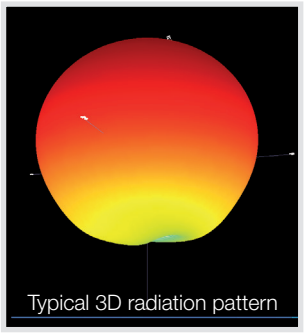
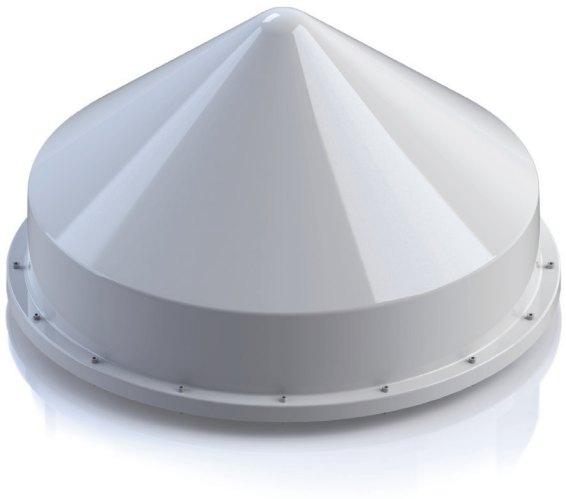
GALILEO/GPS/GLONASS Base Station Reference Antennas


Typical 3D radiation pattern



This antenna has been designed under the SWIRLS contract with the Galileo Supervisory Authority (GSA) specifically targeting reference applications with a high level of flexibility in terms of covered frequency bands.

SOLUTION FOR

- **Reference applications covering GALILEO E5, E6, L1 bands, GPS L5, L2, L1 bands and GLONASS L2, L1 bands**

Main features

Technical performance

- Excellent phase center and group delay stability
- Highly stable radiation pattern (magnitude & phase)
- Optimized radiating element combined with a choke ring provides excellent multi-path immunity
- Wide operational bandwidth of the cross dipoles
- Reduced ohmic losses (< 1.0 dB)

Design

- Sealed radome to be used in severe environments
- Dedicated filters for out-of-band rejection and dedicated LNA for pre-amplification
- Reduced accommodation (easy to install at the top of a mast)

Delivered documents

- Measured return loss
- Measured radiation pattern
- Phase center calibration report

Related standards

- IEC 60068-2/14; -2/6; -2/64; -2/32
- EN 55022

Product configuration

Equipment

■ Specific radome
□ Dedicated filters for custom GALILEO, GPS and/or GLONASS sub-bands

Related services

□ Maintenance
□ Mechanical support

■ Included □ Optional

ENVIRONMENTAL TESTING

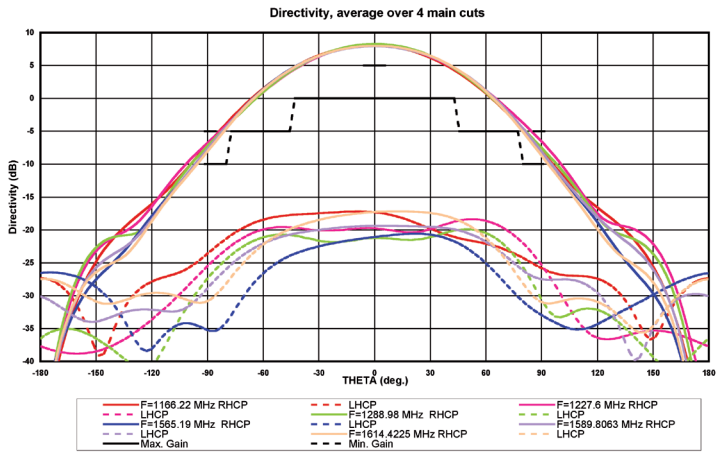
- Thermal cycling test performed according to the norm IEC 60068-2-14.
- Sine vibration test performed according to the norm IEC 60068-2-6.
- Random vibration test performed according to the norm IEC 60068-2-64.
- Free fall test performed according to the norm IEC 60068-2-32.

Electrical characteristics

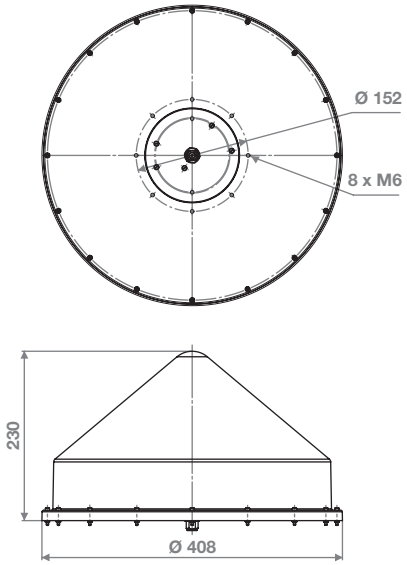
Part number	**ANTE011-A**
Operational frequency bands	B1 Galileo/GPS/GLONASS: 1589.81 ± 24.62 MHz (GPS L1 C/A, GPS L1 P(Y), GAL L1F, SBAS L1, GLO L1 C/A, GLO L1 P) B2 Galileo/GPS/GLONASS: 1227.60 ± 61.38 MHz (GPS L5, GPS L2C, GPS L2 P(Y), GAL E5a, GAL E5b, SBAS L5, GLO L2 C/A, GLO L2 P, GAL E6C) Option: reduced B1 and/or B2 bands
Polarization*	Right hand circularly polarized
Coverage*	Maximized within a conical coverage up to 85° from zenith
Gain antenna (without LNA)*	< +7 dBi at zenith > 0 dBi from 45 to 90° elevation > -5 dBi from 10 to 45° elevation > -10 dBi from 0 to 10° elevation < -5 dBi at 5° elevation
LNA gain*	35 dB +/- 2 dB
Axial ratio*	< 1 dB from 60 to 90° elevation < 2 dB from 10 to 60° elevation < 4 dB from 5 to 10° elevation
Phase center knowledge accuracy*	Within 5 mm radius
Phase center stability	< 1 mm radius for B1 sub-band < 0.5 mm radius for B2 sub-band
Group delay variation	< 10 ns
Group delay stability*	< ± 250 ps at a given frequency point over temperature
Signal to noise density ratio*	C/No ≥ 35 dBHz at B2 or B1 reference conditions
LNA 1 dB compression point*	≥ -10 dBm
LNA output 3rd order intercept*	≥ 0 dBm
LNA burn-out protection (CW)*	Antenna system able to withstand, with no damage, an in-band +20 dBm CW signal
LNA burn-out protection (In-band pulse)*	Antenna system able to withstand, with no damage, an in-band pulsed interference with the following characteristics: • Pulse peak power: +30 dBm • Pulse max width: 1ms (max duty cycle of 10%)

(*) Applicable to each of the GALILEO E5, E6, L1 bands, GPS L5, L2, L1 bands and GLONASS L2, L1 bands.

Typical measured directivity



Dimensional drawing



Functional & environmental characteristics

Part number	ANTE011-A
Antenna input impedance	50 Ohms
Supply voltage	5 V (supplied through the RF cables)
Power consumption	≤ 0.3 Watt (total power consumption)
Output VSWR	< 1.7
Emitted radiation	The antenna system radiated emission is compatible with [EN-55022] recommendation
Conducted EMC	The antenna system conducted emission is compatible with [EN-55022] recommendation
Temperature range	Tested to IEC 60068-2-14 edition 1986 test Nb for thermal cycling Operation range: -40° C to +70° C Storage range: -55° C to +85° C
Wind/other	Able to withstand wind and blast conditions < 200 km/h
Housing	Hermetic to rain under storm conditions
Pressure	The antenna system works properly with an equivalent air pressure condition of 6000 m altitude
Radiation	Able to withstand UV and other radiation
Radome protection	Radome composed of epoxy resin (60%) and glass fibers (40%) with a polyurethane coating
Shock and vibration	Tested to IEC 60086-2-6 (Sinusoidal vibration) Tested to IEC 60086-2-64 edition 1993 (random vibrations) Tested to IEC 60086-2-32 edition 1975 (free fall)

Mechanical characteristics

Part number	ANTE011-A
Dimensions (diameter x height)	408 mm x 230 mm
Weight (approx)	7.5 Kg
Connector	N Female
Radome coating	Polyurethane
Color	White
Ingress protection	Alodine 1200 according to MIL-C 5541 E class 3 for coating treatment
Operating temperature	-40° C to +70° C