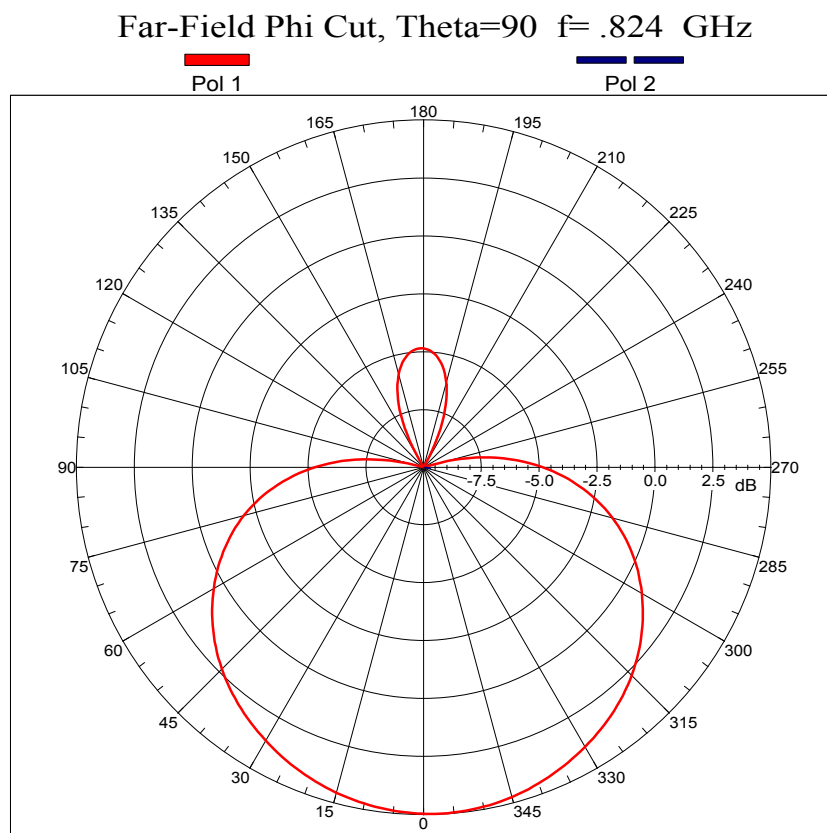


Data for:	C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
Title:	Heatshrink wrapped PIFA antenna installed in ABB wattour meter and in meter box. Production antenna, test for pattern and efficiency.
Data Collected on:	11/6/2002 10:59:48 AM
Number of Beams:	4
Measurement MRE:	15.000
NF Data Spacing:	Theta: 10.000, Phi: 10.000, Theta Span: 180.0, Phi Span: 360.0
S11 Data File:	N/A - S11 not backed out - results are terminal gains
Calibration File:	C:\NSI2000\SCRIPT\NF\WR975\AMPS\AmpsdBiCal.csv : 9/19/2002 10:36:36 AM
Operator:	Randy
NSI Software Version:	3.0.0.65
Report Generator Version:	Version 7.0, March 19, 2002

Gain Plots

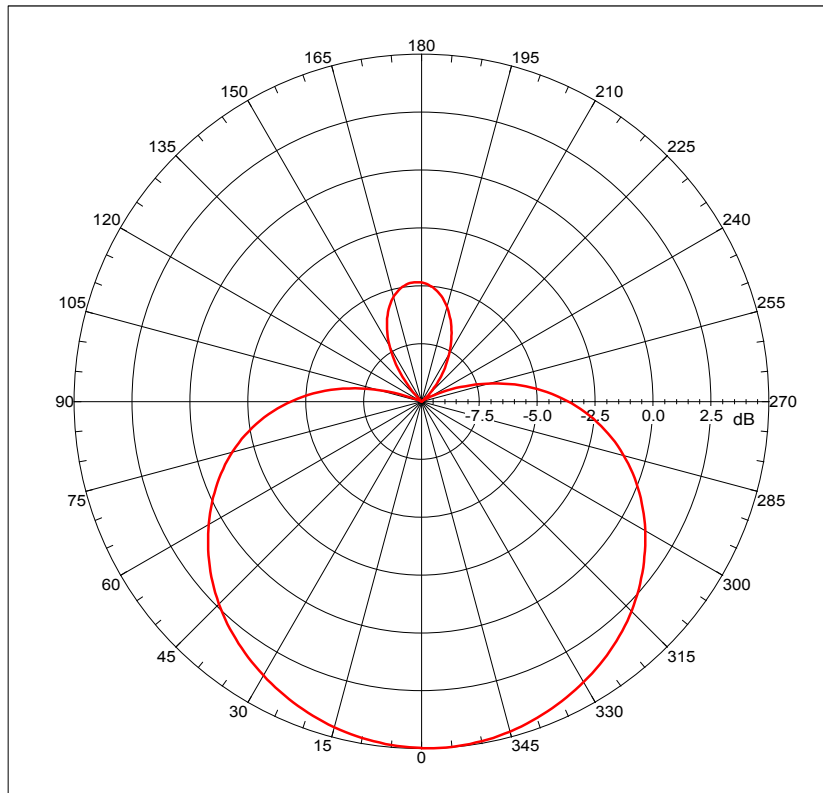


Far-Field Phi Cut, Theta=90 f= .824 GHz

Heatshrink wrapped PIFA antenna installed in ABB wattour meter and in meter box. Production antenna, test for pattern and efficiency.
Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
11/6/2002 10:59:48 AM
Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = 4.969dBi at 357 degrees
Ave Pol 1 = -0.170dBi
Max Pol 2 = -9.695dBi at 277 degrees
Ave Pol 2 = -12.919dBi
3dB Beam Width Pol 1= 102 degrees
3dB Beam Width Pol 2=108 degrees

Far-Field Pwr Sum Phi Cut, Theta=90 f= .824 GHz

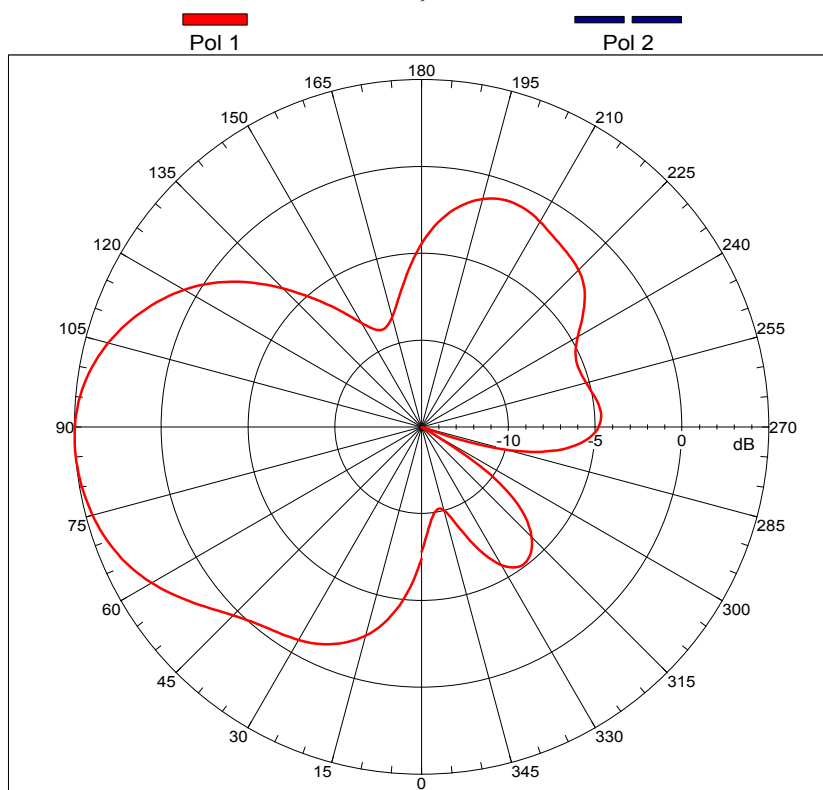


Far-Field Pwr Sum Phi Cut, Theta=90 f= .824 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = 4.975dBi at 357 degrees
 Ave = 0.055dBi
 3dB Beam Width = 103 degrees

Far-Field Theta Cut, Phi=0 f= .824 GHz

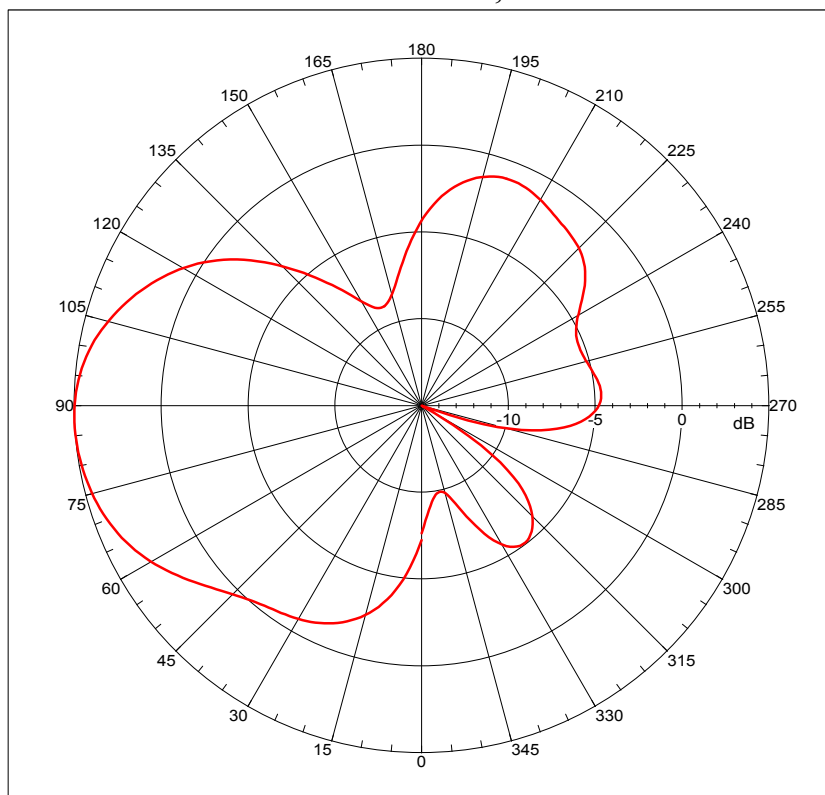


Far-Field Theta Cut, Phi=0 f= .824 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = 4.992dBi at 87 degrees
 Ave Pol 1 = -1.021dBi
 Max Pol 2 = -18.521dBi at 123 degrees
 Ave Pol 2 = -23.602dBi
 3dB Beam Width Pol 1= 61 degrees
 3dB Beam Width Pol 2=21 degrees

Far-Field Pwr Sum Theta Cut, Phi=0 f= .824 GHz

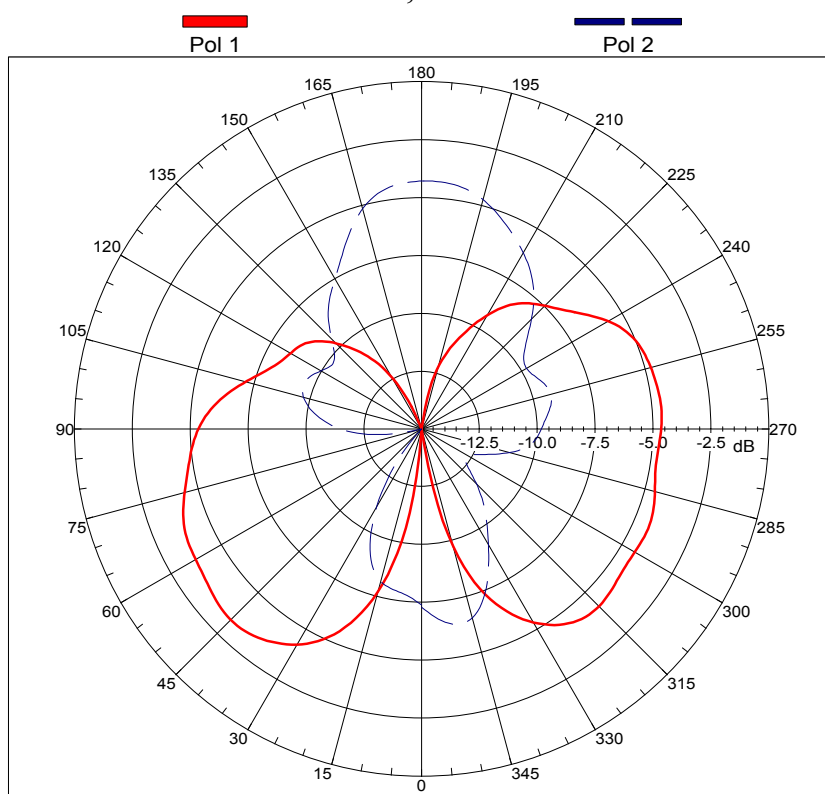


Far-Field Pwr Sum Theta Cut, Phi=0 f= .824 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = 4.998dBi at 87 degrees
 Ave = -0.998dBi
 3dB Beam Width = 61 degrees

Far-Field Theta Cut, Phi=90 f= .824 GHz

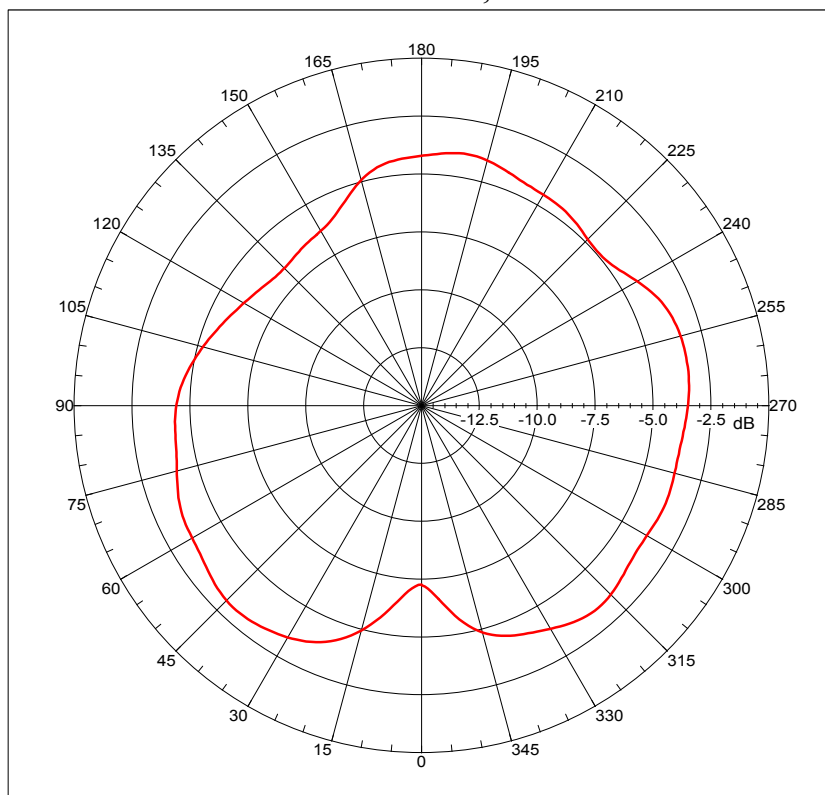


Far-Field Theta Cut, Phi=90 f= .824 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = -3.344dBi at 45 degrees
 Ave Pol 1 = -6.483dBi
 Max Pol 2 = -4.296dBi at 181 degrees
 Ave Pol 2 = -8.584dBi
 3dB Beam Width Pol 1= 80 degrees
 3dB Beam Width Pol 2=68 degrees

Far-Field Pwr Sum Theta Cut, Phi=90 f= .824 GHz

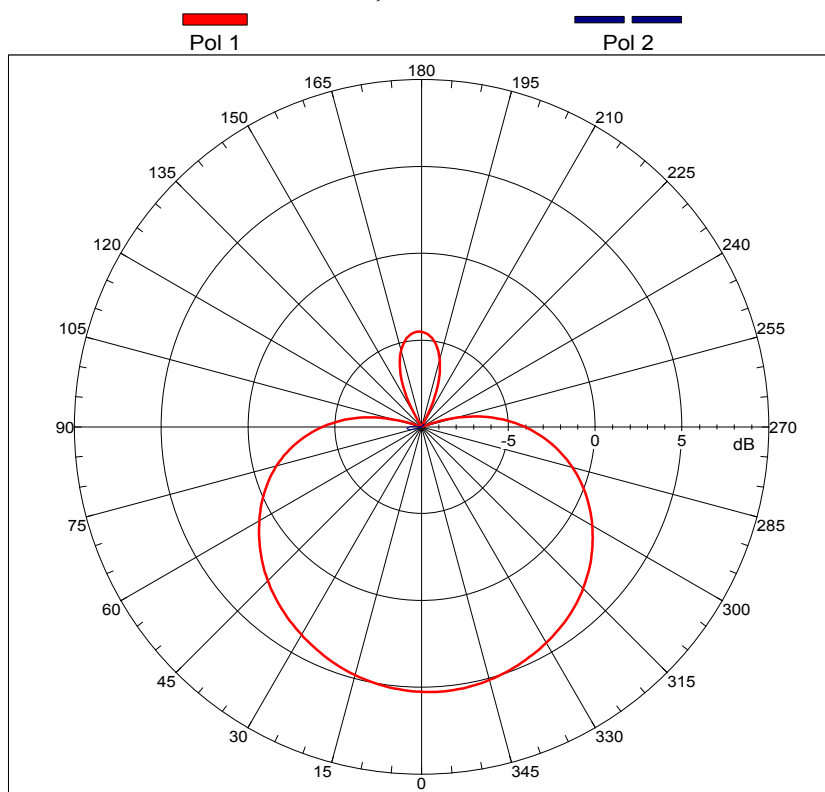


Far-Field Pwr Sum Theta Cut, Phi=90 f= .824 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = -3.076dBi at 43 degrees
 Ave = -4.398dBi
 3dB Beam Width = 110 degrees

Far-Field Phi Cut, Theta=90 f= .849 GHz

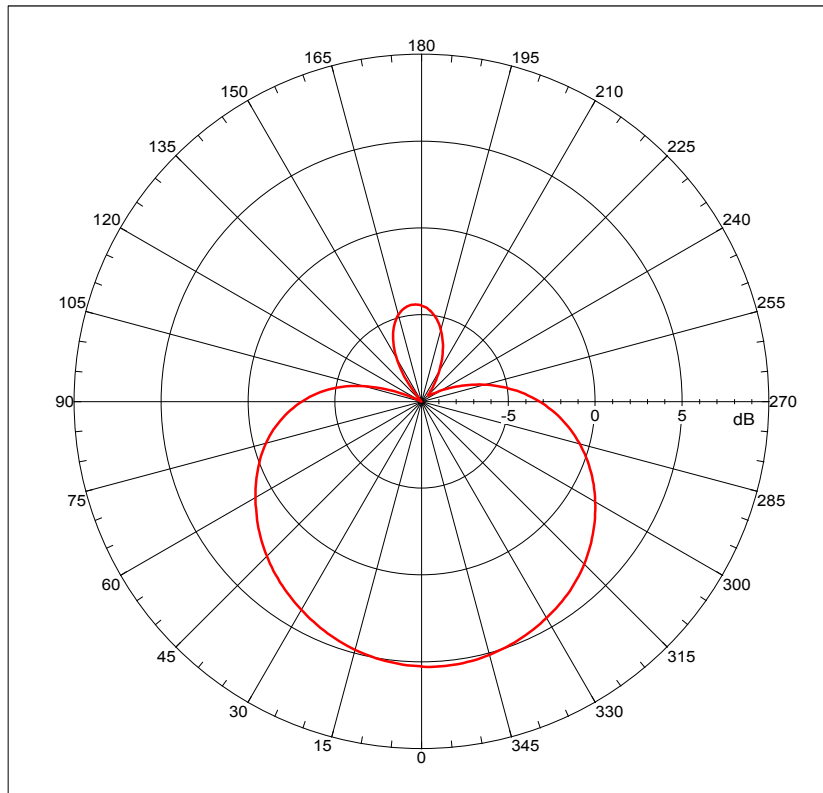


Far-Field Phi Cut, Theta=90 f= .849 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = 5.276dBi at 355 degrees
 Ave Pol 1 = 0.186dBi
 Max Pol 2 = -9.157dBi at 83 degrees
 Ave Pol 2 = -12.591dBi
 3dB Beam Width Pol 1= 102 degrees
 3dB Beam Width Pol 2=54 degrees

Far-Field Pwr Sum Phi Cut, Theta=90 f= .849 GHz

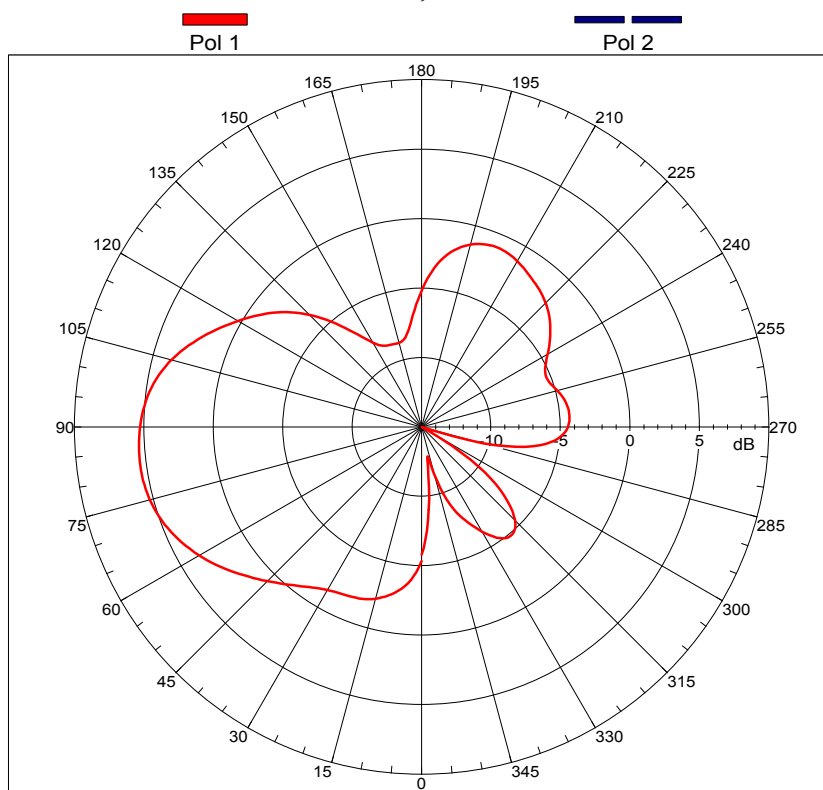


Far-Field Pwr Sum Phi Cut, Theta=90 f= .849 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = 5.282dBi at 355 degrees
 Ave = 0.409dBi
 3dB Beam Width = 104 degrees

Far-Field Theta Cut, Phi=0 f= .849 GHz

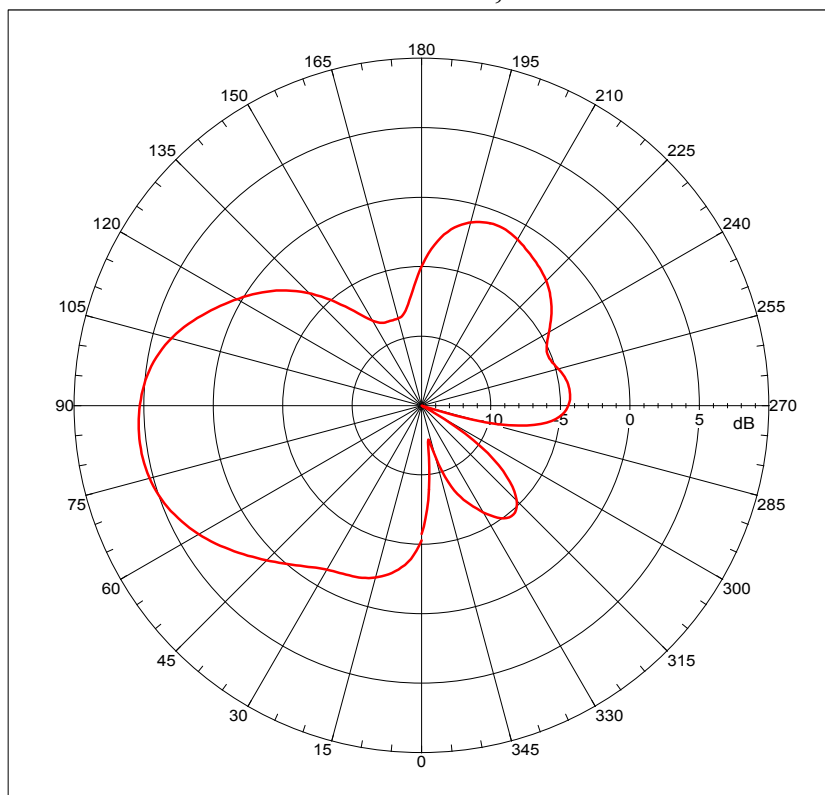


Far-Field Theta Cut, Phi=0 f= .849 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = 5.434dBi at 82 degrees
 Ave Pol 1 = -0.823dBi
 Max Pol 2 = -17.427dBi at 39 degrees
 Ave Pol 2 = -21.462dBi
 3dB Beam Width Pol 1= 57 degrees
 3dB Beam Width Pol 2=51 degrees

Far-Field Pwr Sum Theta Cut, Phi=0 f= .849 GHz

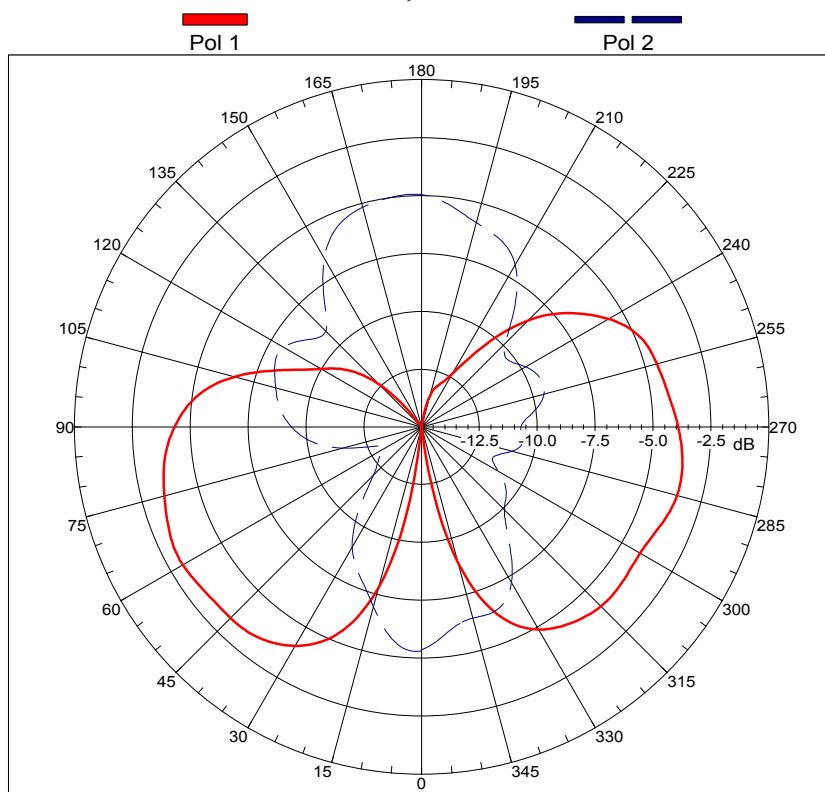


Far-Field Pwr Sum Theta Cut, Phi=0 f= .849 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
11/6/2002 10:59:48 AM
Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = 5.440dBi at 82 degrees
Ave = -0.786dBi
3dB Beam Width = 58 degrees

Far-Field Theta Cut, Phi=90 f= .849 GHz

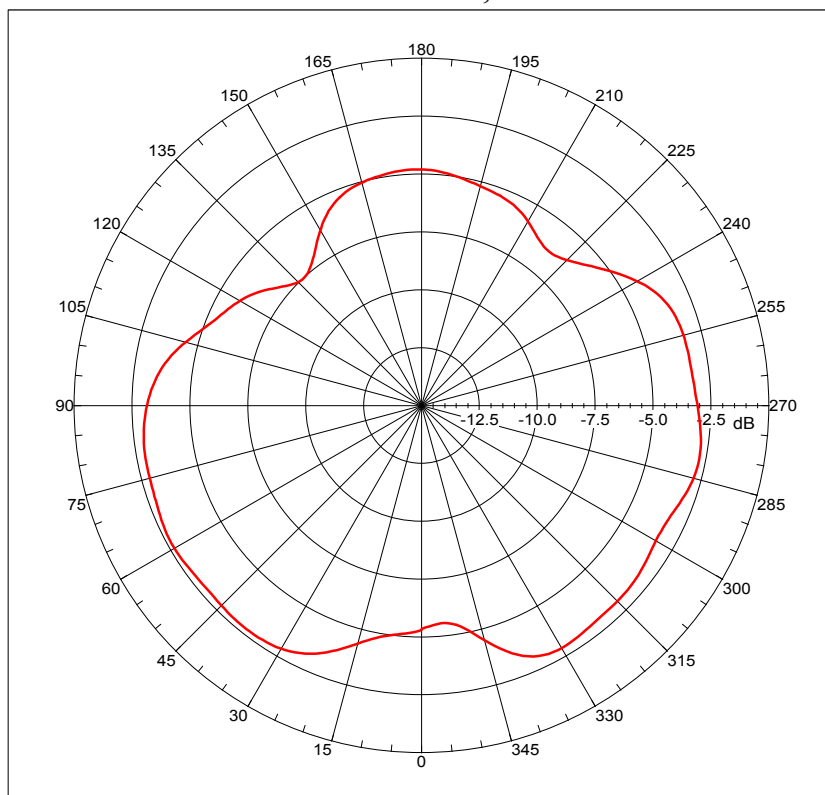


Far-Field Theta Cut, Phi=90 f= .849 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
11/6/2002 10:59:48 AM
Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = -3.088dBi at 61 degrees
Ave Pol 1 = -6.262dBi
Max Pol 2 = -4.948dBi at 177 degrees
Ave Pol 2 = -8.098dBi
3dB Beam Width Pol 1= 84 degrees
3dB Beam Width Pol 2=73 degrees

Far-Field Pwr Sum Theta Cut, Phi=90 f= .849 GHz

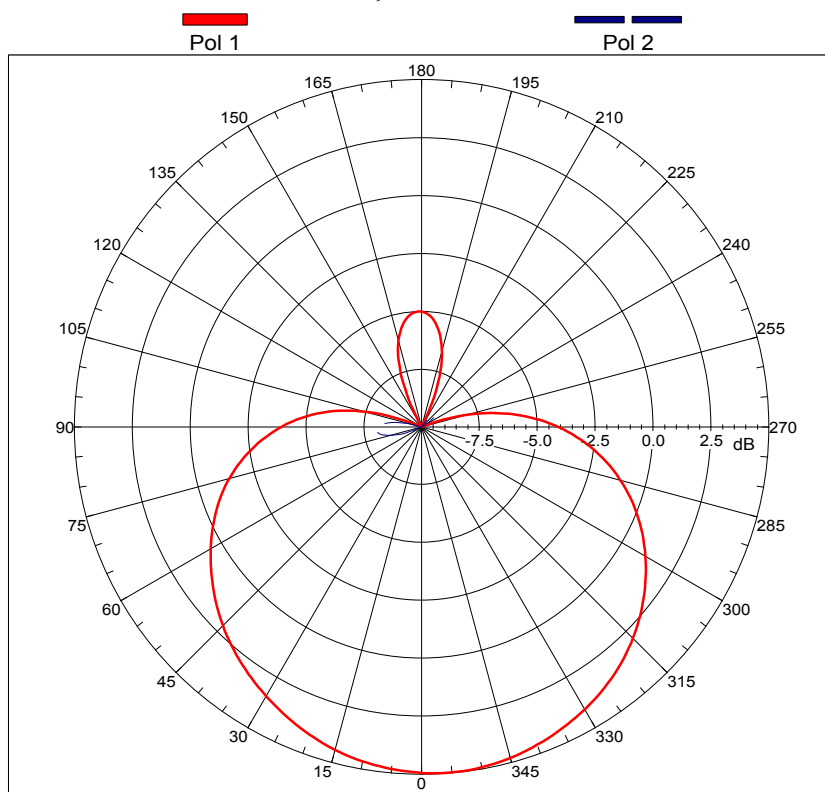


Far-Field Pwr Sum Theta Cut, Phi=90 f= .849 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = -2.676dBi at 61 degrees
 Ave = -4.073dBi
 3dB Beam Width = 249 degrees

Far-Field Phi Cut, Theta=90 f= .869 GHz

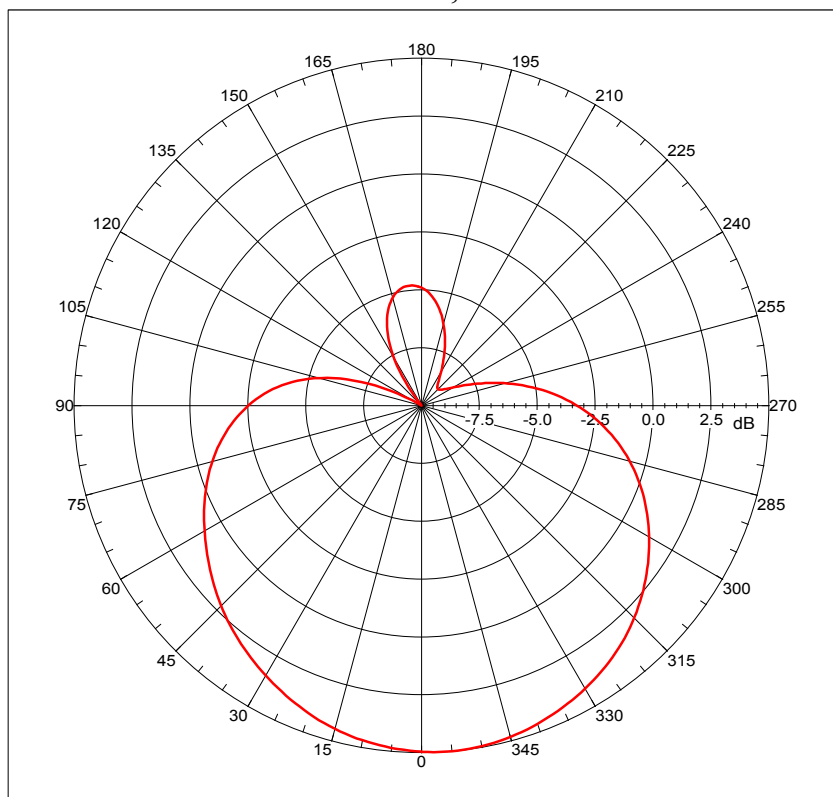


Far-Field Phi Cut, Theta=90 f= .869 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = 4.969dBi at 355 degrees
 Ave Pol 1 = -0.098dBi
 Max Pol 2 = -8.018dBi at 86 degrees
 Ave Pol 2 = -12.032dBi
 3dB Beam Width Pol 1= 102 degrees
 3dB Beam Width Pol 2=53 degrees

Far-Field Pwr Sum Phi Cut, Theta=90 f= .869 GHz

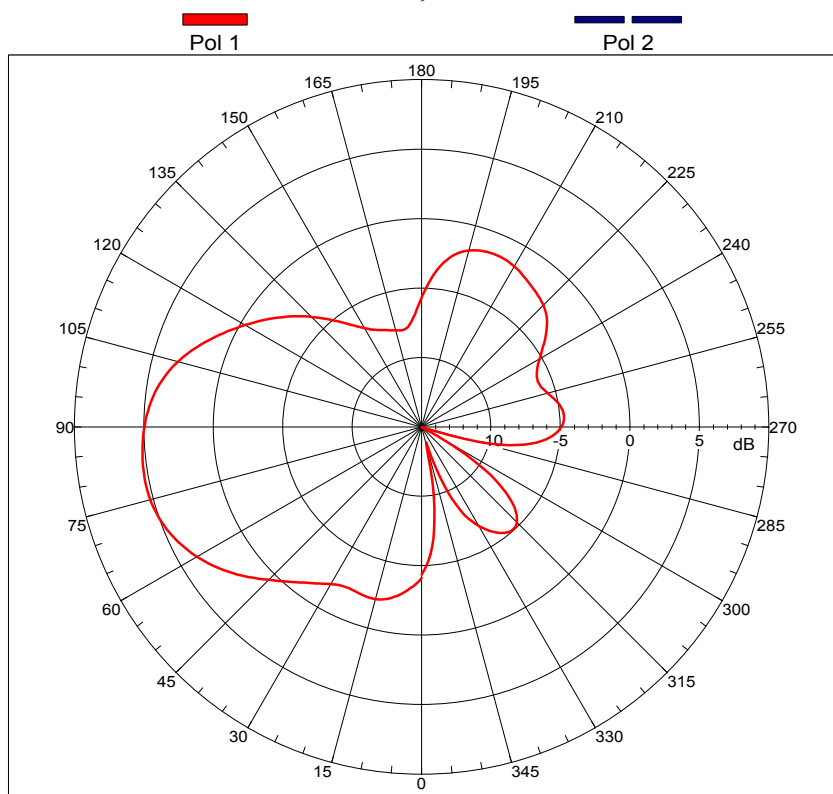


Far-Field Pwr Sum Phi Cut, Theta=90 f= .869 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = 4.982dBi at 355 degrees
 Ave = 0.172dBi
 3dB Beam Width = 104 degrees

Far-Field Theta Cut, Phi=0 f= .869 GHz

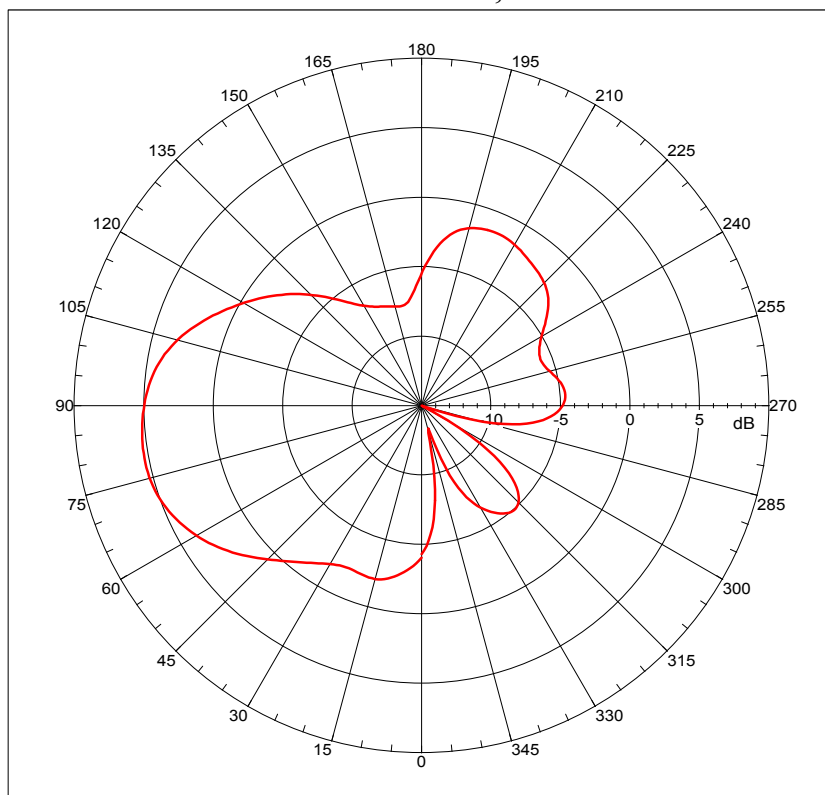


Far-Field Theta Cut, Phi=0 f= .869 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = 5.272dBi at 79 degrees
 Ave Pol 1 = -1.014dBi
 Max Pol 2 = -16.051dBi at 49 degrees
 Ave Pol 2 = -19.448dBi
 3dB Beam Width Pol 1= 57 degrees
 3dB Beam Width Pol 2=69 degrees

Far-Field Pwr Sum Theta Cut, Phi=0 f= .869 GHz

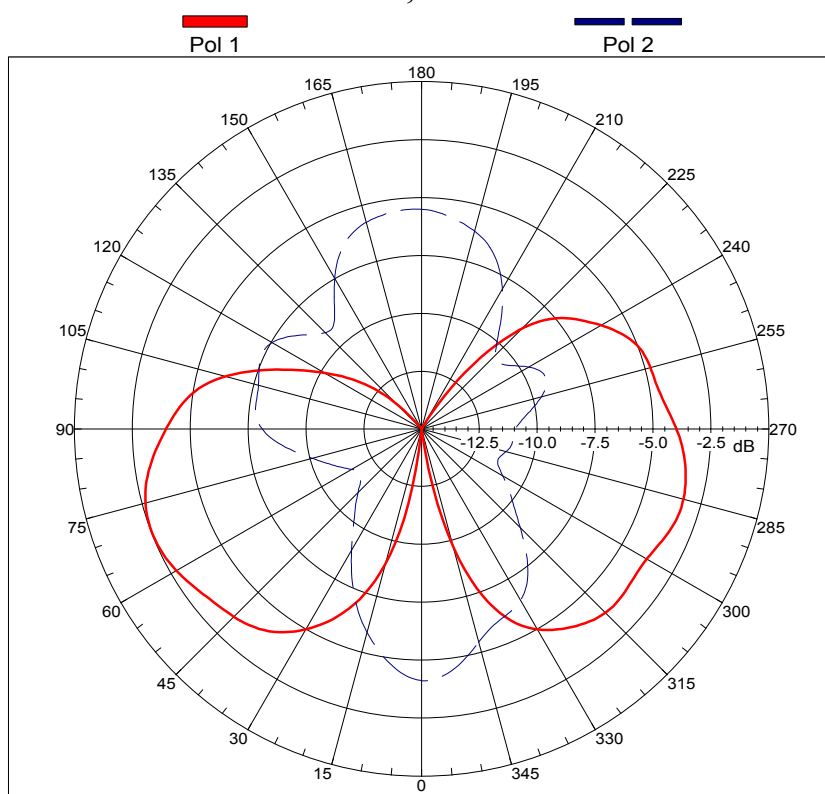


Far-Field Pwr Sum Theta Cut, Phi=0 f= .869 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = 5.293dBi at 79 degrees
 Ave = -0.952dBi
 3dB Beam Width = 57 degrees

Far-Field Theta Cut, Phi=90 f= .869 GHz

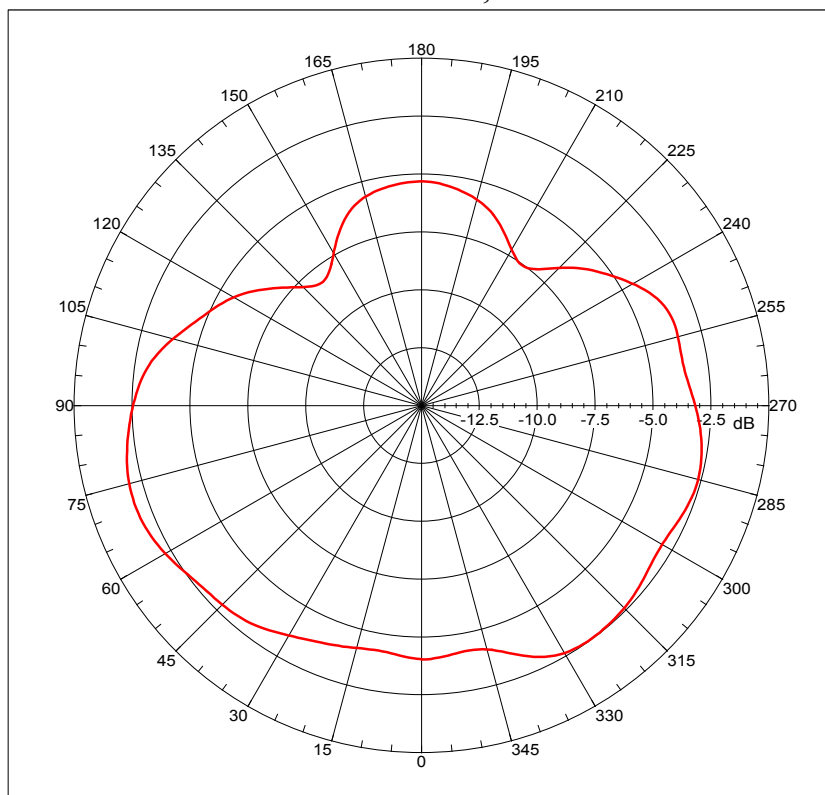


Far-Field Theta Cut, Phi=90 f= .869 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = -2.531dBi at 69 degrees
 Ave Pol 1 = -6.288dBi
 Max Pol 2 = -4.120dBi at 359 degrees
 Ave Pol 2 = -7.834dBi
 3dB Beam Width Pol 1= 76 degrees
 3dB Beam Width Pol 2=59 degrees

Far-Field Pwr Sum Theta Cut, Phi=90 f= .869 GHz

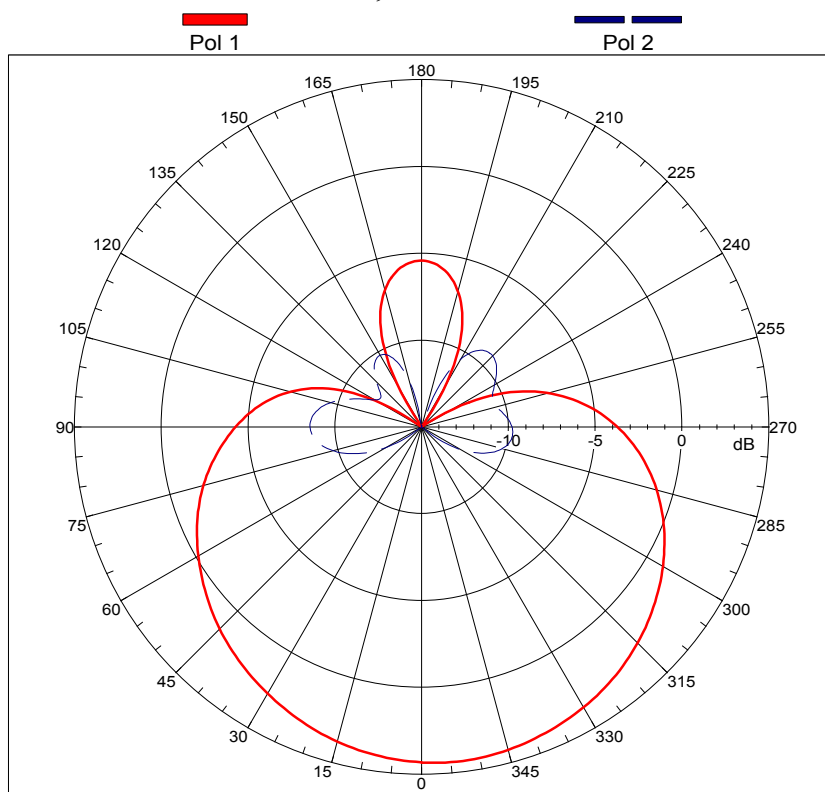


Far-Field Pwr Sum Theta Cut, Phi=90 f= .869 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = -1.908dBi at 71 degrees
 Ave = -3.982dBi
 3dB Beam Width = 237 degrees

Far-Field Phi Cut, Theta=90 f= .894 GHz

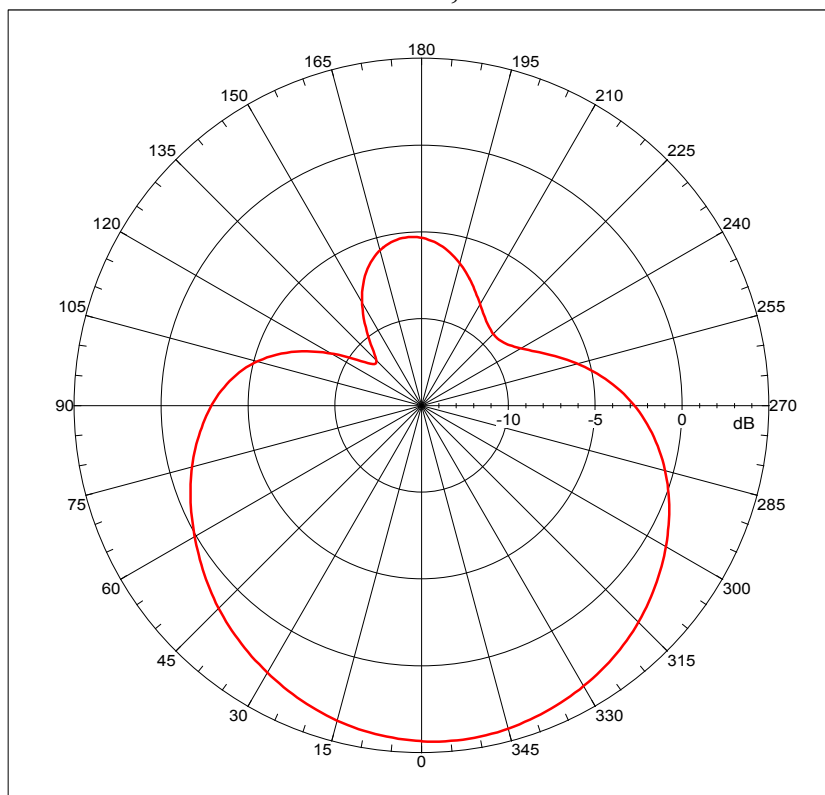


Far-Field Phi Cut, Theta=90 f= .894 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = 4.373dBi at 353 degrees
 Ave Pol 1 = -0.580dBi
 Max Pol 2 = -8.579dBi at 90 degrees
 Ave Pol 2 = -12.153dBi
 3dB Beam Width Pol 1= 104 degrees
 3dB Beam Width Pol 2=54 degrees

Far-Field Pwr Sum Phi Cut, Theta=90 f= .894 GHz

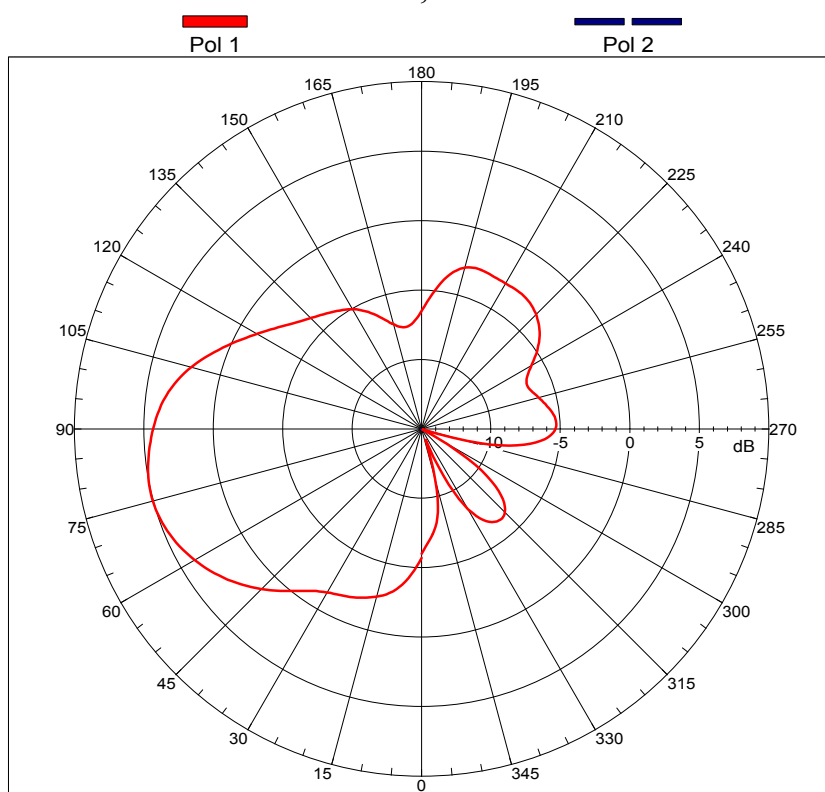


Far-Field Pwr Sum Phi Cut, Theta=90 f= .894 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = 4.385dBi at 353 degrees
 Ave = -0.288dBi
 3dB Beam Width = 107 degrees

Far-Field Theta Cut, Phi=0 f= .894 GHz

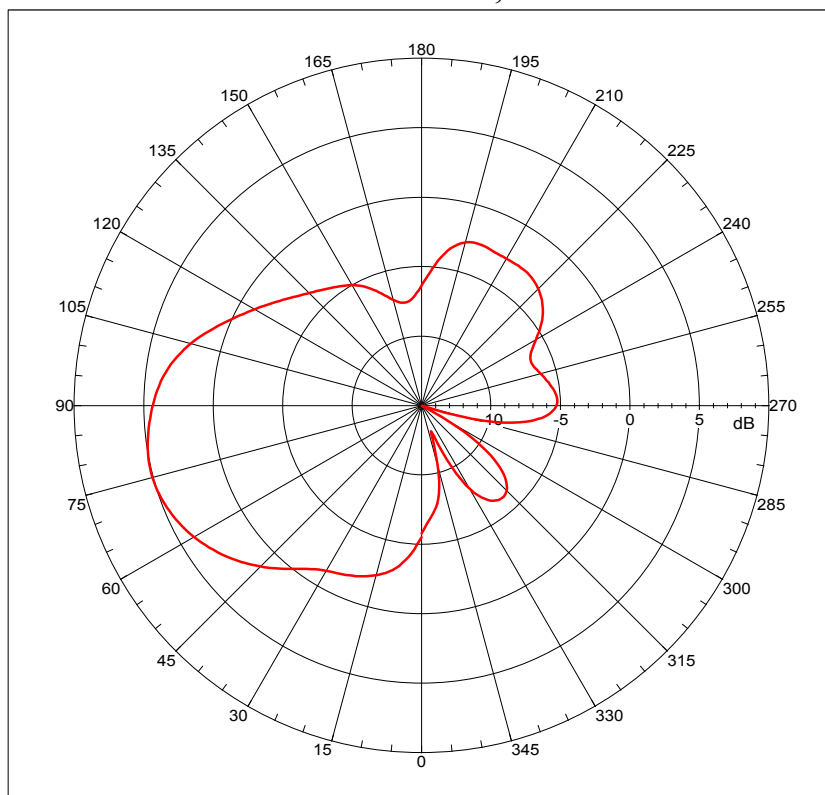


Far-Field Theta Cut, Phi=0 f= .894 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = 5.030dBi at 76 degrees
 Ave Pol 1 = -1.365dBi
 Max Pol 2 = -14.870dBi at 123 degrees
 Ave Pol 2 = -18.579dBi
 3dB Beam Width Pol 1= 58 degrees
 3dB Beam Width Pol 2=24 degrees

Far-Field Pwr Sum Theta Cut, Phi=0 f= .894 GHz

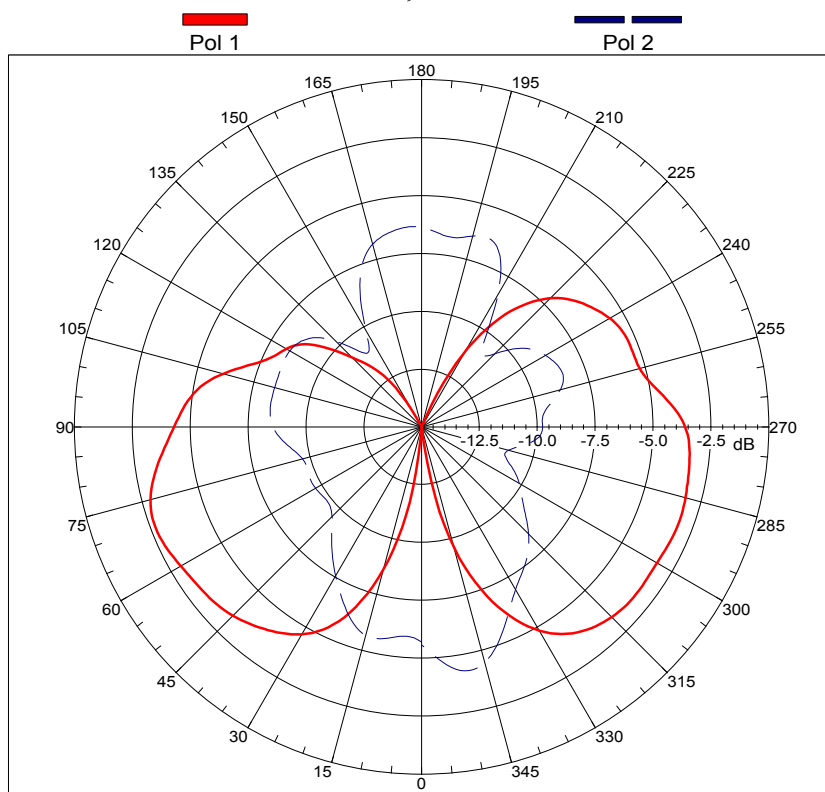


Far-Field Pwr Sum Theta Cut, Phi=0 f= .894 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = 5.050dBi at 76 degrees
 Ave = -1.284dBi
 3dB Beam Width = 58 degrees

Far-Field Theta Cut, Phi=90 f= .894 GHz

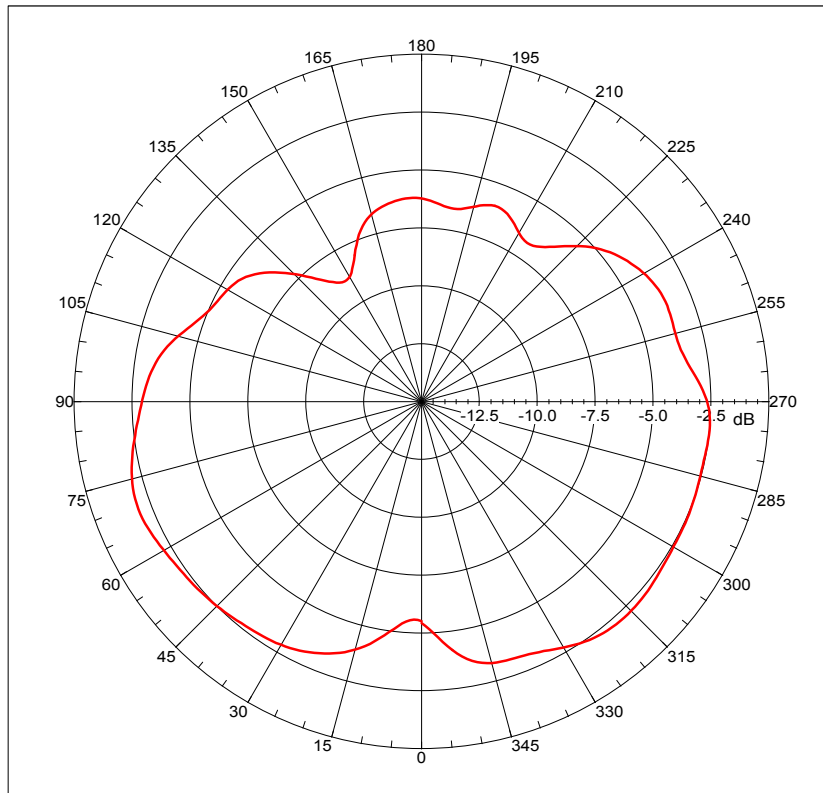


Far-Field Theta Cut, Phi=90 f= .894 GHz

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pol 1 = -2.717dBi at 69 degrees
 Ave Pol 1 = -6.040dBi
 Max Pol 2 = -4.281dBi at 348 degrees
 Ave Pol 2 = -7.980dBi
 3dB Beam Width Pol 1= 80 degrees
 3dB Beam Width Pol 2=63 degrees

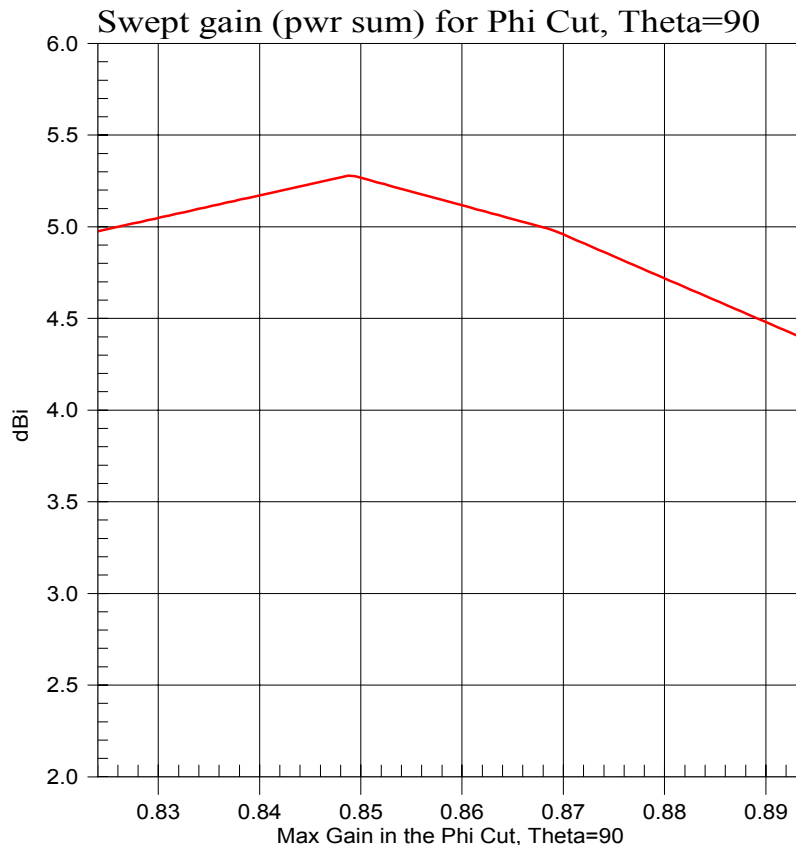
Far-Field Pwr Sum Theta Cut, Phi=90 f= .894 GHz



Far-Field Pwr Sum Theta Cut, Phi=90 f= .894 GHz

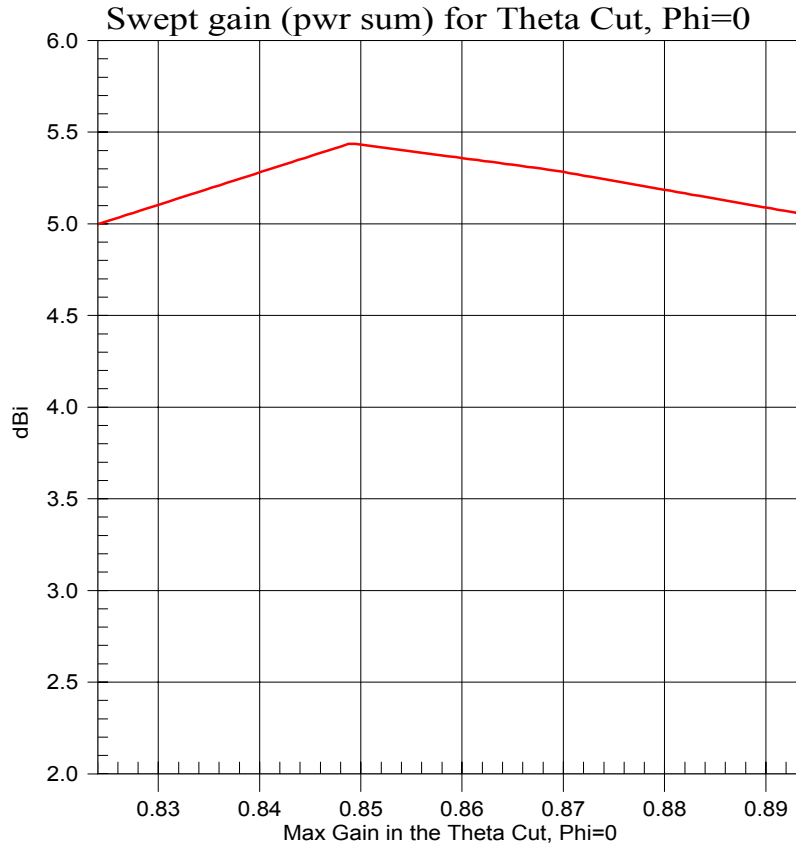
Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out

Max Pwr Sum = -1.930dBi at 69 degrees
 Ave = -3.892dBi
 3dB Beam Width = 104 degrees



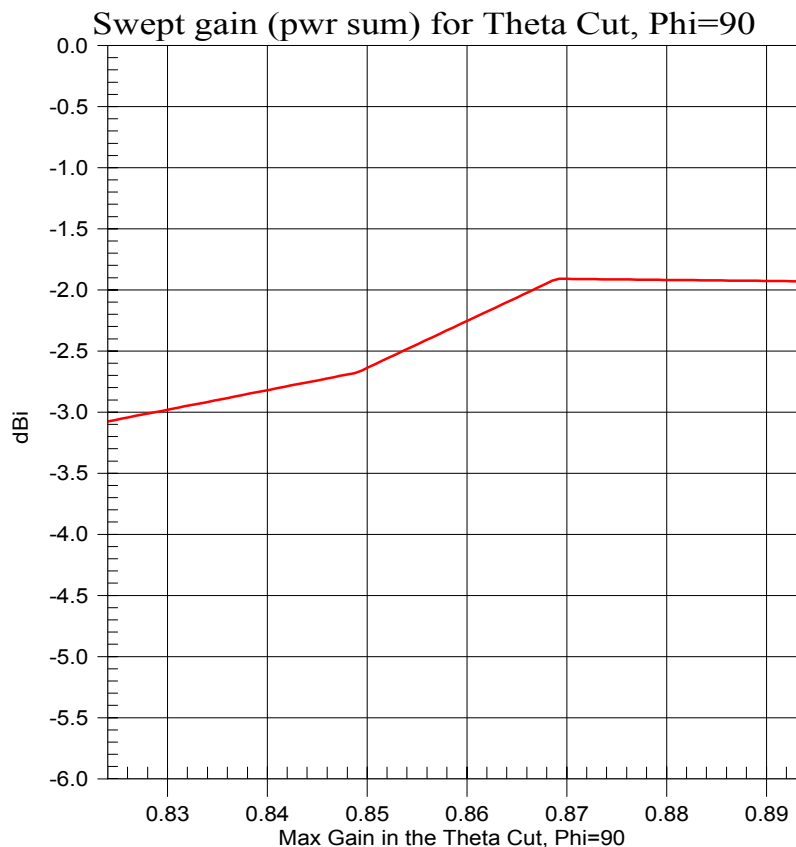
Swept gain (pwr sum) for Phi Cut, Theta=90

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out
 Average gain over this frequency range = 4.918dBi



Swept gain (pwr sum) for Theta Cut, Phi=0

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out
 Average gain over this frequency range = 5.199dBi



Swept gain (pwr sum) for Theta Cut, Phi=90

Heatshrink wrapped PIFA antenna installed in ABB watt-hour meter and in meter box. Production antenna, test for pattern and efficiency.
 Filename: C:\NSI2000\Data\R & D\ABB Wattmeter\Production PIFA\I_production PIFA_AMPS.nsi
 11/6/2002 10:59:48 AM
 Computed values are terminal gains - AUT S11 not backed out
 Average gain over this frequency range = -2.369dBi

Gain Summary for : Phi Cut, Theta=90

Frequency	Pwr Gn Peak (dBi)	Pwr Gn Ave (dBi)	Pol 1 Peak (dBi)	Pol1 Ave (dBi)	Pol2 Peak (dBi)	Pol2 Ave(dBi)
.824 GHz	4.975	0.055	4.969	-0.170	-9.695	-12.919
.849 GHz	5.282	0.409	5.276	0.186	-9.157	-12.591
.869 GHz	4.982	0.172	4.969	-0.098	-8.018	-12.032
.894 GHz	4.385	-0.288	4.373	-0.580	-8.579	-12.153

Gain Summary for : Theta Cut, Phi=0

Frequency	Pwr Gn Peak (dBi)	Pwr Gn Ave (dBi)	Pol 1 Peak (dBi)	Pol1 Ave (dBi)	Pol2 Peak (dBi)	Pol2 Ave(dBi)
.824 GHz	4.998	-0.998	4.992	-1.021	-18.521	-23.602
.849 GHz	5.440	-0.786	5.434	-0.823	-17.427	-21.462
.869 GHz	5.293	-0.952	5.272	-1.014	-16.051	-19.448
.894 GHz	5.050	-1.284	5.030	-1.365	-14.870	-18.579

Gain Summary for : Theta Cut, Phi=90

Frequency	Pwr Gn Peak (dBi)	Pwr Gn Ave (dBi)	Pol 1 Peak (dBi)	Pol1 Ave (dBi)	Pol2 Peak (dBi)	Pol2 Ave(dBi)
.824 GHz	-3.076	-4.398	-3.344	-6.483	-4.296	-8.584
.849 GHz	-2.676	-4.073	-3.088	-6.262	-4.948	-8.098
.869 GHz	-1.908	-3.982	-2.531	-6.288	-4.120	-7.834
.894 GHz	-1.930	-3.892	-2.717	-6.040	-4.281	-7.980