Antennes loop de grandes dimensions

Grandes dimensions ?

La longueur totale de la loop filaire est de l'ordre de grandeur de:

+/- 0,7 à 5 lambda

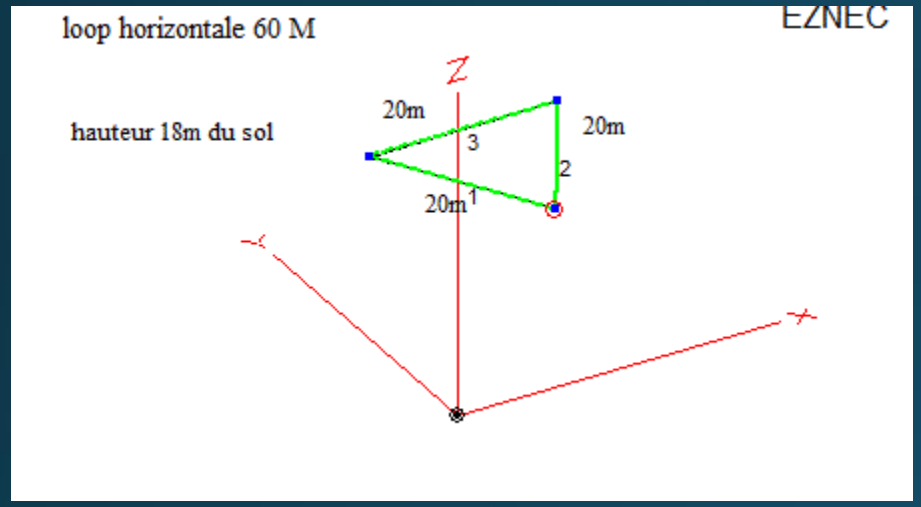
Par opposition aux petites antennes loop (magnétiques) de moins de 0,1 lambda

Différentes sortes de loop

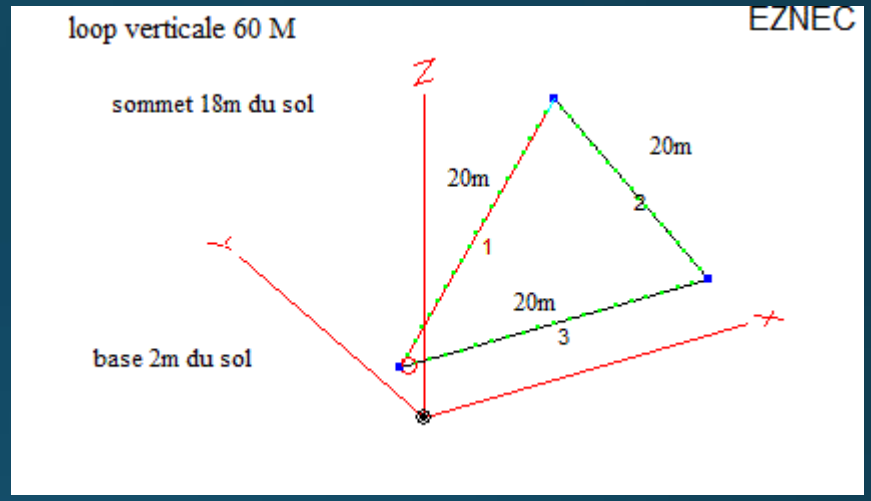
- Loop horizontale
- Loop verticale

en *polarisation horizontale*

en *polarisation verticale*

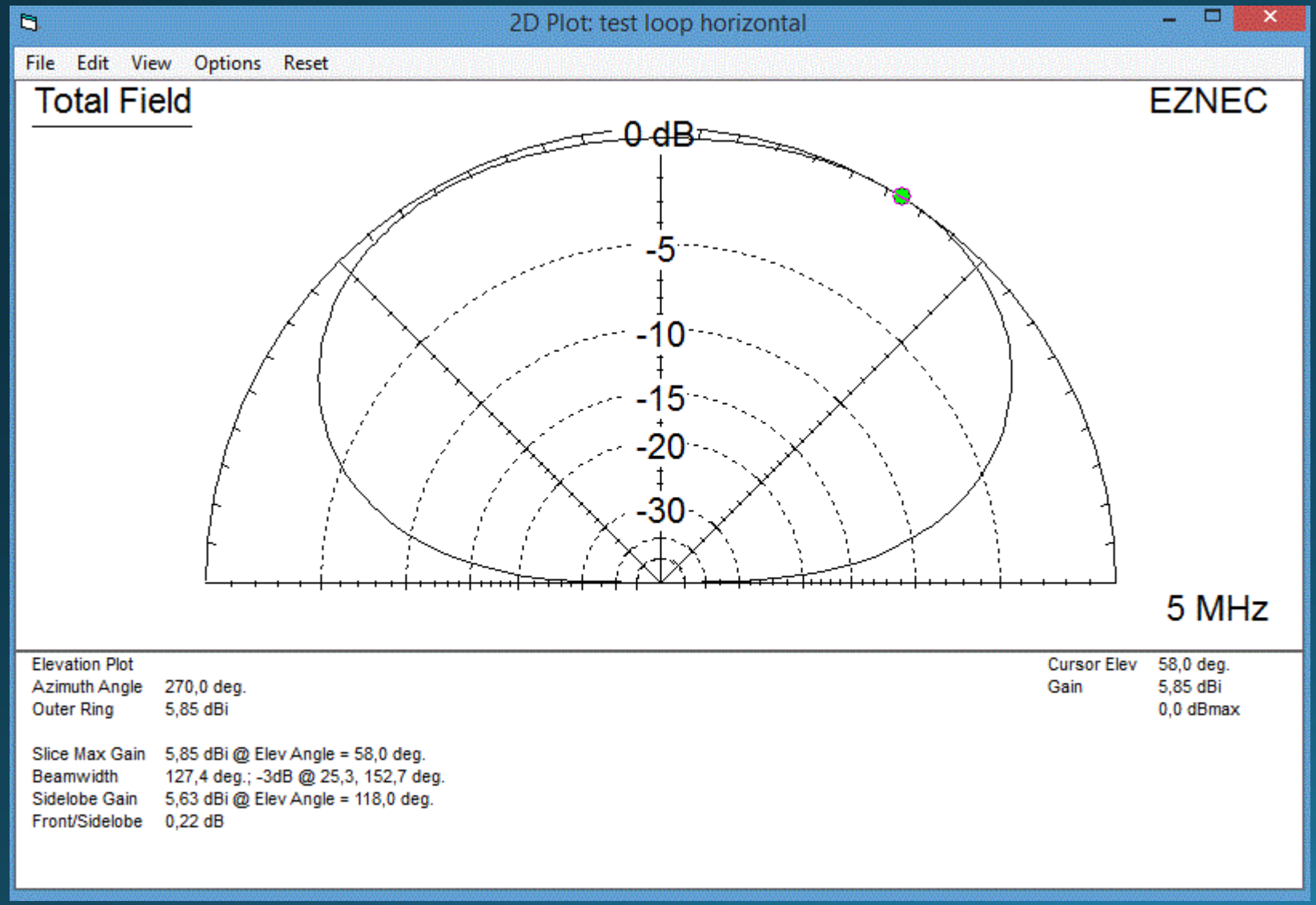


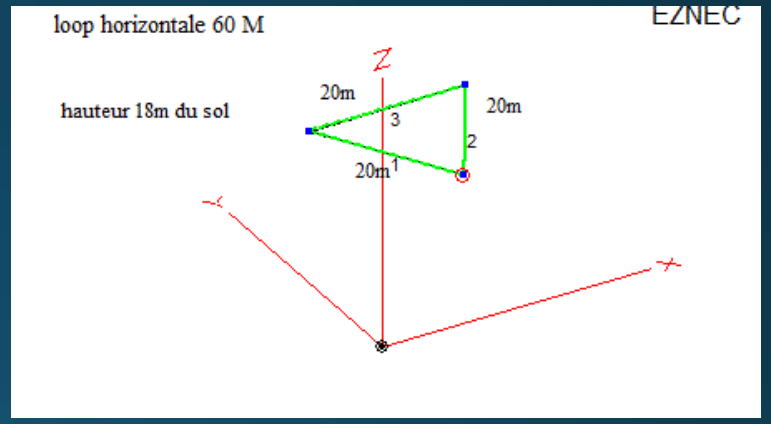
loop horizontale



loop verticale

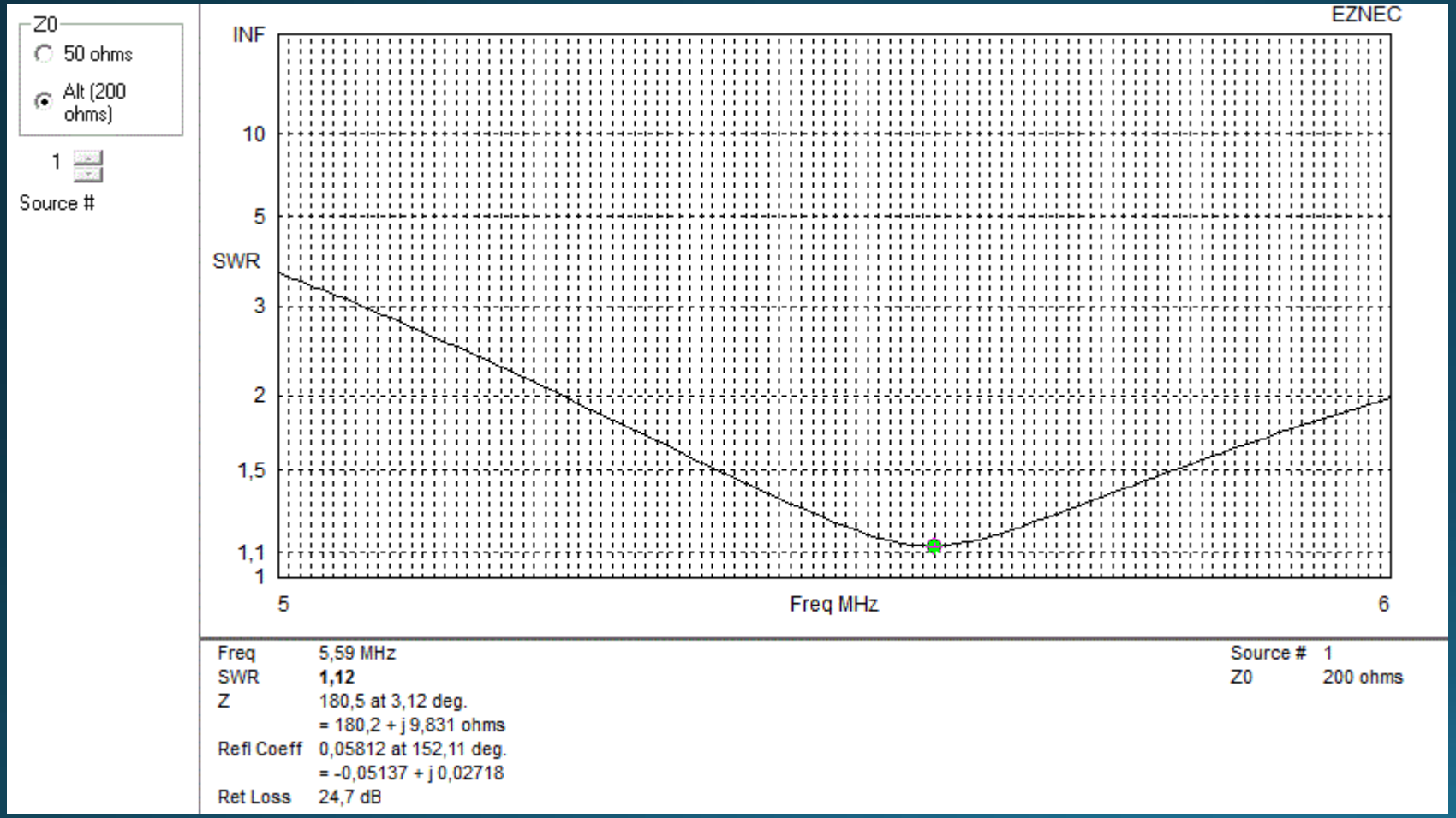
Rayonnement en élévation d'une loop horizontale

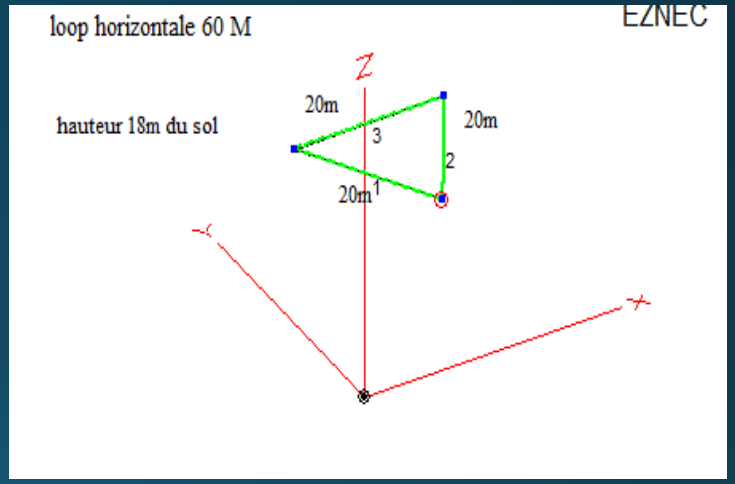


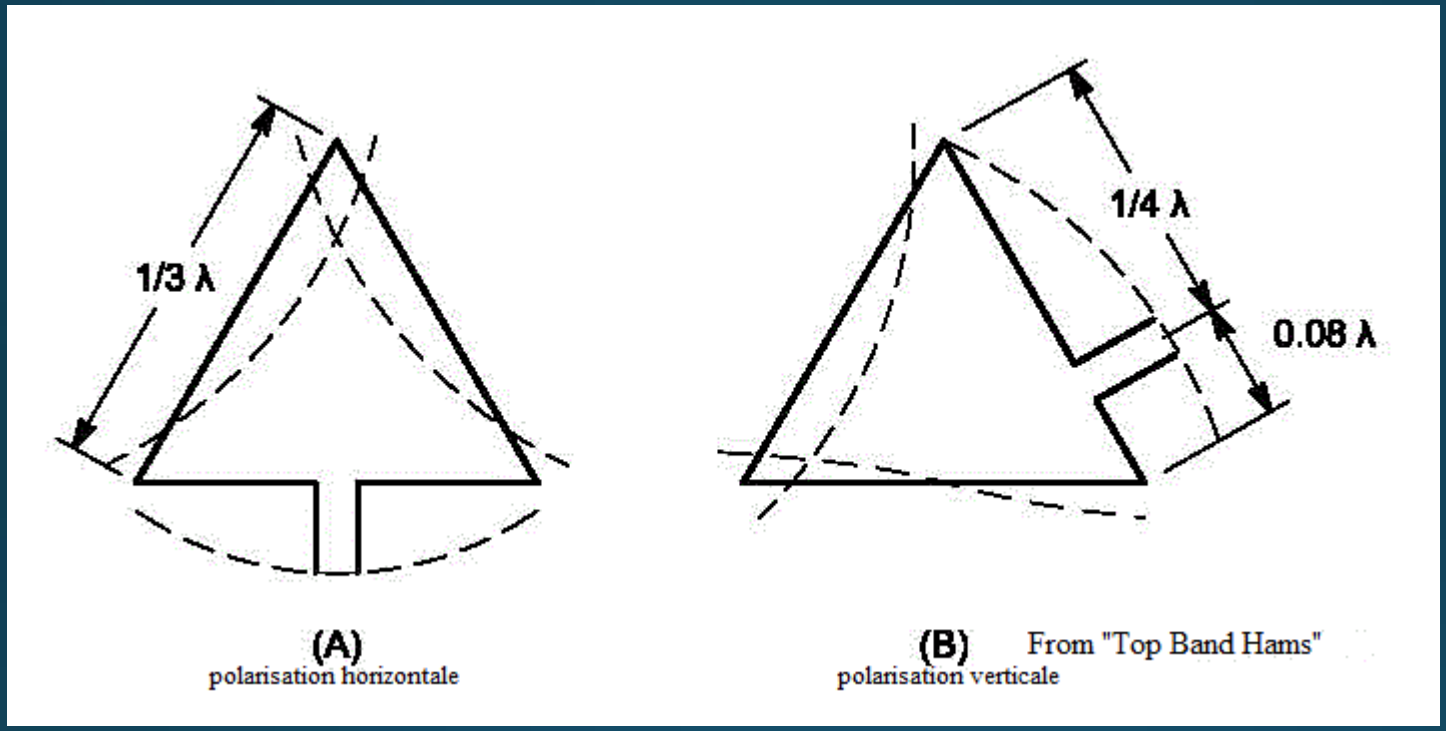


Impédance d'une antenne loop horizontale de 60 mètres à 18 mètre du sol

sol de bonne qualité (conductivité de 10 mS/m)





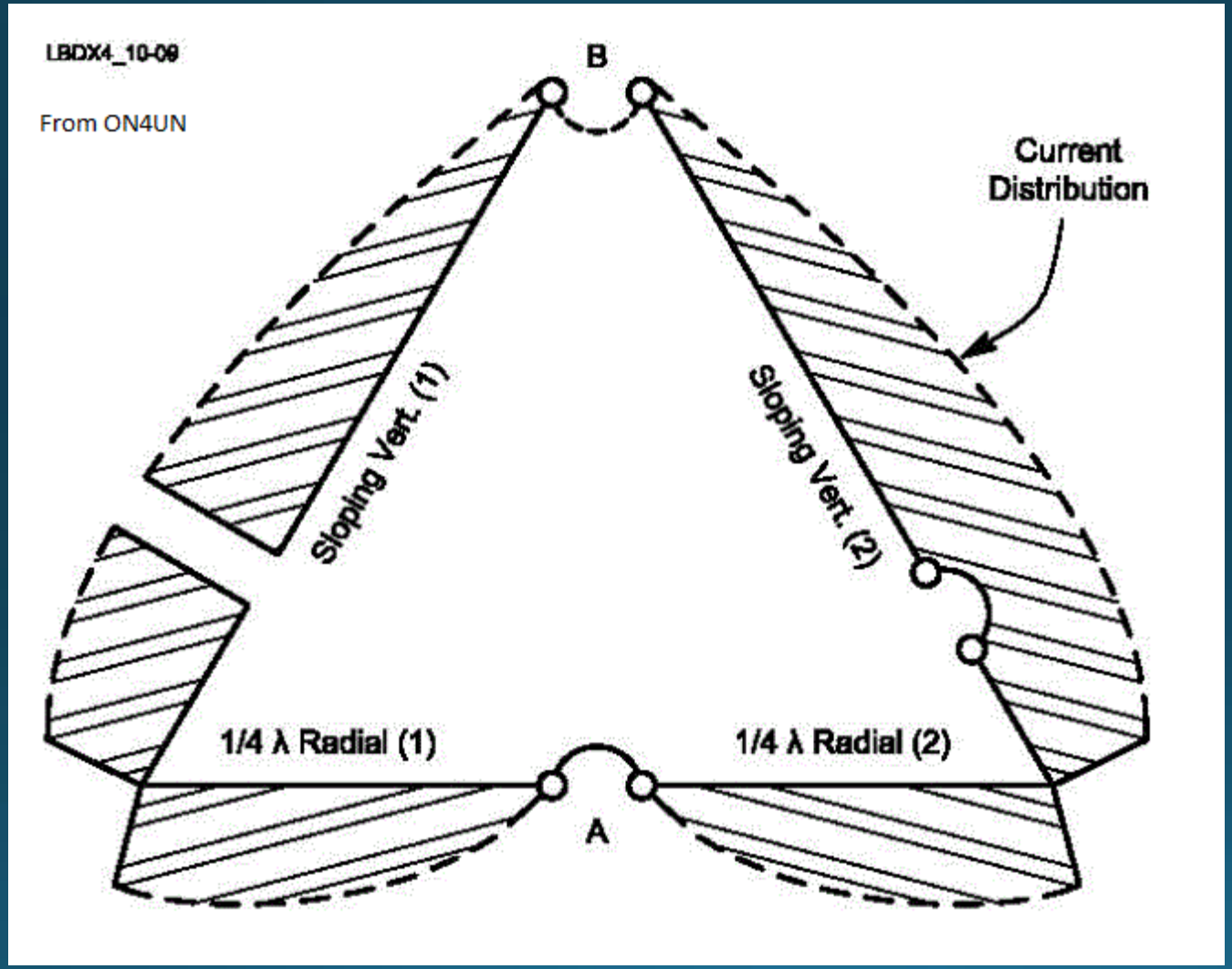


loop verticale

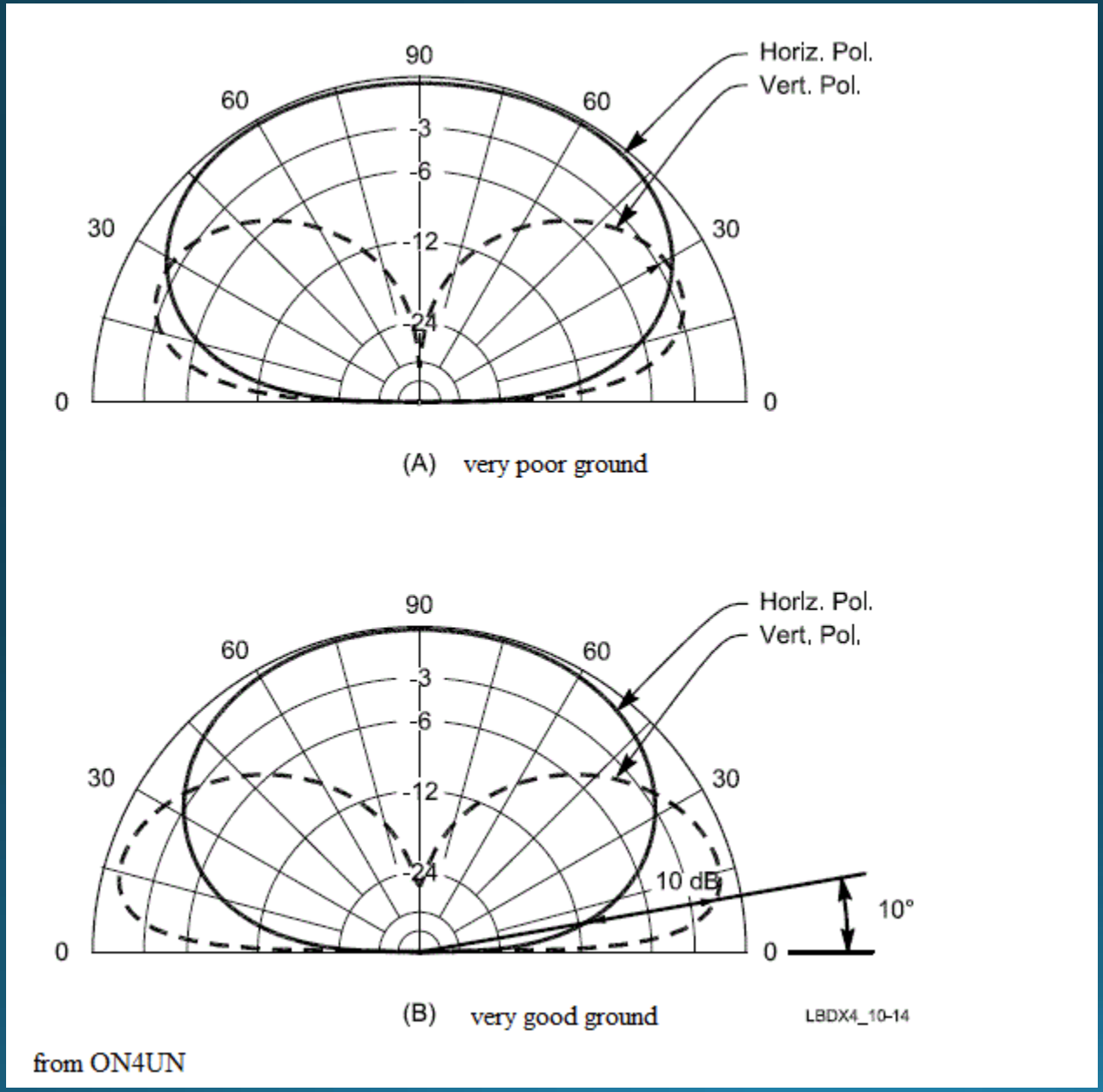
alimentation
au centre

alimentation
sur le côté

Polarization verticale pour une alimentation sur le côté ?



Comparaison du rayonnement en élévation d'une loop verticale entre polarisation horizontale et verticale pour des sols de mauvaise et bonne qualité (broadside)



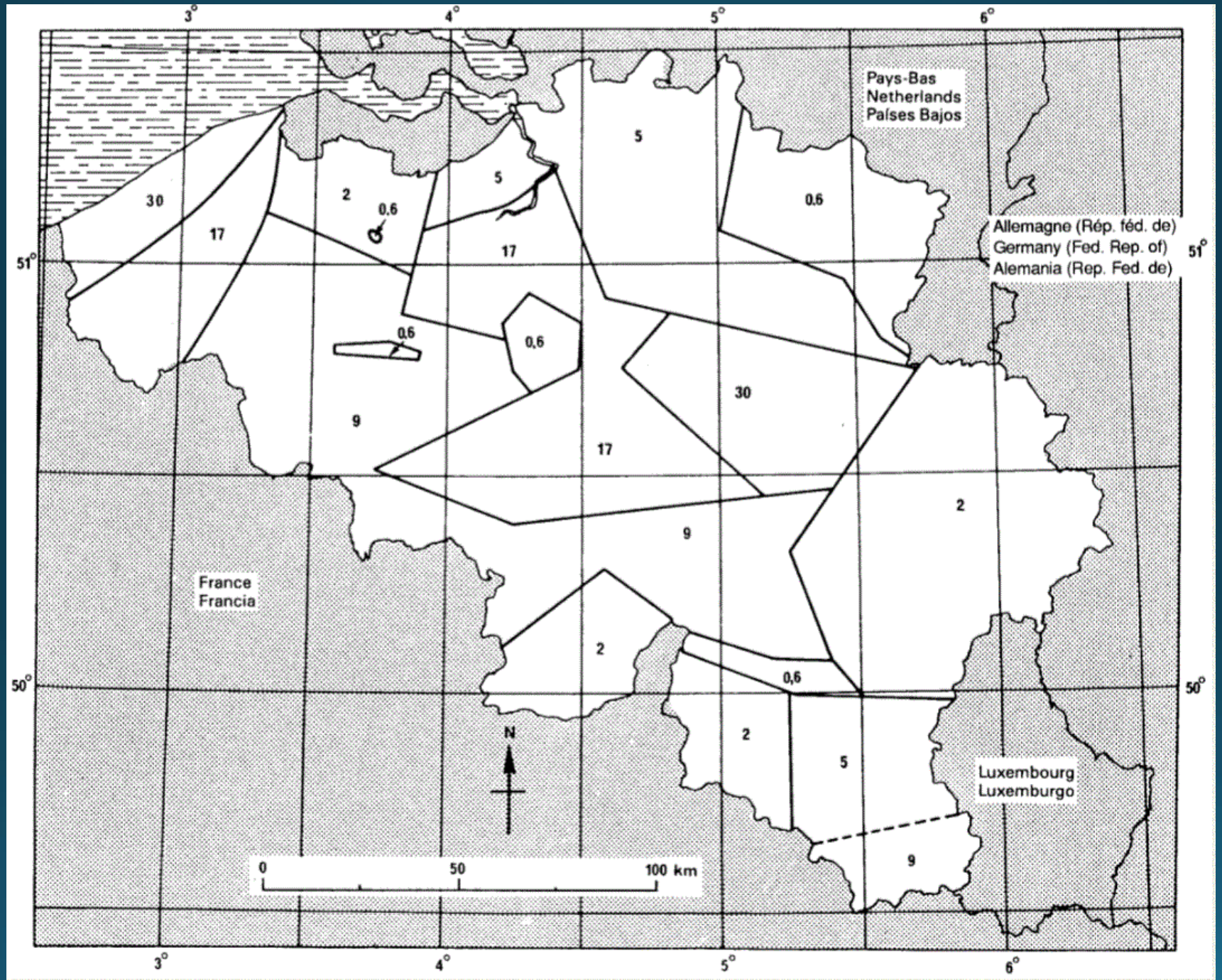


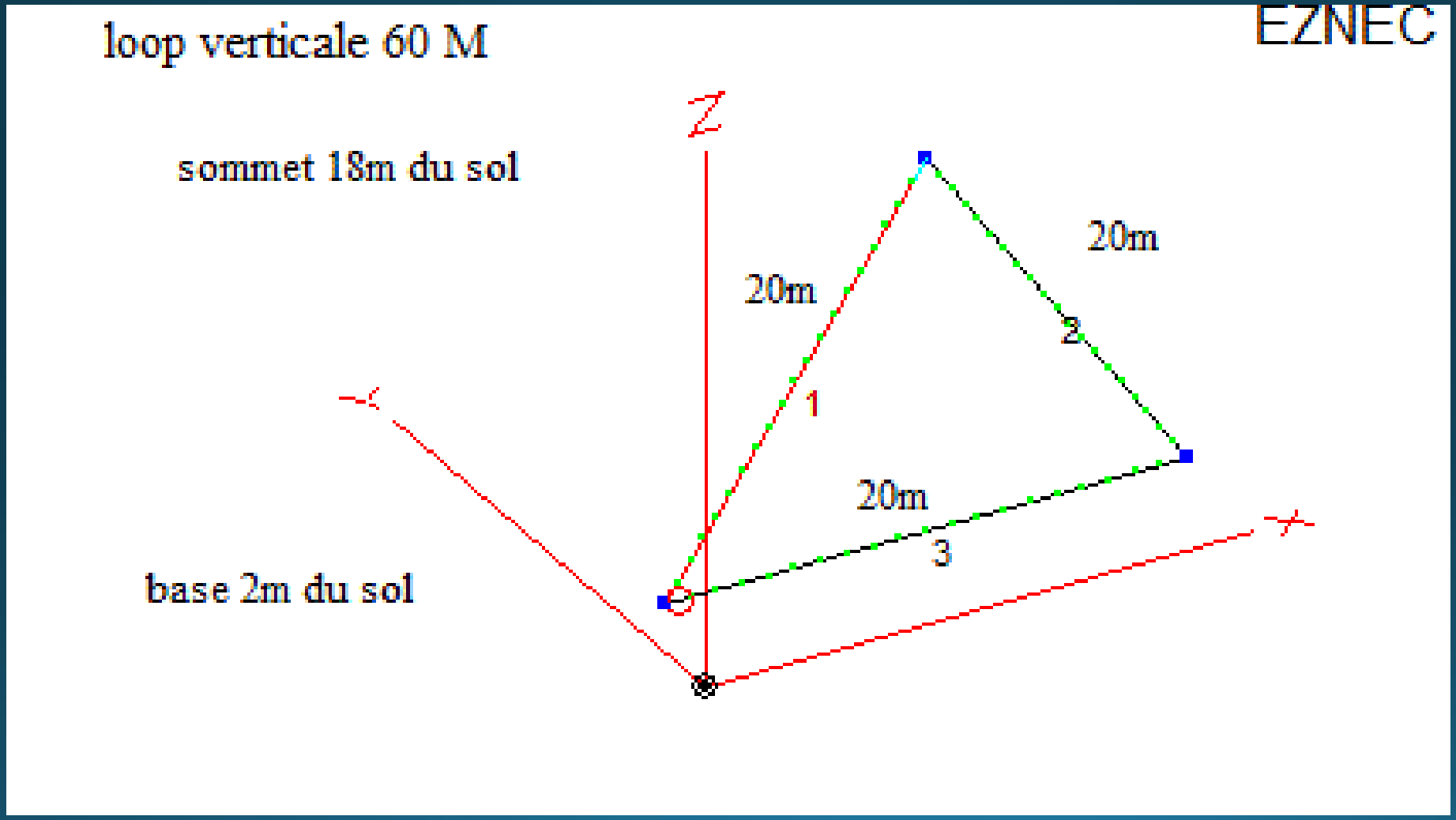
Figure 1: Belgian MF ground conductivity map in mS/m, standardised at 1MHz. *Source:* CCIR Rec. 832

Réalisation pratique d'une loop verticale

contraintes et points recherchés pour ON6MH

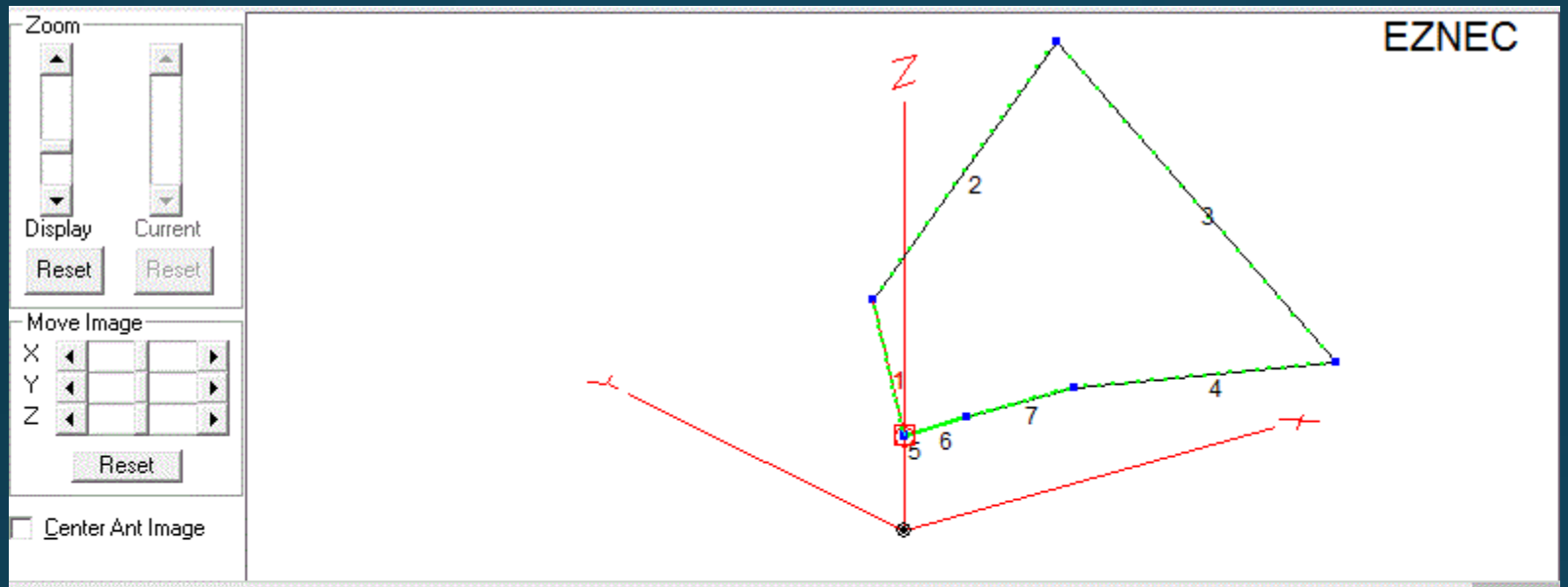
- Antenne multi bandes sans alimentation à ligne ouverte
- Jardin de 20 mètres de long sur 6 mètres de large
- Bonne performances dx et local en 80 mètres
- « 60 mètres
- « 40 mètres
- « 30 mètres
- Utilisable sur les autres bandes 20 à 10 mètres

Loop verticale de 60 mètres résonance native sur 5 Mhz



Antenne loop verticale de ON6MH

Modélisation de la loop verticale de ON6MH



Wires

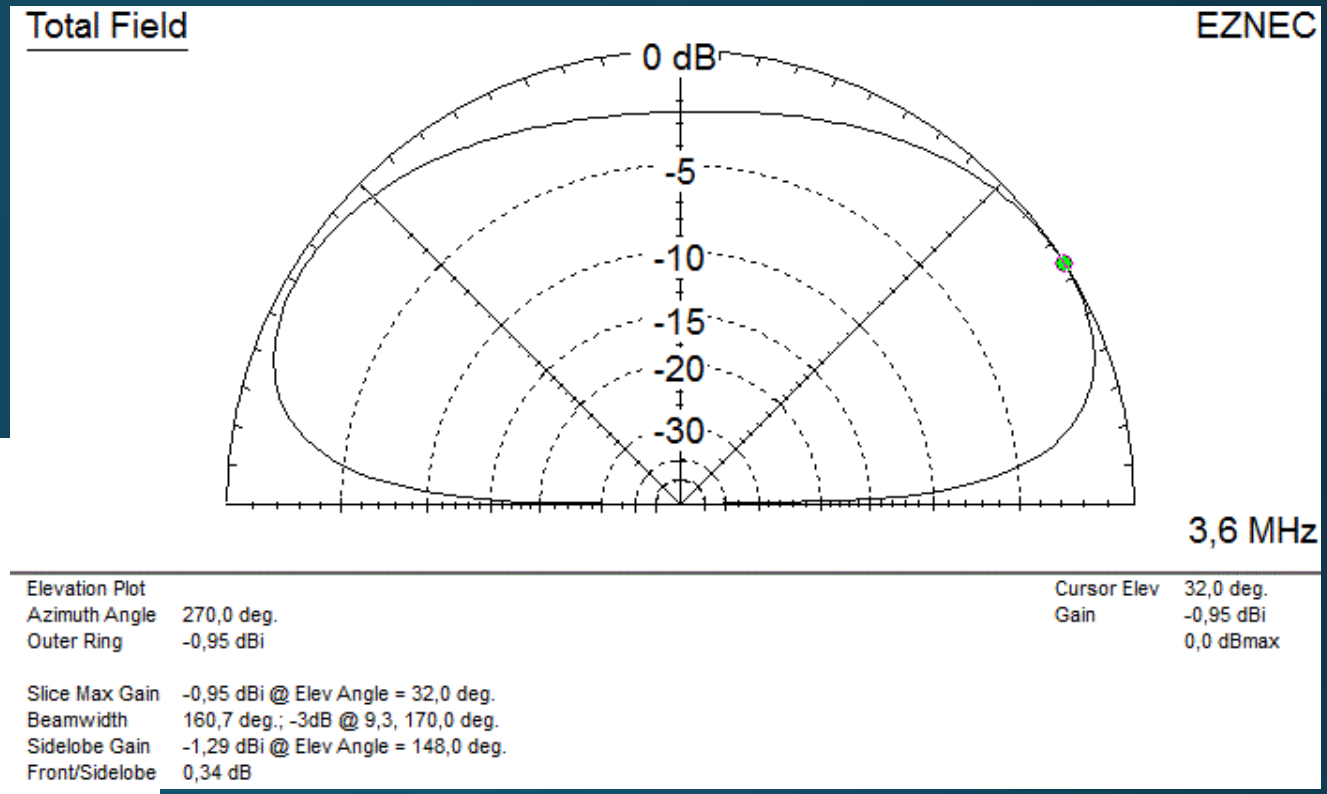
Wire Create Edit Other

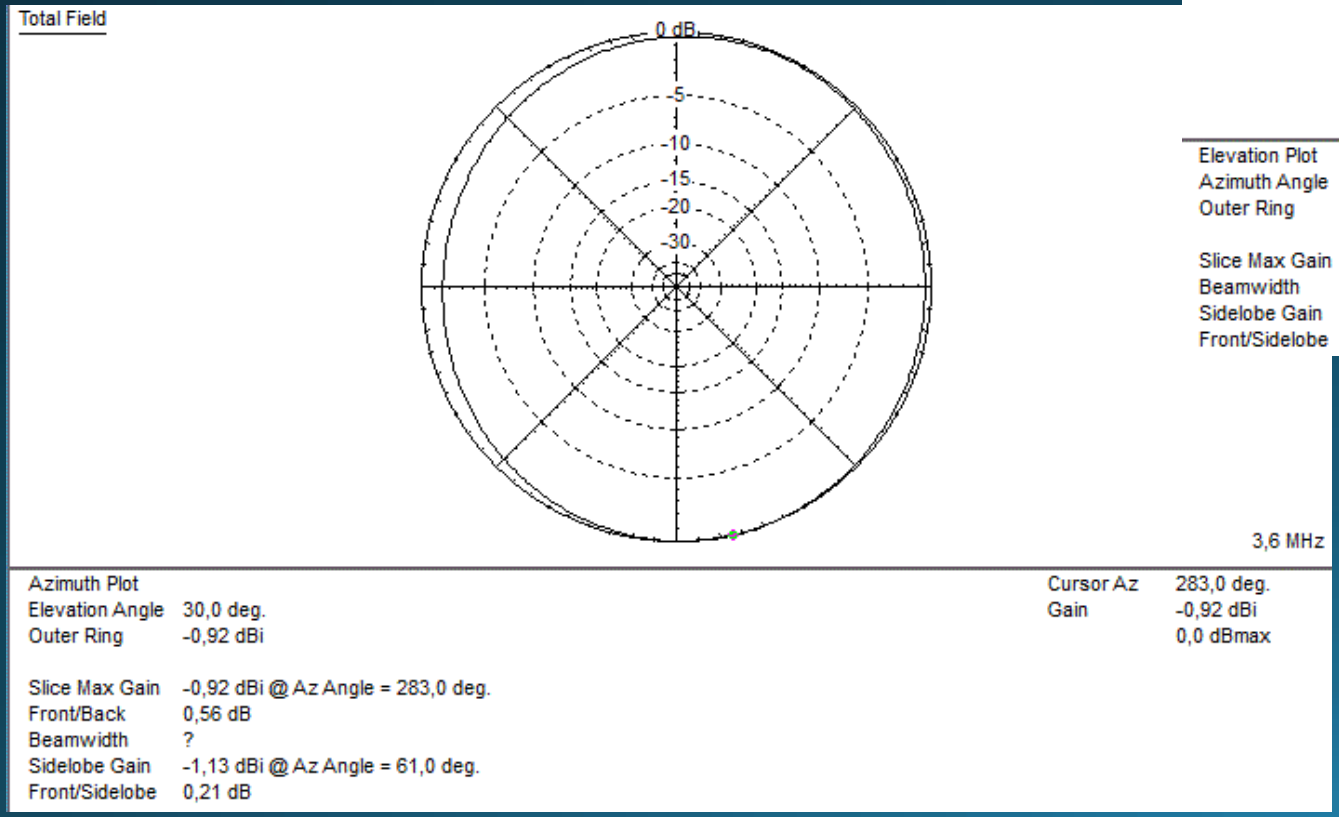
Coord Entry Mode | Preserve Connections | Show Wire Insulation

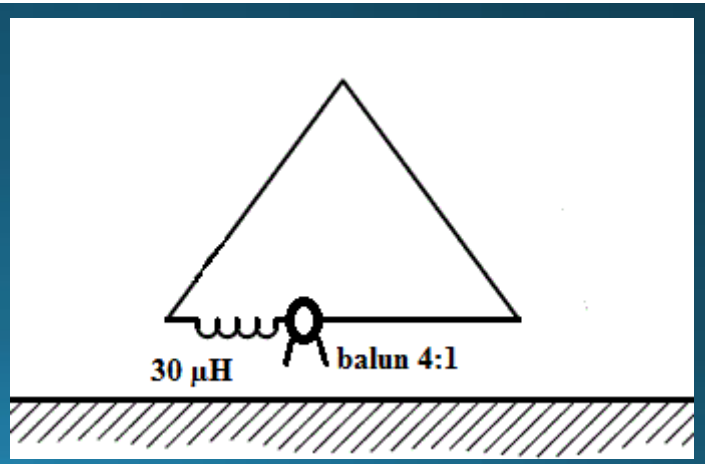
Wires

No.	End 1				End 2				Diameter	Segs	Insulation	
	X (m)	Y (m)	Z (m)	Conn	X (m)	Y (m)	Z (m)	Conn	(mm)		Diel C	Thk (mm)
1	0	0	4	W5E2	1,5	4	8	W2E1	1	20	1	0
2	1,5	4	8	W1E2	10	3,5	17	W3E1	1	20	1	0
3	10	3,5	17	W2E2	21	0	2	W4E1	1	20	1	0
4	21	0	2	W3E2	12	5	1,5	W7E2	1	20	1	0
5	0	0	3,9	W6E2	0	0	4	W1E1	1	2	1	0
6	3	0	4	W7E1	0	0	3,9	W5E1	1	20	1	0
7	3	0	4	W6E1	12	5	1,5	W4E2	1	20	1	0

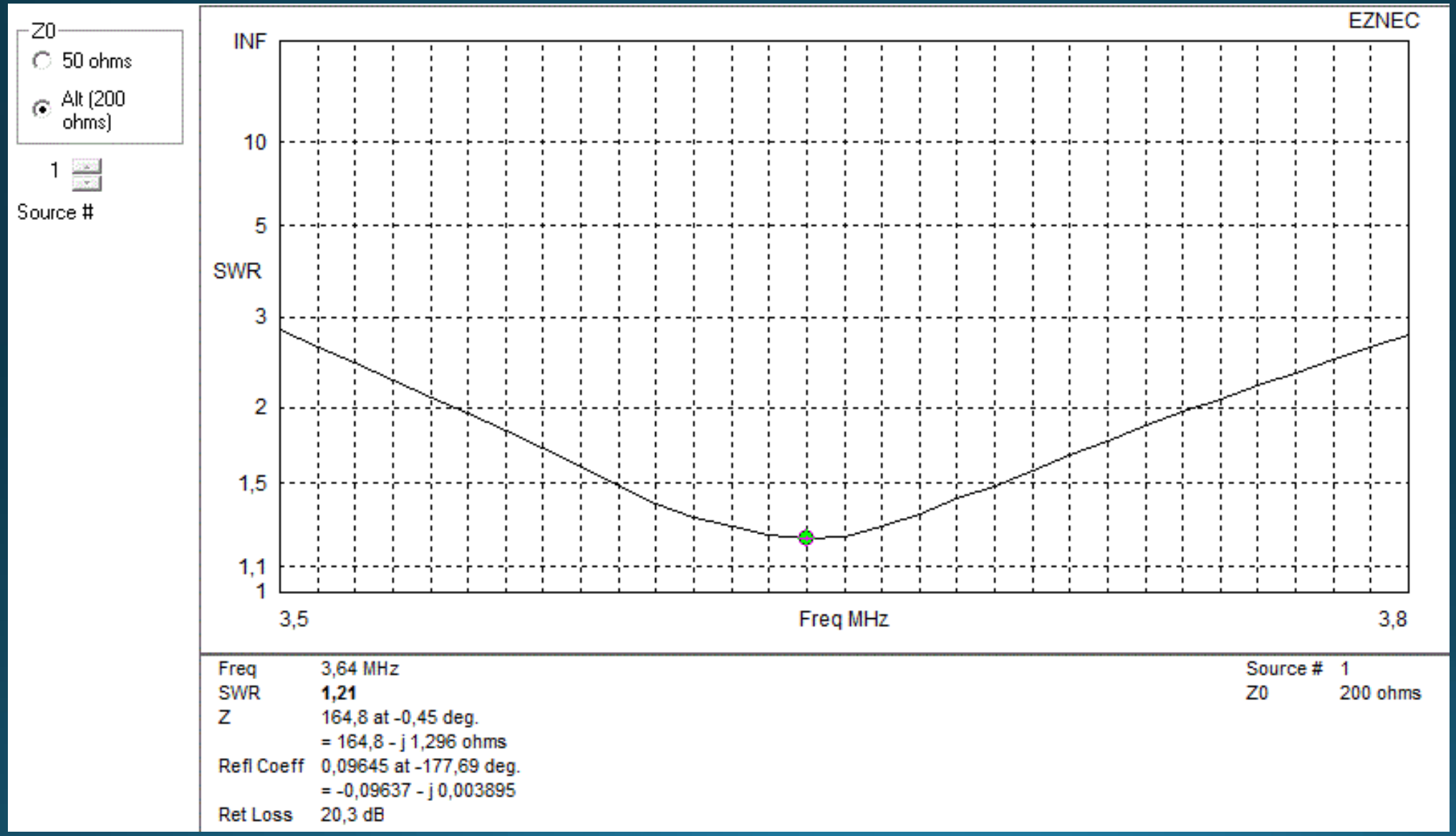
Diagrammes azimut et élévation de la loop verticale pour 3,6 Mhz alimentation au coin inférieur via self de 30 µH





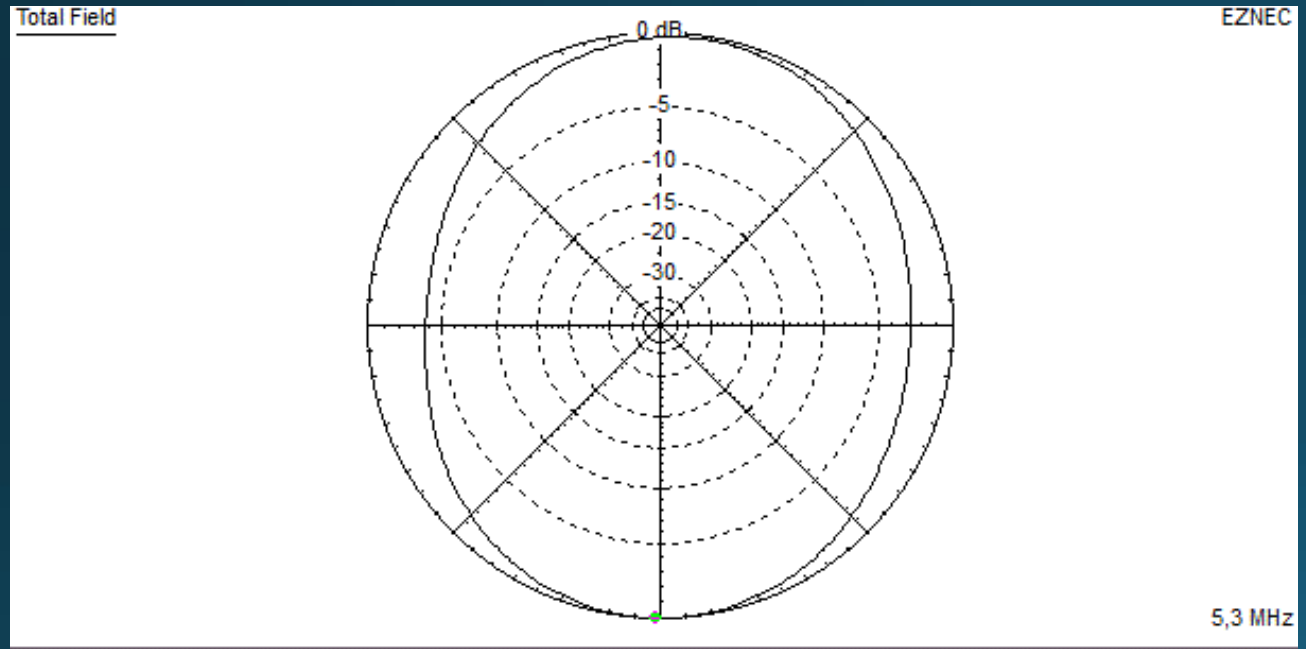


Impédance sur 80 mètres (Eznec)

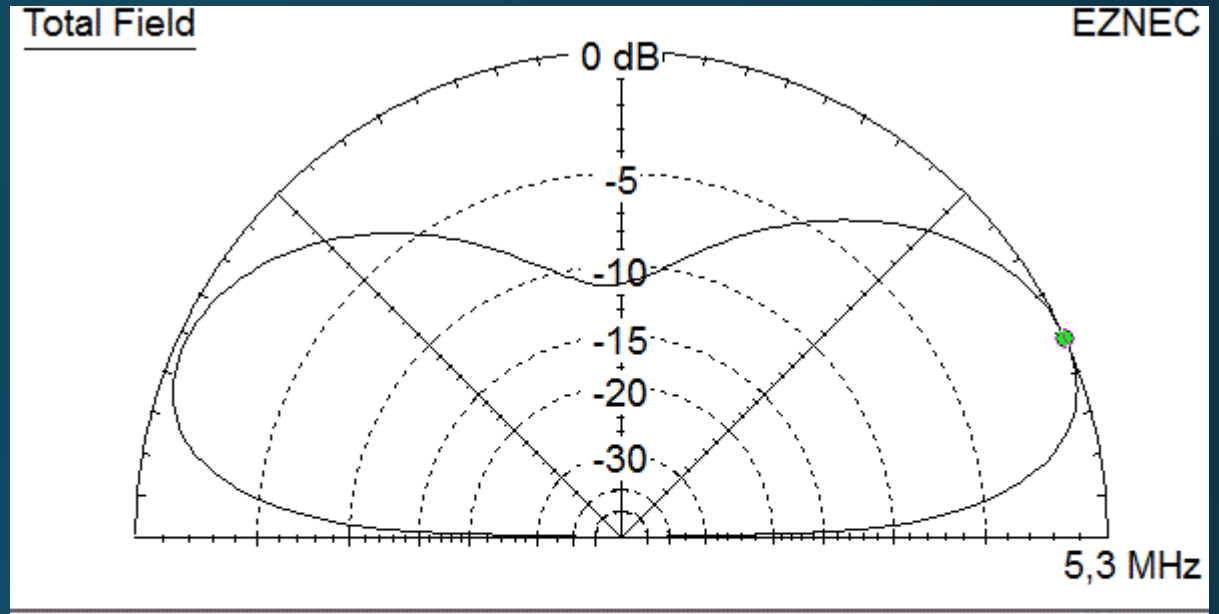


mesure réelle du SWR sur 80 mètres
au bout de 20 mètres de coaxial RG213

Diagrammes azimut et élévation de la loop verticale pour 5 Mhz

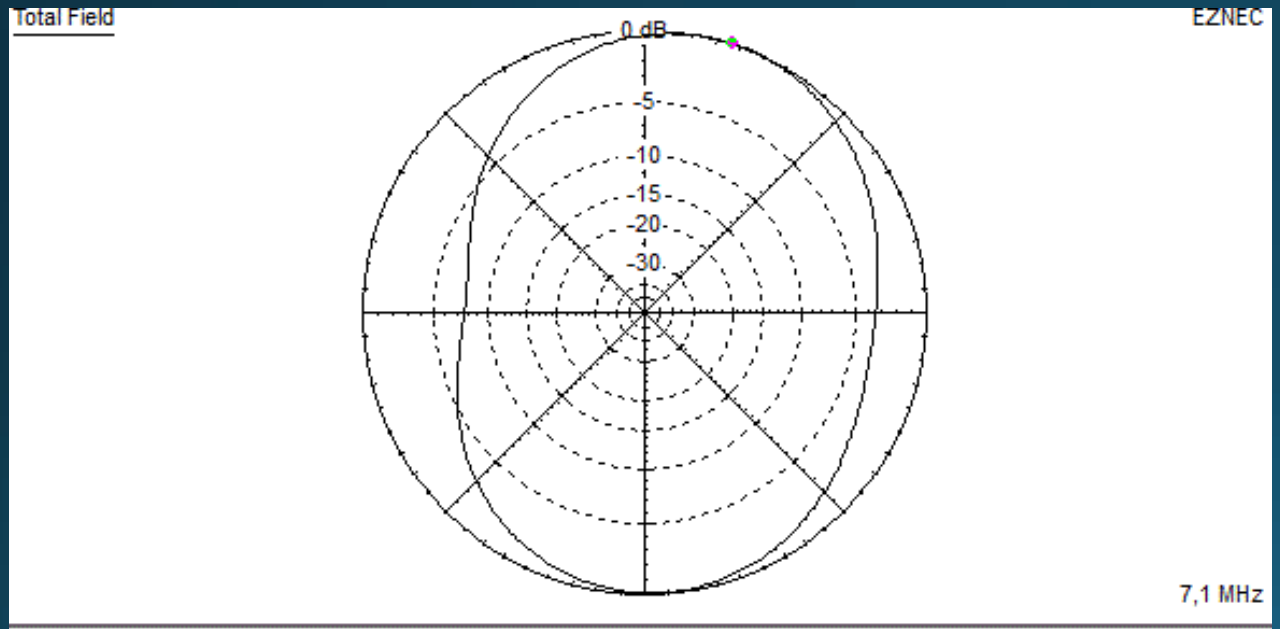


Azimuth Plot		Cursor Az	269,0 deg.
Elevation Angle	24,0 deg.	Gain	0,89 dBi
Outer Ring	0,89 dBi		0,0 dBmax
Slice Max Gain	0,89 dBi @ Az Angle = 269,0 deg.		
Front/Back	0,3 dB		
Beamwidth	305,6 deg.; -3dB @ 202,0, 147,6 deg.		
Sidelobe Gain	0,65 dBi @ Az Angle = 80,0 deg.		
Front/Sidelobe	0,24 dB		

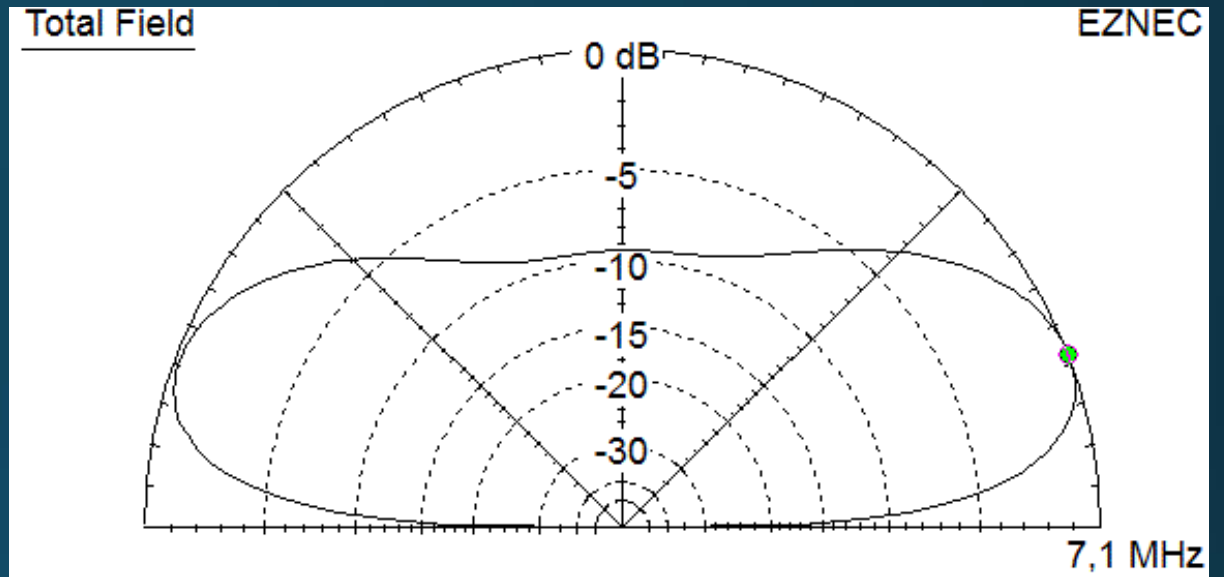


Elevation Plot		Cursor Elev	24,0 deg.
Azimuth Angle	270,0 deg.	Gain	0,89 dBi
Outer Ring	0,89 dBi		0,0 dBmax
Slice Max Gain	0,89 dBi @ Elev Angle = 24,0 deg.		
Beamwidth	42,1 deg.; -3dB @ 8,3, 50,4 deg.		
Sidelobe Gain	0,57 dBi @ Elev Angle = 156,0 deg.		
Front/Sidelobe	0,32 dB		

Diagrammes azimut et élévation de la loop verticale pour 7 Mhz

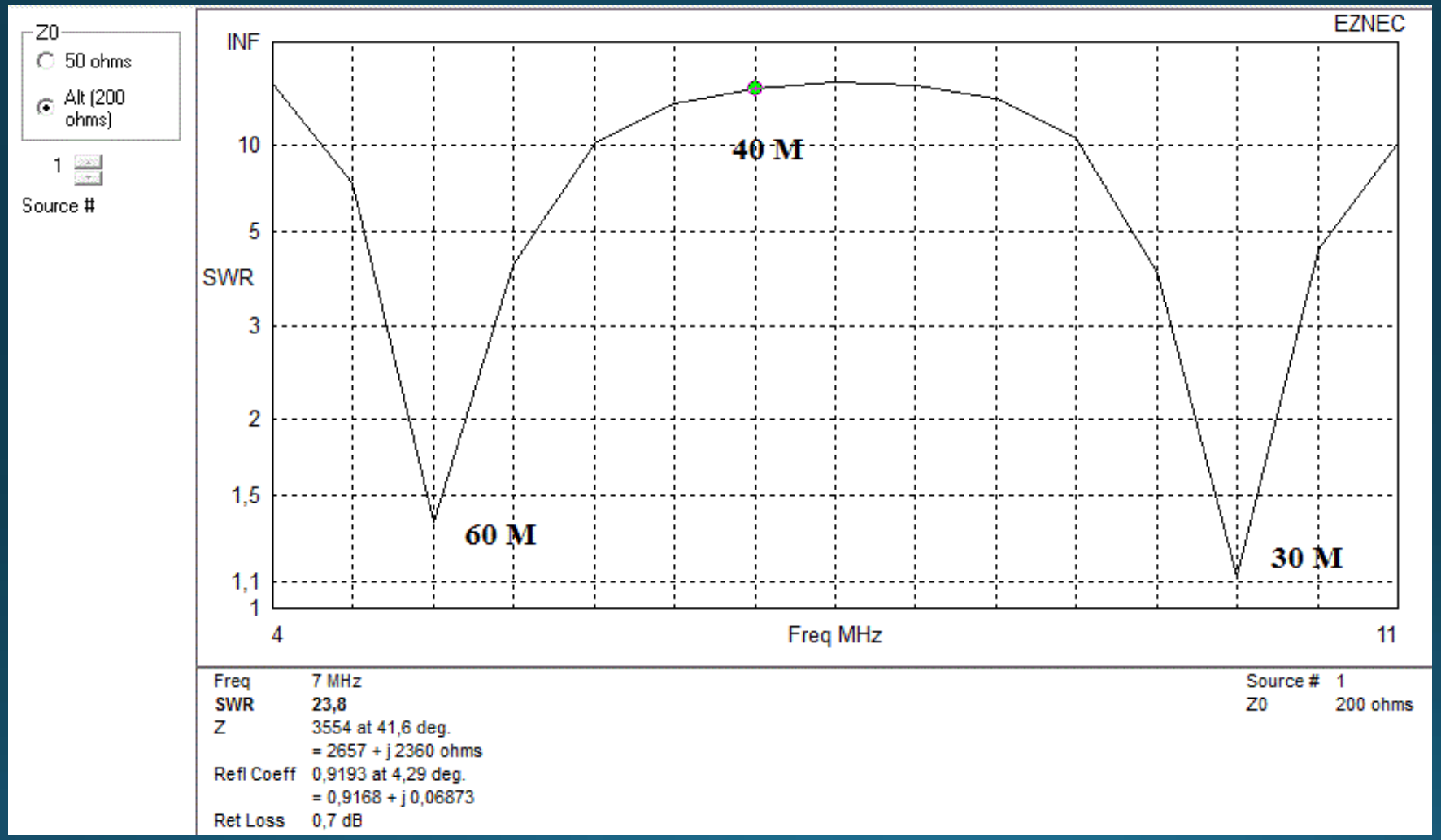


Azimuth Plot		Cursor Az	72,0 deg.
Elevation Angle	21,0 deg.	Gain	1,31 dBi
Outer Ring	1,31 dBi		0,0 dBmax
Slice Max Gain	1,31 dBi @ Az Angle = 72,0 deg.		
Front/Back	0,71 dB		
Beamwidth	114,1 deg.; -3dB @ 10,4, 124,5 deg.		
Sidelobe Gain	1,18 dBi @ Az Angle = 274,0 deg.		
Front/Sidelobe	0,13 dB		

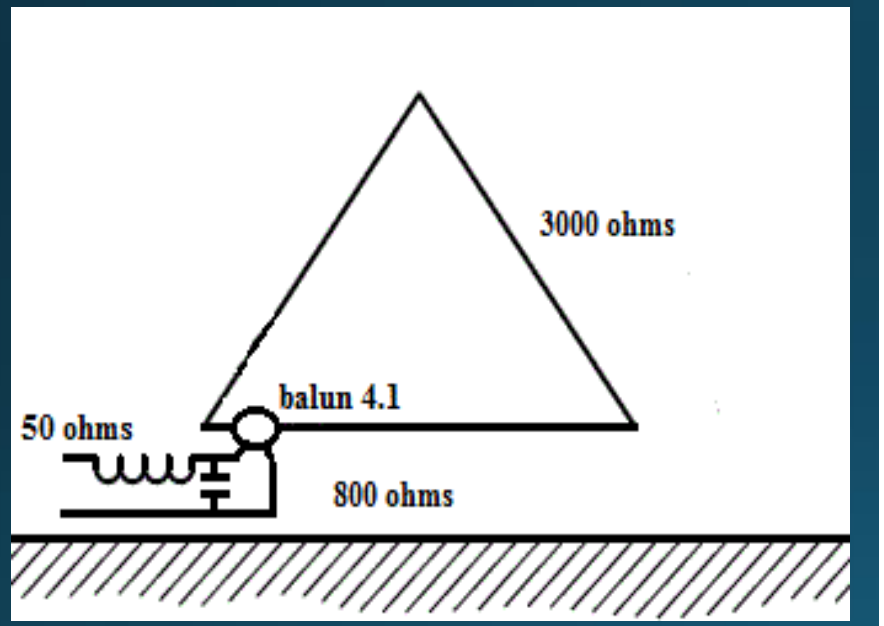


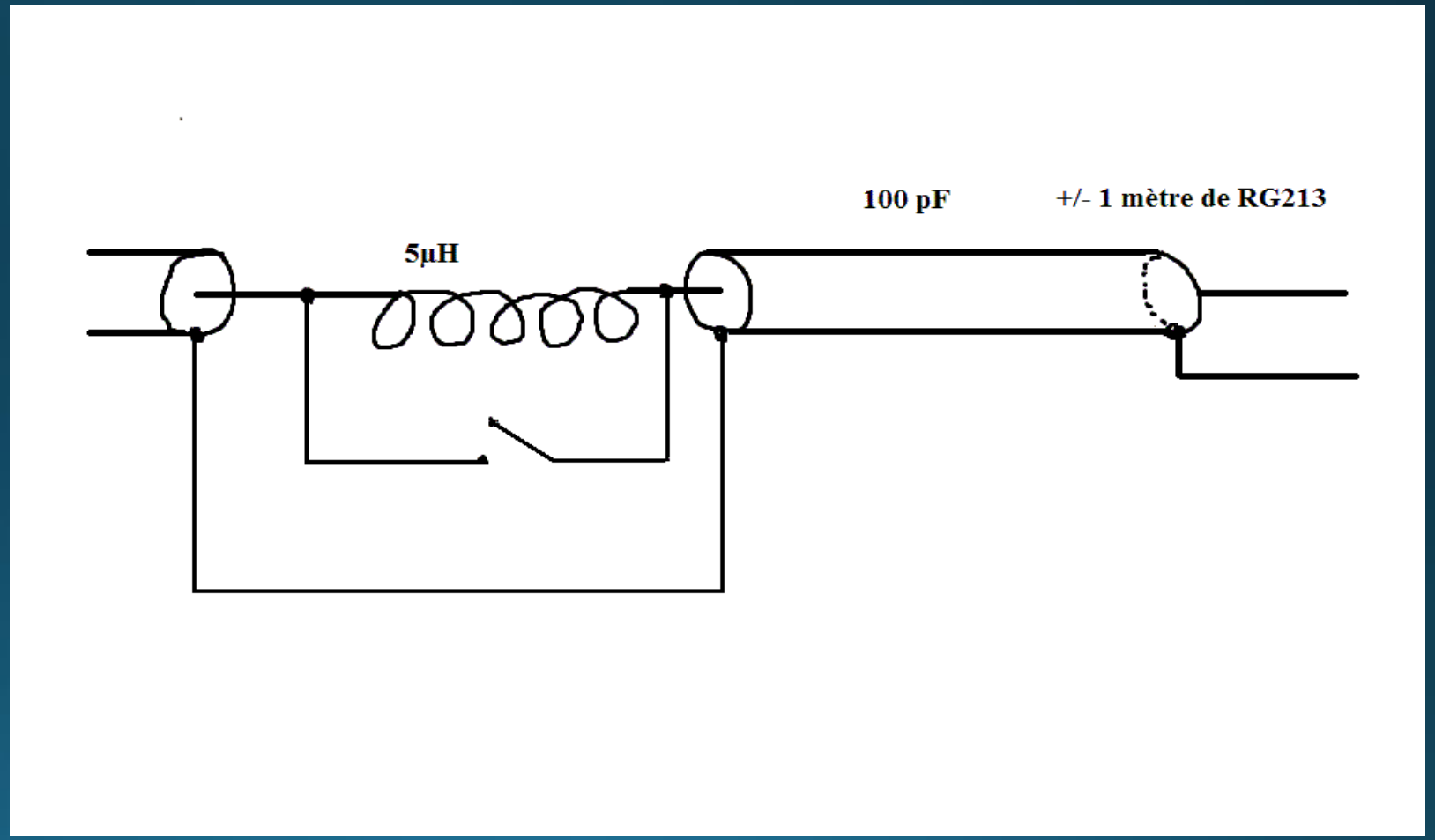
Elevation Plot		Cursor Elev	21,0 deg.
Azimuth Angle	270,0 deg.	Gain	1,16 dBi
Outer Ring	1,16 dBi		0,0 dBmax
Slice Max Gain	1,16 dBi @ Elev Angle = 21,0 deg.		
Beamwidth	35,0 deg.; -3dB @ 7,7, 42,7 deg.		
Sidelobe Gain	0,96 dBi @ Elev Angle = 159,0 deg.		
Front/Sidelobe	0,2 dB		

40 mètres swr et adaptation d'impédance

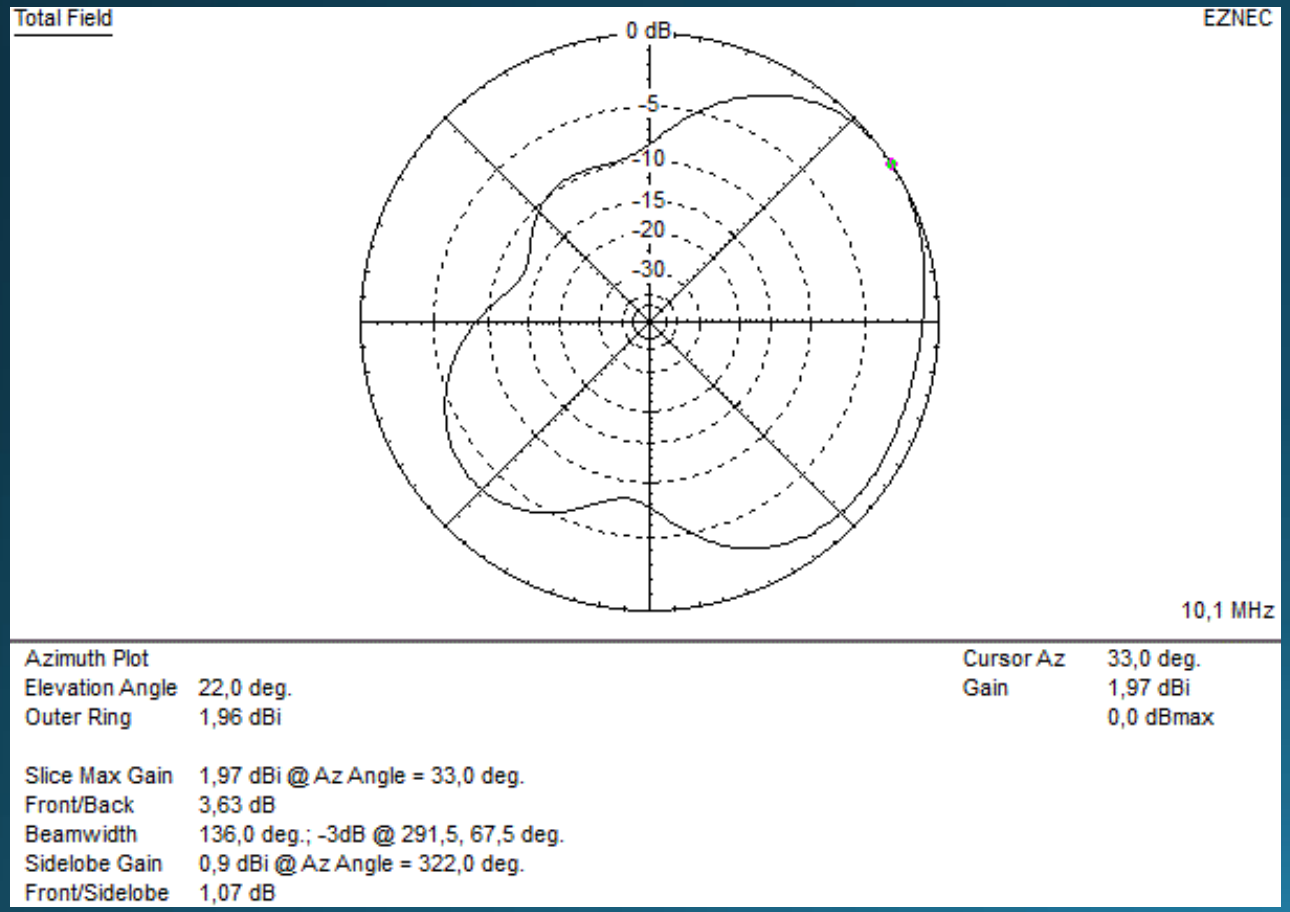


40 mètres swr et adaptation d'impédance

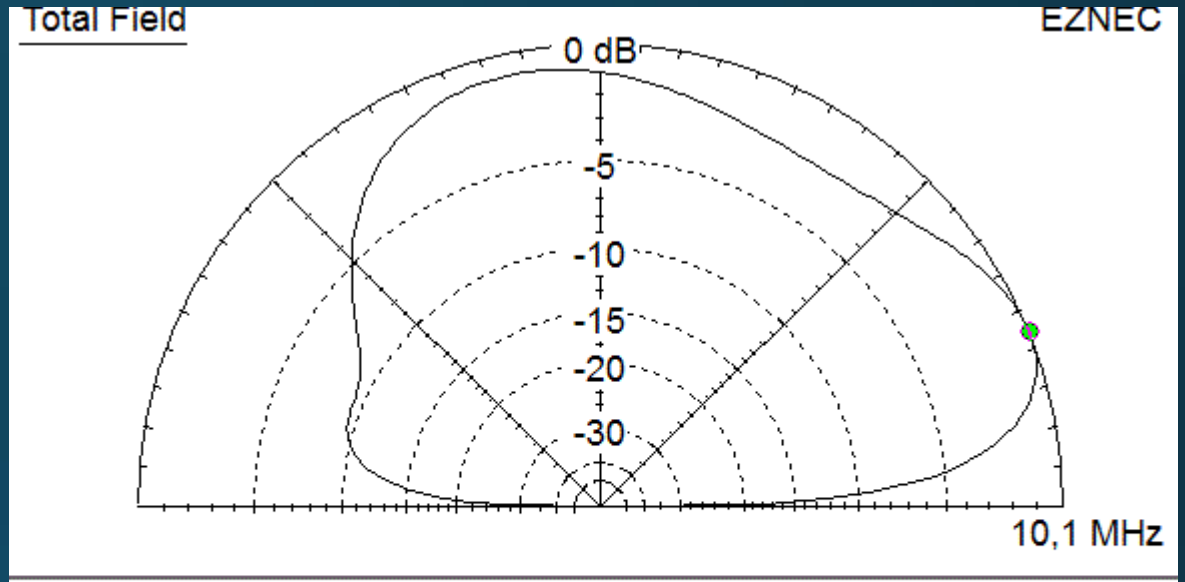




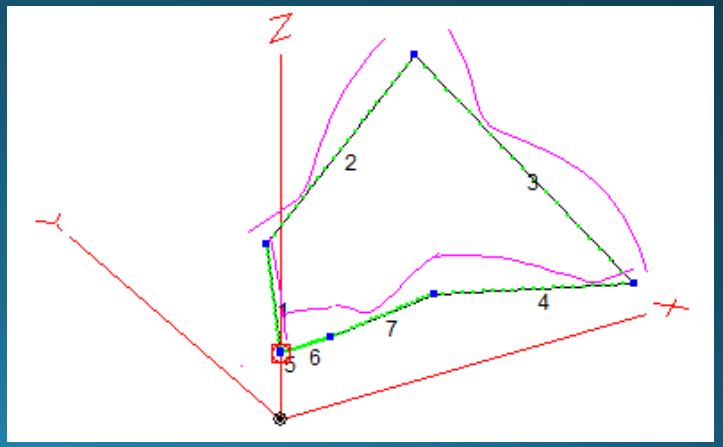
Diagrammes azimut et élévation de la loop verticale pour 10 Mhz



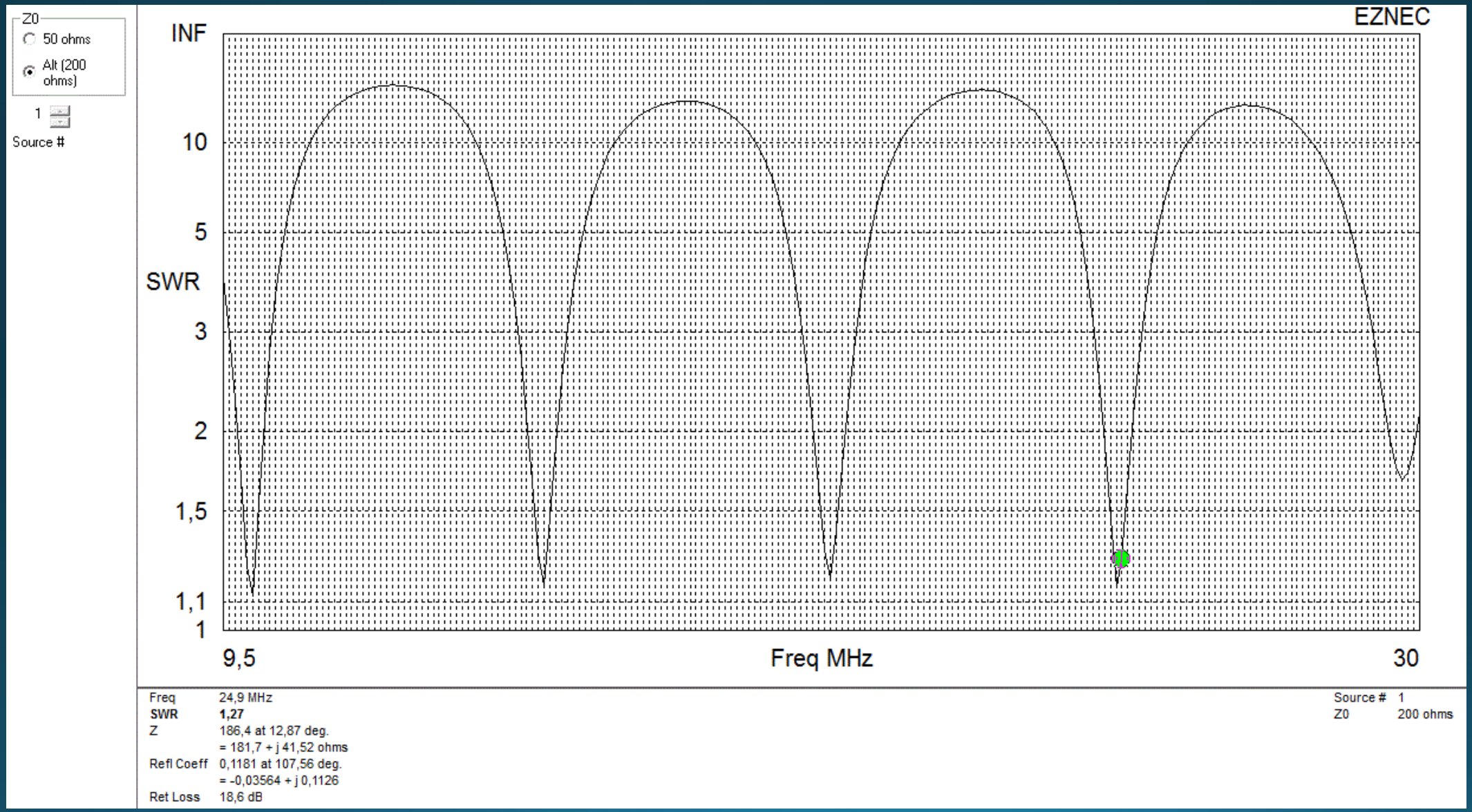
Azimuth Plot		Cursor Az	33,0 deg.
Elevation Angle	22,0 deg.	Gain	1,97 dBi
Outer Ring	1,96 dBi		0,0 dBmax
Slice Max Gain	1,97 dBi @ Az Angle = 33,0 deg.		
Front/Back	3,63 dB		
Beamwidth	136,0 deg.; -3dB @ 291,5, 67,5 deg.		
Sidelobe Gain	0,9 dBi @ Az Angle = 322,0 deg.		
Front/Sidelobe	1,07 dB		



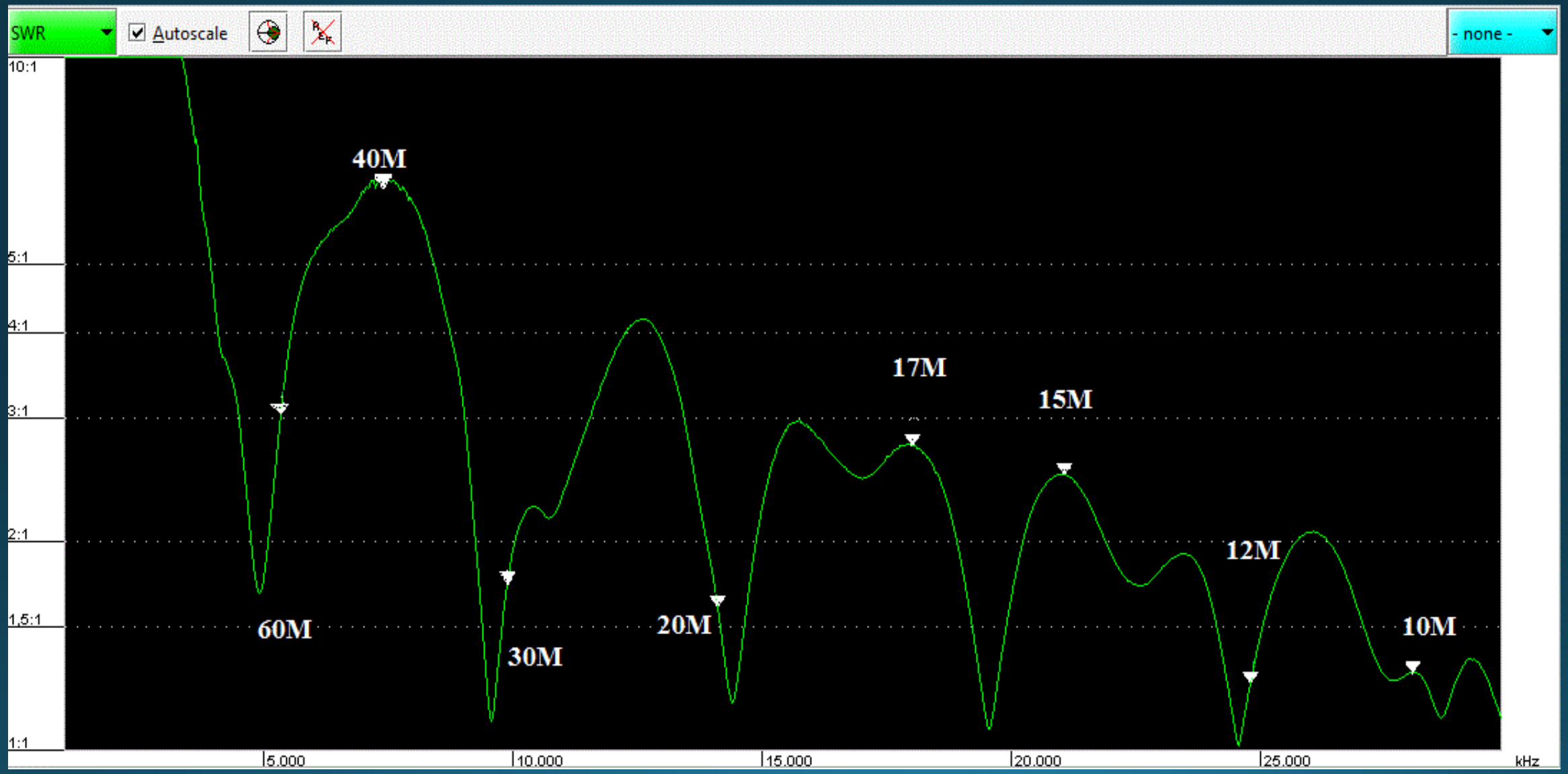
Elevation Plot		Cursor Elev	22,0 deg.
Azimuth Angle	315,0 deg.	Gain	0,83 dBi
Outer Ring	0,83 dBi		0,0 dBmax
Slice Max Gain	0,83 dBi @ Elev Angle = 22,0 deg.		
Beamwidth	119,4 deg.; -3dB @ 8,2, 127,6 deg.		
Sidelobe Gain	-0,01 dBi @ Elev Angle = 101,0 deg.		
Front/Sidelobe	0,84 dB		



Autres bandes entre 20 M et 10 M



mesure réelle du SWR
au bout de 20 mètres de coaxial RG213



Merci pour votre attention

Michel , ON6MH