

13.2m KaTx/QRx/VTx-Band Antenna

Antenna Technologies



Overview

The CPI Antenna Technologies' large diameter KaTx/QRx/VTx-Band antennas require unique design criteria which we have successfully demonstrated with the 13.2-meter product. Items such as reflector surface accuracy, antenna/feed design, structural antenna stiffness and integrity, thermal effects, anti-icing, monopulse tracking, hub redundant air-conditioning, installation alignments, and hub integration all require special engineering expertise at Ka, Q and V-Bands.

We have proven our expertise in the above areas and has earned the position as a preferred antenna system provider and integrator to a number of major satellite broadband companies in the world.

FEATURES:

- Precision KaTx/Q/V-Band rated surface reflector on steel back-up structure with counterweight arms
- An elevation over azimuth all-steel antenna structure with high stiffness turntable bearing
- A circular polarized Ka/Q/V-Band cassegrain 4-port Tx/Rx feed assembly with TE21 tracking coupler (monopulse) and feed rain blower
- Brushless servo motor jackscrew drive in elevation
- Dual brushless servo motor, dual gear-pinion drives with anti-backlash in azimuth
- Access stairway and large work platform for ease of maintenance
- 9-foot dia. hub with five foot roll up access door
- Housing for up to eight high power amplifiers (HPA's)
- Up and down converter integration providing a wideband L-Band interface (or fiber optic)
- Easily accessible test and monitor points
- Strategically placed handles and storage to allow easy and safe access to hub
- Electric hoist on elevation platform for maintenance of hub RF electronics and drive components
- Elevation Maintenance Strut allowing maintenance of the EL actuator while maintaining service
- Lightning protection
- Transmit signal block down converters capability to allow spectrum monitoring at L-band in a control room
- Hub mounted test loop translator capability for station calibration with couplers
- Redundant HVAC systems for hub and pedestal (pedestal is HVAC is optional)
- Hub and antenna mounted electrical outlets & lighting

OPTIONS:

- Power meter sensing of TX power capability
- Transmit signal block down converters allowing L-Band spectrum monitoring at control room
- Gas or electric (non-embedded heaters) anti-icing system for main reflector, subreflector & feed assembly
- Hub mounted test loop translator capability for station calibration with couplers
- IOT and CSM capabilities with precision calibrated couplers
- Complete M&C capability for monitoring and control of all hub components
- Temperature monitoring

APPLICATIONS:

- Broadband Gateways (VHTS and HTS); TT&C; IOT; High Power Uplinks

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Specifications

PERFORMANCE PARAMETER ⁽¹⁾		KaTx/QRx/VTx-Band
Reflector		13.2 meter, counterweight
Optics Configuration		Cassegrain
Frequency	Transmit - V Band	47.2 - 52.4 GHz
	Transmit - Ka Band	27.0 - 31.0 GHz
Receive Tracking (Monopulse)	Receive	37.5 - 42.0 GHz
	Tracking (Monopulse)	37.5 - 42.0 GHz (any one GHz of RX Band)
Antenna Gain	Transmit @ Feed Tx Port Input (V-Band)	73.3 dBi @ 47.20 GHz 74.0 dBi @ 52.40 GHz
	Transmit @ Feed Tx Port Input (Ka-Band)	68.9 dBi @ 27.00 GHz 69.8 dBi @ 30.00 GHz
	Receive @ Feed Rx Port Output (Q-Band)	72.1 dBi @ 37.50 GHz 73.0 dBi @ 42.00 GHz
G/T (min) @ 50° Elevation, 230K LNA Clear Sky, LNA Primary Path		45.2 dBi/K @ 37.50 GHz
EIRP with 250W Peak TWTA @ V-Band Linear EIRP @ 4 dB OBO (19 dB NPR)		88.8 dBW @ 47.2 GHz 89.5 dBW @ 52.4 GHz
	EIRP with 550W Peak TWTA @ Ka-Band Linear EIRP @ 4 dB OBO (19 dB NPR)	
Polarization (Transmit and Receive) 3 dB Beamwidth		Dual Circular (RHCP/LHCP)
	Transmit Receive	0.03° (V-Band @ 49.8 GHz); 0.04° (Ka-Band @ 28.50 GHz) 0.03° (Q-Band @ 39.75 GHz)
X-POL Isolation @ 1dB BW		
	Transmit Receive	≥30.0 dB ≥30.0 dB
Port to Port Isolation	Transmit to Receive	85 dB
	Receive to Transmit	85 dB
	Transmit to Transmit	17 dB
	Receive to Receive	17 dB
VSWR/Return Loss		
	Transmit Receive	1.30:1/17.7 dB 1.30:1/17.7 dB
Sidelobe Performance		ITU-RS.580-6 (10% rule) FCC CFR-47 & 25.209
Power Handling		250W Ka-Band, 100W V-Band CW per TX port
Feed Waveguide Interface	Transmit	V-Band: WR-19 Ka-Band: WR-34 Q-Band: WR-22
	Receive	

⁽¹⁾ Some specifications may vary based on the combination of equipment, options and/or upgrades ordered.

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PERFORMANCE PARAMETER ⁽¹⁾		KaQ/V-Band
Pressurization	Operational Maximum	0.25 psi 2.0 psi
Elevation Travel		0 to 90° Continuous
Azimuth Travel		±100° Continuous
AZ/EL Axis Velocity		0.5 °/s (AZ); 0.2 °/s (EL)
AZ/EL Axis Acceleration		0.2°/s ²
Azimuth Drive Configuration		Dual Motor, Dual Gear and Pinion Drives
Elevation Drive Configuration		Single Motor Machine Jackscrew Drive
Motor Type for Azimuth and Elevation		Brushless Servo Motor
Antenna Two-Axis Pointing Performance (over 10 degree of axis travel)		0.003° RMS, No Wind 0.01° RMS Winds 30 mph gusting to 45 mph
Tracking Performance for Optrack (C/No: 45 dB-Hz)		0.003° RMS, No Wind 0.005° RMS Winds 30 mph gusting to 45 mph
Tracking Performance for Monopulse (C/No: 45 dB-Hz)		0.002° RMS, No Wind 0.003° RMS Winds 30 mph gusting to 45 mph
Tracking Modes		Monopulse Program Track Optrack Step Track
Deicing		Feed Blower Optional Heated Subreflector Optional Primary Reflector – Gas or Electric (as required)

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ENVIROMENTAL PARAMETER ⁽¹⁾		KaQ/V-Band
Normal Conditions	Temperature	-22 to +122°F (-30 to +50°C, +55°C Optional)
	Wind	30 gusting to 45 mph (48 gusting to 72 km/hr)
	Humidity	30 to 100%, with condensation
	Rain	Up to 4 in/hr (100 mm/hr)
	Altitude	To 3280ft AMSL (1000m AMSL)
	Solar Radiation	1.1 kW/m ²
Degraded Conditions	Wind	45 gusting to 60 mph (72 gusting to 97 km/hr)
Limit of Driving	Wind	60 gusting to 75 mph (97 gusting to 120 km/hr)
Survival Conditions	Temperature	-40 to +131°F (-40 to +55°C)
	Wind	125 mph (200 km/hr) Continuous at zenith stow position
	Humidity	30 to 100%, with condensation
	Altitude	To 3280 ft AMSL (1000m AMSL)
	Seismic	0.3g horizontal & 0.15g vertical acceleration
Design Life		20 years

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The data should be used for basic information only.

Formal, controlled specifications may be obtained from CPI for use in equipment design.



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