

Geoscope DXG Antenna description

The Geoscope DXG antenna is a ground coupled antenna designed to operate as a ground penetrating radar antenna located on top of the ground surface.

The antenna system for the Geoscope consists of an array of broadband resistively loaded bow-tie monopole antennas with very low efficiency (5%). Figure 1 shows the principle of operation of the antenna array.

The antenna gain (in the downward direction) is -5dBi. When these antennas are facing toward the ground, the typical shielding efficiency for undesired radiation into the air is 25 – 30 dB.

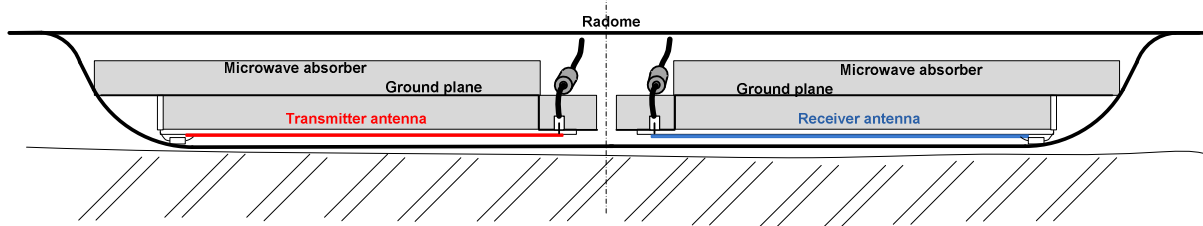


Figure 1. Principle of operation of the antenna array.

Figure 2 shows the antenna layout from the bottom side. The elements are scanned by connecting transmitter and receiver antennas sequentially to the TX and dual-channel RX via the RF multiplexers.

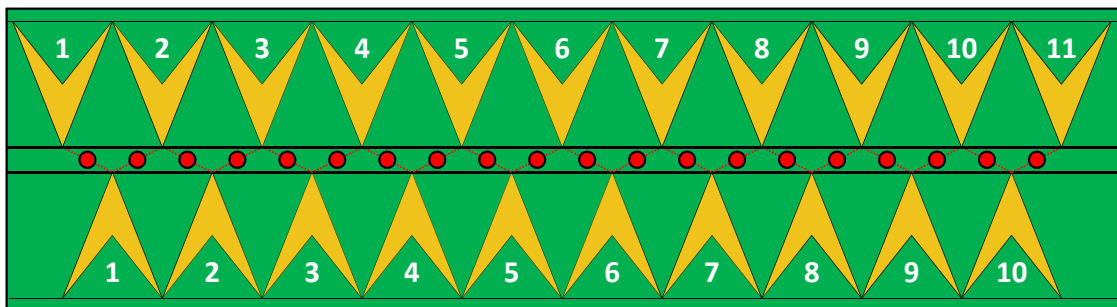


Figure 2. Antenna element layout (bottom side) for Antenna Model DXG1820. Transmitting antenna lower side, receiving antenna upper side.

The antenna array can be manufactured in different lengths containing different number of channels as shown in Table 1. The antenna elements and RF-electronics (Antenna Front End, multiplexers etc.) are identical for all antennas. Hence, the only difference is the number of transmitter and receiver elements being used, but since the signals are fed sequentially to these elements, the radiation and emission characteristics are identical for all antenna models.

Table 1. Available DXG Antenna models for the Geoscope system.

Model	DX0908	DXG1212	DXG1820	DX2124	DX2428	DX3340
Length (mm)	900	1200	1800	2100	2400	3300
Channels	8	12	20	24	29	40

Figures 3 and 4 contains photos of the antenna without the top cover (radome) mounted. In Figure 3 the top side of the ground plane is not covered by microwave absorbers, while Figure 4 also contains the microwave absorbers.

Figure 5 contains a photo of the fully assembled antenna.

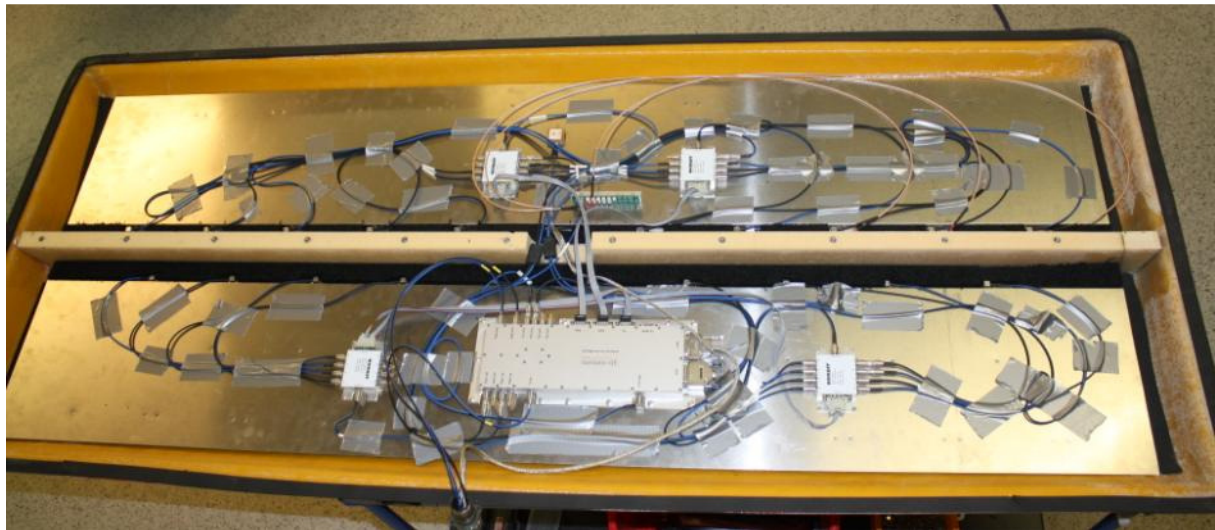


Figure 3. Antenna layout from top side (without cover) showing the transmitter and receiver antenna panels with RF-multiplexers (4pcs), Antenna Front End module (middle) and corresponding cabling for control and RF-distribution. Feed point of antenna elements are located close to the wall separating the transmitter and receiver arrays.



Figure 4. *DXG antenna without top cover. Microwave absorbers are located on the top side of the ground plane.*



Figure 5. *DXG antenna completely assembled with top cover.*