

The dipole of PAOSNY, and the supposed radiation
using data and graphs of *The ARRL Antenna book 1988 (15th edition)*

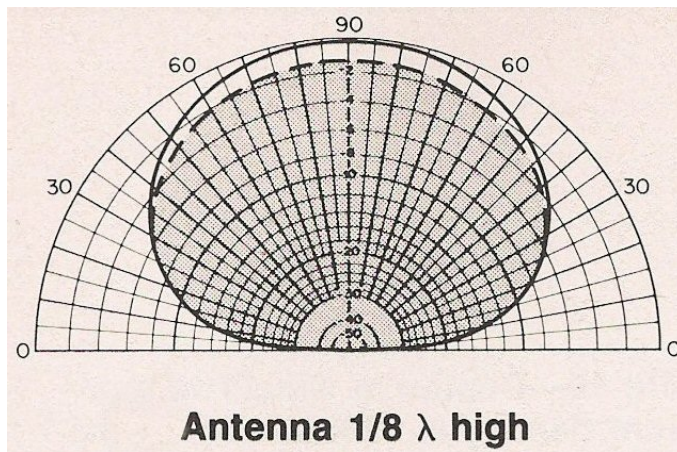
The antenna that is discussed here is an open dipole, with a total length of 27m30 (2 x 13m65), mounted between two chimneys at a height of approximately 10 meters above earth and center fed with an open feeder (chicken ladder).

A separate document describes the construction and another one the installation (actual situation).

In the described graphs, the solid line represents the theoretical situation, where as the dashed line assumes a real earth (no 100% reflection). The radiation pattern that is shown, assumes looking along the antenna from the end (so seeing a 'dot' only).

The graphs in this publication come from the 15th edition of the ARRL Antennabook, and this is done with permission of the ARRL, for which I am grateful.

For 80 meters:



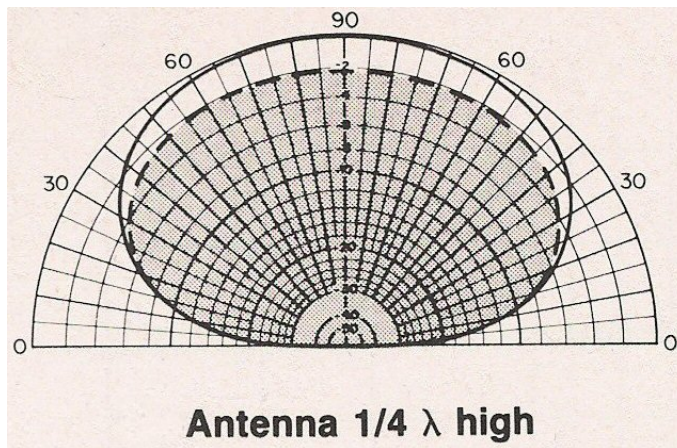
The majority of the signal will travel upward, due to the typical ground effect of this $1/8 \lambda$ height above ground situation

This makes the dipole, in this 80m application, a typical NVIS *) antenna

*) **NVIS: Near Vertical Incidence Skywave.** This is an effective means for 'semi local' QSO's, and uses the skyward radiation field, supported by the reflected wave coming from the earth.

The skywave reflects against the F-layer at about 400 km, and provides good signal in a radius of around 350 km (daylight).

For 40 meters:

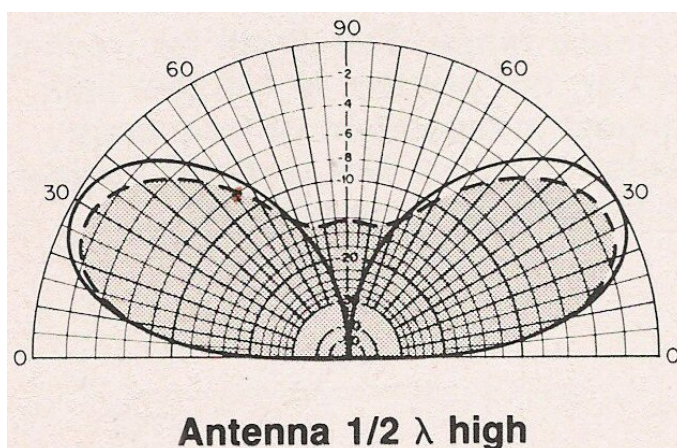


Here also, the majority of the signal will travel upward, due to the typical ground effect of this $1/4 \lambda$ height above ground situation

This makes the dipole, in this 40m application, a typical NVIS antenna as well, be it that at lower angles the radiation will be better than on 80m.

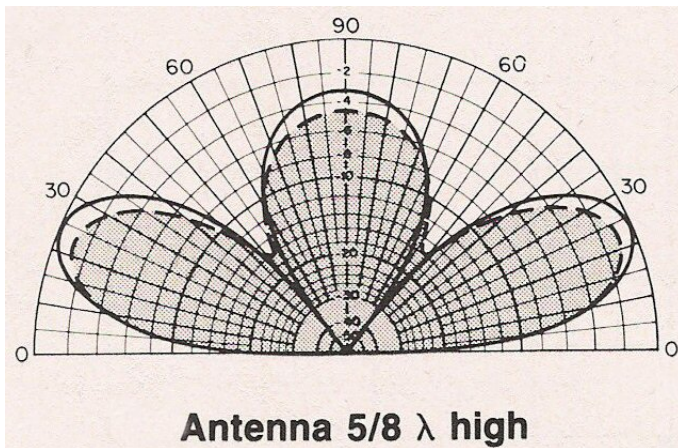
For better understanding on NVIS: there are enough publications, but Harold Melton, [KV5R](#), has made a very good story about it.

For 20 meters:



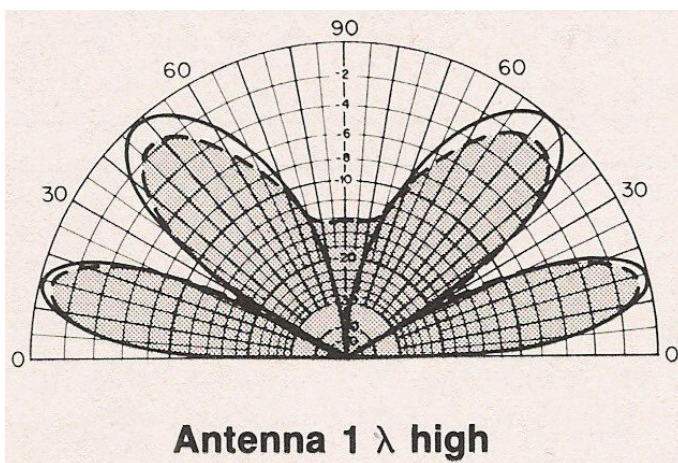
As here the antenna is 'exactly' a half wavelength above the reflecting surface, the reflected signal is out of phase with the directly transmitted signal, and the upward reflected component compensates the direct signal. Because of the 'unideal' reflection, there is no 100% compensation, and a vertical component still exists. But the graphs show that the predominant radiation is at the lower angles

For 15 meters:



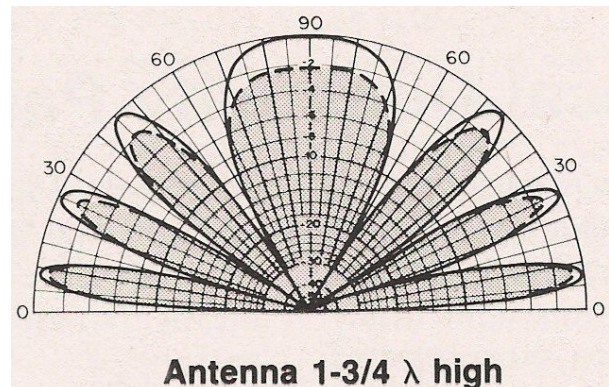
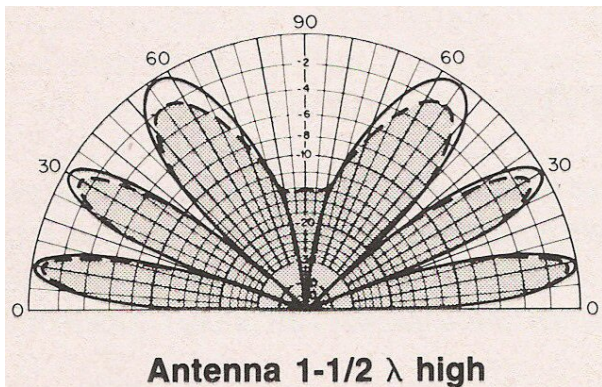
This 5/8 λ comes close to the 10m height of the antenna for this frequency. As can be seen there is a considerable upward component, but, for DX, a very favorable low angle radiation

For 10 meters:



Indeed: this is the 1 λ ! Only time will tell how the antenna behaves in relation to the GPA-30 that is mounted on the side of our house. With the low sunspot numbers, 10 meters is rather dead nowadays (time of writing: July 2007).

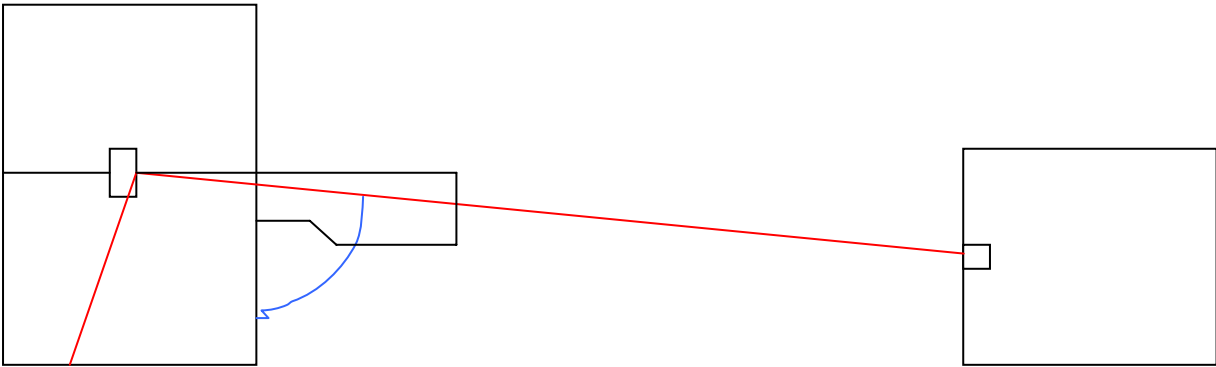
For 6 meters:



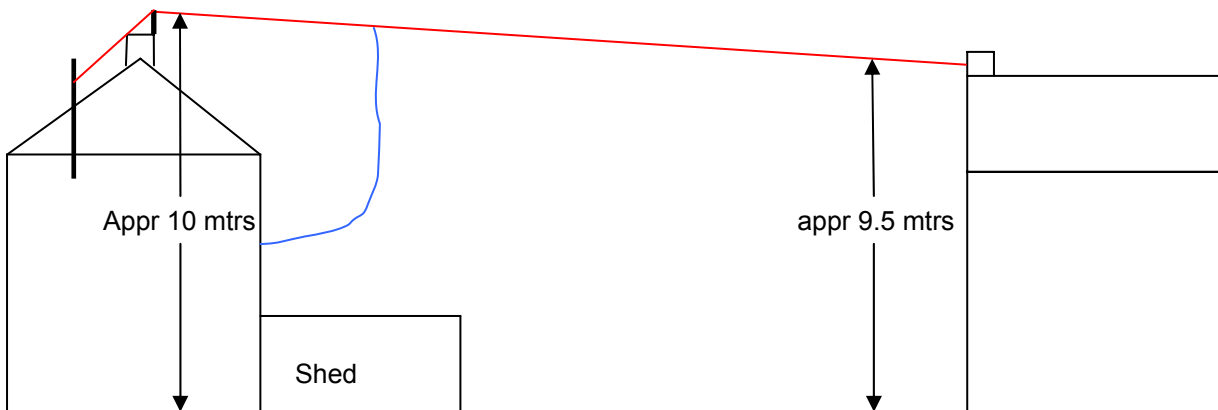
When calculating the exact figures for 6 meters, the antenna would be at 1 2/3 λ above ground, which is in-between the left and right wavelengths. Fact is that in both situations there will be a low radiation angle anyway

It seems that my antenna tuner has no problems with matching the antenna on 50 MHz. Local trials indicate that polarization has become important: my other antenna for 6 meters (the V2000) and this one are used alternately, depending on the stations that I work.

Here is depicted how my antenna has been installed.



Above: the situation as seen from above. Left is our house ("two under one roof"), on the right is the house of the neighbour. It is the last in a row of 6 houses



And here as seen from the side of our house.

It is clear that the antenna is not exactly horizontal, and it is also clear that the dipole has one bent leg. This will certainly have some effect on the behavior of the radiated field. The shed is made of wood and has no metal parts

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Permission for using the seven radiation graphs was obtained by e-mail from Steve, WB8IMY on July 11, 2007