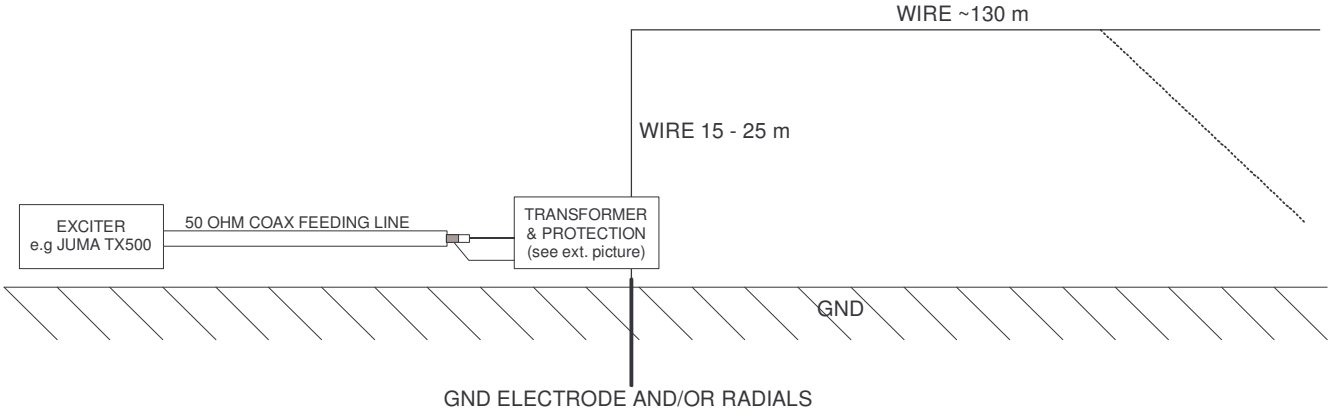
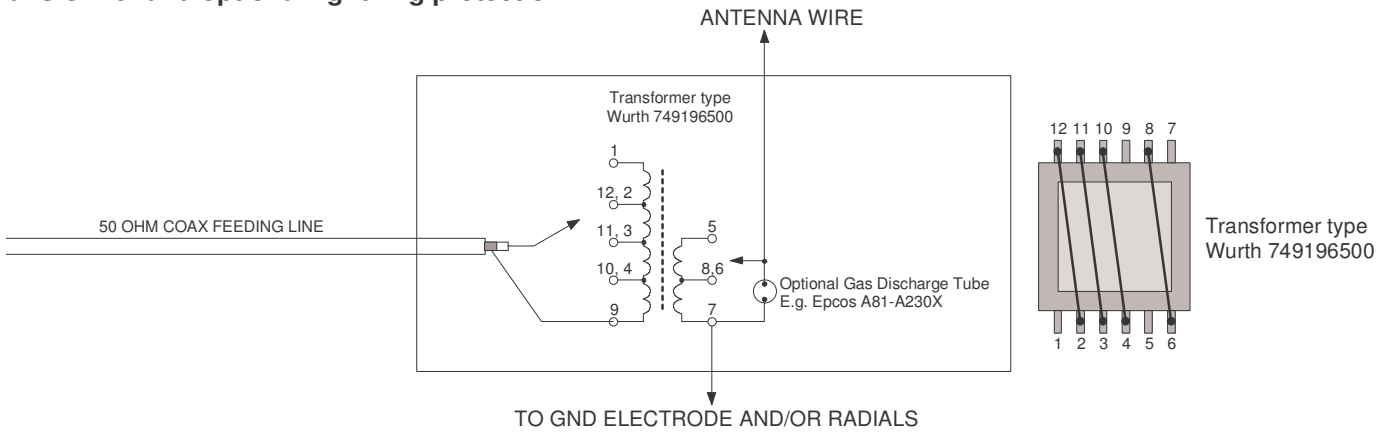
L-antenna construction



Tips and notes

- Use a copper wire diameter of 1 - 2 mm, enammel, plastic insulated or open wire
- GND electrodes alone can be used when the ground coductivity is good or moderate
- Few to several 150 m radial wires can be used in conjunction with the GND electrode
- Adjust reactance to zero (to resonance) by the lenght of the horizontal wire.
- The horizontal wire can be sloped down to few meters for easier length adjustment
- Adjust the resistance (real part of impedance) by selecting suitable taps in the transformer
- Use an antenna analyzer e.g. MiniVNA to adjust separately the resistance and the reactance

Transformer and optional lightning protection



Transformer tips and instructions

- The transformer is also used in TX500 and will be available as an option part to JUMA TX500
- Transformer data sheet http://www.we-online.de/katalog/media/pdf/749196500.pdf
- The transformer has six separate windings
- Connect the windings in series according the picture
- Solder the input & output to the tarnsformer taps
- Do not ground the coax shield in the antenna feeding point

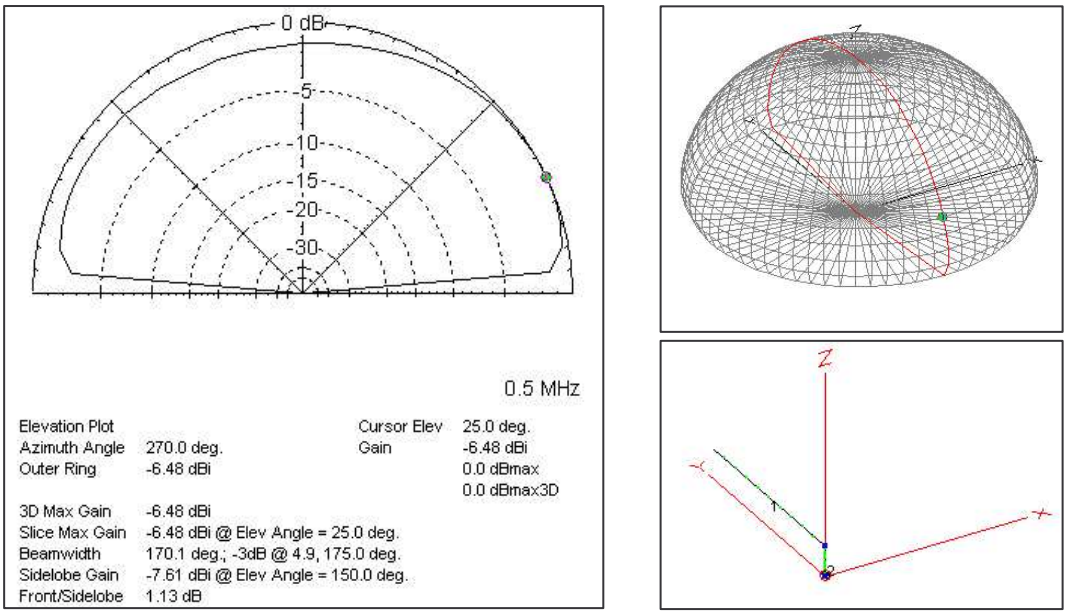
Available ouput impedances with 50 ohm input

- IN 1 / OUT 8,6 => 3.1 ohms
- IN 12,2 / OUT 8,6 => 5.6 ohms
- IN 1 / OUT 5 => 12.5 ohms
- IN 12,2 / OUT 5 => 22 ohms
- IN 11,3 / OUT 5 => 50 ohms
- IN 5 / OUT 12,2 => 113 ohms
- IN 5 / OUT 1 => 200 ohm

For final installation to protect direct rain, cover the transformer with a plastic can which is open at the bottom.

Performance

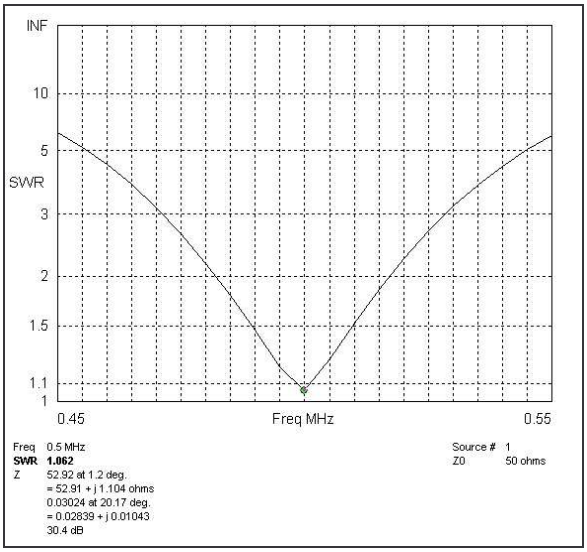
The gain depends very much on the ground properties, conductivity and dielectric constant. Simulation indicates a gain variation from about 0 dBi with an ideal ground down to -10 dBi with average ground type. If the ground is poor like in sandy, dry or rocky areas, it is recommended to use several radials, otherwise the gain will drop much below -10 dBi. The shape of the radiation pattern does not vary so much with the ground properties. Here is one example EZNEC simulation of radiation pattern with a good rich soil ground (conductivity 0.03 S/m).



Total radiation pattern simulation on a good ground with EZNEC.

Feeding point impedance

The feeding point impedance is depending on the ground properties too. The better the ground conductivity, the lower is the feeding point impedance. Simulation indicates low feeding point impedance, down to 5 ohms with an ideal ground and up to 100 ohms or more with a poor real ground conductivity. This can be matched with the transformer in the feeding point. Here is one example EZNEC simulation of the SWR.



Typical SWR with a good ground 0.01 S/m

The presented L-antenna can be scaled to other bands. E.g. on 136 kHz the wire lengths should be approximately 500/136 (~3.68) times longer.

Se related information JUMA TX500 www.nikkemedia.fi/juma-tx500