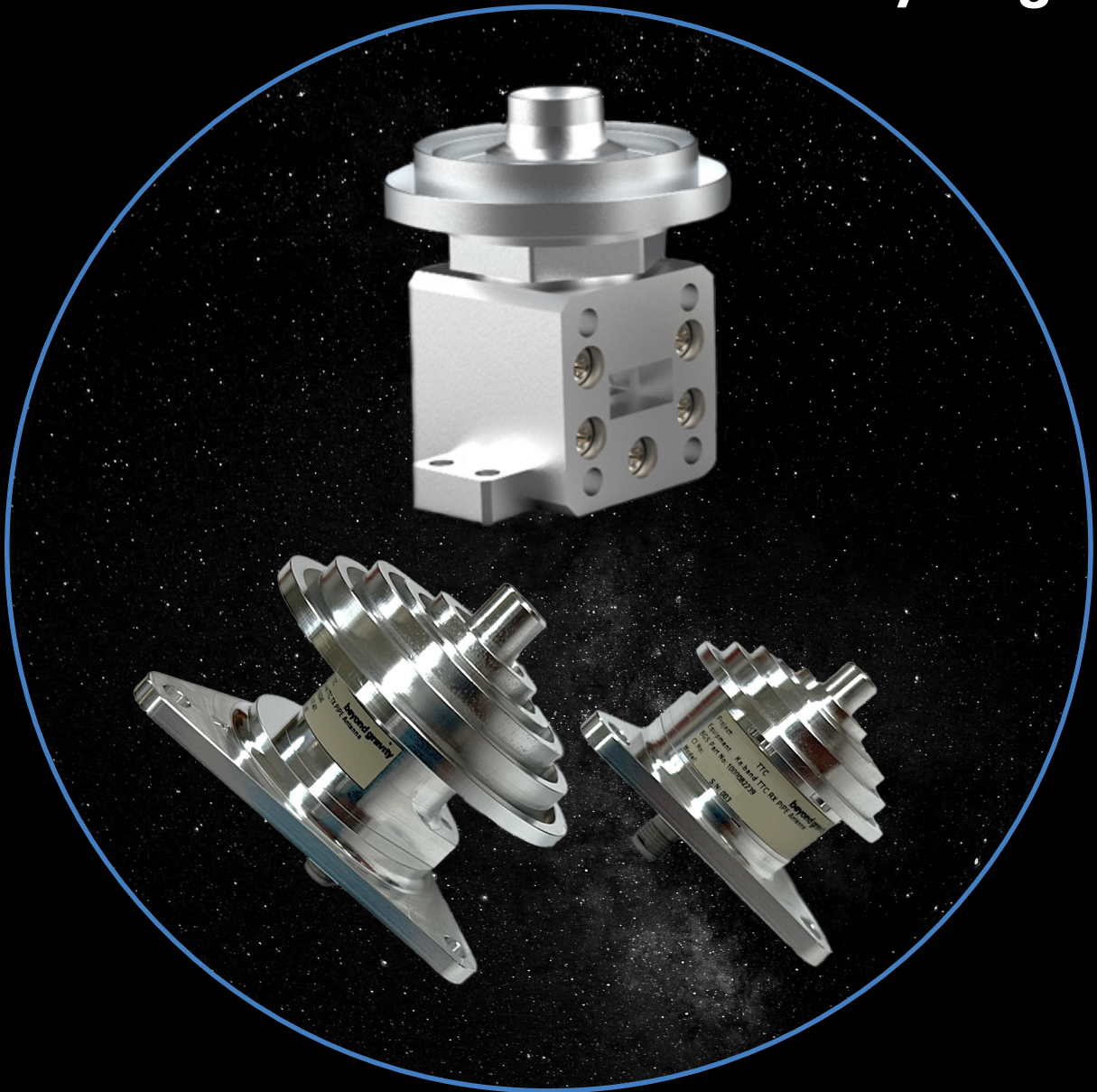




K/Ka-band TTC Antennas

Our K/Ka-Band TTC antennas are developed to give the customer reliable control and monitoring for all types of satellites.

Background

Beyond Gravity Sweden has vast experience of waveguide pipe antennas for frequency bands from C to Ka.

Currently, two main variants of K/Ka-band TTC antennas based on the pipe antenna principle are available:

- Flat radiation pattern antennas with up to 10% bandwidth.
- Antennas with approximately 10 dBi peak gain, 15% bandwidth and maximum radiation pattern stability over frequency.

Key features

- Compact with low mass.
- Mechanically Robust.
- Temperature range: $\pm 150^{\circ}\text{C}$.
- LHCP, RHCP or dual polarization.
- Low loss.
- High power handling capability.
- Can be scaled to operate at any K/Ka-band frequency.
- Suitable for mass production.
- Coaxial or waveguide interface.
- Test caps/hats available on request.

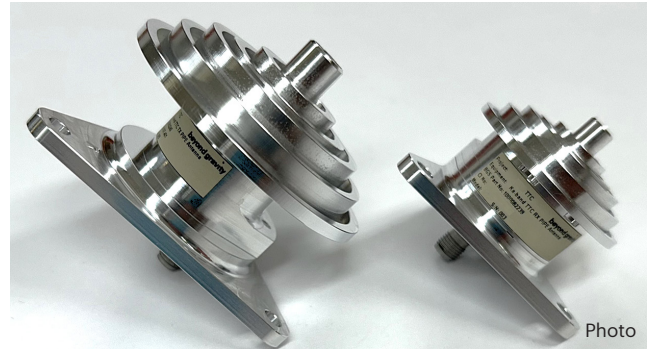
Heritage

- Several hundred C to Ka-band TTC antennas delivered, or in production.
- Serving European and North American Missions.

K/Ka-band Antennas with flat radiation pattern

Technical Data

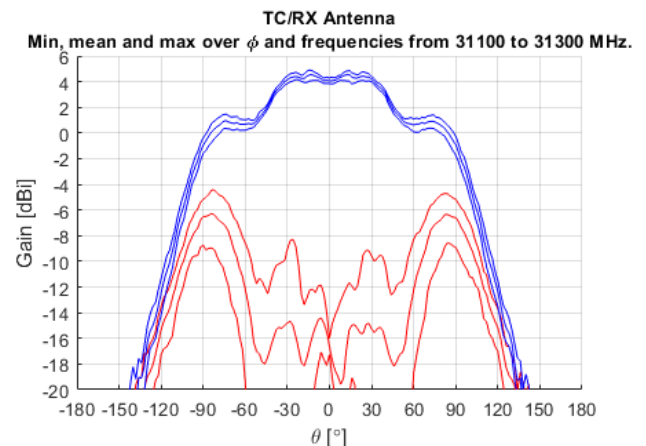
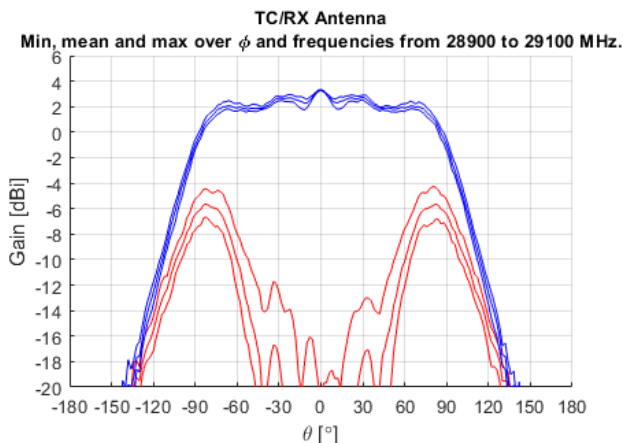
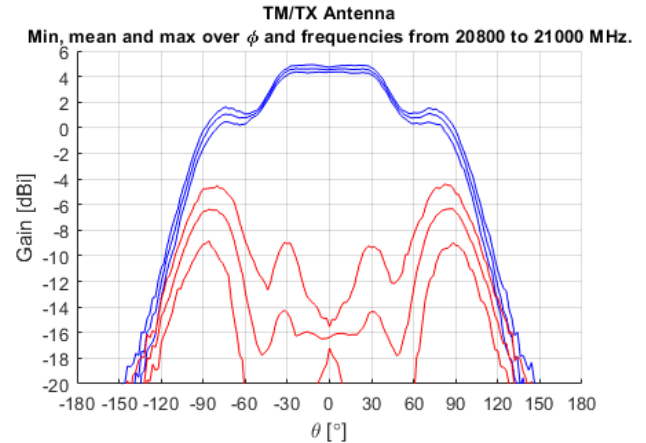
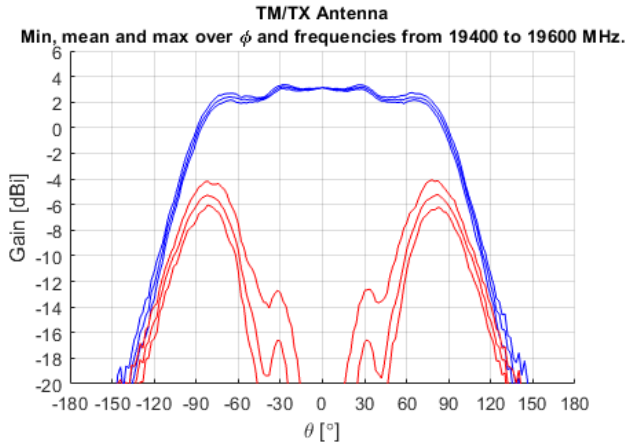
- Bands of current off-the-shelf antennas:
 - TM/TX antenna: 19200 to 21200 MHz
 - TC/RX antenna: 28700 to 31700 MHz.
 - Band limits are approximate and depend on detailed requirements.
 - Can be scaled to other bands.
- Radiation pattern: Flat, for hemispherical coverage.
 - For small bandwidth operation, the radiation pattern can be tweaked for maximum flatness or higher boresight gain by means of scaling.
- Polarization: Single or dual circular.
- Physical characteristics, current off-the-shelf antennas:



Photo

	<u>TM/TX</u>	<u>TC/RX</u>
Radiator diameter:	62 mm	49 mm
Mass:	110 g	67 g
Height from I/F plane:	49 mm	35 mm

- Interface: Coaxial (as shown) or waveguide.
- Examples of measured radiation patterns shown below.



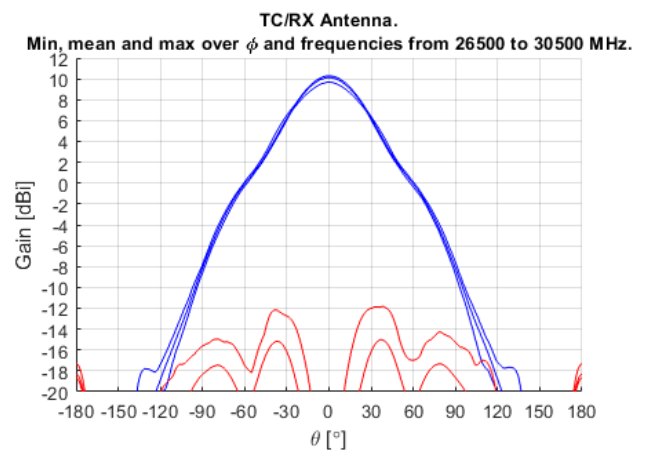
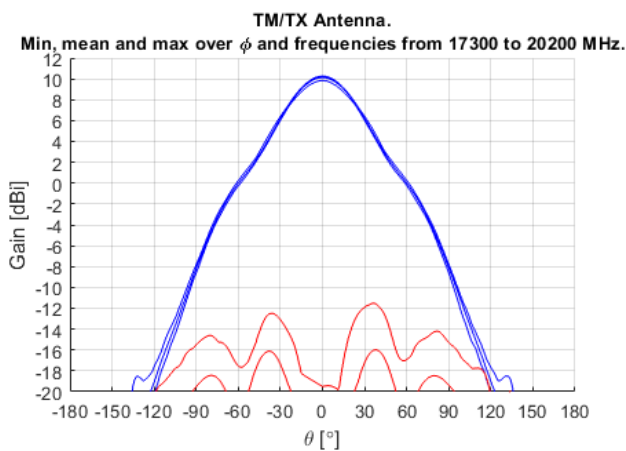
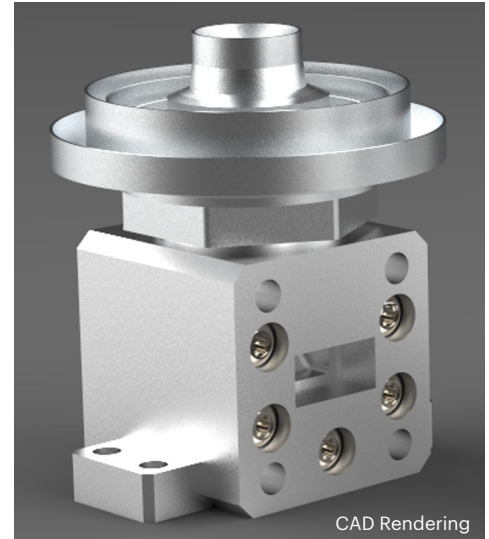
K/Ka-band Antennas with 15% bandwidth

Technical Data

- Bands of current antenna designs:
 - TM/TX antenna: 17300 to 20200 MHz.
 - TC/RX antenna: 26500 to 30500 MHz.
 - Wider band operation may be possible, pending requirements.
 - Can be scaled to other bands.
- Radiation pattern: 10 dBi in boresight, 0 dBi @ 60°.
- Polarization: Single or dual circular.
- Physical characteristics, current antenna designs:

	<u>TM/TX</u>	<u>TC/RX</u>
Radiator diameter:	55 mm	40 mm
Mass:	≈120 g	≈100 g
Height from I/F plane:	65 mm	45 mm

- Interface: Waveguide.
 - Design modification for coaxial interface is possible.
- Radiation patterns from full-wave simulations (ANSYS HFSS) are shown below.



Other Possibilities

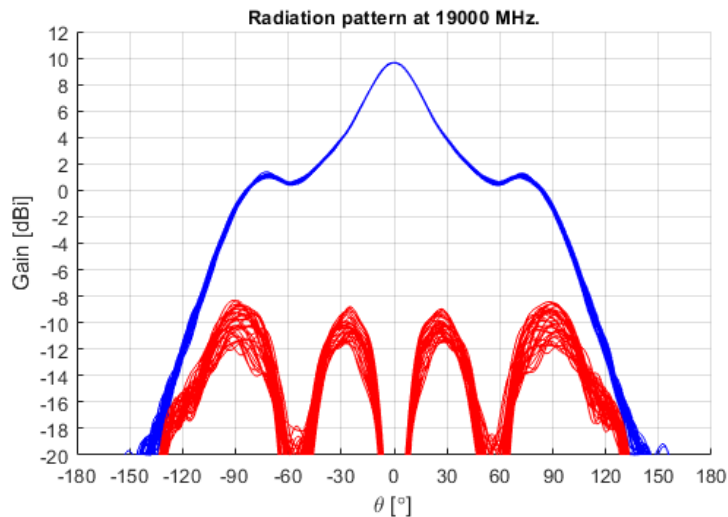
Beyond Gravity continuously reviews the different designs.

An example of a possible radiation pattern is seen below.

The antenna is a slightly modified version of the *K/Ka-band antennas with flat radiation pattern*.

The radiation pattern shown below is particularly useful for cases described as follows:

- Nominal pointing towards a ground station close to boresight.
- Hemispherical coverage for other situations.



Test Caps/Hats

All K/Ka-band TTC antennas can be provided with test caps/hats, on request.

The test caps are absorptive with a typical coupling value of 20 dB or non-absorptive with 0 dB coupling.



CAD Rendering