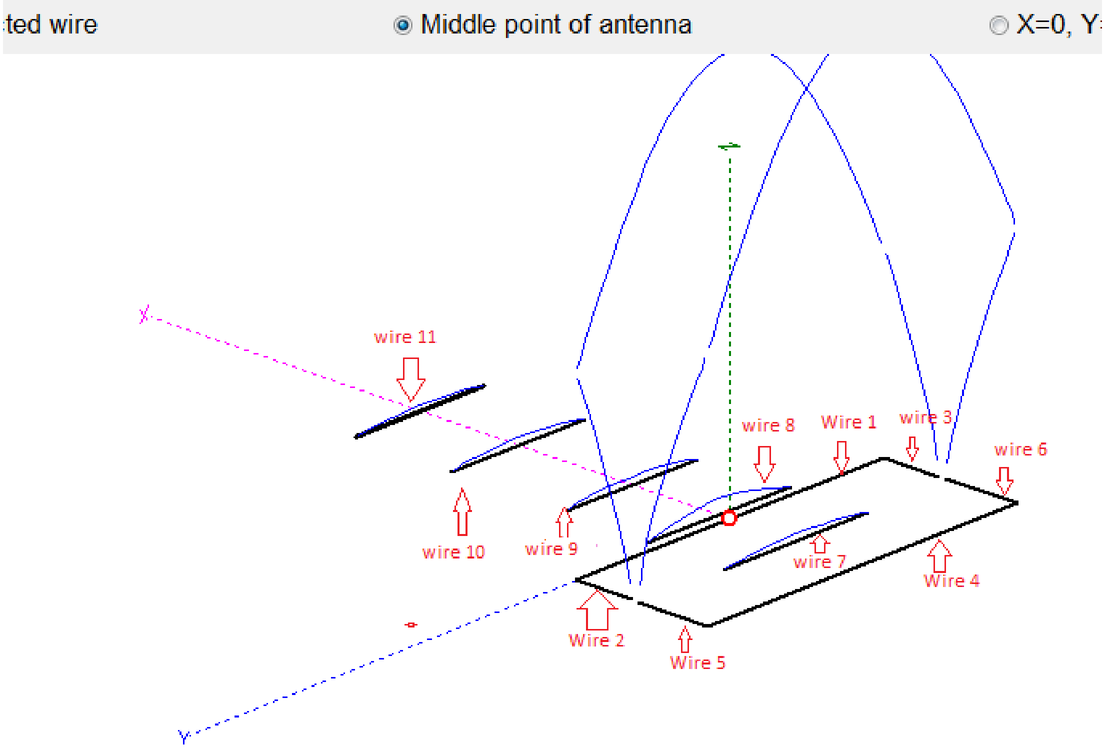
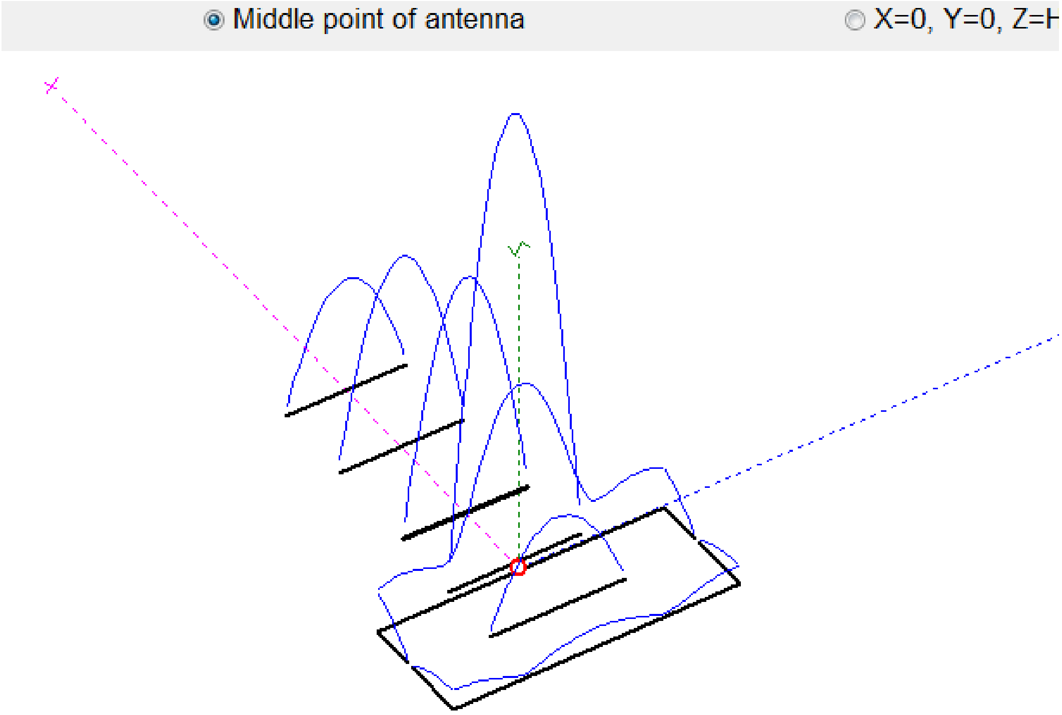
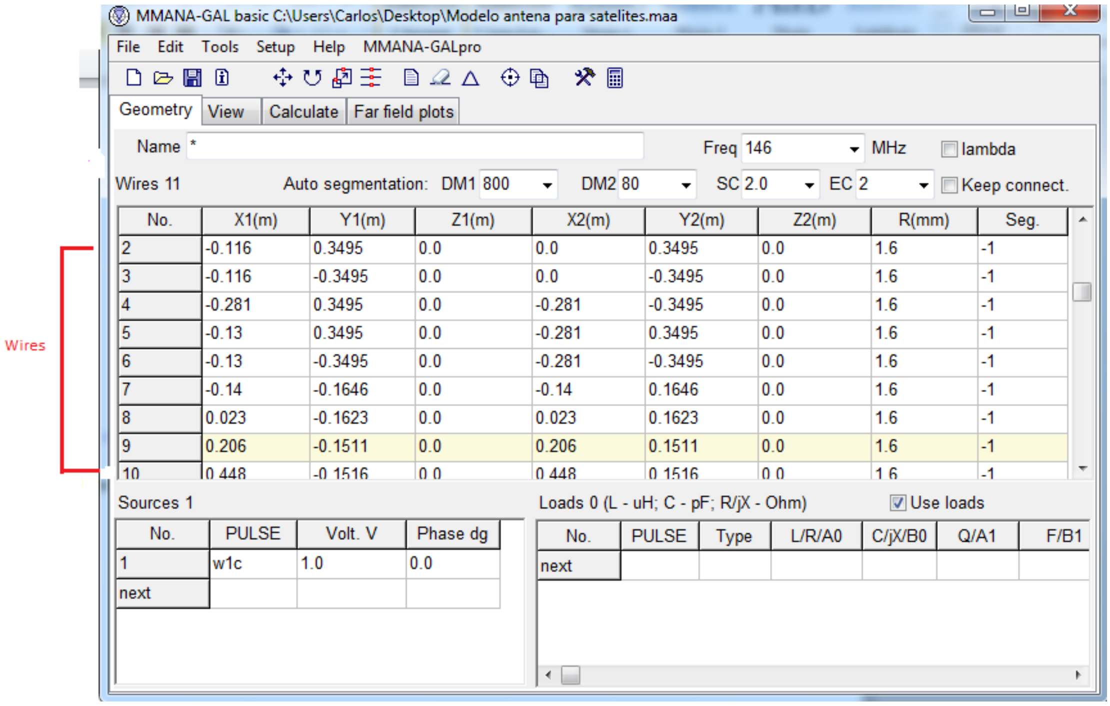
Vista da antena nos eixos cartesianos:


ted wire
● Middle point of antenna
○ X=0, Y
X
wire 11
wire 10
wire 9
wire 8
Wire 1
wire 3
wire 6
wire 7
Wire 4
Wire 2
Wire 5
Y


● Middle point of antenna
○ X=0, Y=0, Z=H
X
Y

Obs. Em Azul temos as correntes induzidas (1ª em 146 MHz, 2ª em 436 MHz).

Medidas dos elementos:


Wires
MMANA-GAL basic C:\Users\Carlos\Desktop\Modelo antena para satelites.maa
File Edit Tools Setup Help MMANA-GALpro
Geometry View Calculate Far field plots

Name *

Freq 146 MHz ☐ lambda

Wires 11 Auto segmentation: DM1 800 DM2 80 SC 2.0 EC 2 ☐ Keep connect.

No.	X1(m)	Y1(m)	Z1(m)	X2(m)	Y2(m)	Z2(m)	R(mm)	Seg.
2	-0.116	0.3495	0.0	0.0	0.3495	0.0	1.6	-1
3	-0.116	-0.3495	0.0	0.0	-0.3495	0.0	1.6	-1
4	-0.281	0.3495	0.0	-0.281	-0.3495	0.0	1.6	-1
5	-0.13	0.3495	0.0	-0.281	0.3495	0.0	1.6	-1
6	-0.13	-0.3495	0.0	-0.281	-0.3495	0.0	1.6	-1
7	-0.14	-0.1646	0.0	-0.14	0.1646	0.0	1.6	-1
8	0.023	-0.1623	0.0	0.023	0.1623	0.0	1.6	-1
9	0.206	-0.1511	0.0	0.206	0.1511	0.0	1.6	-1
10	0.448	-0.1516	0.0	0.448	0.1516	0.0	1.6	-1

Sources 1

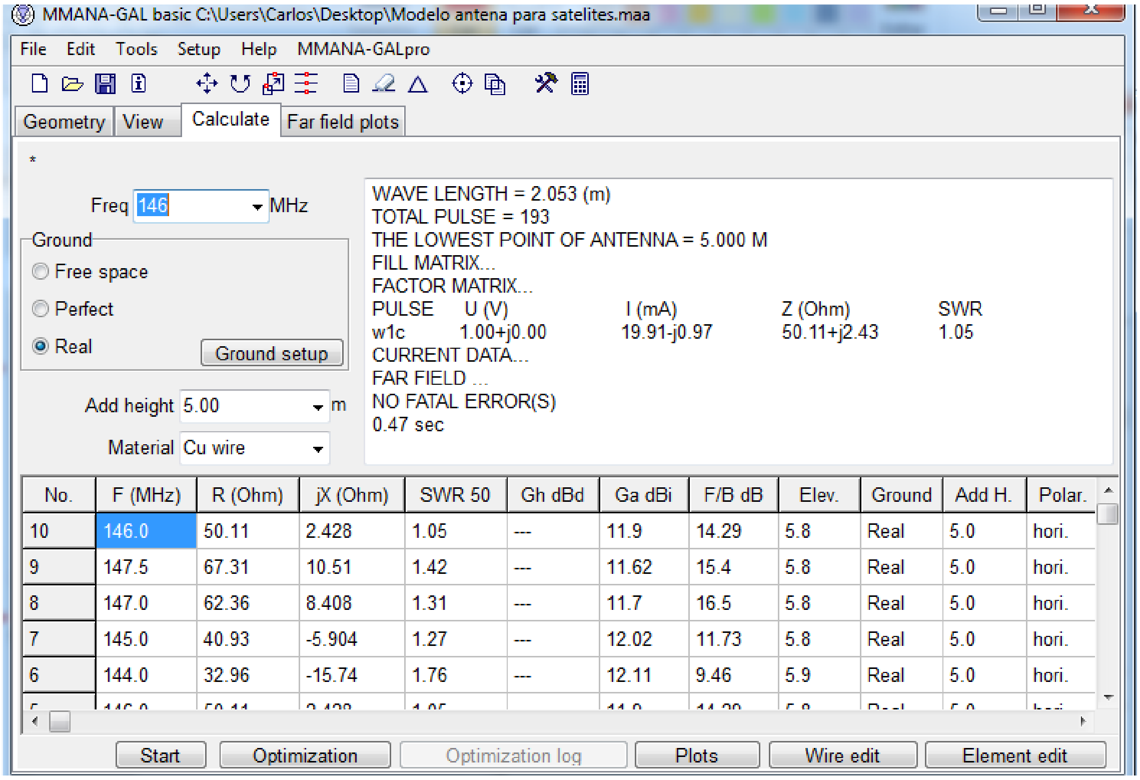
No.	PULSE	Volt. V	Phase dg
1	w1c	1.0	0.0
next			

Loads 0 (L - uH; C - pF; R/jX - Ohm) ☑ Use loads

No.	PULSE	Type	L/R/A0	C/jX/B0	Q/A1	F/B1
next						

Parâmetros da Antena:

Em 146 MHz


MMANA-GAL basic C:\Users\Carlos\Desktop\Modelo antena para satelites.maa
File Edit Tools Setup Help MMANA-GALpro
Geometry View Calculate Far field plots
Ground setup
Start
Optimization
Optimization log
Plots
Wire edit
Element edit

*

Freq 146 MHz

Ground
○ Free space
○ Perfect
● Real

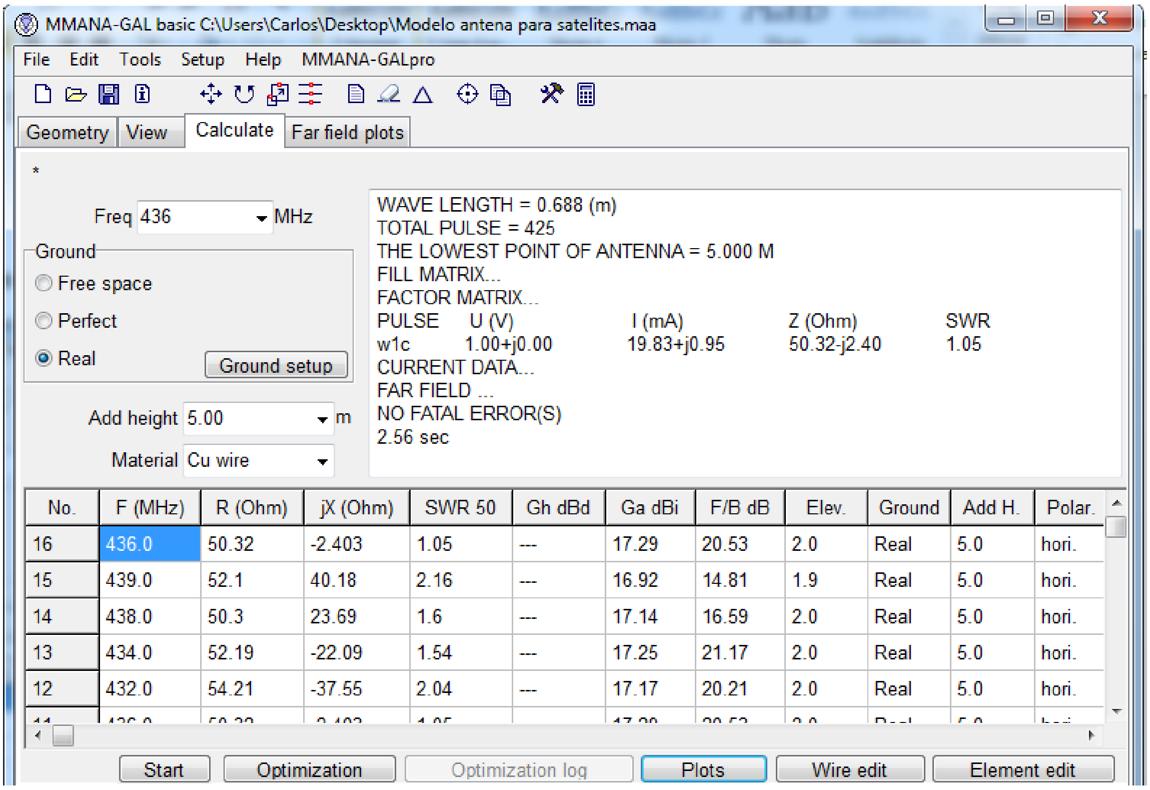
Add height 5.00 m

Material Cu wire

```
WAVE LENGTH = 2.053 (m)
TOTAL PULSE = 193
THE LOWEST POINT OF ANTENNA = 5.000 M
FILL MATRIX...
FACTOR MATRIX...
PULSE    U (V)            I (mA)         Z (Ohm)        SWR
w1c      1.00+j0.00       19.91-j0.97    50.11+j2.43    1.05
CURRENT DATA...
FAR FIELD ...
NO FATAL ERROR(S)
0.47 sec
```

No.	F (MHz)	R (Ohm)	jX (Ohm)	SWR 50	Gh dBd	Ga dBi	F/B dB	Elev.	Ground	Add H.	Polar.
10	146.0	50.11	2.428	1.05	---	11.9	14.29	5.8	Real	5.0	hori.
9	147.5	67.31	10.51	1.42	---	11.62	15.4	5.8	Real	5.0	hori.
8	147.0	62.36	8.408	1.31	---	11.7	16.5	5.8	Real	5.0	hori.
7	145.0	40.93	-5.904	1.27	---	12.02	11.73	5.8	Real	5.0	hori.
6	144.0	32.96	-15.74	1.76	---	12.11	9.46	5.9	Real	5.0	hori.

Em 436 MHz


MMANA-GAL basic C:\Users\Carlos\Desktop\Modelo antena para satelites.maa
File Edit Tools Setup Help MMANA-GALpro
Geometry View Calculate Far field plots
Start Optimization Optimization log Plots Wire edit Element edit

Freq 436 MHz

Ground
○ Free space
○ Perfect
● Real
Ground setup

Add height 5.00 m

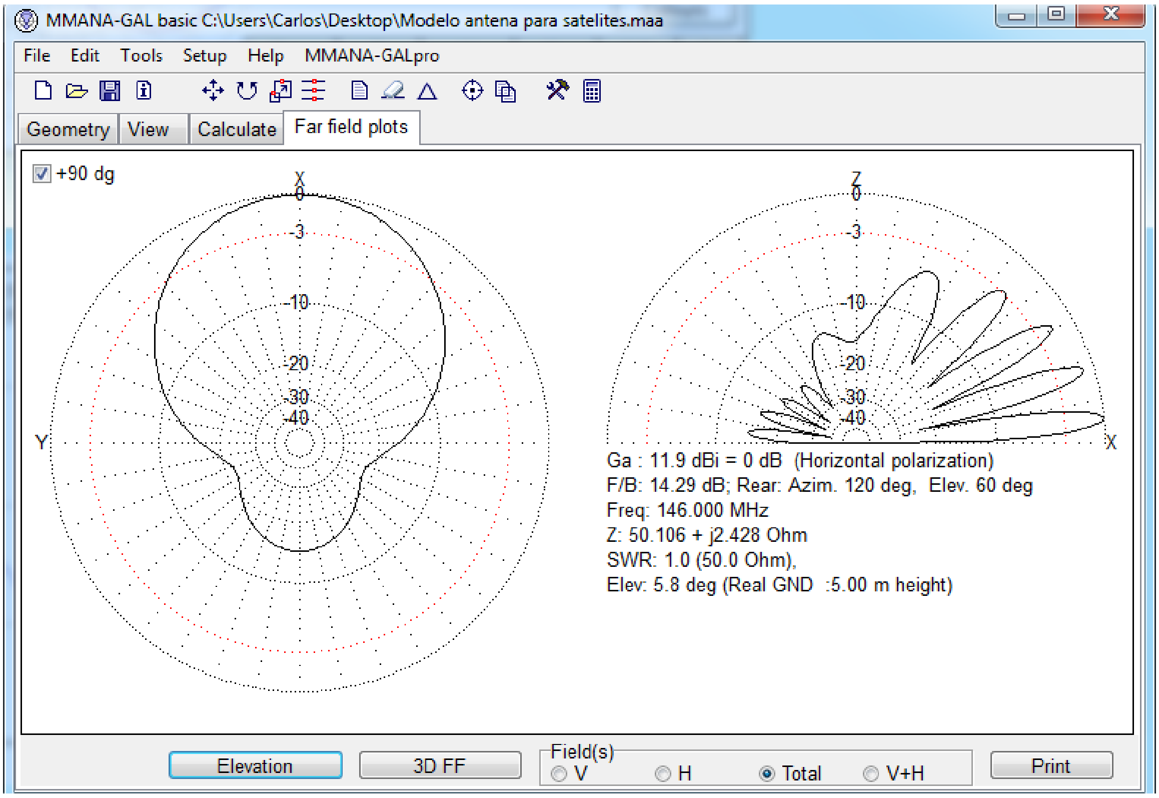
Material Cu wire

```
WAVE LENGTH = 0.688 (m)
TOTAL PULSE = 425
THE LOWEST POINT OF ANTENNA = 5.000 M
FILL MATRIX...
FACTOR MATRIX...
PULSE     U (V)          I (mA)        Z (Ohm)       SWR
w1c       1.00+j0.00     19.83+j0.95   50.32-j2.40   1.05
CURRENT DATA...
FAR FIELD ...
NO FATAL ERROR(S)
2.56 sec
```

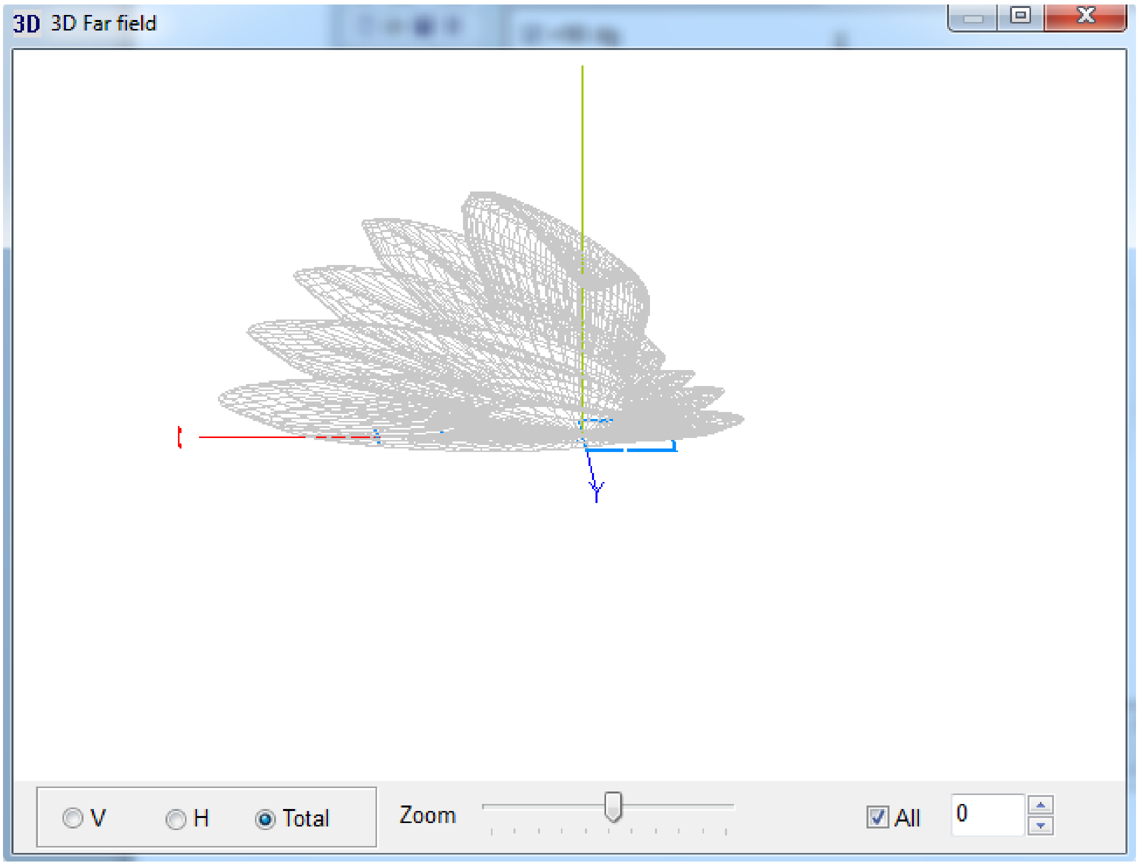
No.	F (MHz)	R (Ohm)	jX (Ohm)	SWR 50	Gh dBd	Ga dBi	F/B dB	Elev.	Ground	Add H.	Polar.
16	436.0	50.32	-2.403	1.05	---	17.29	20.53	2.0	Real	5.0	hori.
15	439.0	52.1	40.18	2.16	---	16.92	14.81	1.9	Real	5.0	hori.
14	438.0	50.3	23.69	1.6	---	17.14	16.59	2.0	Real	5.0	hori.
13	434.0	52.19	-22.09	1.54	---	17.25	21.17	2.0	Real	5.0	hori.
12	432.0	54.21	-37.55	2.04	---	17.17	20.21	2.0	Real	5.0	hori.

Diagramas de irradiação:

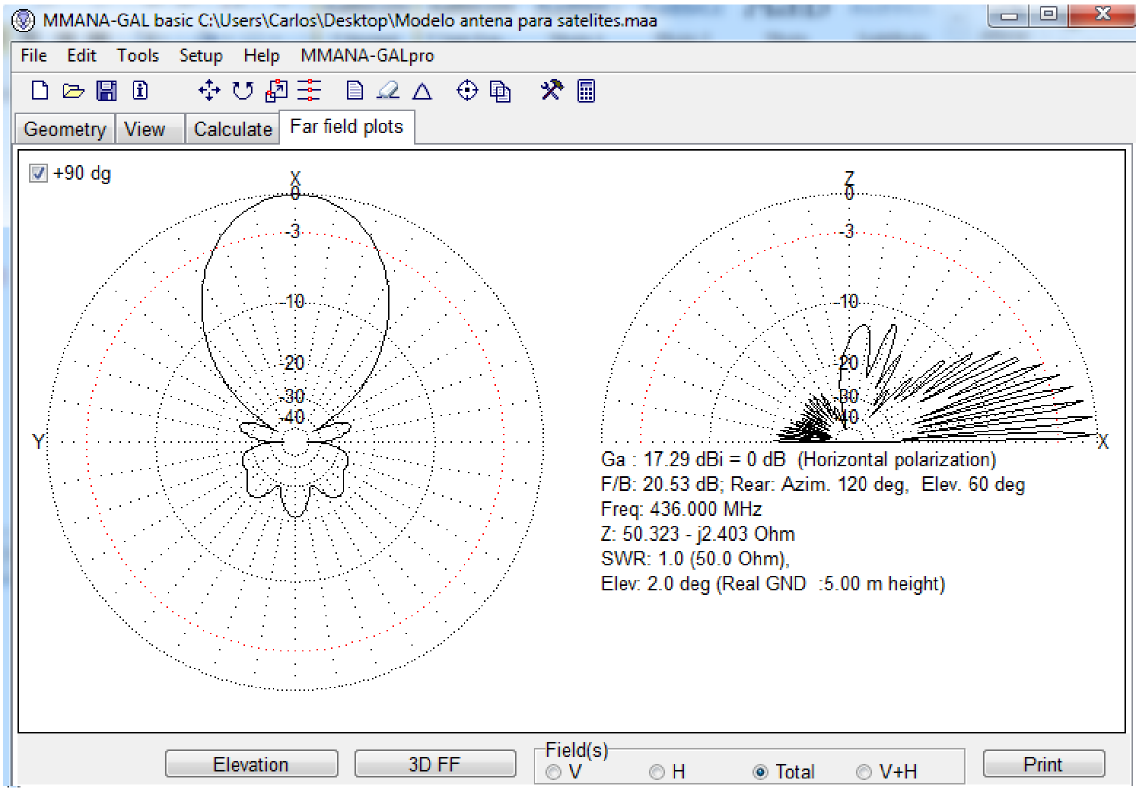
Em 146 MHz


MMANA-GAL basic C:\Users\Carlos\Desktop\Modelo antena para satelites.maa
File Edit Tools Setup Help MMANA-GALpro
Geometry View Calculate Far field plots
☑ +90 dg
X
0
-3
-10
-20
-30
-40
Y
Z
0
-3
-10
-20
-30
-40
X
Elevation 3D FF
Field(s) ○ V ○ H ● Total ○ V+H
Print

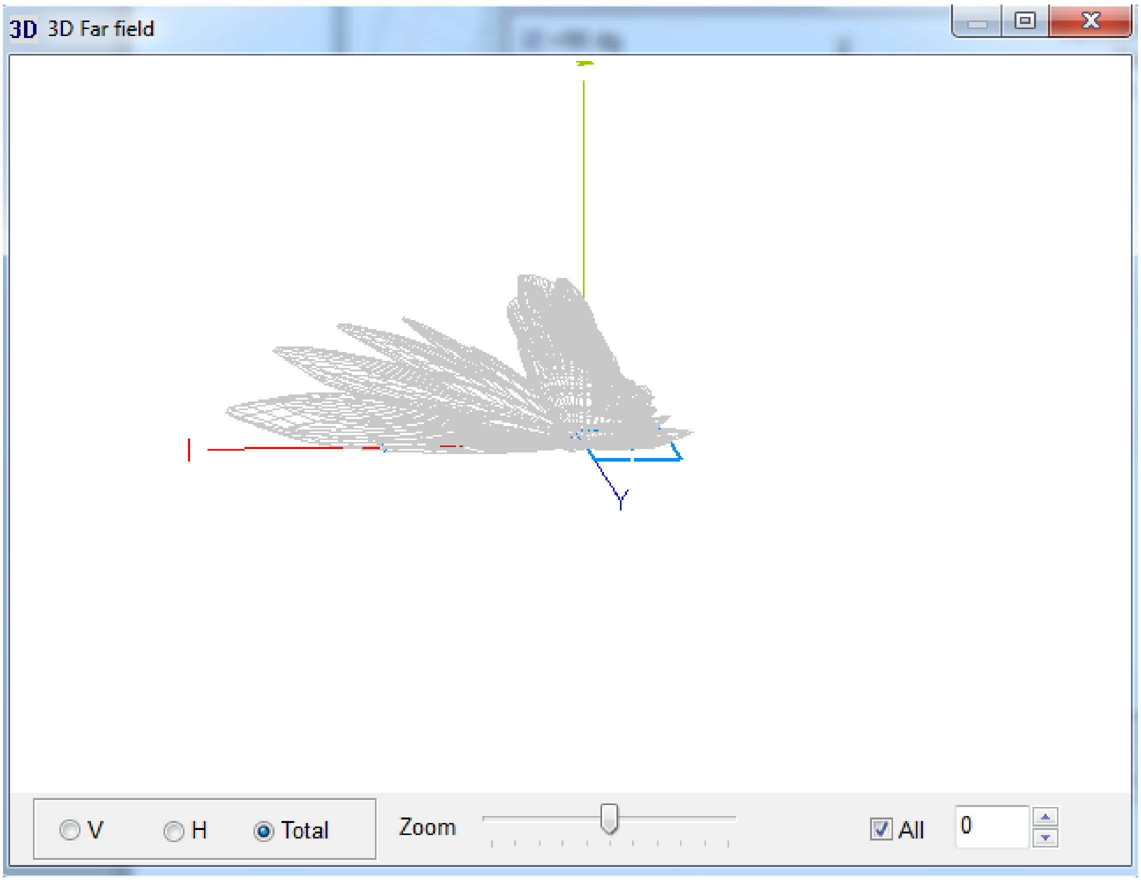
```
Ga : 11.9 dBi = 0 dB  (Horizontal polarization)
F/B: 14.29 dB; Rear: Azim. 120 deg,  Elev. 60 deg
Freq: 146.000 MHz
Z: 50.106 + j2.428 Ohm
SWR: 1.0 (50.0 Ohm),
Elev: 5.8 deg (Real GND  :5.00 m height)
```


3D 3D Far field
Y
○ V
○ H
● Total
Zoom
☑ All
0

Em 436 MHz


MMANA-GAL basic C:\Users\Carlos\Desktop\Modelo antena para satelites.maa
File
Edit
Tools
Setup
Help
MMANA-GALpro
Geometry
View
Calculate
Far field plots
☑ +90 dg
X
0
-3
-10
-20
-30
-40
Y
Z
0
-3
-10
-20
-30
-40
X
Elevation
3D FF
Field(s)
○ V
○ H
● Total
○ V+H
Print

```
Ga : 17.29 dBi = 0 dB  (Horizontal polarization)
F/B: 20.53 dB; Rear: Azim. 120 deg,  Elev. 60 deg
Freq: 436.000 MHz
Z: 50.323 - j2.403 Ohm
SWR: 1.0 (50.0 Ohm),
Elev: 2.0 deg (Real GND  :5.00 m height)
```


3D Far field
Y
Zoom

○ V ○ H ● Total

☑ All 0