

Buried Targets

Case 6b

A wire at the ground interface vicinity

Philippe. Pouliguen¹, Yannick Béniguel²

1 DGA / DS / MRIS, Paris

2IEEA, Courbevoie

1. A wire at the ground interface vicinity

The calculation to be performed is a near field calculation. The diffracting structure is a wire which will be either located on the ground or slightly buried.

- The wire length is 100 m. Its radius is 0.75 mm.
- The antenna phase center is located 2 meters above the ground level.
- The antenna pattern is Gaussian; its aperture (3 dB) half angles are 40° in the horizontal plane and 5° in the vertical plane. Its amplitude is one V/m at its maximum.
- The angle β between the horizontal axis and the antenna Line of Sight (the pointing direction) is 10° .
- Ground : Flat with electrical characteristics (epsilon = 15 ; sigma = 0.01 s / m)
- Polarizations : VV and HH ($\theta\theta$ and $\phi\phi$)

2.1 Case 6b.1 Moving antenna perpendicular to the wire

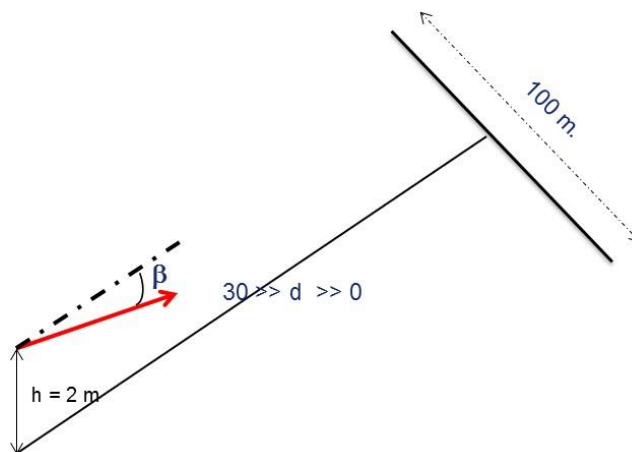


Figure 2 moving antenna / RCS of a wire on the ground

- The calculation will be performed at 500MHz
 - The distance is varying from 30m to 1m with a step equal to 1m.
- a) The wire is laid on the ground surface. The distance between the wire center at any point along it, to the ground is consequently equal to its radius i.e. 0.75 mm
 - b) The wire is slightly buried. The distance between the wire center at any point along it, to the ground surface is 1.5 cm.

1.2 Case 6b.2 Varying the frequency at a given distance

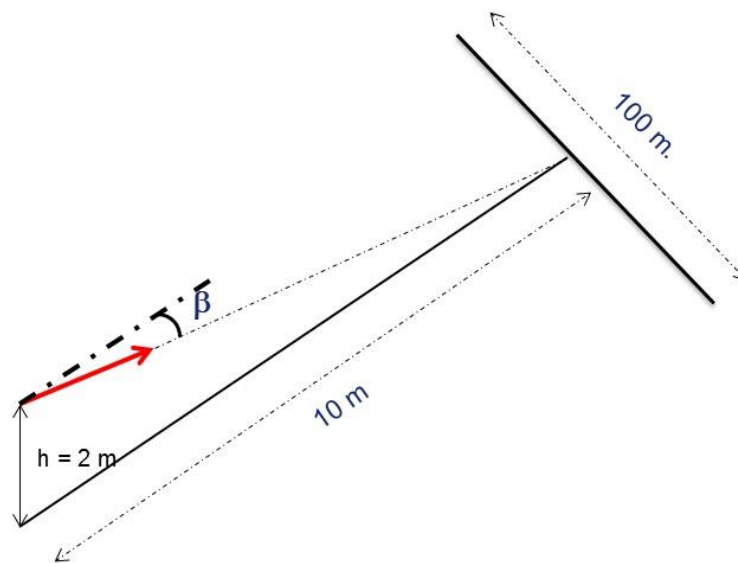


Figure 3: RCS of a wire on the ground / varying the frequency

- The calculation will be performed at 10m
 - Frequency band [100 MHz – 1 GHz] - frequency step : 10 MHz
- a) The wire is laid on the ground surface. The distance between the wire center at any point along it, to the ground is consequently equal to its radius i.e. **0.75 mm**
 - b) The wire is slightly buried. The distance between the wire center at any point along it, to the ground surface is 1.5 cm.

2. Results to be provided

d (in meters), $E_{\theta\theta}$, $E_{\phi\phi}$ (in V/m) for the case 6b.1
frequency (in GHz), $E_{\theta\theta}$, $E_{\phi\phi}$ (in V/m) for the case 6b.2

Each result will be provided as an ASCII file.
They will be named
BuriedTargets_Case_6b.i_CompanyName.txt