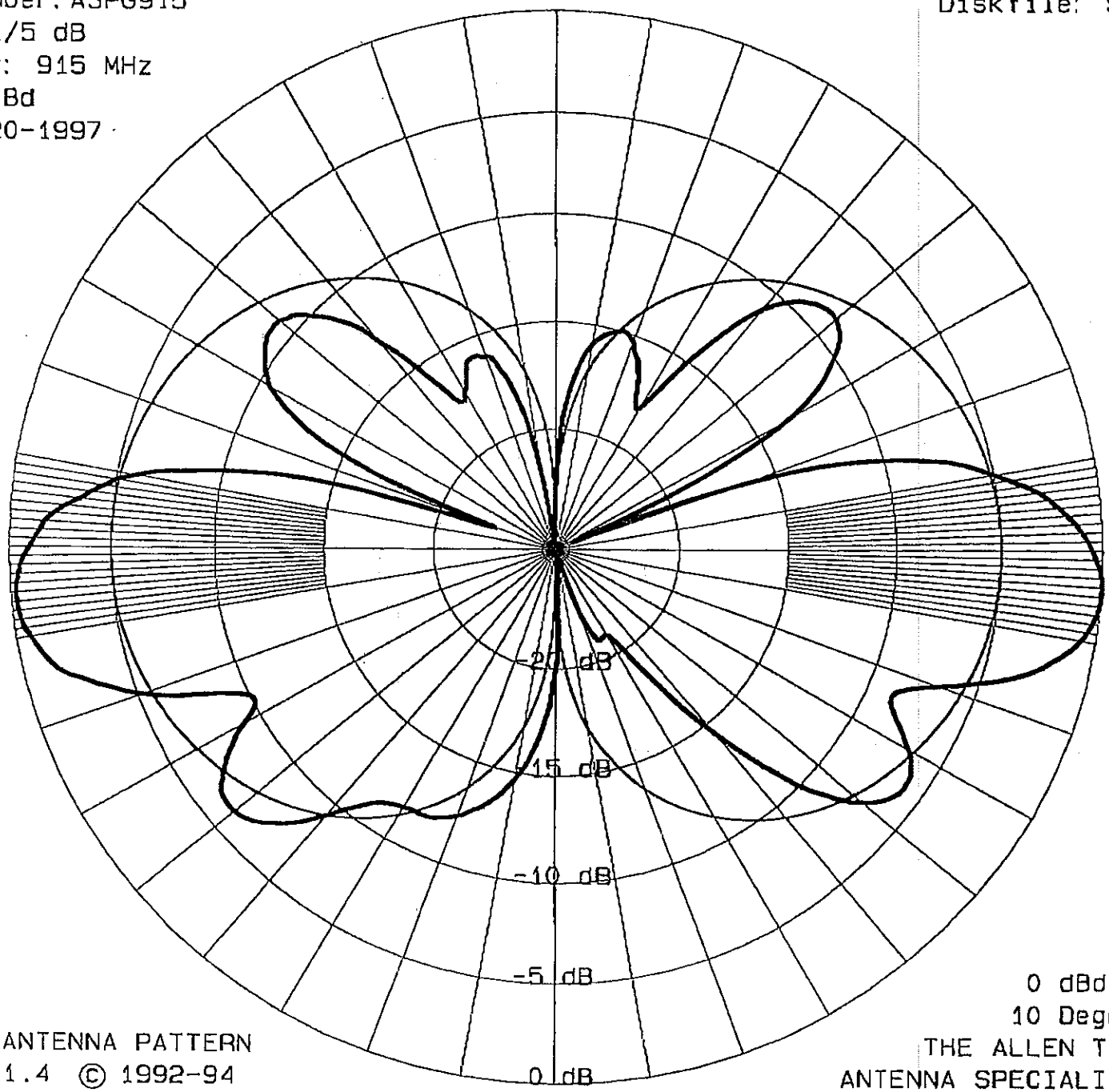


02-20-1997
DIGITIZED ANTENNA PATTERN
PATPLOT v.1.4 © 1992-94

0 dBd Reference
10 Degree Radials
THE ALLEN TELECOM GROUP
ANTENNA SPECIALISTS DIVISION

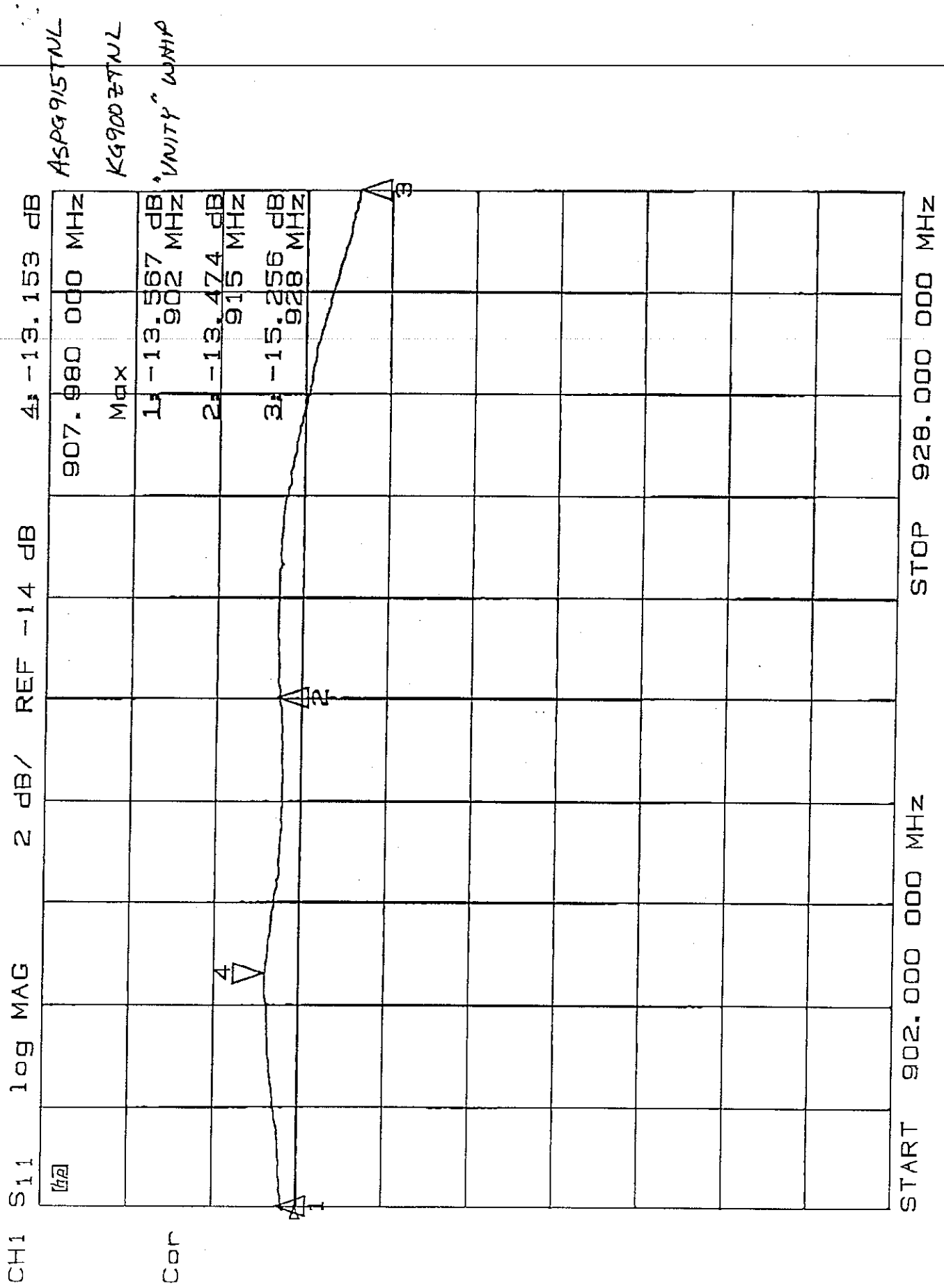
>Model Number: ASPG915
>KG905ZTNL/5 dB
>Frequency: 915 MHz
>Gain: 5 dBd
>Date: 02-20-1997
>E Plane

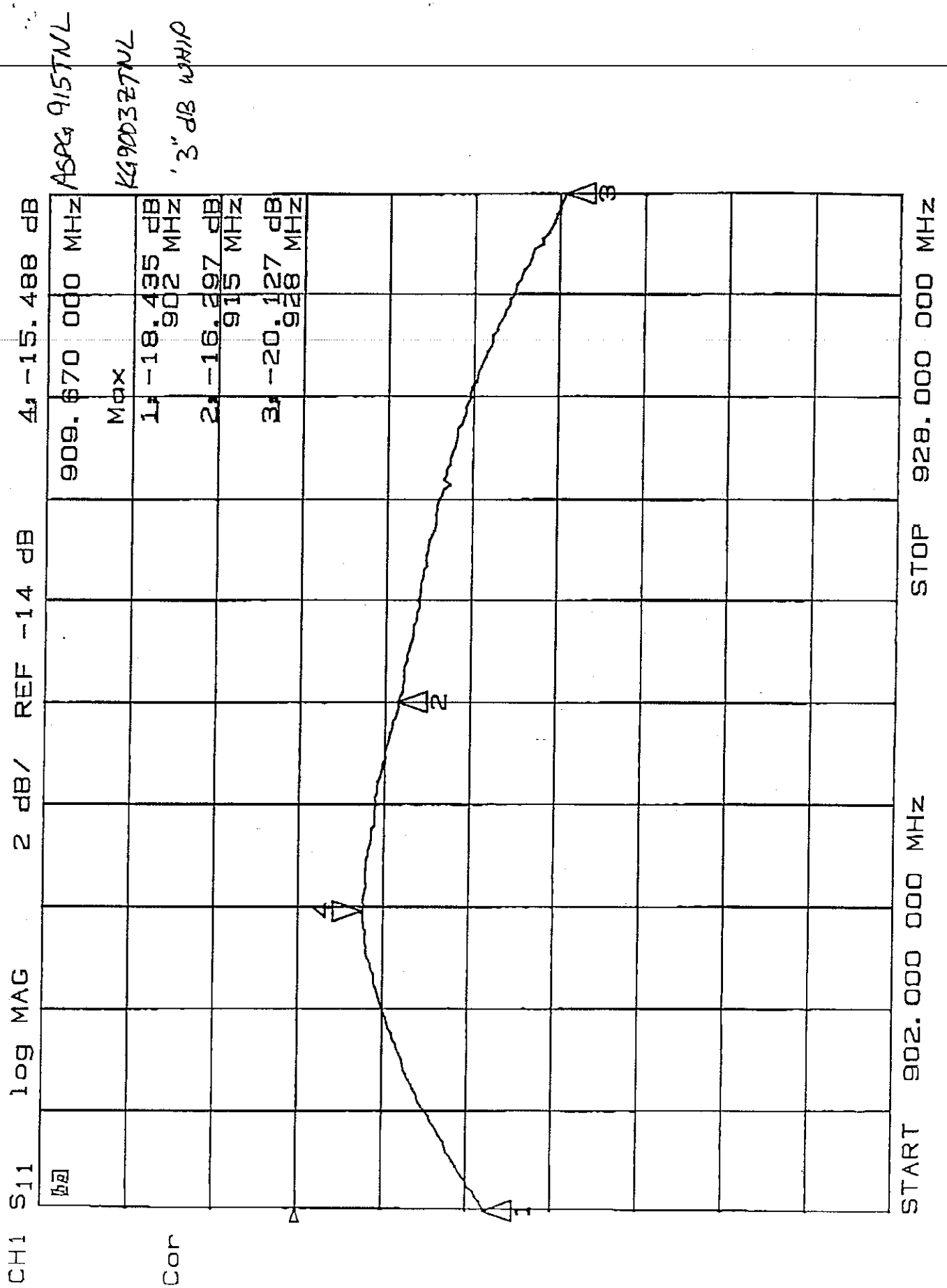
Diskfile: S_G915VM.915

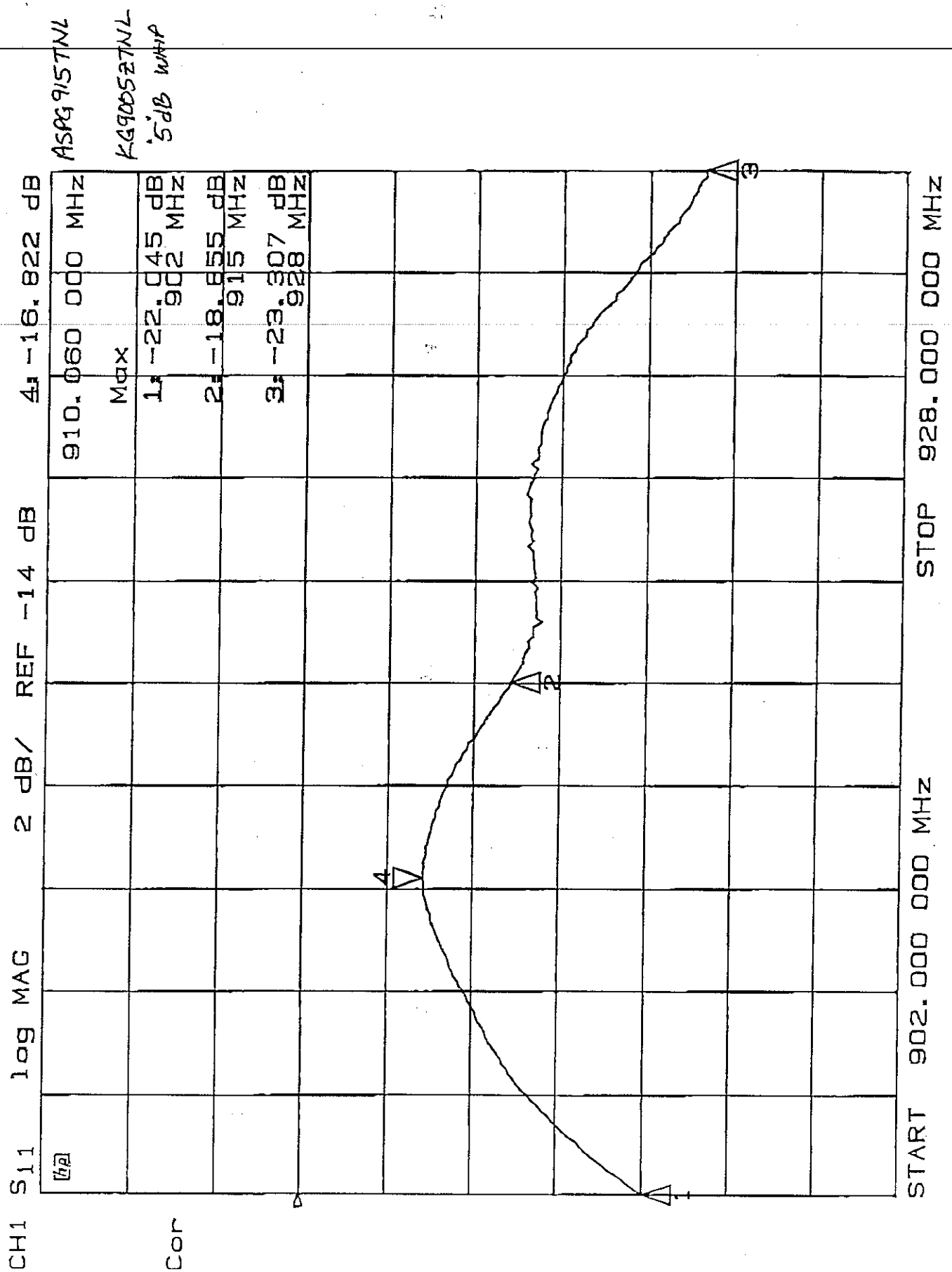


02-25-1997
DIGITIZED ANTENNA PATTERN
PATPLOT v.1.4 © 1992-94

0 dBd Reference
10 Degree Radials
THE ALLEN TELECOM GROUP
ANTENNA SPECIALISTS DIVISION


ASPG915TNL
K4900ZTNL
"UNITY" WHIP
CH1 S11 log MAG 2 dB/ REF -14 dB
4: -13.153 dB
907.980 000 MHz
Max
1: -13.567 dB
902 MHz
2: -13.474 dB
915 MHz
3: -15.256 dB
928 MHz
START 902.000 000 MHz
STOP 928.000 000 MHz
Cor


ASR-9 915 TNL
KGP037 TNL
3" dB WHIP
CH1 S11 log MAG 2 dB/ REF -14 dB 4: -15.488 dB
909.670 000 MHz
Max
1: -18.435 dB 902 MHz
2: -16.297 dB 915 MHz
3: -20.127 dB 928 MHz
START 902.000 000 MHz
STOP 928.000 000 MHz
Cor


ASPG915TNL
KG900527NL
5dB whip
CH1 S11 log MAG 2 dB/ REF -14 dB
4: -16.822 dB
910.060 000 MHz
Max
1: -22.045 dB
902 MHz
2: -18.655 dB
915 MHz
3: -23.307 dB
928 MHz
START 902.000 000 MHz
STOP 928.000 000 MHz
Cor