

# X-band data downlink Antennas

Our X-Band antennas are developed to facilitate reliable data downlink for satellites in low earth orbits.

## We offer three main variants of X-band data downlink antennas.

- Helix Antennas generation 2 (G2)
- Helix Antennas generation 1 (G1)
- Waveguide Pipe Antenna

They are of either helix or waveguide pipe type. Compared to conventional alternatives like reflectors or bi-cone antennas, the helix antennas are small and light-weight. They have also excellent RF performance with iso-flux radiation patterns. The waveguide pipe antenna has a flat top radiation pattern with very low gain variation over frequency and high power handling capability. The antennas can be delivered for operation with a coaxial or a waveguide interface, selectable at order. The designs are modular and use few parts which results in stable performance, small production variations and low cost. The modular design facilitates a common qualification for the helix antennas. The innovative helix radiator design can be changed to match specific customer requirements on gain, coverage (iso-flux), polarization and frequency band. We can also offer test caps to be used for system testing.



## Key Features

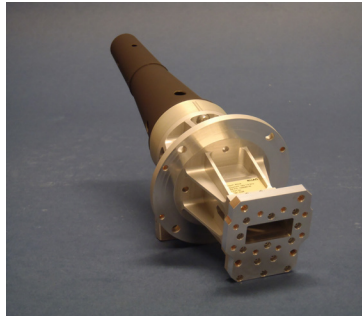
- Different edge of coverage (EOC) variants are available
- Different frequency range variants are available
- LHCP or RHCP variants are available
- Modular designs with few parts (i.e. radiator and polarizer)
- Selectable coaxial or waveguide interface (within one polarizer design)
- Compact designs, 90 mm diameter and < 255 mm total height (all helix variants)
- Low mass designs, < 410 g (all helix variants)
- Wide operational temperature range ( $\pm 150^{\circ}\text{C}$ )

## X-band helix data downlink antennas generation 2

The generation 2 (G2) antennas have small size and low mass. They are developed to exhibit higher EOC gain than the G1 antennas. The helix radiator is a multifilar one and is fed from a conventional septum polarizer. The polarizer body is made in one piece. The antenna can have either a waveguide (WR112) or a coaxial (SMA) RF interface. Antennas for both 7.8 GHz and 8.0 - 8.4 GHz bands are available.

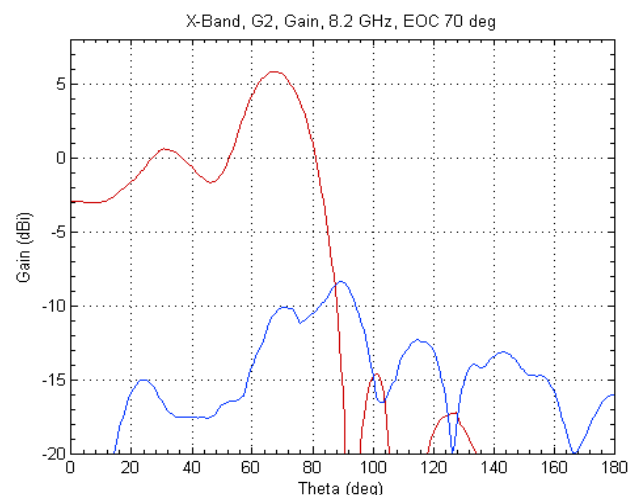
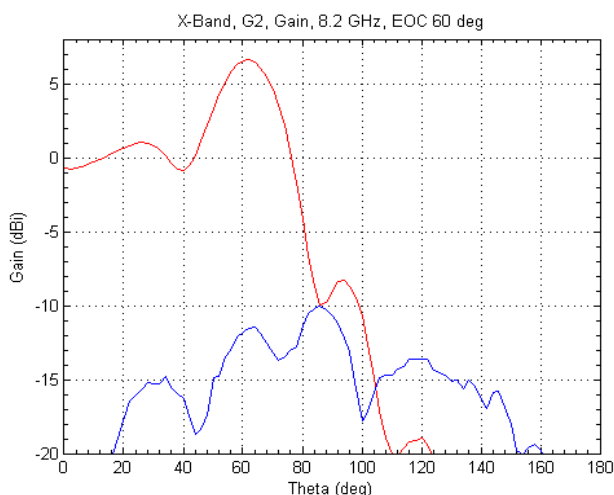
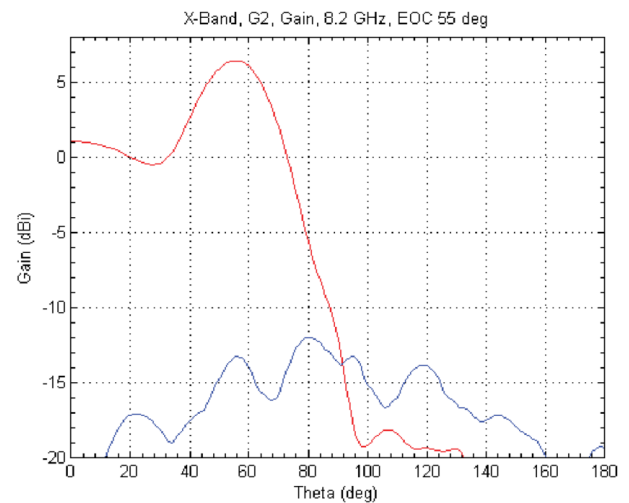
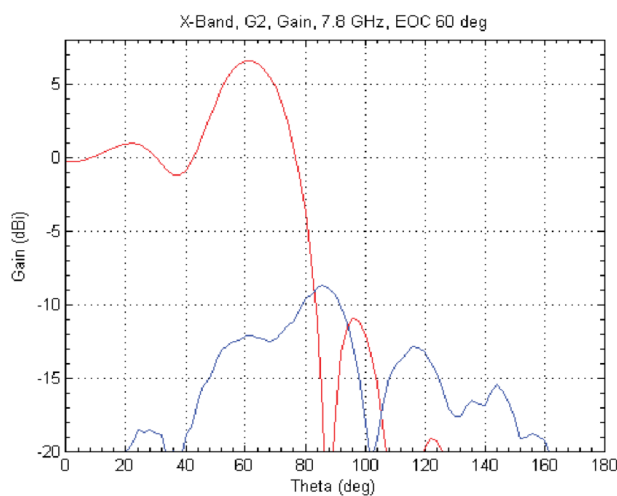
### Technical data:

- EOC variants, 55°, 60° and 70°
- Diameter 90 mm
- Total height < 255 mm
- Height over mounting I/F < 190 mm
- Mass < 410 g
- High power capability (80 W with waveguide RF interface)



Antenna with waveguide interface (WR112)

Typical measured antenna radiation patterns (average over frequency) are shown for the different frequency bands and different EOC angles.



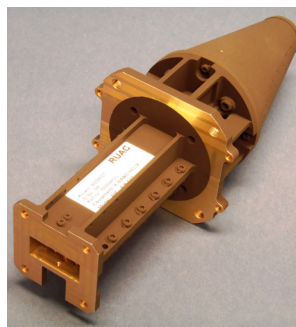
## X-band helix data downlink antennas generation 1

The generation 1 (G1) antennas, already used in many LEO missions, have small size and low mass. The helix radiator is a quadrifilar one and is fed from a conventional septum polarizer. The polarizer is made in three main parts. The antenna can have either a waveguide (WR112) or a coaxial (SMA) RF interface. Antennas for both 7.8 GHz and 8.0 - 8.4 GHz bands are available.

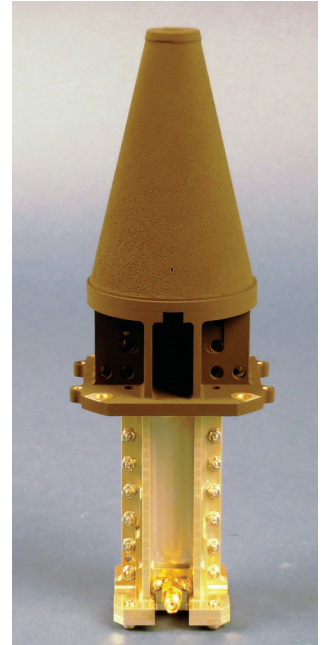
### Technical data:

- EOC variants, 60° and 70°
- Diameter 90 mm
- Total height < 250 mm
- Height over mounting I/F < 155 mm
- Mass < 350 g
- Power capability (35 W with waveguide RF interface)

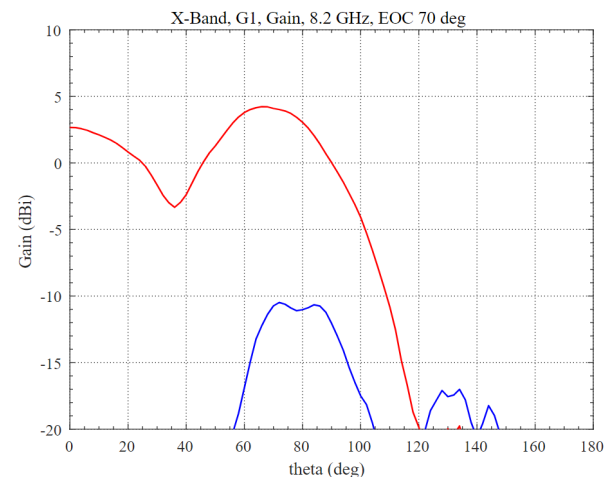
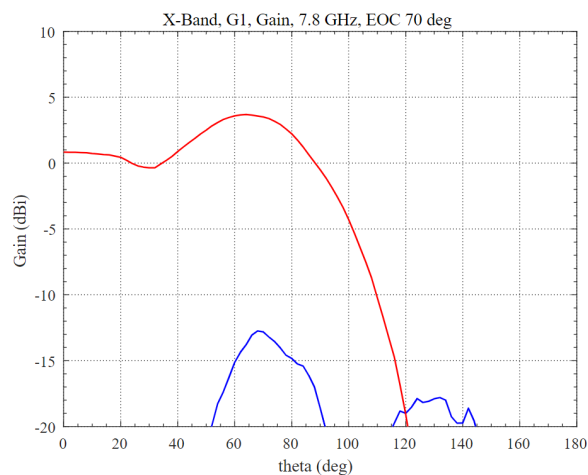
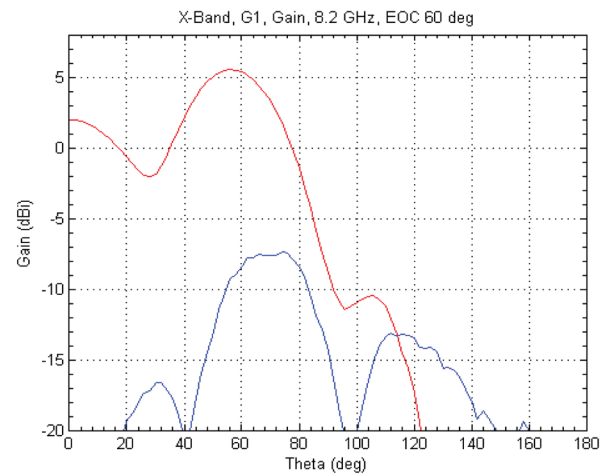
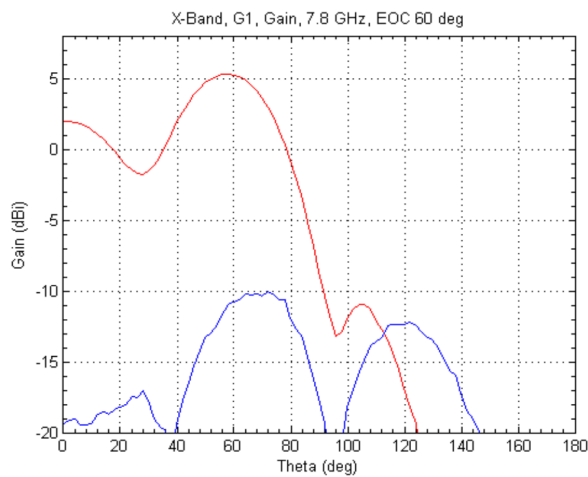
Typical measured antenna radiation patterns (average over frequency) are shown for the different frequency bands and different EOC angles.



Antenna with waveguide interface (WR112)



Antenna with coaxial interface (SMA)



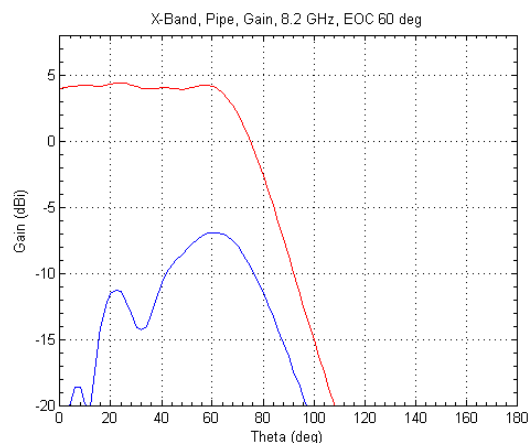
## X-Band waveguide pipe data downlink antenna

The waveguide pipe antenna is a compact design. The radiator is a waveguide opening with corrugations to shape the antenna radiation pattern. This antenna is also fed from a conventional septum polarizer. The polarizer body is made in one piece. The antenna can have either a waveguide (WR112) or a coaxial (SMA) RF interface. It is designed for the 8.0 - 8.4 GHz band. It has very low gain variation vs frequency.

### Technical data:

- EOC 60°
- Diameter 285 mm
- Total height < 235 mm
- Height over mounting I/F < 100 mm
- Mass < 1000 g
- High power capability (240 W with waveguide RF interface)

Typical measured antenna radiation pattern (average over frequency) is shown.



Antenna with coaxial interface (SMA)



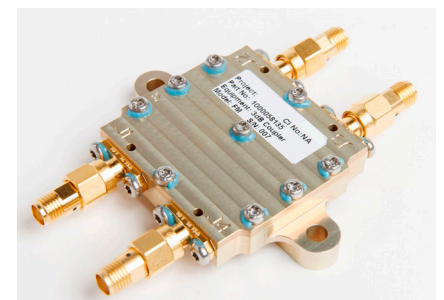
Antenna with waveguide interface (WR112)

## Auxiliary items

- Test caps/hats are available to all X-band data downlink antennas. The Helix antenna caps/hats are absorptive with a set coupling value (e.g. 10, 15, 20 dB etc.). The waveguide pipe antenna test cap/hat is of a 0 dB coupling type, suitable for high power.
- A 3 dB S-Band hybrid with X-band filter function is available (to be used in a co-located S-band TTC system). It has > 25 dB suppression at X-band data downlink frequencies.



X-band test caps/hats



3 dB S-band hybrid