



UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Escola Superior d'Enginyeries Industrial,
Aeroespacial i Audiovisual de Terrassa

Disseny d'una Antena

Informe de progrès 1

Informe

Curs: Màster Universitari en Enginyeria Aeronàutica

Assignatura: Navegació Aèria

Data d'entrega: 23-05-2018

Estudiants:

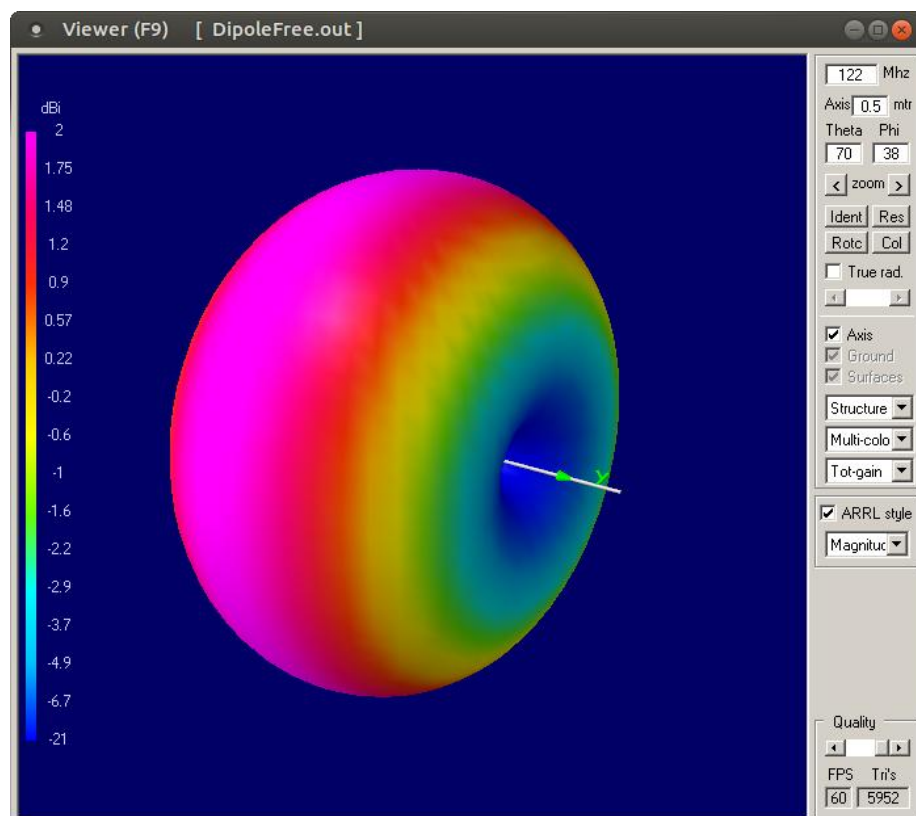
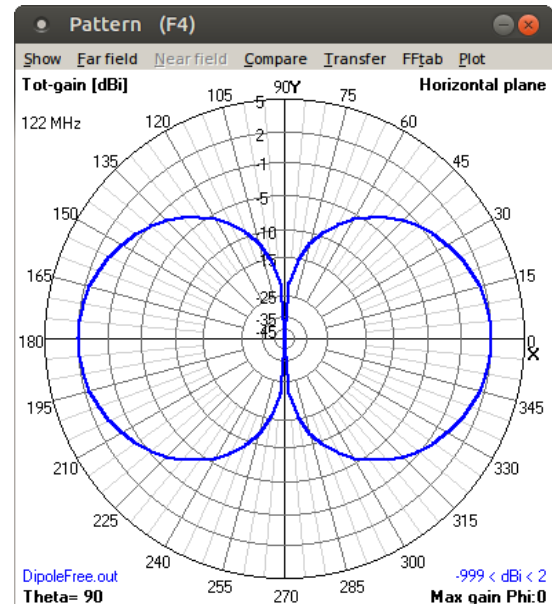
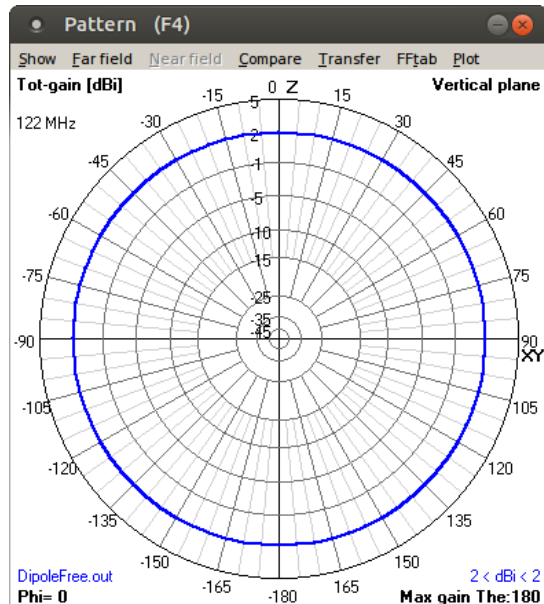
González García, Silvia

Naydenov, Boyan

Per cada una de les següents configuracions es treballa amb una freqüència de 122MHz doncs aquesta serà la freqüència central de la banda de la futur antenna a construir.

1. Antena dipol en $\lambda/2$ en espai lliure

Diagrama de radiació



Directivitat

$D = 2.17 \text{ dB}$

Impedància d'entrada de l'antena.

$Z_0 = 82.1 + j48.4 \text{ Ohms}$

Main [V5.8.16] (F2)

File Edit Settings Calculate Window Show Run Help

Filename: DipoleFree.out Frequency: 122 Mhz Wavelength: 2.457 mtr

Voltage: 105 + j 0 V Current: 0.95 - j 0.56 A

Impedance: 82.1 + j 48.4 Series comp.: 26.93 pF Parallel form: 111 // j 188 Parallel comp.: 6.956 pF

S.W.R.50: 2.41 Input power: 100 W Efficiency: 96.24 % Structure loss: 3.758 W Radiat-eff.: 96.17 % Network loss: 0 uW RDF [dB]: 2.17 Radiat-power: 96.24 W

Environment: ☐ Loads ☐ Polar

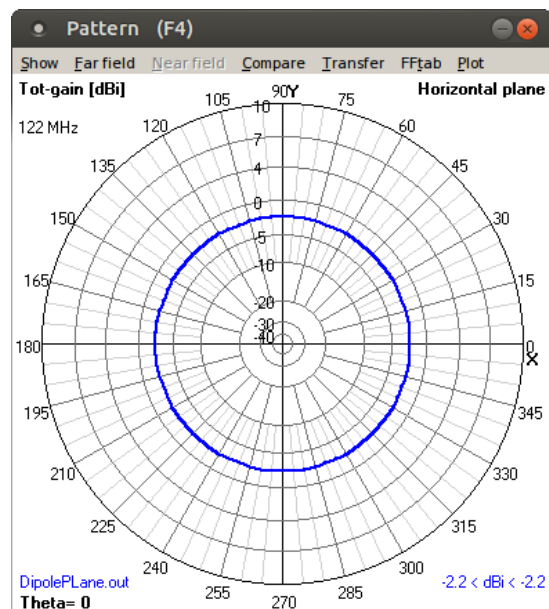
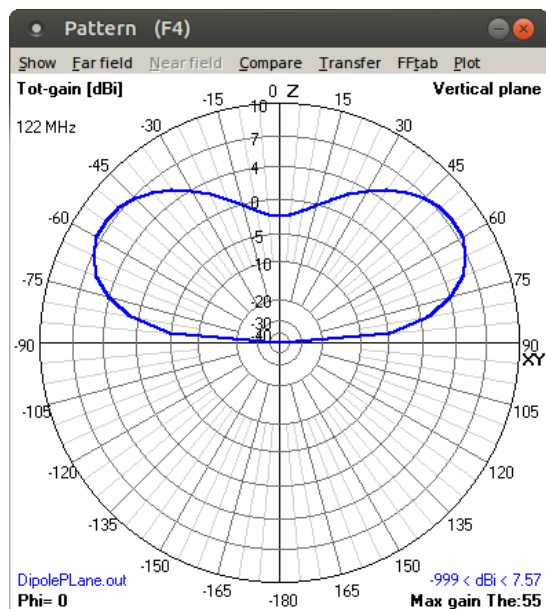
FREE SPACE

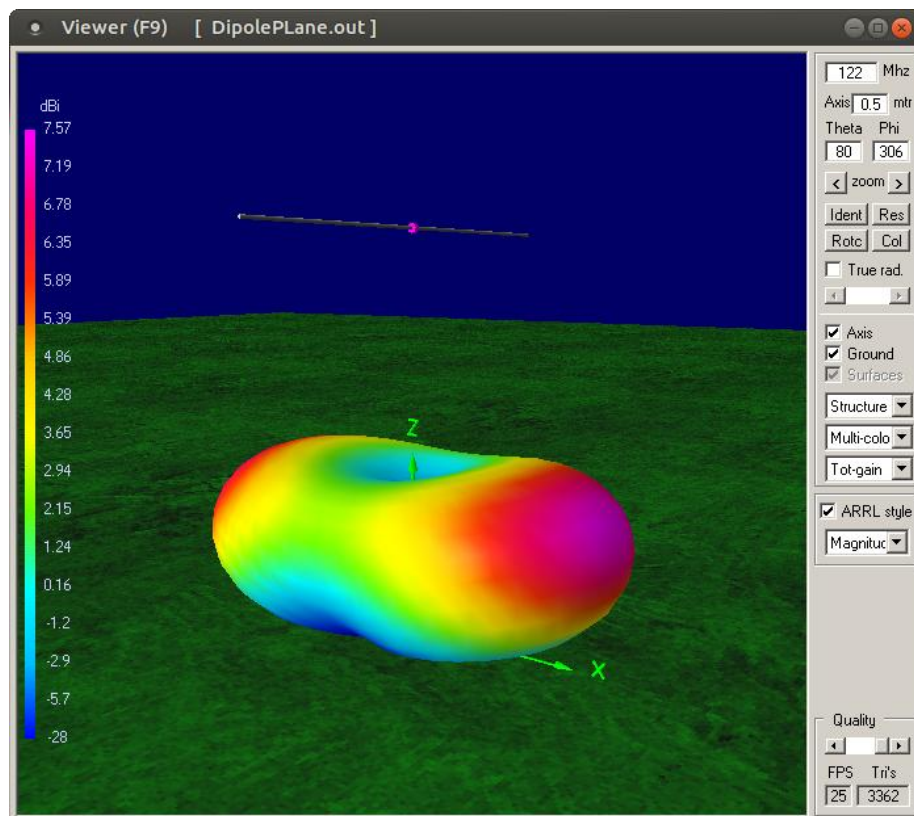
Comment:

Seg's/patches: 19 start: 180 stop: 180 count: 73 step: 5 Pattern lines: 5329 Theta: 0 Phi: 0 stop: 360 count: 73 step: 5 Freq/Eval steps: 1 Calculation time: 0.020 s

2. Antena dipol en $\lambda/2$ a una certa distància d'un pla conductor perfecte

Diagrama de radiació



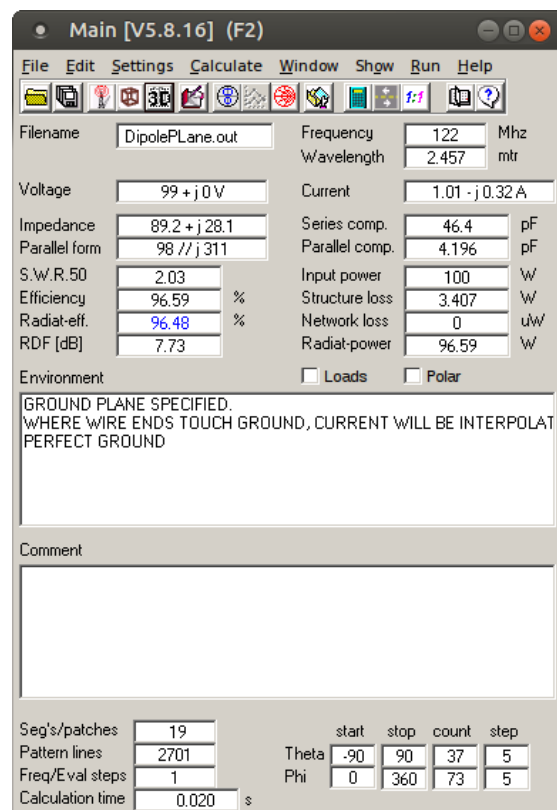


Directivitat

$D = 7.73 \text{ dB}$

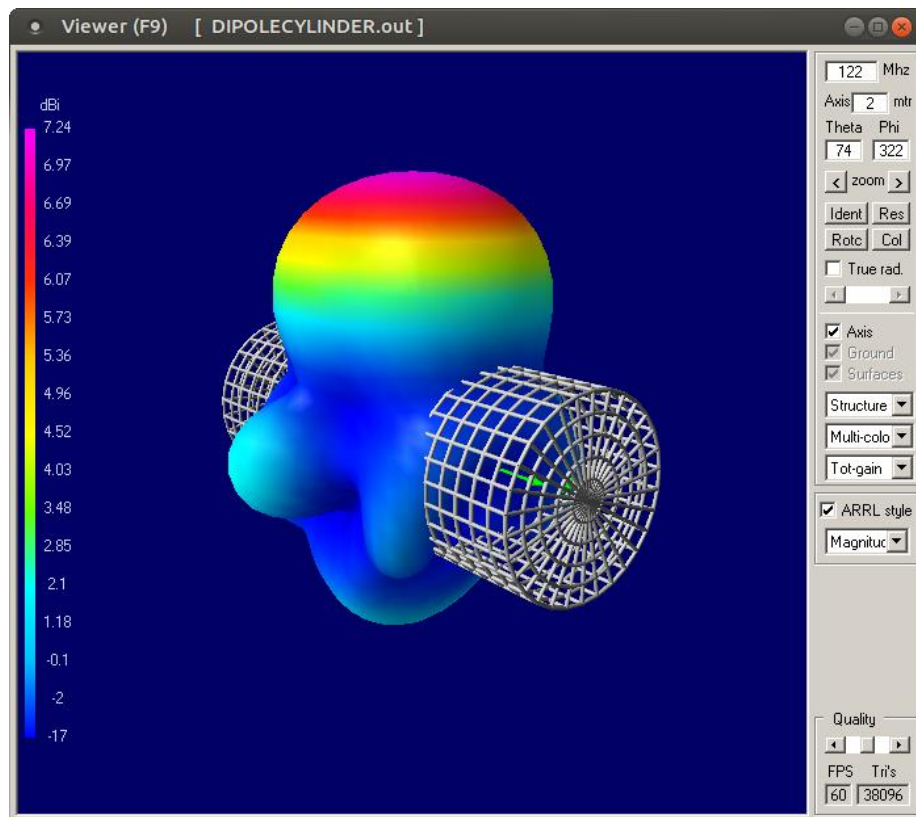
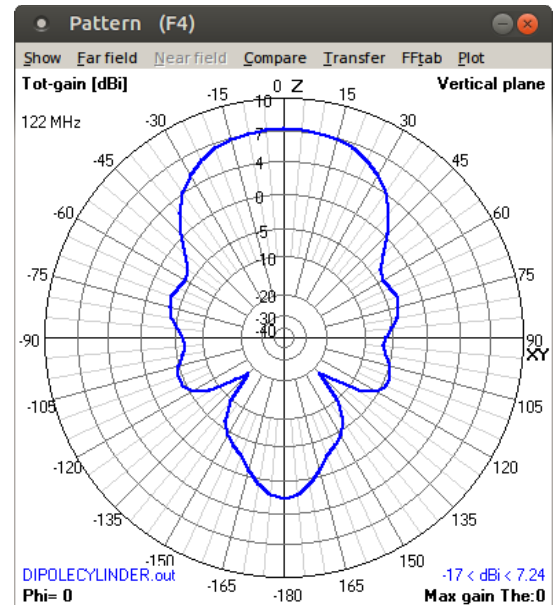
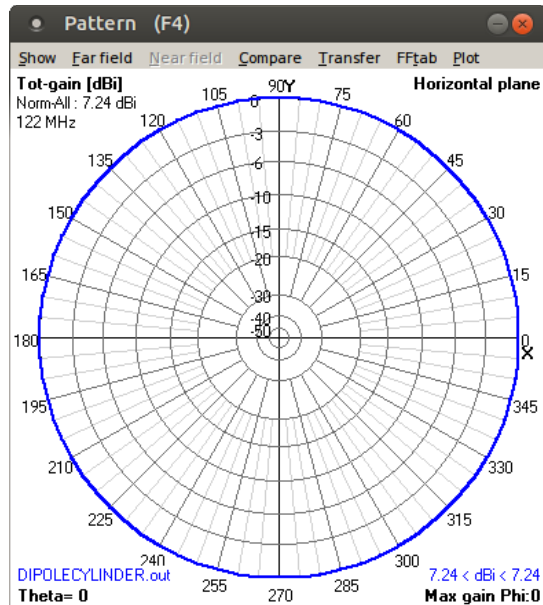
Impedància d'entrada de l'antena.

$Z_0 = 89.2 + j28.1 \text{ Ohms}$



3. Antena dipol en $\lambda/2$ a una certa distància d'un cilindre metàl·lic

Diagrama de radiació



Directivitat

$D = 7.62 \text{ dB}$

Impedància d'entrada de l'antena.

$Z_0 = 45.9 + j53.3 \text{ Ohms}$

• Main [V5.8.16] (F2)

File Edit Settings Calculate Window Show Run Help

Filename: DIPOLECYLINDER.o Frequency: 122 Mhz
Wavelength: 2.457 mtr

Voltage: 104 + j0 V Current: 0.96 - j1.12 A

Impedance: 45.9 + j53.3 Series comp.: 24.46 pF
Parallel form: 108 // j92.9 Parallel comp.: 14.04 pF

S.W.R.50: 2.9 Input power: 100 W
Efficiency: 91.93 % Structure loss: 8.073 W
Radiat-eff.: 91.64 % Network loss: 0 uW
RDF [dB]: 7.62 Radiat-power: 91.93 W

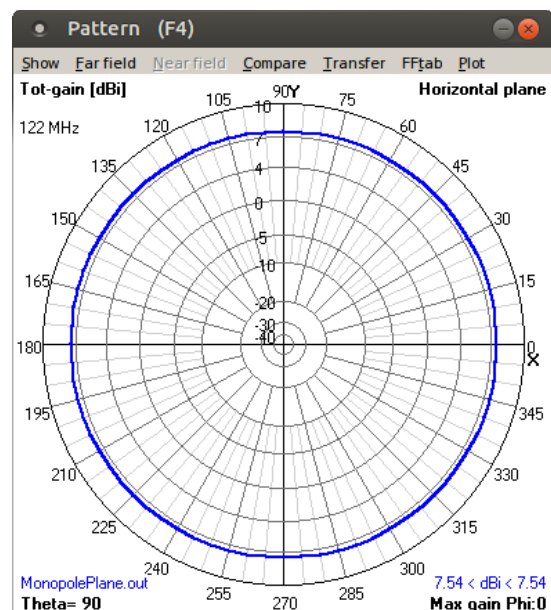
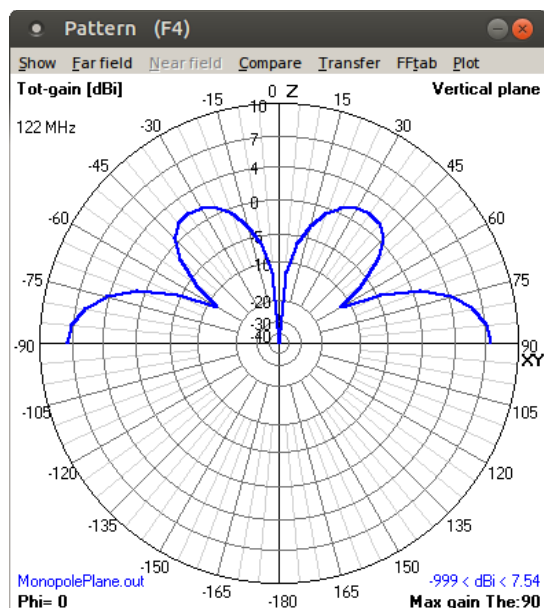
Environment: ☐ Loads ☐ Polar
FREE SPACE

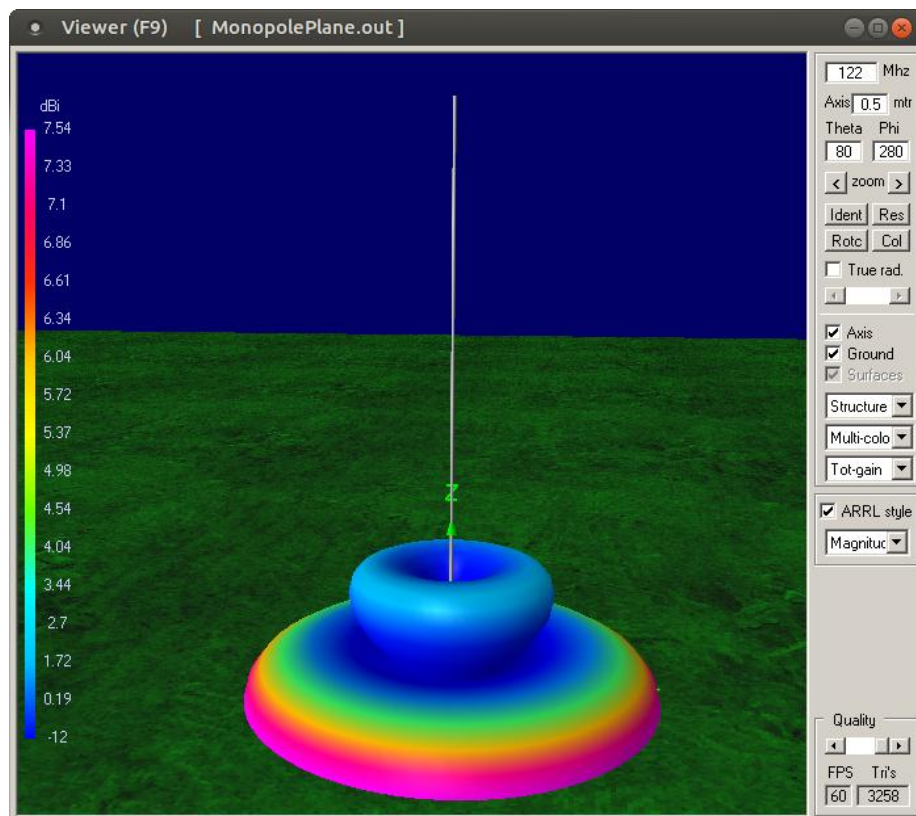
Comment:
Length L in mtr. = 5
Radius R1 in cm. = 100
Radius R2 in cm. = 100
Start angle A1 = 0
Stop angle A2 = 360
Straight sections = 24
Circular sections = 30

Seg's/patches: 2029 start stop count step
Pattern lines: 5329 Theta -180 180 73 5
Freq/Eval steps: 1 Phi 0 360 73 5
Calculation time: 18.240 s

4. Antena monopol ($\lambda/4$) sobre un pla conductor perfecte

Diagrama de radiació





Directivitat

$D = 7.89 \text{ dB}$

Impedància d'entrada de l'antena.

$Z_0 = 85.8 - j350 \text{ Ohms}$

Main [V5.8.16] (F2)

File Edit Settings Calculate Window Shgw Run Help

Filename MonopolePlane.out Frequency 122 Mhz
Wavelength 2.457 mtr

Voltage 389 + j 0 V Current 0.26 + j 1.05 A

Impedance 85.8 - j 350 Series comp. 0.456 uH
Parallel form 1511 // - j 371 Parallel comp. 0.484 uH

S.W.R. 50 30.8 Input power 100 W
Efficiency 92.76 % Structure loss 7.238 W
Radiat-eff. 92.28 % Network loss 0 uW
RDF [dB] 7.89 Radiat-power 92.76 W

Environment ☐ Loads ☐ Polar

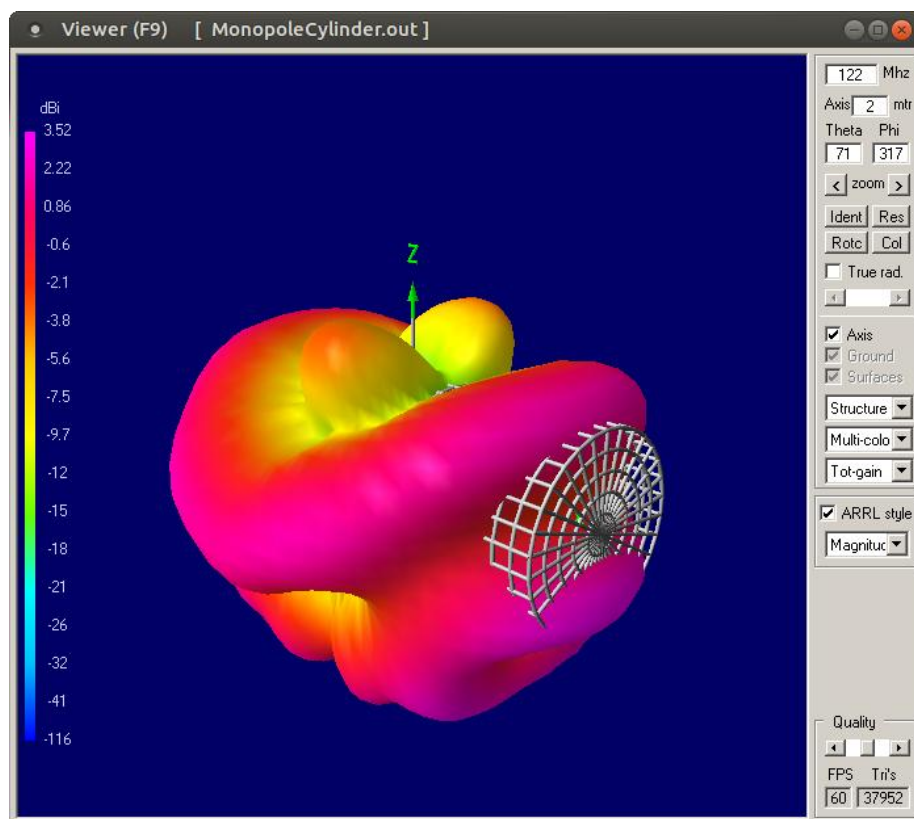
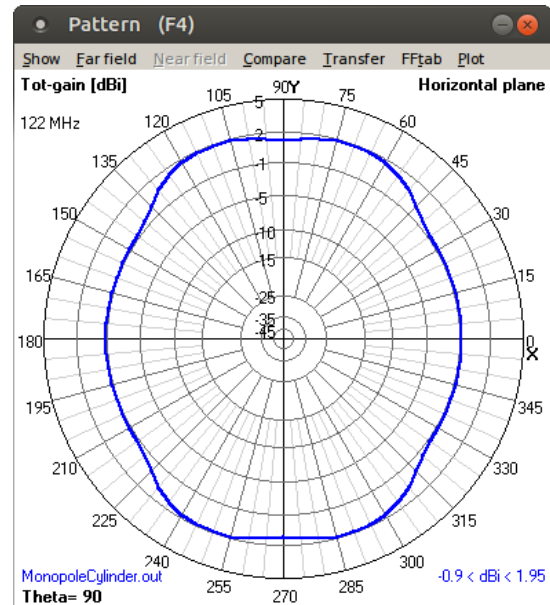
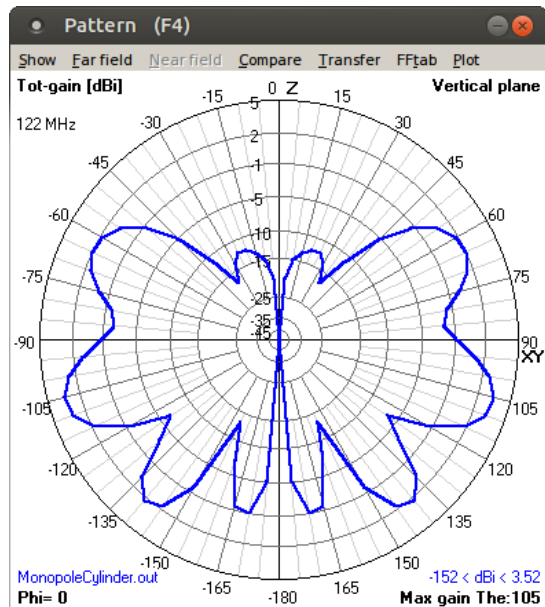
GROUND PLANE SPECIFIED.
WHERE WIRE ENDS TOUCH GROUND, CURRENT WILL BE INTERPOLATED
PERFECT GROUND

Comment

Seg's/patches 10 start stop count step
Pattern lines 2701 Theta -90 90 37 5
Freq/Eval steps 1 Phi 0 360 73 5
Calculation time 0.020 s

5. Antena monopol ($\lambda/4$) sobre un cilindre metàl·lic

Diagrama de radiació



Directivitat

$D = 4.11 \text{ dB}$

Impedància d'entrada de l'antena.

$Z_0 = 91.2 + j115 \text{ Ohms}$

Main [V5.8.16] (F2)

File Edit Settings Calculate Window Shgw Run Help

Filename: MonopoleCylinder.out Frequency: 122 Mhz
Wavelength: 2.457 mtr

Voltage: $154 + j0 \text{ V}$ Current: $0.65 - j0.82 \text{ A}$

Impedance: $91.2 + j115$ Series comp.: 11.34 pF
Parallel form: $236 // j187$ Parallel comp.: 6.961 pF

S.W.R.50: 5.08 Input power: 100 W
Efficiency: 96.23 % Structure loss: 3.775 W
Radiat-eff.: 87.35 % Network loss: 0 uW
RDF [dB]: 4.11 Radiat-power: 96.23 W

Environment: ☐ Loads ☐ Polar

FREE SPACE

Comment

Length L in mtr. = 5
Radius R1 in cm. = 100
Radius R2 in cm. = 100
Start angle A1 = 0
Stop angle A2 = 360
Straight sections = 24
Circular sections = 30

Seg's/patches: 2020
Pattern lines: 5329
Freq/Eval steps: 1
Calculation time: 14.160 s

	start	stop	count	step
Theta	-180	180	73	5
Phi	0	360	73	5