

AVANTEGO

PRODUCT SPECIFICATION & PERFORMANCE TEST 2054-1 RETRACTABLE M5 ANTENNA

This AVANTEGO retractable M5 antenna is developed to be used as a mobile phone antenna. The performance is optimised for the LGE, DB 520, AMPS/Am PCS handset.

Document No: 2054-1 issue 2

2 February 2001
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2 February 2001
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ELECTRICAL SPECIFICATION

1:1 FREQUENCY RANGE

824-894 MHz
1850-1990 MHz

1:2 HANDSET NUMBER

AVANTEGO No: LG133A
Received at AVANTEGO: 15 January 2001

Note: This specification is only valid with the handset above..

1:3 MATCHING CIRCUIT

Ant 1,0 pFsh - 1,8 nHse – 10nHsh

Note: This specification is only valid with matching circuit above .

1:4 VSWR

1:4:1 Maximum values in free space for retracted antenna:

824-894	MHz	VSWR<	3 : 1
1850-1990	MHz	VSWR<	3,5 : 1

1:4:2 Typical values in talk position for retracted antenna:

824-894	MHz	VSWR<	2,5 : 1
1850-1990	MHz	VSWR<	3,5 : 1

1:4:3 Maximum values in free space for extended antenna:

824-894	MHz	VSWR<	4 : 1
1850-1990	MHz	VSWR<	3,5 : 1

1:4:4 Typical values in talk position for extended antenna:

824-894	MHz	VSWR<	2 : 1
1850-1990	MHz	VSWR<	3,5 : 1

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1:4:5 Measuring method:

The VSWR is measured with a network analyser or other equipment with same or better accuracy as HP 8753D network analysers. *Free space* means that the antenna and mobile phone is placed on a non absorbing non reflecting material in an environment suitable for measurements on antennas. *Talk position* means that the phone is measured in user position. The talk position VSWR measurement is performed when a person is holding the phone in a typical user position.

1:5 GAIN

1:5:1 Minmum values in maximum direction, retracted antenna:

824-894	MHz	-3 dBd
1850-1990	MHz	-4 dBd

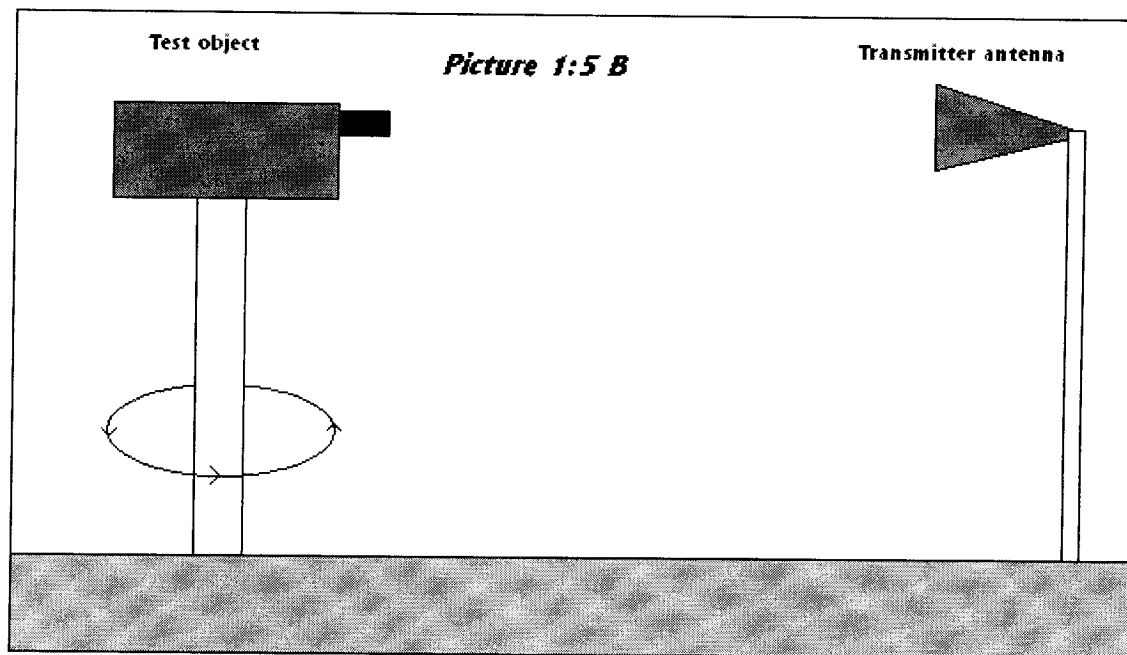
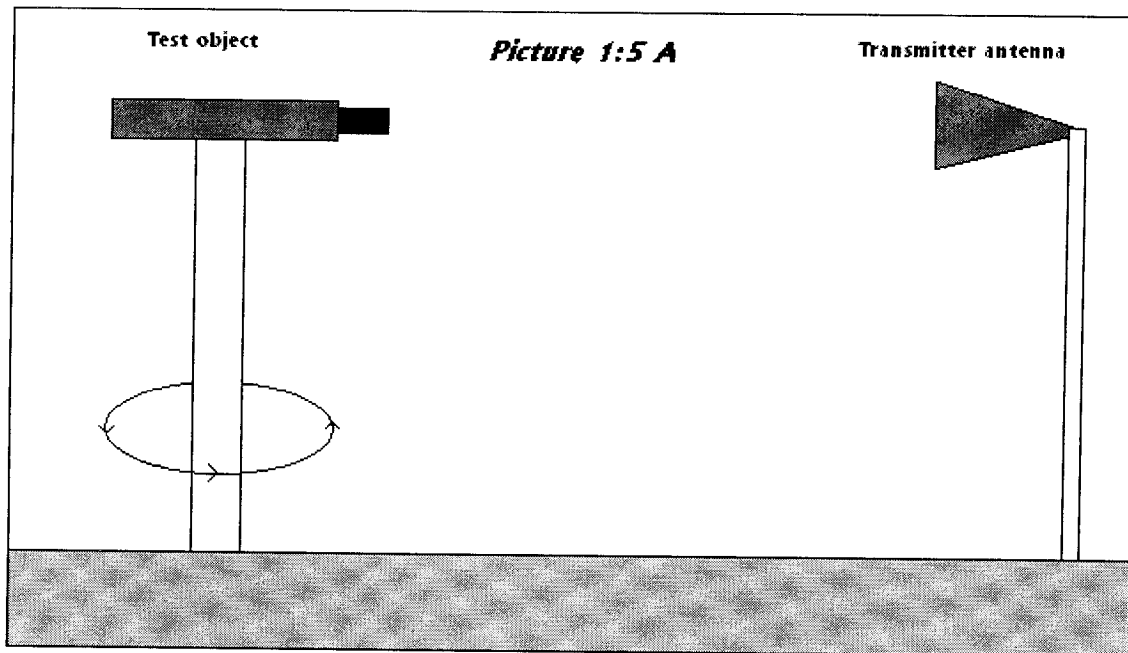
1:5:2 Minmum values in maximum direction, extended antenna:

824-894	MHz	-3 dBd
1850-1990	MHz	-4 dBd

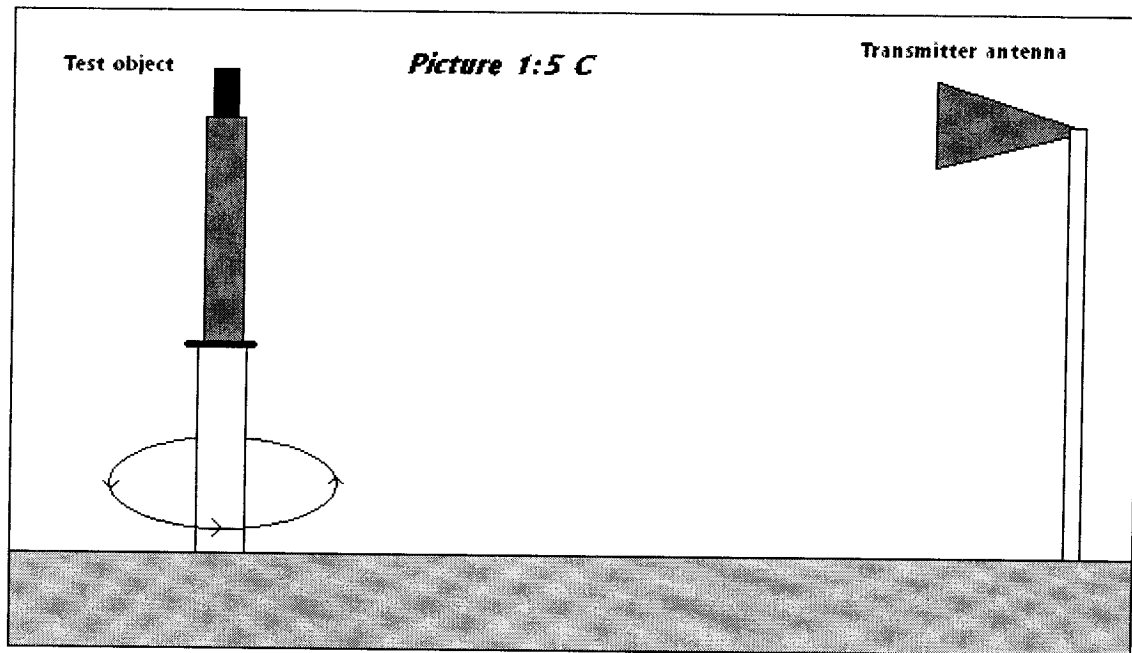
1:5:3 Measuring method:

The radiation measurements are performed in an anechoic chamber. Three different planes are measured. E1-plane (*picture 1:5A*), E2-plane (*picture 1:5B*) and H-plane (*picture 1:5C*).

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1:6 POWER RATING

1:6:1 Maximum input power:
824-894 MHz 2W

1:6:2 Demands:

No visual deformation is allowed, and the antenna must meet the electrical specification after the test.

1:5:3 Measuring method:

A 2W cw signal from a signal generator/amplifier is connected, through a power meter to the antenna for 10 minutes at room temperature.

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MECHANICAL SPECIFICATION

2:1 APPEARANCE

The appearance shall be according to the product specification drawing 2054-1 issue 5 at page 15.

2:2 HELICAL DEFORMATION

2:2:1 Demands

Angle (α):	30°
Bending Force (F)	40N

The antenna must meet the electrical specification and remain mechanically bounded after the test. Only minor non reversible deformations is allowed.

2:2:2 Measuring method:

The test object is placed in a test jig.

A force (F) is applied perpendicular to the antenna, 10mm from the top until the specified force (F) or angle (α) is reached. (picture 3:4A)

2:3 TORQUE

2:3:1 Demands

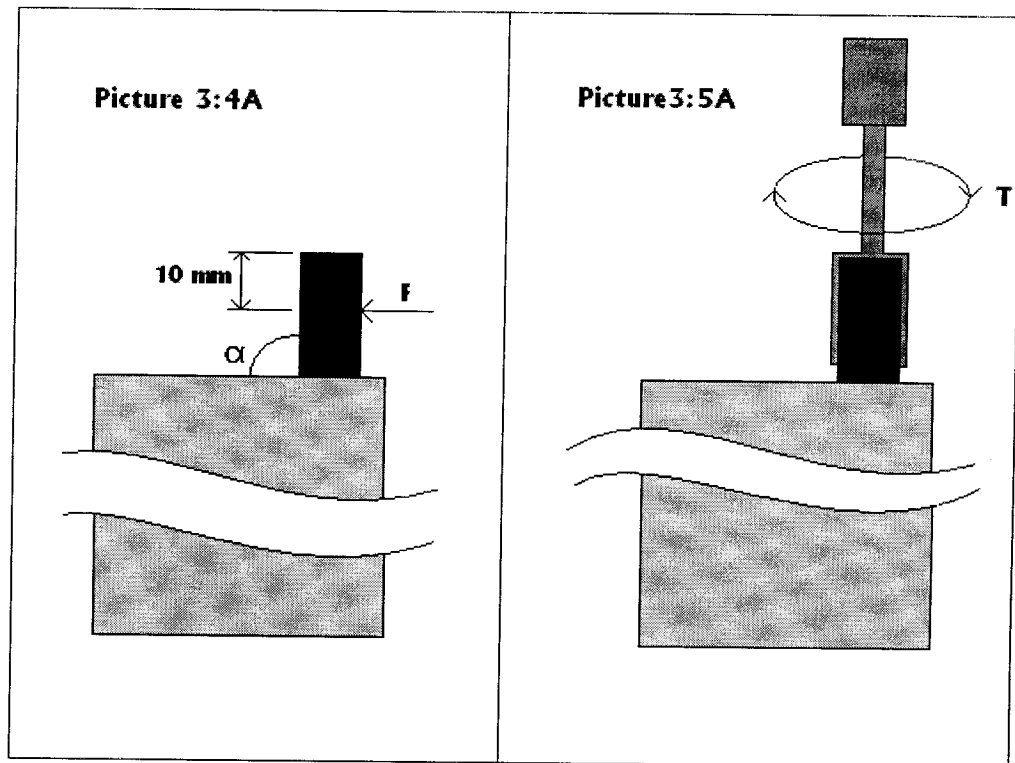
T=10 Ncm

The antenna must meet the electrical specification and remain mechanically bounded after the test. Only minor non reversible deformations is allowed.

2:3:2 Measuring method:

The test object is placed in a test jig. A torque measurement instrument is attached to the test object. The test object is exposed to the specified torque. (picture 3:5A)

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2:4 DROP

2:4:1 Demands:

Drop Height	150cm
Handset weight	150g
Angle	0°
Number of drops	3

The antenna must meet the electrical specification and remain mechanically bounded after the test. Only minor non reversible deformations is allowed.

2:4:2 Measuring method:

The retracted antenna is attached to a test fixture with a specified weight, and is dropped from a specified height and with specified angle. The antenna is dropped on a steel surface. This is repeated with the same antenna in extended position.

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2:5 TENSION LOAD

2:5:1 Demands:

Between cover and frame	50N
Between whip and helix	50N

The antenna must meet the electrical specification and remain mechanically bounded after the test. Only minor non reversible deformations is allowed.

2:5:2 Measuring method:

The antenna is placed in a test jig. A force measurement instrument is attached to the cover. The cover is exposed to the specified force for 30 seconds. Then the whip is exposed to the specified force for 30 seconds.

2:6 WHIP BENDING

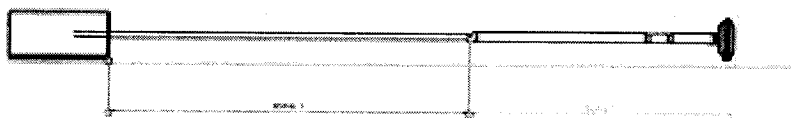
2:6:1 Demands:

Bending radius	20mm
Zone 1:	Remaining deformation <0,5mm / 40mm wire length. The original straightness shall be possible to restore.
Zone 2:	No fracture. The original straightness shall be possible to restore.

The antenna must meet the electrical specification after the test.

2:6:2 Measuring method:

The extended antenna is placed in a test jig. The whip is bend 180° around a cylinder with the specified radius. After that the antenna is released and sprung back to vertical position.



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2:7 WHIP BENDING ENDURANCE

2:7:1 Demands:

The antenna must meet the electrical specification and remain mechanically bounded after the test. Only minor non-reversible deformations are allowed.

2:7:2 Measuring method:

The antenna is placed in a test jig. The whip is bend 90° left and 90° right. The cycle time is 6 seconds. This is repeated 400 times.

2:8 EXTENSION AND RETRACTION FORCES

2:8:1 Demands:

Extension from retracted position	0,5-5,0N
Retraction from extended position	0,5-5,0N

The demands is valid up to 10 000 cycles.

2:8:2 Measuring method:

The antenna is placed in a test jig. A force measurement instrument is attached to the whip. The antenna is extended from retracted position.

The whip is locked in extended position. The antenna is pushed down from extended position using a force measurement instrument.

The force is measured after 1, 5 000 and 10 000 cycles.

2:9 Sinusoidal Vibration

2:9:1 Demands:

No visual deformation is allowed, and the antenna must meet the specification after the test.

2:9:2 Measuring method:

Vibration frequencies:	5-55-5 Hz (1 cycle)
Sweep rate:	0,5 octave/min (logarithmic)
Maximum amplitude:	1,5mm
Maximum acceleration:	2g
Crossover frequency:	18,2 Hz

The antenna is placed in a test jig. Vibration is done both vertical and horizontal with duration of 1 hour per direction.

2:10 OPERATING TEMPERATURE

2:10:1 Demands:

-20°C to 70°C at 50% RH

No visual deformation is allowed, and the antenna must meet the specification after the test.

2:10:2 Measuring method:

The test is performed in a climatic chamber. The antenna is kept at the lower temperature for 1 hour. After that the antenna is kept at the higher temperature for 1 hour. After 1 hour in approximately 20°C and 50% RH the VSWR is measured in free space.

2:11 TEMPERATURE CYCLING

2:11:1 Demands:

Low cycling temperature	-40°C
High cycling temperature	80°C at 50% RH

No visual deformation is allowed, and the antenna must meet the specification after the test.

2:11:2 Measuring method:

The test is performed in a climatic chamber. The temperature is cycled between “Low cycling temperature” and “High cycling temperature” 10 times. Between every cycling the temperature is kept constantly at “Low cycling temperature” and “High cycling temperature” for one hour. Start and end temperature is room temperature (approximately 20°C and 50% RH)

Room temperature ⇒ 10 times (Low cycling temperature for one hour ⇒ High cycling temperature for one hour) ⇒ Room temperature

The electrical specification is checked after 1 hour in approximately 20°C and 50% RH. The mechanical specification is checked after 24 hours in approximately 20°C and 50% RH.

2:12 HUMIDITY

2:12:1 Demands:

Relative humidity	95% RH
Temperature	+55°C

No visual deformation is allowed, and the antenna must satisfy the electrical specification after the test.

2:12:2 Measuring method:

The test object is placed in a climatic chamber with specified humidity for 24 hours. The electrical and mechanical specification is checked after 24 hours in approximately 20°C and 50% RH.

2:13 CORROSION

2:13:1 Demands:

Without permanent mechanical damage and the antenna must satisfy the electrical specification after the test.

2:13:2 Measuring method:

The antenna is placed in air saturated with 5% (by weight) Sodium Chloride solution for 96 hours at +35°C.

2:14 UV RESISTANCE

2:14:1 Demands:

Without permanent mechanical damage and the antenna must satisfy the electrical specification after the test.

2:14:2 Measuring method:

The antenna is subjected to ultra violet radiation according to IEC 68-2-5, Part 2, Test Sa, Procedure A (10 cycles, +40°C, no humidity no operation).

2:15 AGING

2:15:1 Demands:

No visual deformation is allowed, and the antenna must satisfy the electrical specification after the test.

2:15:2 Measuring method:

The antenna is placed in a dark storage for 3 years.

2:16 GUIDING TUBE ATTACHMENT

2:16:1 Demands:

Tube shall keep bounded with antenna when kept in a vertical position (parallel to the antenna axis).

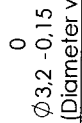
2:16:2 Measuring method:

The antenna is kept in vertical position, held in the cover.

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4 LOG OF CHANGES

Issue	Item	From	To
2	1 : 2	LG 133B	LG 133A
2	1 : 3	TBD	Ant 1,0 pFsh - 1,8 nHsc - 10nHsh
2	1 : 4 : 1	VSWR< TBD VSWR< TBD	VSWR< 3 : 1 VSWR< 3,5 : 1
2	1 : 4 : 2	VSWR< TBD VSWR< TBD	VSWR< 2,5 : 1 VSWR< 3,5 : 1
2	1 : 4 : 3	VSWR< TBD VSWR< TBD	VSWR< 4 : 1 VSWR< 3,5 : 1
2	1 : 4 : 4	VSWR< TBD VSWR< TBD	VSWR< 2 : 1 VSWR< 3,5 : 1
2	1 : 5 : 1	TBD TBD	-3 dBd -4 dBd
2	1 : 5 : 2	TBD TBD	-3 dBd -4 dBd



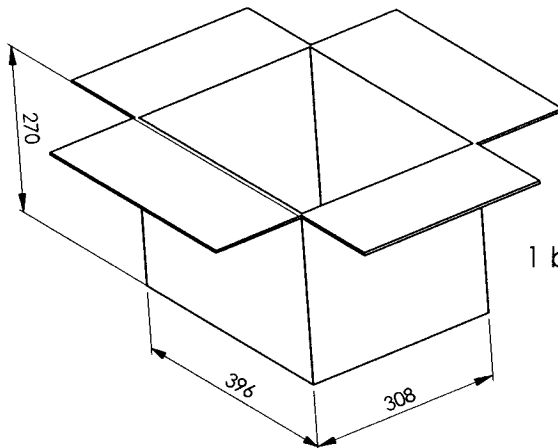
6	PVC / NITI-core	Colour Black
5	PP	Black
4	Brass	Nickel plated
3	Zyrel	Surface acc. to Charmilles VDI 3400 No. 30. Colour Black
2	Delrin	Surface acc. to Charmilles VDI 3400 No. 30. Colour Black
1	Santoprene 103-40	Surface acc. to Charmilles VDI 3400 No. 33. Colour Black
Item	Material	Note

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Detail Label

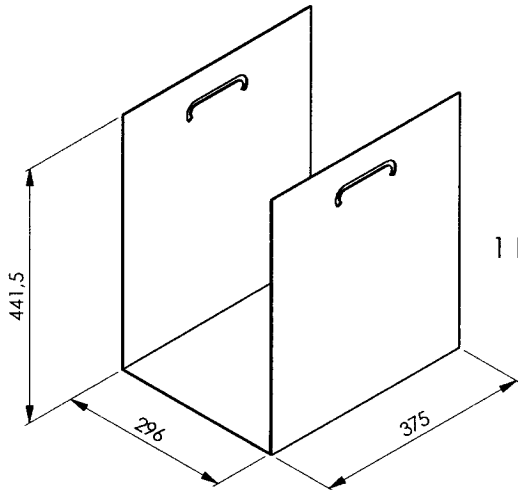
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Article number:	
Number of components:	
Checked by:	
Date:	



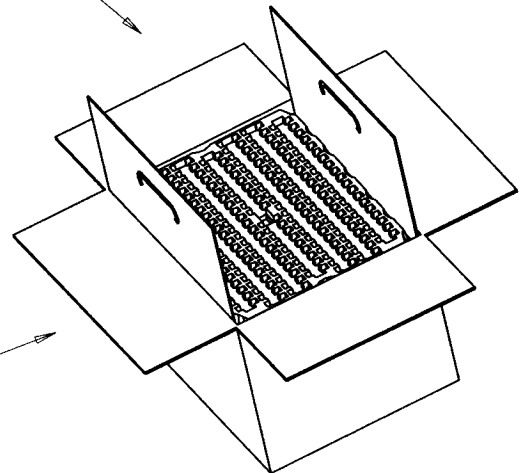
1 box

Wellpapp-box that contains 1500 retractable antennas



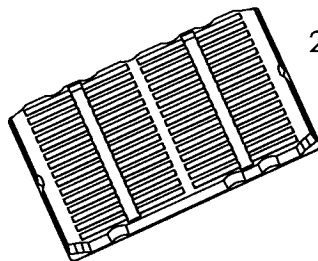
1 lifting aid

Wellpapp-lifting-aid



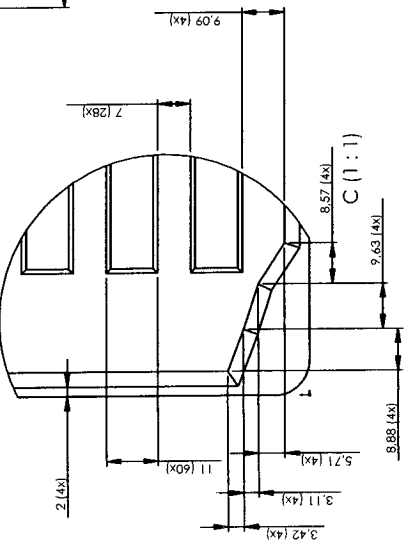
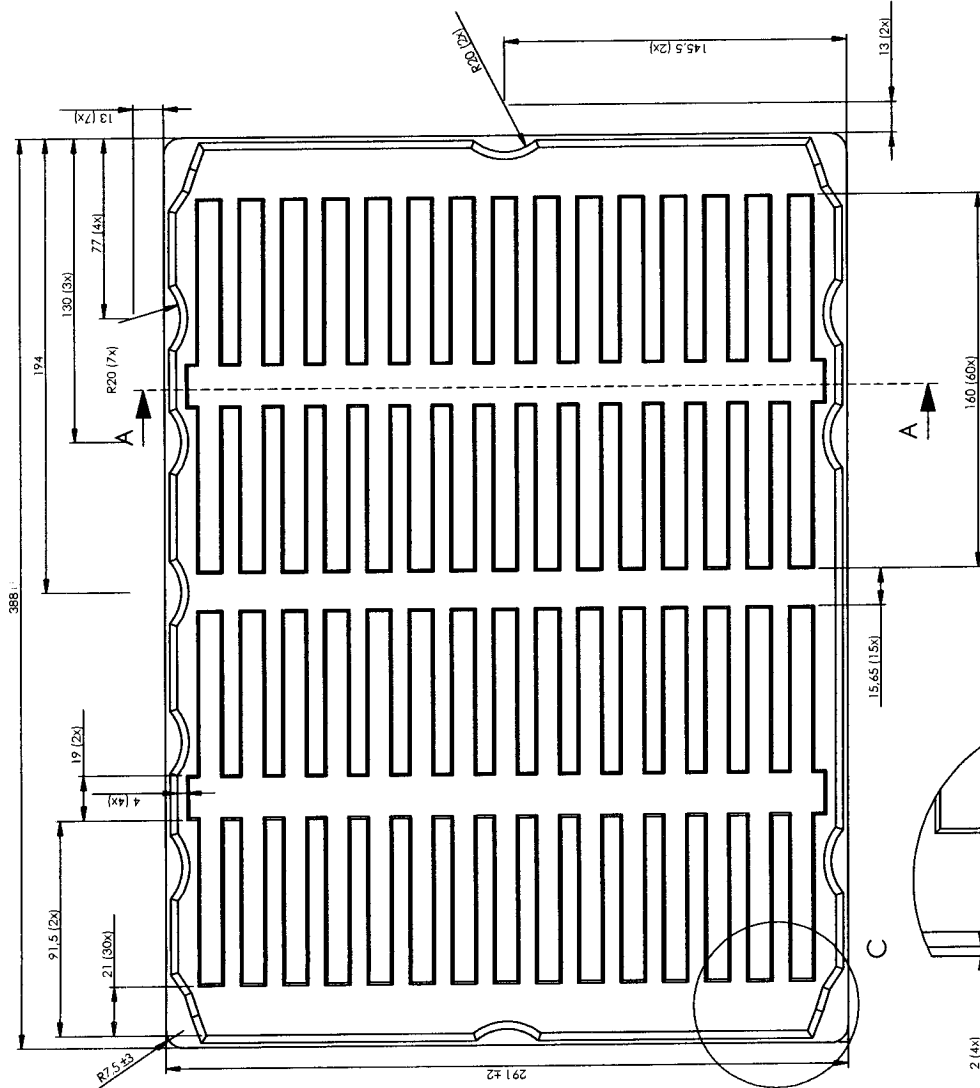
26 trays (Only 25 contains antennas)

1500 Retractable antennas



Tray for 60 retractable antennas

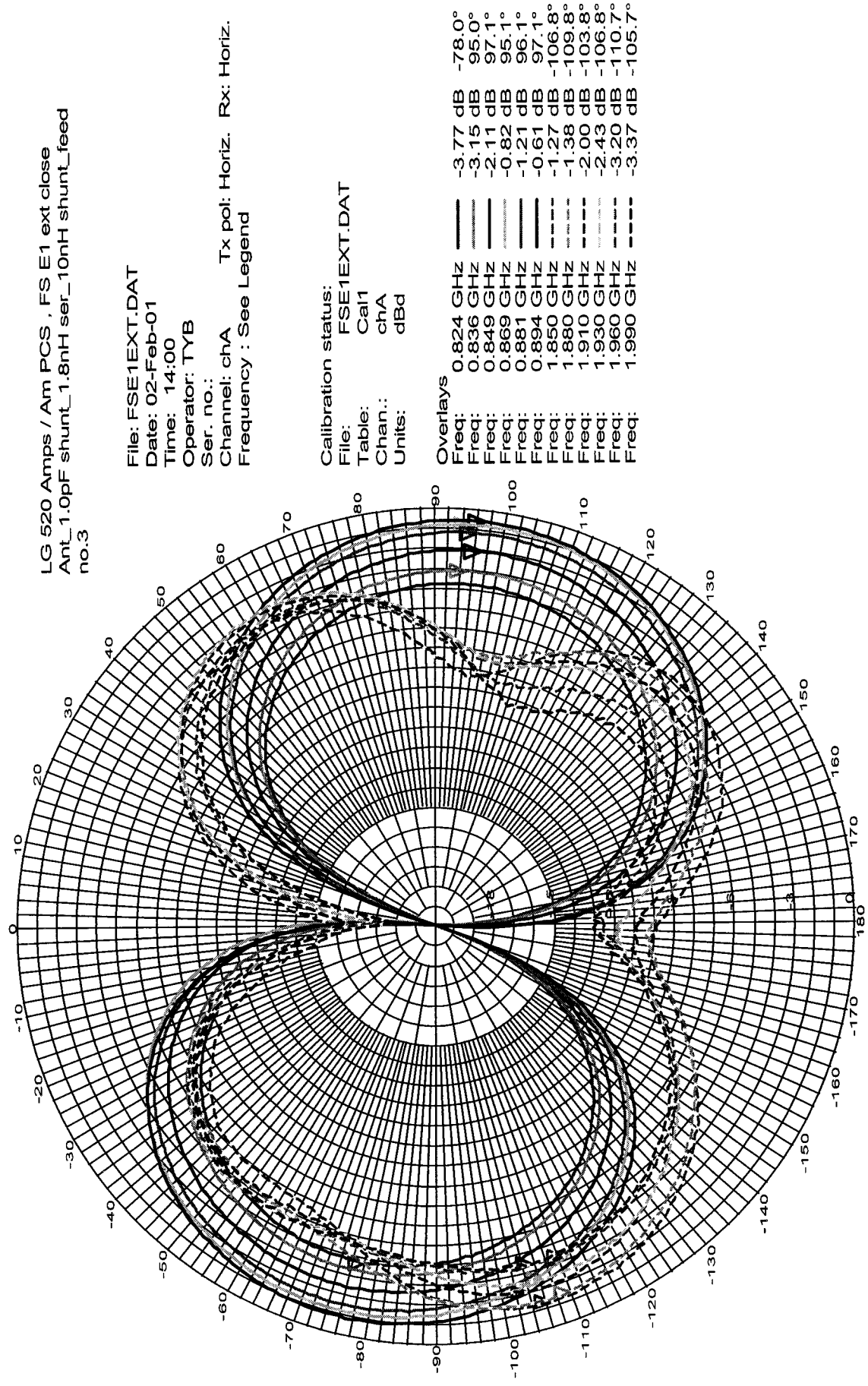
1	1	.	.	.			
Pos	Qty	Article No.	Name/Designation	Material	Note		
Unless otherwise stated:			Title Box that contains 26 trays and 1500 retractable antennas	Surface properties			
Tolerances acc.to		Format A4		Finish: .			
Broken edge		Radius		Colour: .			
.		.		Drawn JMS			
Other remarks			.	Scale	Rev. Date	Approved	
.				1:10	01-02-01	 	
AVANT E GO				Drawing No. 10191-0144 A Packing			



Marked with: "Recycling symbol" for Polystyren
and the text "Antistatic treated"

Pos	Qty	Article No.	Name/Designation	Material	Thickness
1	1		Tray for 60 retractable antennas	Polystyren	0.6
Note					
Surface properties					
Finish:					
Colour:					
Drawn Mech/El:					
Approved					
Scale					
Rev. Date					
1:1 99-12-11					
Drawing No.					
10280-0144 A					

Magnitude (dB) vs. A (Deg)



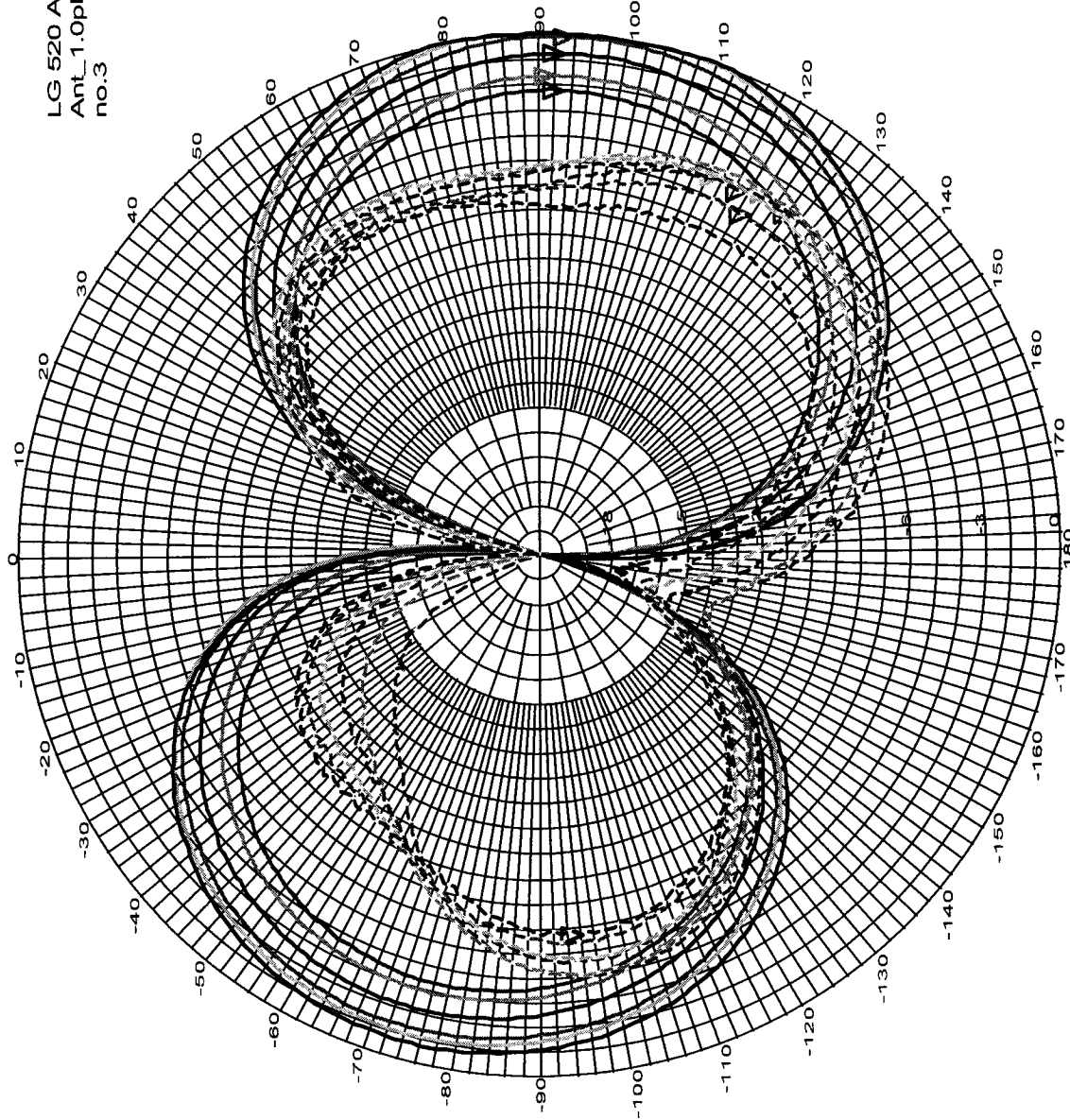
Magnitude (dB) vs. A (Deg)

LG 520 Amps / Am PCS , FS E1 ext open
Ant_1.0pF shunt_1.8nH ser_10nH shunt_feed
no.3

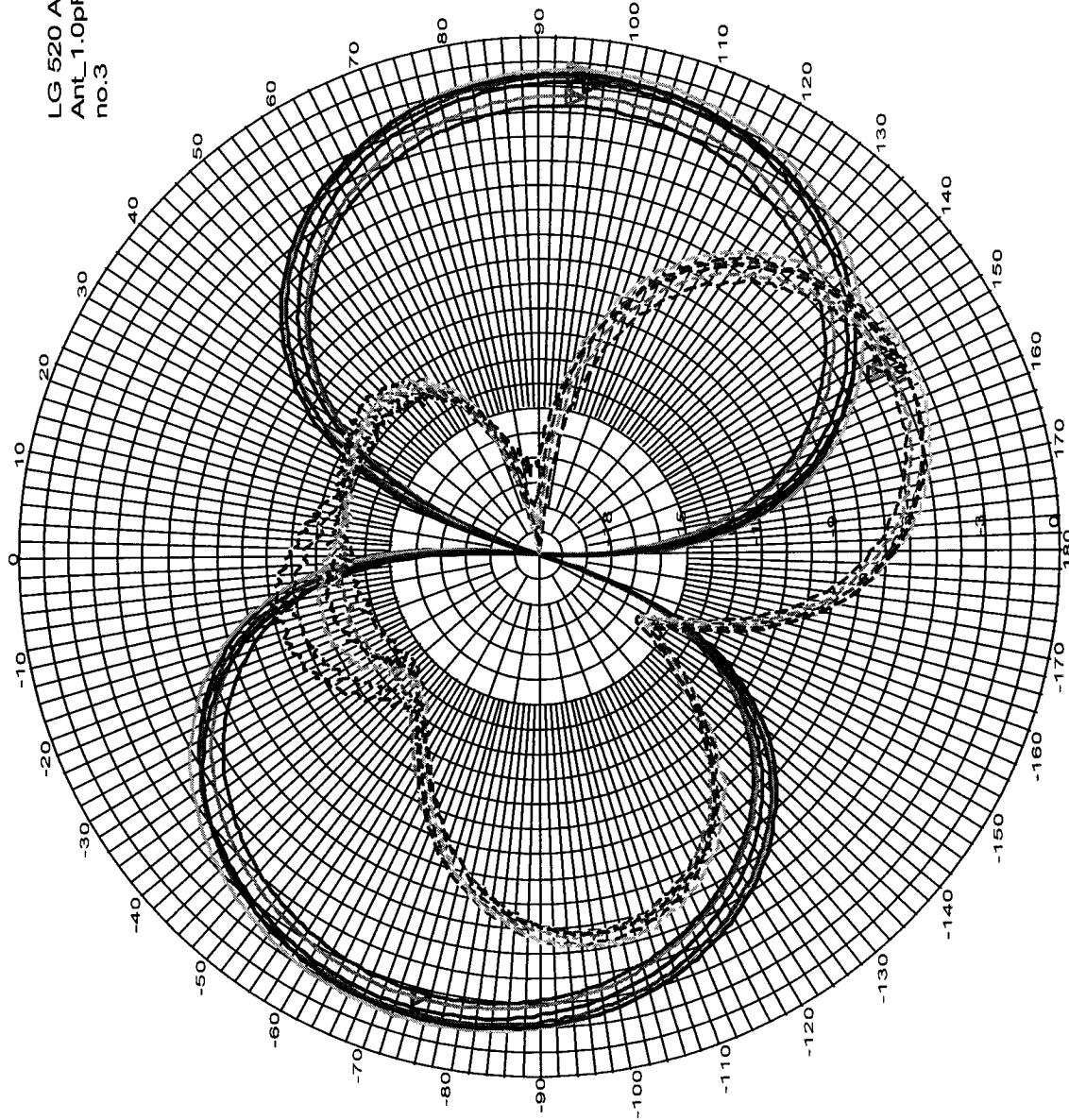
File: FSE1EXTO.DAT
Date: 02-Feb-01
Time: 14:20
Operator: TYB
Ser. no.:
Channel: chA Tx pol: Horiz. Rx: Horiz.
Frequency : See Legend

Calibration status:
File: FSE1EXTO.DAT
Table: Cal1
Chan.: chA
Units: dBd

Overlays			
Freq:	0.824 GHz	---	-2.27 dB 93.0°
Freq:	0.836 GHz	---	-1.70 dB 92.0°
Freq:	0.849 GHz	---	-0.78 dB 92.9°
Freq:	0.869 GHz	---	0.32 dB 94.9°
Freq:	0.881 GHz	---	-0.09 dB 93.9°
Freq:	0.894 GHz	---	0.49 dB 91.9°
Freq:	1.850 GHz	---	-3.96 dB 126.8°
Freq:	1.880 GHz	---	-3.78 dB 122.8°
Freq:	1.910 GHz	---	-4.24 dB 119.8°
Freq:	1.930 GHz	---	-4.15 dB 115.8°
Freq:	1.960 GHz	---	-4.96 dB 121.7°
Freq:	1.990 GHz	---	-5.67 dB -96.3°



Magnitude (dB) vs. A (Deg)



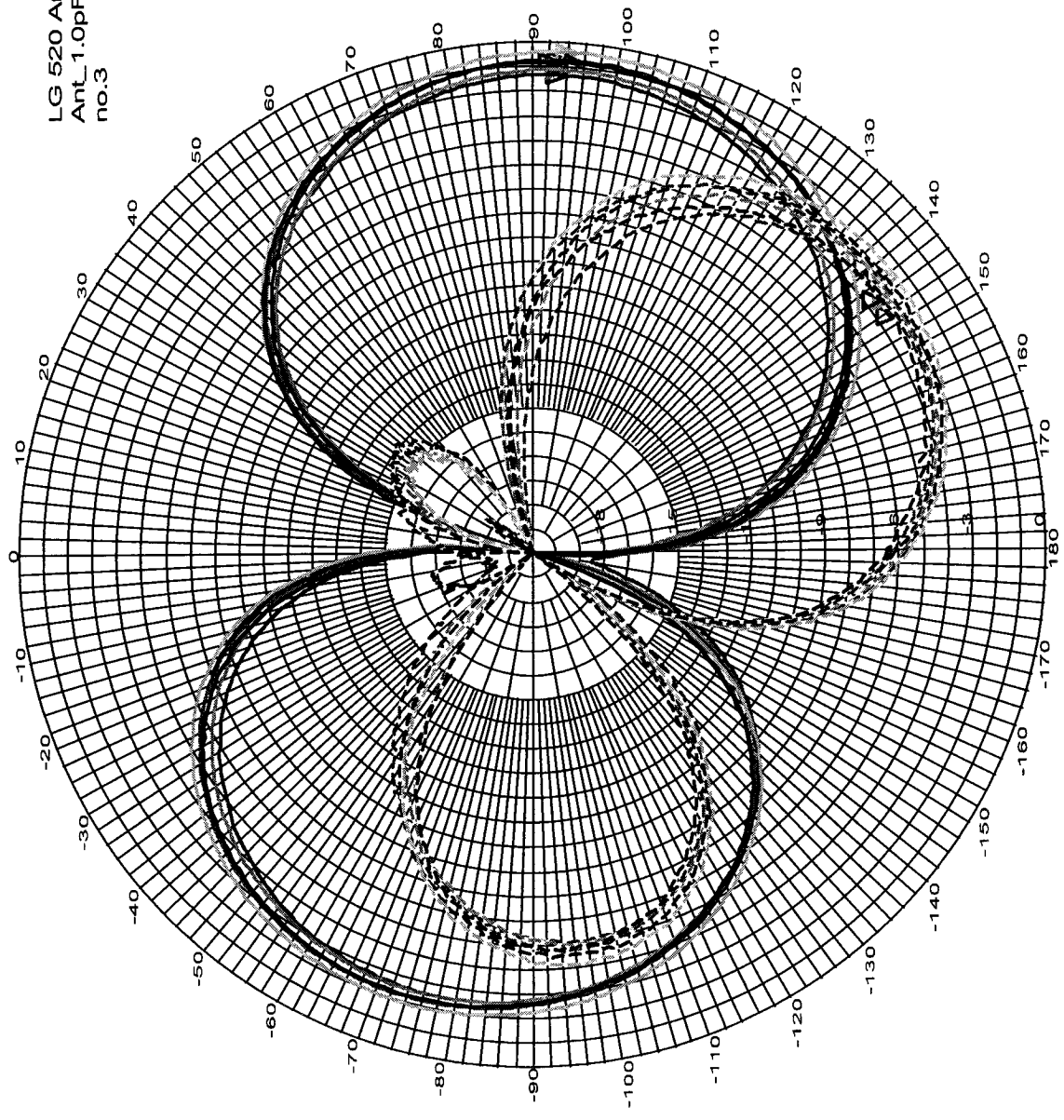
LG 520 Amps / Am PCS , FS E1 ret close
Ant_1.0pF shunt_1.8nH ser_10nH shunt_feed
no.3

File: FSE1RET.DAT
Date: 02-Feb-01
Time: 14:09
Operator: TYB
Ser. no.:
Channel: chA Tx pol: Horiz. Rx: Horiz.
Frequency : See Legend

Calibration status:
File: FSE1RET.DAT
Table: Cal1
Chan.: chA
Units: dBd

Overlays				
Freq:	0.824 GHz	██████████	-2.81 dB	-76.0°
Freq:	0.836 GHz	██████████	-2.40 dB	96.0°
Freq:	0.849 GHz	██████████	-1.82 dB	97.9°
Freq:	0.869 GHz	██████████	-1.31 dB	95.9°
Freq:	0.881 GHz	██████████	-1.64 dB	98.9°
Freq:	0.894 GHz	██████████	-1.53 dB	95.9°
Freq:	1.850 GHz	██████████	-5.28 dB	152.8°
Freq:	1.880 GHz	██████████	-5.02 dB	152.8°
Freq:	1.910 GHz	██████████	-4.47 dB	152.8°
Freq:	1.930 GHz	██████████	-4.13 dB	148.8°
Freq:	1.960 GHz	██████████	-4.53 dB	154.7°
Freq:	1.990 GHz	██████████	-4.60 dB	150.7°

Magnitude (dB) vs. A (Deg)



LG 520 Amps / Am PCS , FS E1 ret open
 Ant_1.0pF shunt_1.8nH ser_10nH shunt_feed
 no.3

File: FSE1RETO.DAT
 Date: 02-Feb-01
 Time: 14:15
 Operator: TYB
 Ser. no.:
 Channel: chA Tx pol: Horiz. Rx: Horiz.
 Frequency : See Legend

Calibration status:
 File: FSE1RETO.DAT
 Table: Cal1
 Chan.: chA
 Units: dBd

Overlays			
Freq: 0.824 GHz	----	-1.40 dB	94.0°
Freq: 0.836 GHz	----	-1.18 dB	94.0°
Freq: 0.849 GHz	----	-0.79 dB	94.1°
Freq: 0.869 GHz	----	-0.44 dB	95.1°
Freq: 0.881 GHz	----	-0.85 dB	96.1°
Freq: 0.894 GHz	----	-0.85 dB	93.1°
Freq: 1.850 GHz	----	-3.30 dB	147.2°
Freq: 1.880 GHz	----	-3.07 dB	145.2°
Freq: 1.910 GHz	----	-2.73 dB	142.2°
Freq: 1.930 GHz	----	-2.37 dB	143.2°
Freq: 1.960 GHz	----	-2.89 dB	140.3°
Freq: 1.990 GHz	----	-3.46 dB	144.3°

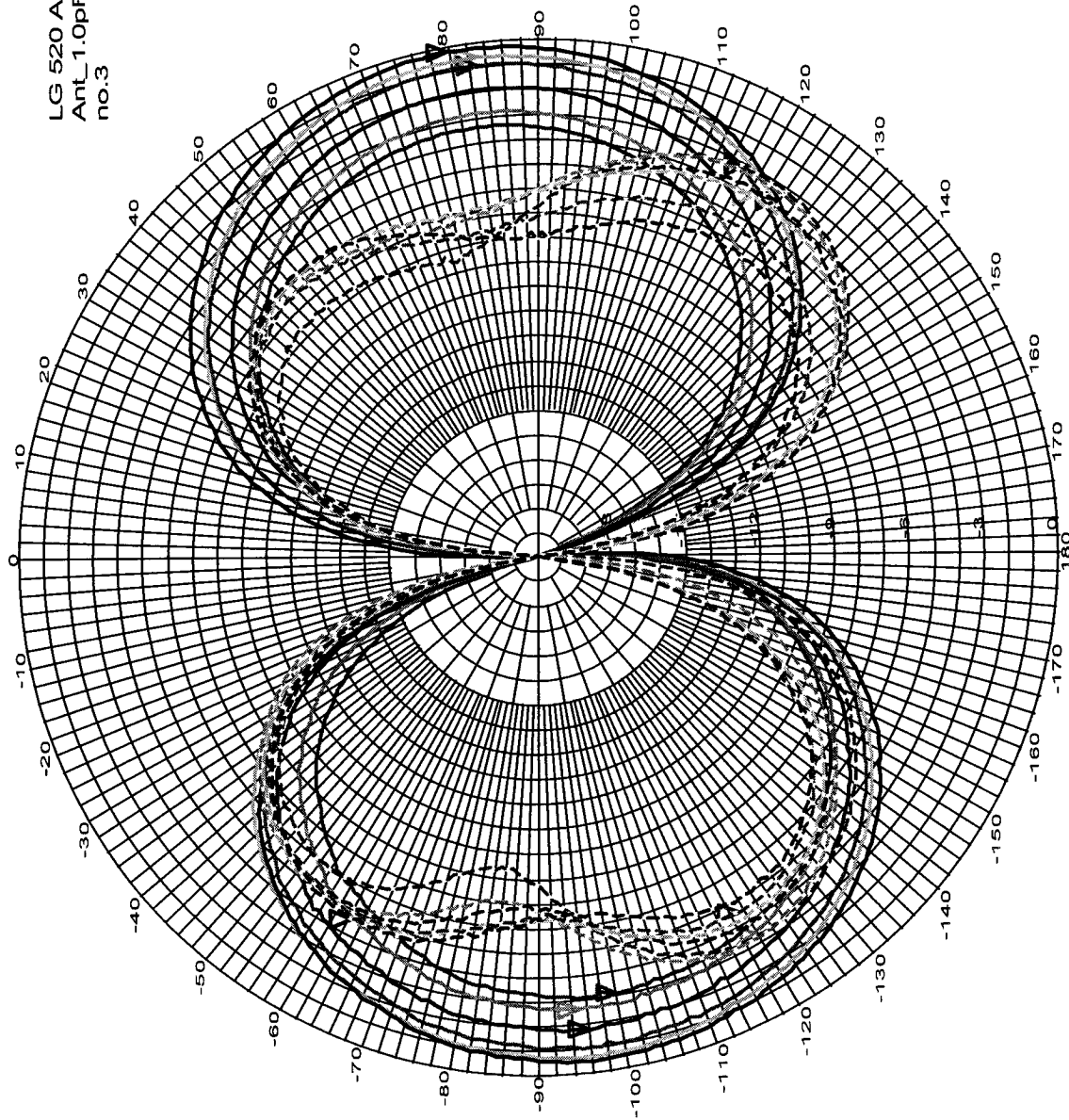
Magnitude (dB) vs. A (Deg)

LG 520 Amps / Am PCS , FS E2 ext closed
 Ant_1.0pF shunt_1.8nH ser_10nH shunt_feed
 no.3

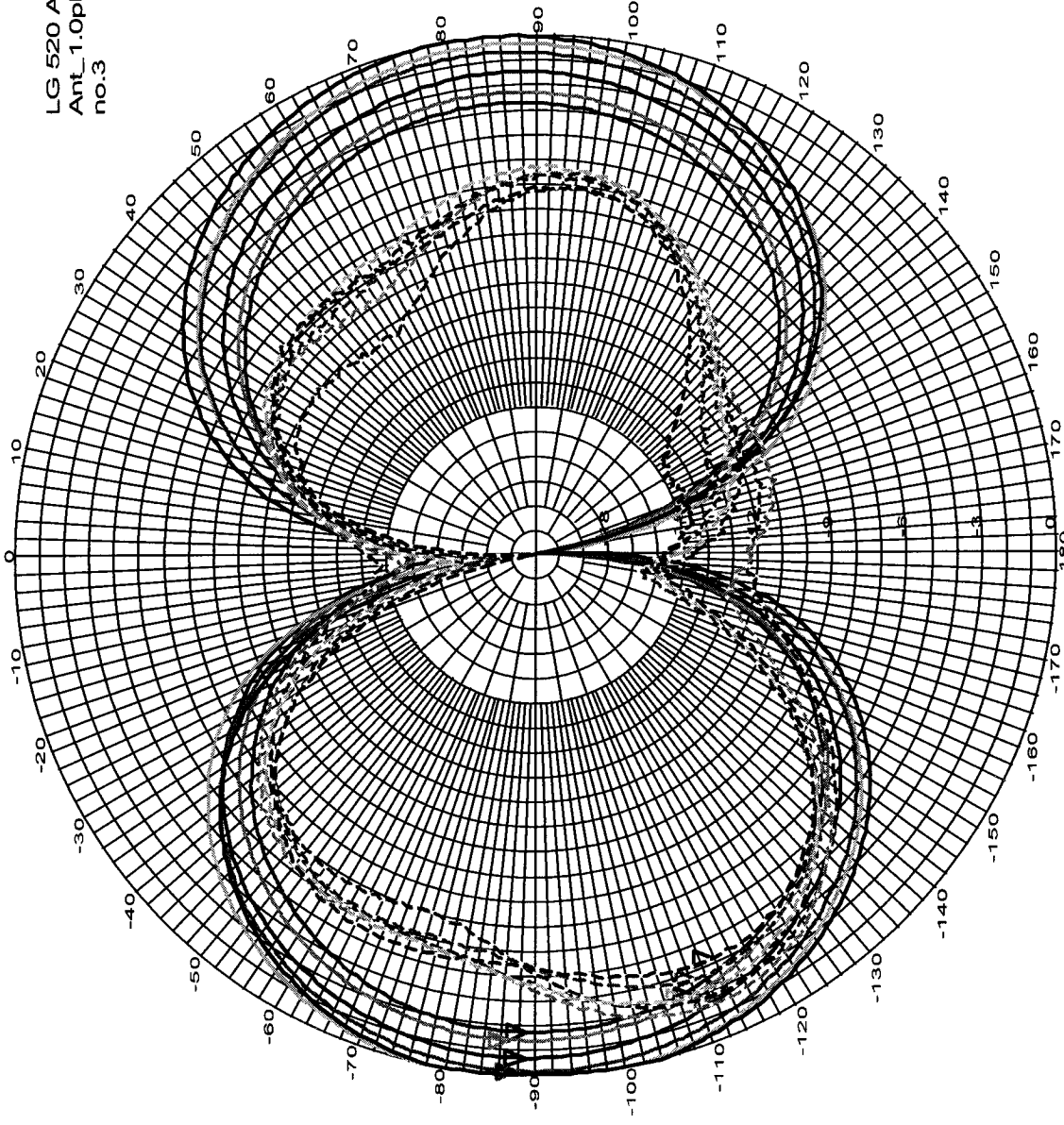
File: FSE2EXT.DAT
 Date: 02-Feb-01
 Time: 14:43
 Operator: TYB
 Ser. no.:
 Channel: chA Tx pol: Horiz. Rx: Horiz.
 Frequency : See Legend

Calibration status:
 File: FSE2EXT.DAT
 Table: Cal1
 Chan.: chA
 Units: dBd

Overlays			
Freq:	0.824 GHz	-3.11 dB	-100.0°
Freq:	0.836 GHz	-2.63 dB	-95.0°
Freq:	0.849 GHz	-1.78 dB	-96.1°
Freq:	0.869 GHz	-0.64 dB	82.9°
Freq:	0.881 GHz	-0.96 dB	82.9°
Freq:	0.894 GHz	-0.23 dB	79.9°
Freq:	1.850 GHz	-3.15 dB	117.8°
Freq:	1.880 GHz	-3.23 dB	120.2°
Freq:	1.910 GHz	-3.76 dB	123.8°
Freq:	1.930 GHz	-4.06 dB	120.8°
Freq:	1.960 GHz	-4.50 dB	-119.3°
Freq:	1.990 GHz	-4.61 dB	-62.3°



Magnitude (dB) vs. A (Deg)



LG 520 Amps / Am PCS , FS E2 ext open
Ant_1.0pF shunt_1.8nH ser_10nH shunt_feed
no.3

File: FSE2EXT0.DAT
Date: 02-Feb-01
Time: 14:28
Operator: TYB
Ser. no.:
Channel: chA Tx pol: Horiz. Rx: Horiz.
Frequency : See Legend

Calibration status:
File: FSE2EXT0.DAT
Table: Cal1
Chan.: chA
Units: dBd

Overlays	Freq:	0.824 GHz	0.836 GHz	0.849 GHz	0.869 GHz	0.881 GHz	0.894 GHz	1.850 GHz	1.880 GHz	1.910 GHz	1.930 GHz	1.960 GHz	1.990 GHz
		0.824 GHz	0.836 GHz	0.849 GHz	0.869 GHz	0.881 GHz	0.894 GHz	1.850 GHz	1.880 GHz	1.910 GHz	1.930 GHz	1.960 GHz	1.990 GHz
		-1.71 dB	-1.40 dB	-0.69 dB	-0.25 dB	-0.12 dB	0.27 dB	-1.80 dB	-1.48 dB	-2.08 dB	-2.07 dB	-2.69 dB	-3.19 dB
		-89.0°	-87.0°	-88.9°	-90.9°	-87.9°	-87.9°	-113.8°	-111.8°	-109.8°	-108.8°	-110.7°	-113.7°

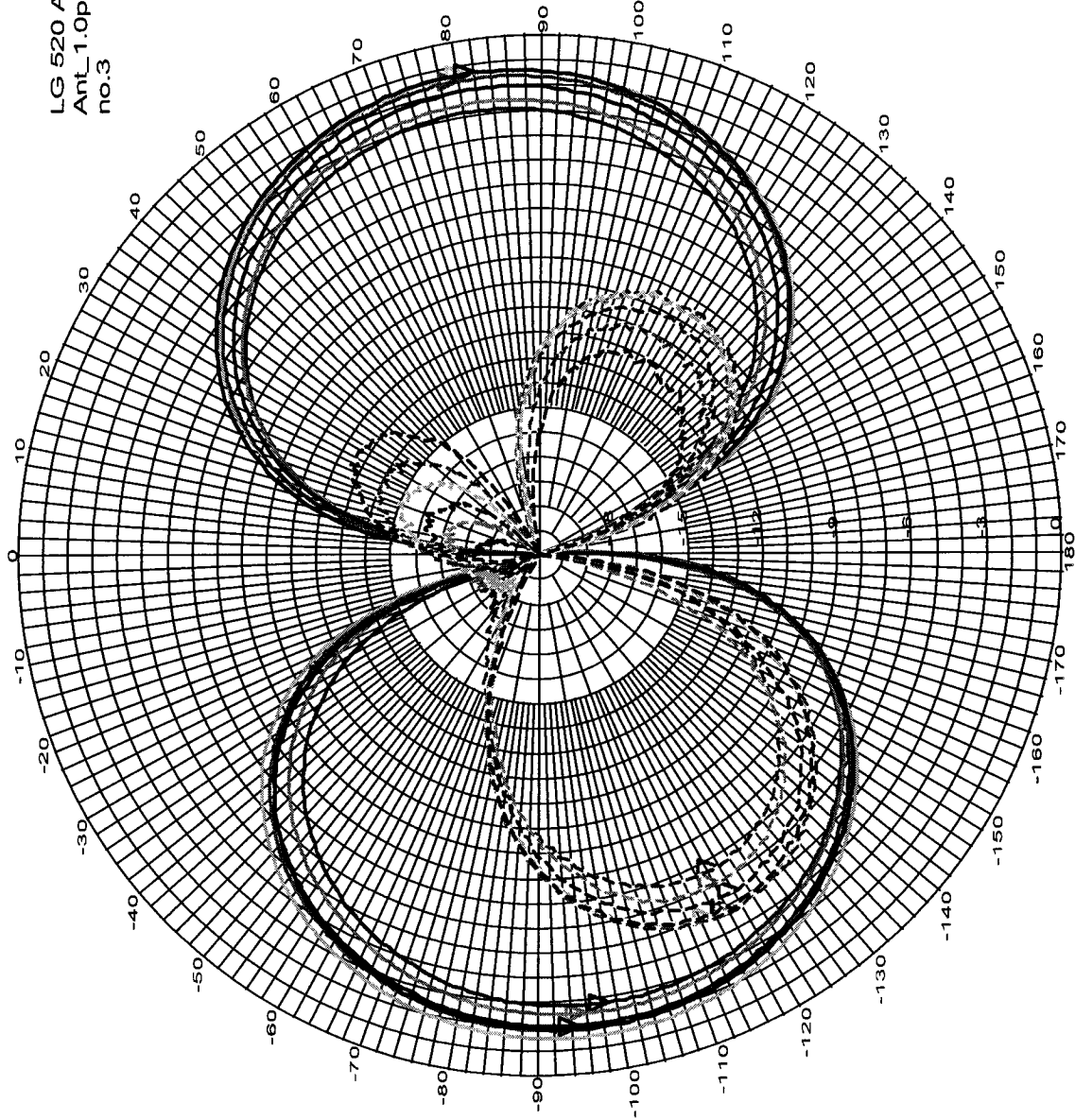
Magnitude (dB) vs. A (Deg)

LG 520 Amps / Am PCS , FS E2 ret closed
Ant_1.0pF shunt_1.8nH ser_10nH shunt_feed
no.3

File: FSE2RET.DAT
Date: 02-Feb-01
Time: 14:38
Operator: TYB
Ser. no.:
Channel: chA Tx pol: Horiz. Rx: Horiz.
Frequency : See Legend

Calibration status:
File: FSE2RET.DAT
Table: Cal1
Chan.: chA
Units: dBd

Overlays			
Freq:	0.824 GHz	-----	-2.76 dB -99.0°
Freq:	0.836 GHz	-----	-2.44 dB -96.0°
Freq:	0.849 GHz	-----	-1.95 dB -94.9°
Freq:	0.869 GHz	-----	-1.39 dB 81.1°
Freq:	0.881 GHz	-----	-1.63 dB 80.1°
Freq:	0.894 GHz	-----	-1.38 dB 82.1°
Freq:	1.850 GHz	-----	-6.52 dB -119.8°
Freq:	1.880 GHz	-----	-5.97 dB -118.8°
Freq:	1.910 GHz	-----	-5.30 dB -120.8°
Freq:	1.930 GHz	-----	-4.82 dB -115.8°
Freq:	1.960 GHz	-----	-4.70 dB -118.7°
Freq:	1.990 GHz	-----	-4.80 dB -118.7°



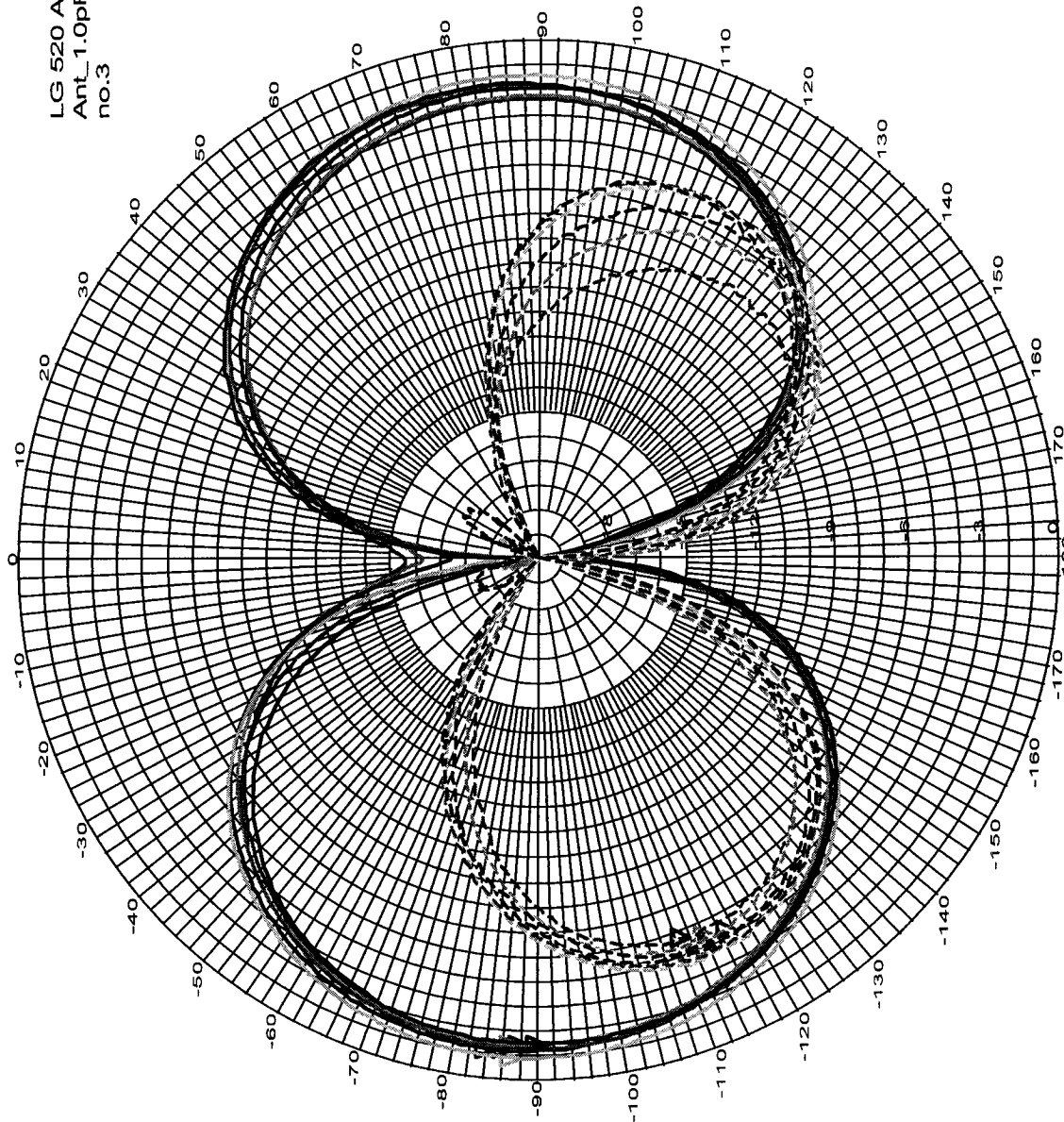
Magnitude (dB) vs. A (Deg)

LG 520 Amps / Am PCS , FS E2 ret open
Ant_1.0pF shunt_1.8nH ser_10nH shunt_feed
no.3

File: FSE2RETO.DAT
Date: 02-Feb-01
Time: 14:33
Operator: TYB
Ser. no.:
Channel: chA Tx pol: Horiz. Rx: Horiz.
Frequency : See Legend

Calibration status:
File: FSE2RETO.DAT
Table: Cal1
Chan.: chA
Units: dBd

Overlays		
Freq:	0.824 GHz	-1.46 dB -89.0°
Freq:	0.836 GHz	-1.43 dB -88.0°
Freq:	0.849 GHz	-1.17 dB -85.1°
Freq:	0.869 GHz	-0.89 dB -88.1°
Freq:	0.881 GHz	-1.27 dB -87.1°
Freq:	0.894 GHz	-1.47 dB -91.1°
Freq:	1.850 GHz	-4.55 dB -112.2°
Freq:	1.880 GHz	-4.24 dB -115.2°
Freq:	1.910 GHz	-3.88 dB -115.2°
Freq:	1.930 GHz	-3.55 dB -113.2°
Freq:	1.960 GHz	-3.66 dB -113.3°
Freq:	1.990 GHz	-4.04 dB -118.3°



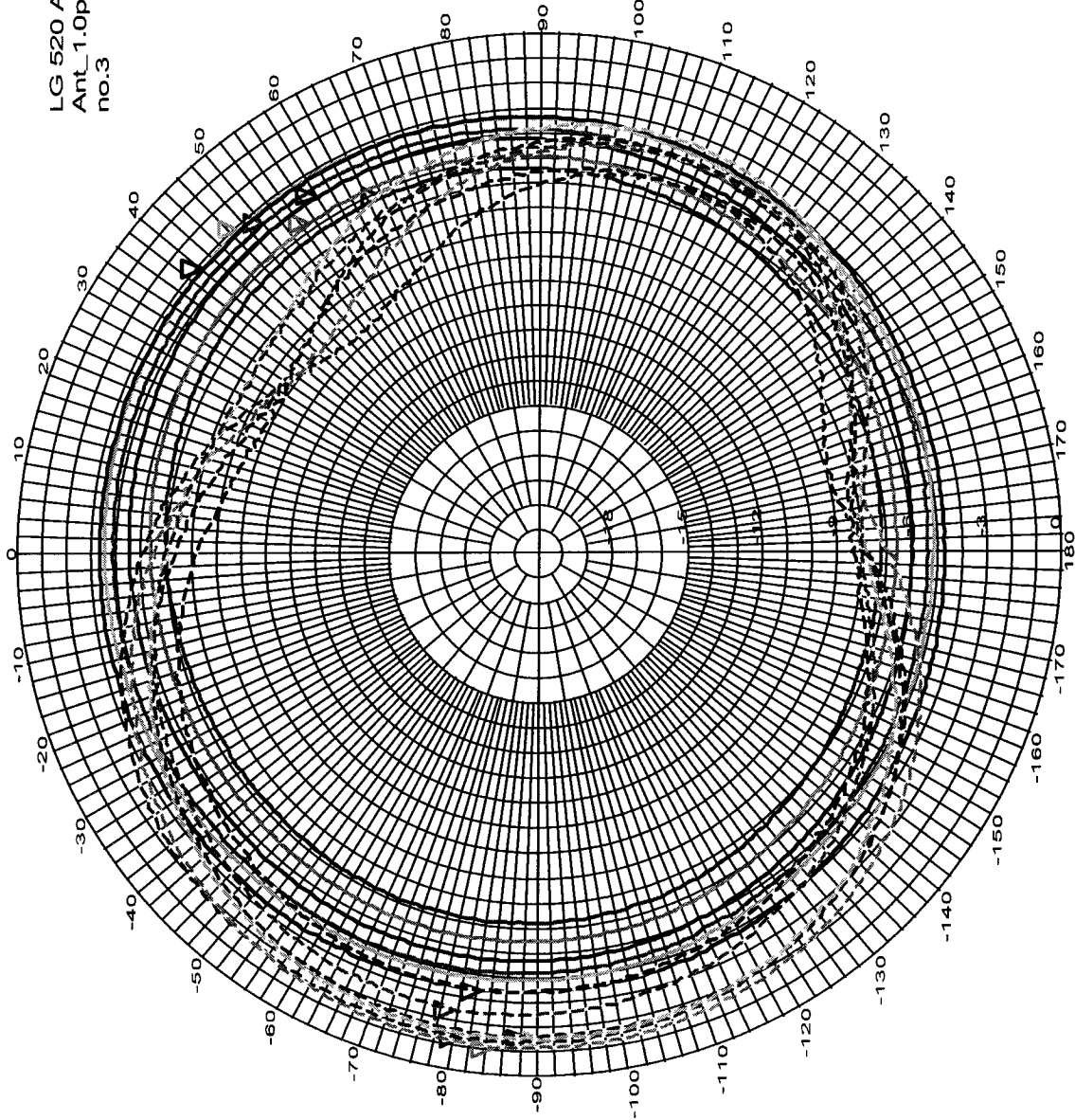
Magnitude (dB) vs. A (Deg)

LG 520 Amps / Am PCS , FS H ext closed
Ant_1.0pF shunt_1.8nH ser_10nH shunt_feed
no.3

File: FSHEXT.DAT
Date: 02-Feb-01
Time: 14:49
Operator: TYB
Ser. no.:
Channel: chA Tx pol: Horiz. Rx: Horiz.
Frequency : See Legend

Calibration status:
File: FSHEXT.DAT
Table: Cal1
Chan.: chA
Units: dBd

Overlays			
Freq:	0.824 GHz	-----	-5.30 dB
Freq:	0.836 GHz	-----	-4.79 dB
Freq:	0.849 GHz	-----	-4.05 dB
Freq:	0.869 GHz	-----	-3.22 dB
Freq:	0.881 GHz	-----	-3.68 dB
Freq:	0.894 GHz	-----	-3.25 dB
Freq:	1.850 GHz	-----	-1.34 dB
Freq:	1.880 GHz	-----	-1.09 dB
Freq:	1.910 GHz	-----	-1.55 dB
Freq:	1.930 GHz	-----	-1.46 dB
Freq:	1.960 GHz	-----	-2.42 dB
Freq:	1.990 GHz	-----	-3.32 dB
			66.0°
			55.0°
			58.1°
			47.1°
			50.1°
			40.1°
			-80.8°
			-84.8°
			-88.8°
			-90.8°
			-79.7°
			-82.7°



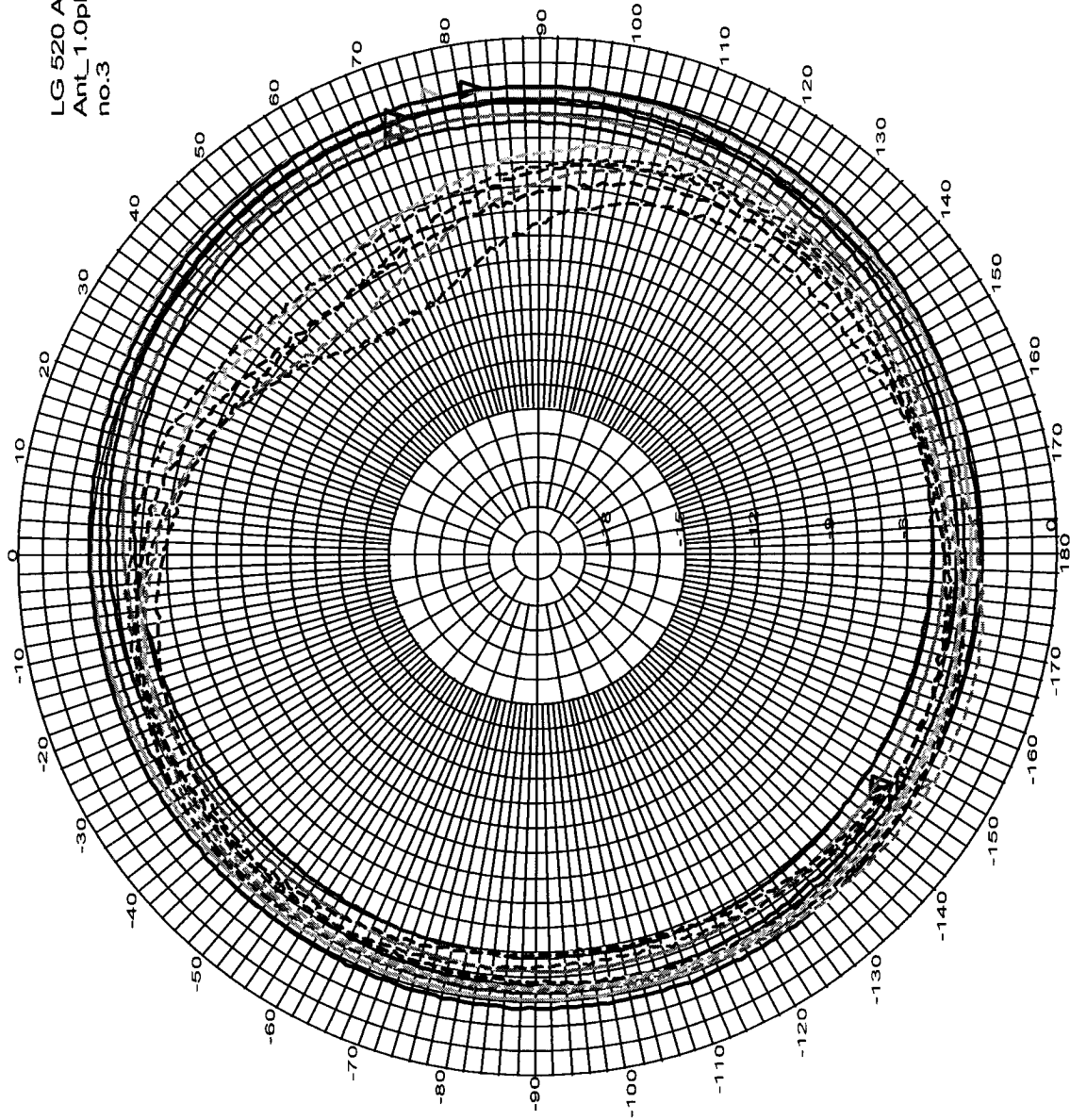
Magnitude (dB) vs. A (Deg)

LG 520 Amps / Am PCS , FS H ext open
Ant_1.0pF shunt_1.8nH ser_10nH shunt_feed
no.3

File: FSHEXTO.DAT
Date: 02-Feb-01
Time: 15:04
Operator: TYB
Ser. no.:
Channel: chA Tx pol: Horiz. Rx: Horiz.
Frequency : See Legend

Calibration status:
File: FSHEXTO.DAT
Table: Cal1
Chan.: chA
Units: dBd

Overlays			
Freq:	0.824 GHz	-3.36 dB	72.0°
Freq:	0.836 GHz	-3.03 dB	73.0°
Freq:	0.849 GHz	-2.53 dB	72.9°
Freq:	0.869 GHz	-2.02 dB	77.9°
Freq:	0.881 GHz	-2.46 dB	72.9°
Freq:	0.894 GHz	-1.98 dB	82.9°
Freq:	1.850 GHz	-3.17 dB	-149.2°
Freq:	1.880 GHz	-2.52 dB	-150.2°
Freq:	1.910 GHz	-2.92 dB	-146.2°
Freq:	1.930 GHz	-3.08 dB	-136.2°
Freq:	1.960 GHz	-3.86 dB	-146.3°
Freq:	1.990 GHz	-3.94 dB	-147.3°



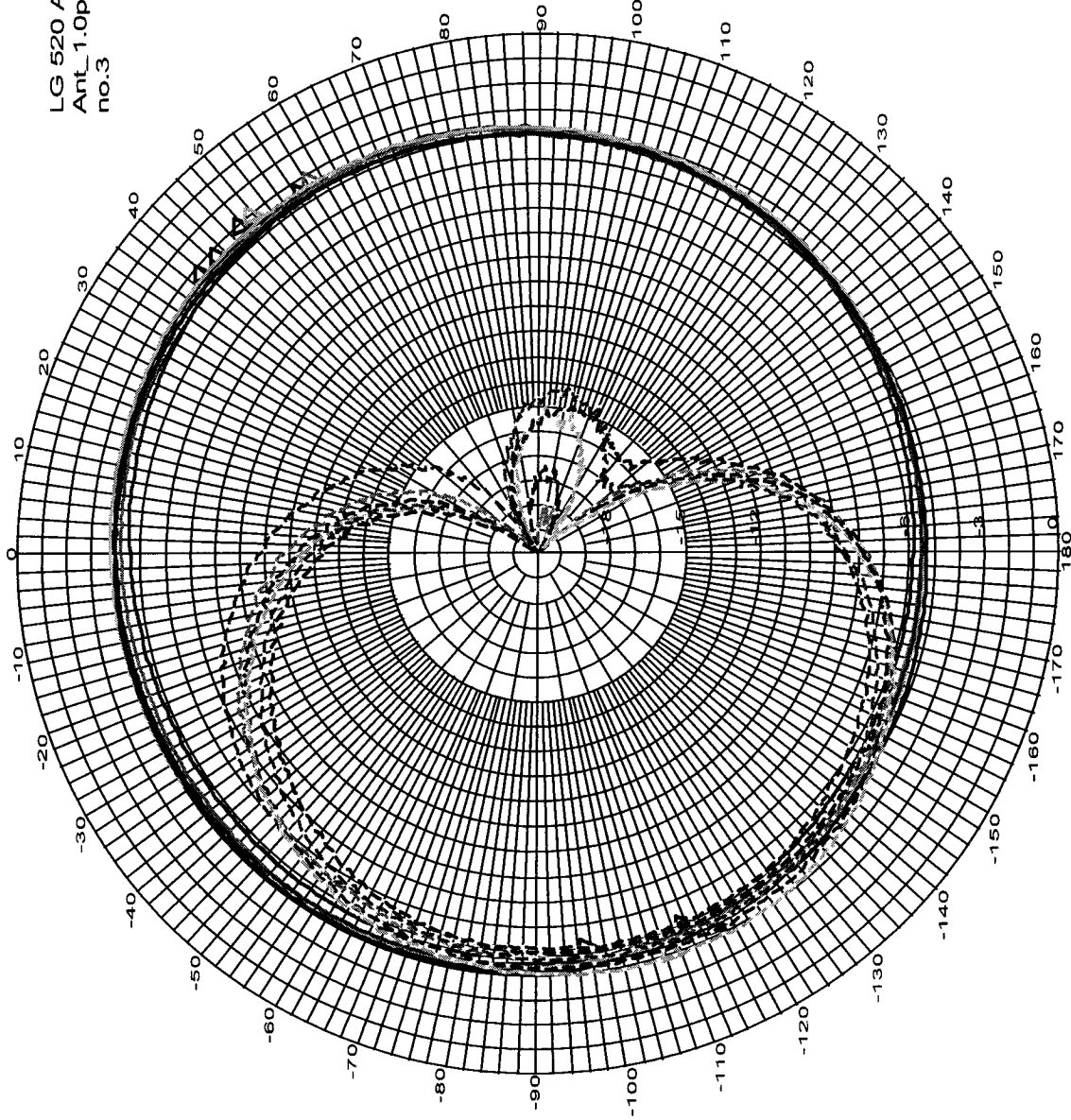
Magnitude (dB) vs. A (Deg)

LG 520 Amps / Am PCS , FS H ret closed
Ant_1.0pF shunt_1.8nH ser_10nH shunt_feed
no.3

File: FSHRET.DAT
Date: 02-Feb-01
Time: 14:54
Operator: TYB
Ser. no.:
Channel: chA Tx pol: Horiz. Rx: Horiz.
Frequency : See Legend

Calibration status:
File: FSHRET.DAT
Table: Cal1
Chan.: chA
Units: dBd

Overlays			
Freq:	0.824 GHz	---	-3.85 dB 58.0°
Freq:	0.836 GHz	---	-3.65 dB 60.0°
Freq:	0.849 GHz	---	-3.50 dB 48.9°
Freq:	0.869 GHz	---	-3.47 dB 50.9°
Freq:	0.881 GHz	---	-3.78 dB 43.9°
Freq:	0.894 GHz	---	-3.79 dB 40.9°
Freq:	1.850 GHz	---	-4.94 dB -99.2°
Freq:	1.880 GHz	---	-4.50 dB -106.2°
Freq:	1.910 GHz	---	-4.13 dB -117.2°
Freq:	1.930 GHz	---	-3.86 dB -110.2°
Freq:	1.960 GHz	---	-4.46 dB -108.3°
Freq:	1.990 GHz	---	-4.78 dB -113.3°



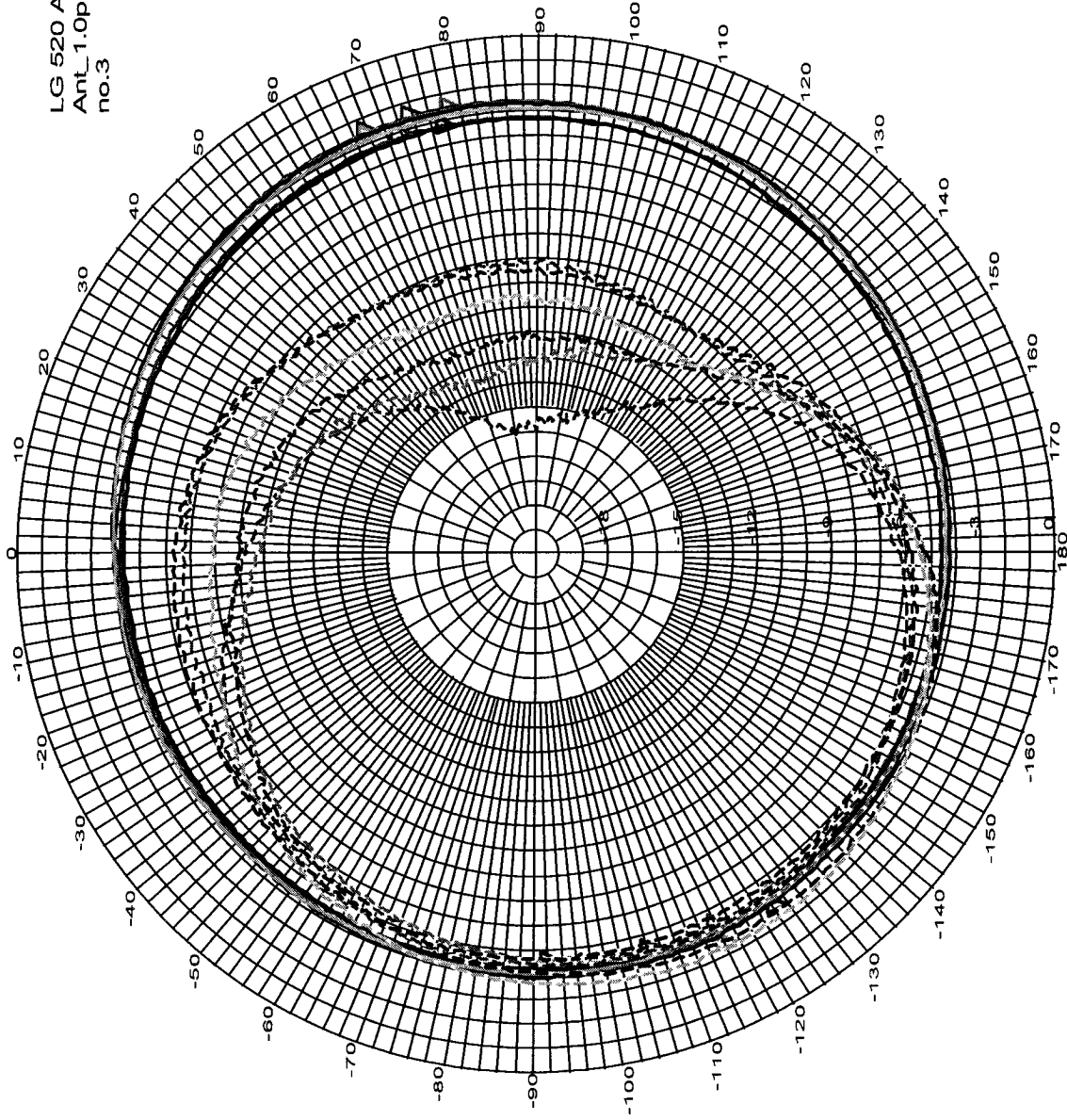
Magnitude (dB) vs. A (Deg)

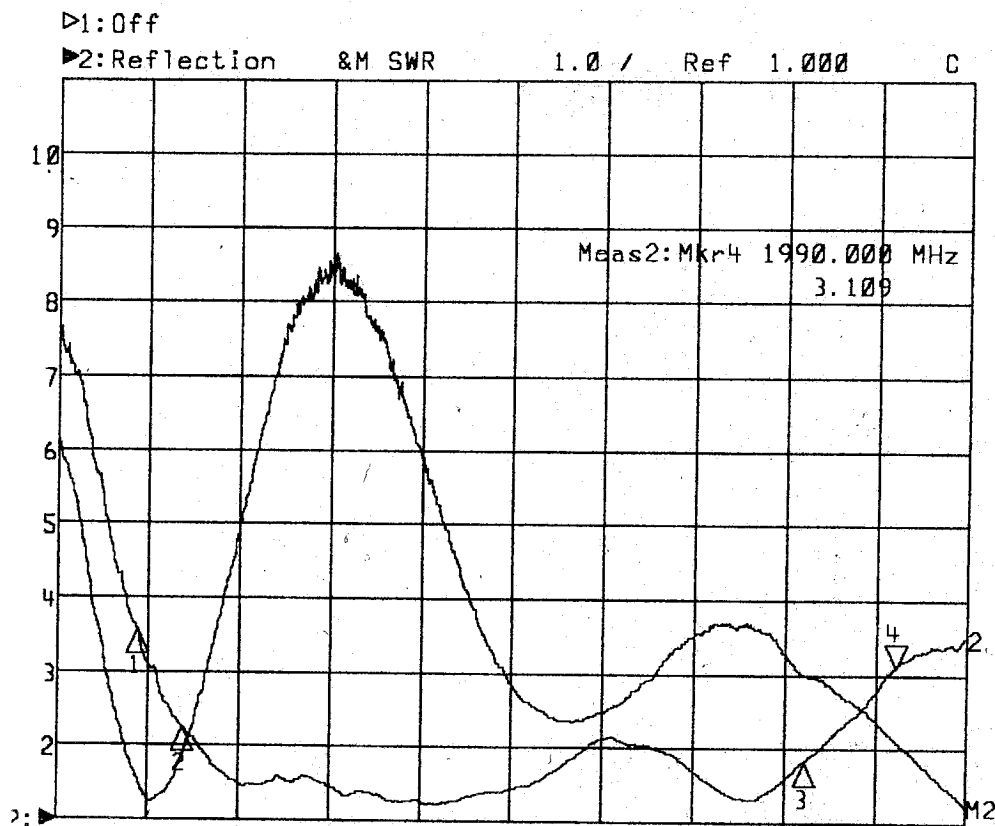
LG 520 Amps / Am PCS , FS H ret open
Ant_1.0pF shunt_1.8nH ser_10nH shunt_feed
no.3

File: FSHRETO.DAT
Date: 02-Feb-01
Time: 14:59
Operator: TYB
Ser. no.:
Channel: chA Tx pol: Horiz. Rx: Horiz.
Frequency : See Legend

Calibration status:
File: FSHRETO.DAT
Table: Cal1
Chan.: chA
Units: dBd

Overlays			
Freq:	0.824 GHz	-----	-2.64 dB 75.0°
Freq:	0.836 GHz	-----	-2.67 dB 80.0°
Freq:	0.849 GHz	-----	-2.73 dB 69.1°
Freq:	0.869 GHz	-----	-2.90 dB 69.1°
Freq:	0.881 GHz	-----	-3.29 dB 73.1°
Freq:	0.894 GHz	-----	-3.39 dB 79.1°
Freq:	1.850 GHz	-----	-4.31 dB -107.8°
Freq:	1.880 GHz	-----	-4.05 dB -126.8°
Freq:	1.910 GHz	-----	-3.52 dB -125.8°
Freq:	1.930 GHz	-----	-3.25 dB -117.8°
Freq:	1.960 GHz	-----	-4.16 dB -117.7°
Freq:	1.990 GHz	-----	-4.56 dB -93.7°





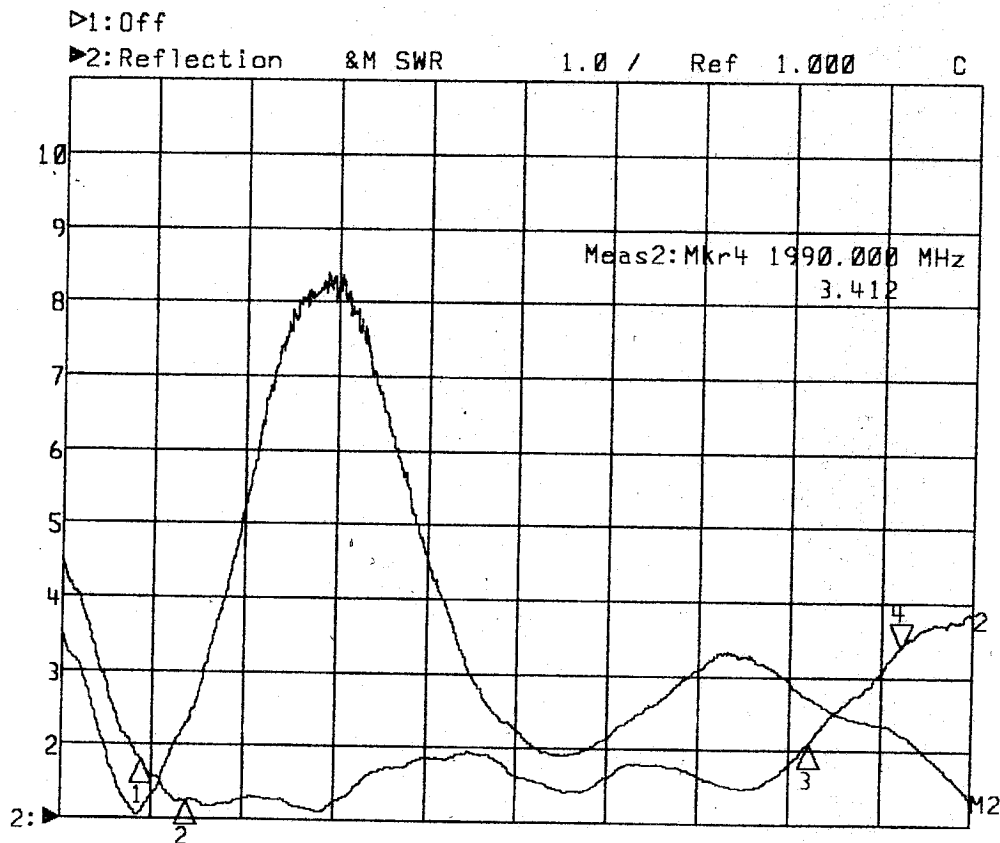
Start 700.000 MHz			Stop 2 100.000 MHz	
1:Mkr (MHz)	Ohm	Ohm	2:Mkr (MHz)	
			1:	824.0000 3.567
			2:	894.0000 2.248
			3:	1850.0000 1.832
			4:	1990.0000 3.109

LG DBS20 closed F.S.

Matching Ant 1,0pF sh - 1,8nHse - 10nHsh

Trace = Extended

Memory = Retracted



Start 700.000 MHz			Stop 2 1000.000 MHz	
1: Mkr (MHz)	Ohm	Ohm	2: Mkr (MHz)	
			1:	824.0000 1.802
			2:	894.0000 1.247
			3:	1850.0000 2.097
			4:	1990.0000 3.412

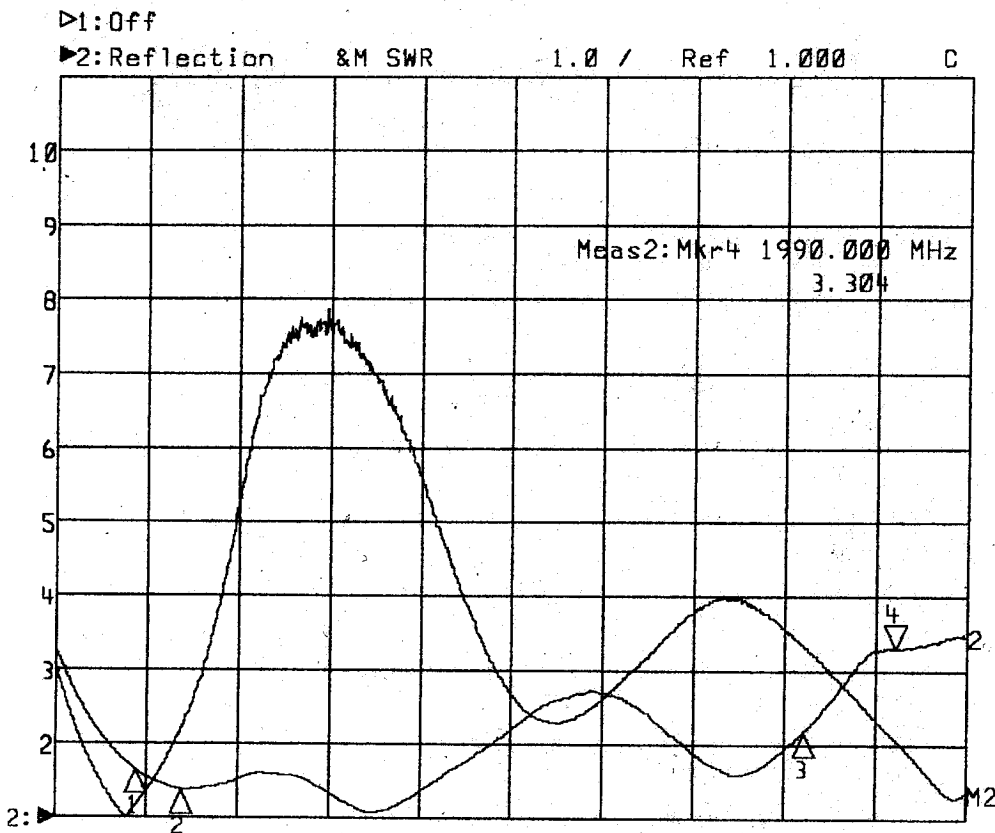
LG DB520

Open F.S.

Matching Ant 1,0pF sh - 1,8nHse - 10nHsh

Trace = Extended

Memory = Retracted



Start 700.000 MHz			Stop 2 100.000 MHz	
1: Mkr (MHz)	Ohm	Ohm	2: Mkr (MHz)	
			1:	824.0000 1.653
			2:	894.0000 1.386
			3:	1850.0000 2.187
			4:	1990.0000 3.304

LG DB 520

open T.P.

Matching Ant 1,0pF sh - 1,8nH se - 10nH sh

Trace = Extended

Memory = Retracted