



Impulse Radiating Antenna



The HIRA180 is an ultra wideband half radiating antenna using a ground plane as an electromagnetic mirror. This antenna produces a very narrow beam in the bore sight direction. The advantage of this construction compared to a full paraboloidal reflector antenna is a better ruggedness, a broader frequency range and an improved return loss.

Two families of antennas are available:

- standard version with a 50 Ω high voltage connector and a impedance adapter for the antenna
- special version with the pulse generator placed under the ground plane and connected directly to the feed arms.

Connected to a 30 kV, 130 ps pulse generator, the antenna can theoretically produce more than 7.3 kV/m at a distance of 20 m. The antenna can be oriented in every direction. In a receive mode, its output voltage is proportional to the incident E-field.

This antenna is designed for the following applications:

- immunity tests on electronic equipment
- buried object identification
- wideband jammers
- wideband source for vulnerability studies via transfer function measurements
- industrial applications (e.g. detecting leaky or defective pipes underground)
- avalanche rescue operations
- etc.



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SPECIFICATIONS

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| Type | 20 kV: HIRA180 / 30 kV: HIRA180S |
| Reflector diameter | 180 cm |
| Reflector type | half paraboloidal |
| Frequency range | 100 MHz – 18 GHz |
| Gain | frequency dependant |
| Polarisation | vertical |
| rE value (for a 130 ps / 20 kV pulser)¹ | 98 kV |
| rE value (for a 130 ps / 30 kV pulser)¹ | 147 kV |
| rE value (for a 1 ns / 20 kV pulser)¹ | 12.7 kV |
| Theoretical far field limit (for a 130 ps / 20 kV pulser)² | 42 m @ 130 ps |
| Theoretical far field limit (for a 1 ns / 20 kV pulser)² | 5.4 m @ 1 ns |
| Maximum voltage | HIRA180: about 20 kV / HIRA180S: about 30 kV |
| Power capability (continuous) | 160 W |
| Maximum energy | 26 kJ |
| S11 | better than 9.5 dB, up to 2.5 GHz |
| Input impedance | 50 Ω |
| Connector | HIRA 180: HN / HIRA 180S: proprietary |
| Dimensions of the ground plane | 190 x 190 cm |
| Overall dimensions L x W x H | 190 x 190 x 220 cm |
| Weight | 90 kg |

Note 1: This is a theoretical value. In the reality, the field could be lower due to the following losses: for instance: losses in the cable, in the impedance transformer, in the voltage divider (if used), in the antenna, etc. The measurement have shown that a difference between the theoretical and measured field can be roughly 20 to 50 %.

Note 2: The measurement have shown that the far field condition is also achieved for shorter distances. For this model, the far field conditions are already fulfilled at a distance of less than 13 m from the antenna feeding point! The reason of the difference between the calculated and measured values is not known for the moment.

This data sheet gives an example of realization. The design can be adapted to the customer need. Other possible designs: other dimensions and gains, full IRA design, antenna arrays, hyperboloidal reflectors, etc. A full system consisting of the antenna, the frame with rotation system and the adequate impulse generator can be proposed as shown in the picture above. The generator can be adapted especially to the antenna. A full range of generators is available (subnanosecond, damped waves, double exponential, etc.).