

7.3 METERS THA ANTENNA

1 Main Function

Main task of this antenna subsystem is to accurately track the satellite, provide RF (both uplink and downlink) channels with high quality for the satellite testing and controlling system and complement the efficient track and measurement to the satellite angles; also real-timely send the messages such as the status, mode and angle of operation, etc to the supervisory computer.

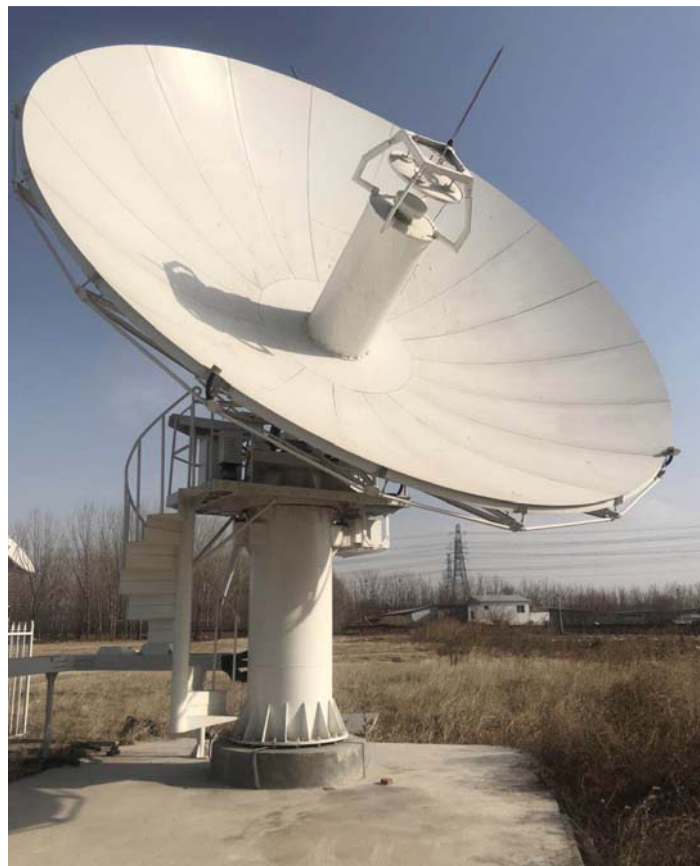


Figure 1-1 7.3m THA antenna

2 SPECIFICATION

2.1. RF specification

Electric Performance

Item	Tx	Rx
Frequency (GHz)	13.75~14.50	10.95~12.75
Gain (dBi)	$58.6+20\log(F/14.25)$	$57.6+20\log(F/12.50)$
First Sidelobe	$\leq -14\text{dB}$	



Item	Tx	Rx
Wide-angle Sidelobe	90 percent of the sidelobe peak values satisfy the following envelope, the excess is less than 3dB, comply with ITU_R.S580-6 specifications. 29-25log(θ) dBi ($1^\circ \leq \theta < 20^\circ$) -3.5dBi ($20^\circ < \theta \leq 26.3^\circ$) 32-25log(θ) dBi ($26.3^\circ < \theta < 48^\circ$) -10dBi ($48^\circ \leq \theta$)	
Polarization Mode	Tx&Rx: HLP&VLP	
Port-Port Isolation	Rx-Rx ≥ 30 , Tx-Tx ≥ 30 , Tx-Rx ≥ 85	
Cross Polarization Isolation	35dB on Axis and 30dB within 1dB contour	
Antenna Noise Temperature (LNA Input Port)	$\leq 65K$ (Elevation of 20° , sunny day, gentle breeze)	
G/T (dB/K) (El= 20° , LNA noise temperature $\leq 70K$, Clear Sky and Light Wind)	$\geq 36.2 + 10 \lg(f/12.5GHz)$ dB/K	
VSWR	$\leq 1.30:1$	
Feed Insertion Loss(dB)	≤ 0.60	

2.2 Mechanical Specification

Item	Description
Output interface of feed	Tx: WR-75F waveguide interface Rx: WR-75F waveguide interface
Feed	Frequency multiplex 4-port, corrugated conical horn
Antenna type	Modified antenna
Antenna diameter	7.3m
Pedestal type	THA, azimuth-elevation (EL/AZ) type
Antenna travel	Azimuth: $\pm 90^\circ$ Continuous



Item	Description
	Elevation: 5°~90°(Continuous)
Antenna velocity (AZ/EL)	Slew Speed: 0.05 °/s (max)
Surface accuracy (steady wind: 50km/h, gust: 75km/h)	Main reflector: ≤0.5mm (r.m.s.) Sub reflector: ≤0.2mm (r.m.s.)
Antenna appearance	White
Environmental Condition	50km/h gusting to 75km/h
Normal Operation Wind	75km/h gusting to 97km/h
Degraded Operation Wind	200km/h at EL=90°
Survival Wind	indoor: 5℃ to 45℃
Temperature	outdoor:-35℃ to 55℃
Relative humidity	outdoor: 100%;indoor:20%-90%,no dew.
Earthquake	0.3g horizontal, 0.1g vertical
Rain	100mm/h
Solar Radiation	1135W/m ²