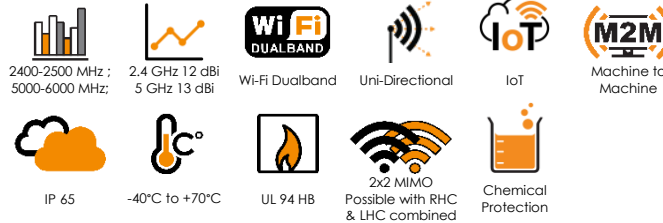
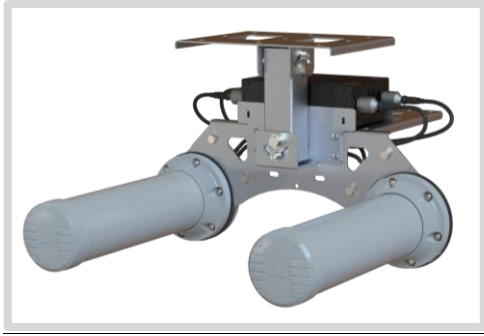


ANTENNAS | HELI-21 SERIES

DUAL FREQUENCY UNI-DIRECTIONAL MINE & TUNNEL ANTENNA

UNI-DIRECTIONAL 2400-2500 MHZ & 5000-6000 MHZ LHC & RHC CIRCULAR POLARISED ANTENNA



- **Circular Polarised HELI antenna provides enhanced signal propagation and connection stability within a tunnel.**
- **Left Hand Circular (LHC) & Right Hand Circular (RHC) polarised.**
- **Uni-directional – radiates in one direction in a tunnel.**
- **Ruggedized & water ingress protected.**
- **Ideal for Mining & Tunnel M2M and IoT deployments.**



Product Overview

The HELI-21 forms part of a series of Mini-HELI antennas. These antennas are only mini in size relative to their bigger brothers, the HELI-5 and HELI-6 but offer medium to high gain, which makes these antennas ideal for mining tunnels where IoT/M2M connectivity is deployed and can also be used for coverage into the stopes.

The HELI-21 is a set of dual 2.4 GHz and 5 GHz antennas, radiating in one direction (i.e. Uni-directional), which make them ideal for the coverage of both 2.4 GHz and 5 GHz in mining and other types of tunnels. These antennas are typically used for the deployment of IoT within the tunnel to provide telemetry and mine automation. The Left Hand Circular (LHC) and Right Hand Circular (RHC) polarised antenna elements provide optimal decorrelation within a MIMO deployment, resulting in the best of the two worlds; decorrelation due to the polarisation differences and spatial diversity to enhance MIMO performance and RF reliability to service the most severe connectivity within a demanding mining tunnel. The dualband Wi-Fi connection propagates around tunnel bends in a Non-Line Of Sight scenario and provides immunity to many of the Wi-Fi signal disrupting objects such as trains and drilling machinery which appear to obscure the tunnel.

Features

- Four Port 2.4GHz and 5GHz antenna.
- This antenna is especially designed for mining and other types of tunnels.
- Uni-directional – radiates in one direction in a tunnel.
- Left & Right Hand Circular Polarised.

Application Areas

- Supplementing fibre /cable networks "Hotspots" to areas to enhance mobility or extend networks to inaccessible areas such as mines and tunnels.
- Underground telemetry and automation.
- Creating of complete underground in tunnel wide data networks and internet/LTE connectivity.
- Seamless connection to personnel using cellular phones and smart devices and tablets.



Frequency Bands

The Heli-21 is a wide-band antenna that works from 2400-2500 MHz | 5000-6000 MHz |



Antenna Overview

		
Ports	1 & 3	2 & 4
Frequency Bands	2.4 - 2.5 GHz	5-6 GHz
Peak Gain	12.0 dBi	13.0 dBi
Coax Cable Type	RG-58	RG-58
Coax Cable Length	350mm	350mm
Connector Type	N-Type Male	N-Type Male

Electrical Specifications

Frequency bands:	2400-2500 MHz 5000-6000 MHz
Gain (max):	12.0 dBi for 2400 – 2500 MHz 13.0 dBi for 5000 – 6000 MHz
VSWR:	<1.5:1 over 90% of the band
Feed power handling:	30 W
Input impedance:	50 Ohm (nominal)
Polarisation:	Circular Polarised (LHC and RHC)
Coax cable loss:	1.96 dB/m
DC short:	Yes

Coax Cable & Connector Type

Cable length:	350 mm
Coax cable type:	RG 58
Connector type:	N-Type (Male)

**The coax cable & connector is factory mounted to the antenna*

Product Box Contents

Antenna:	A-HELI-0013-V2-01-R A-HELI-0013-V2-01-L
Mounting bracket:	A-BRKT-045-V2-01

Ordering Information

Commercial name:	HELI-21
Order product code:	A-HELI-0021-V2-01
EAN number:	6009693810037

Mechanical Specifications

Product dimensions	± 266 mm x 415 mm x 526 mm
Packaged dimensions:	542 mm x 372 mm x 182 mm
Weight:	3.9 kg
Packaged weight:	4.2 kg
Radome material:	ABS & PVC
Radome colour:	GREY
Mounting Type:	Ceiling Mounted

Environmental Specifications, Certification & Approvals

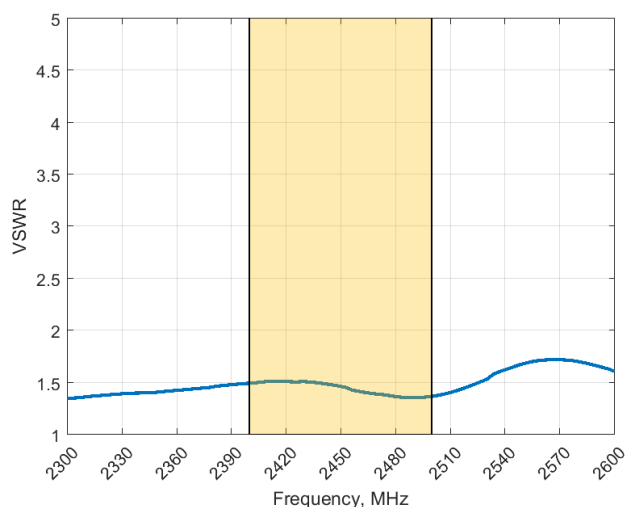
Wind Survival:	<120 km/h
Temperature Range (Operating):	-40°C to +70°C
Environmental Conditions:	Outdoor/Indoor
Water ingress protection ratio/standard:	IP 65
Salt Spray:	MIL-STD 810F/ASTM B117
Operating Relative Humidity:	Up to 98%
Storage Humidity:	5% to 95% - non-condensing
Storage Temperature:	-40°C to +70°C
Flammability Rating:	UL 94-HB
Impact resistance:	IK 08

Product Safety & Environmental:

Complies with CE, EN, CSA, RoHS and IEC standards



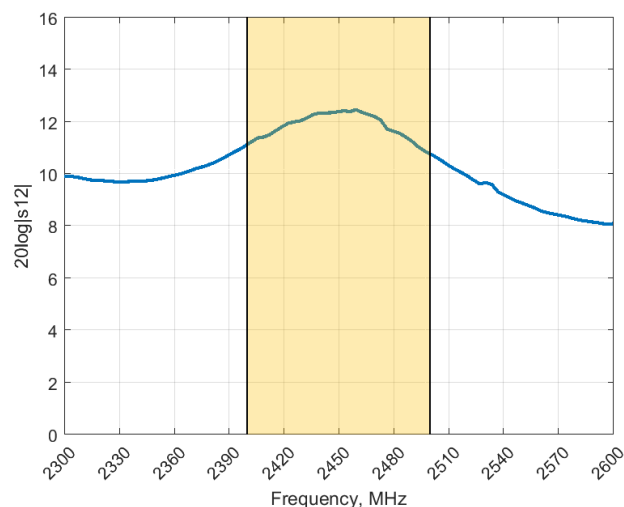
Antenna Performance Plots

VSWR 2400 – 2500 MHz


Voltage Standing Wave Ratio (VSWR)

VSWR is a measure of how efficiently radio-frequency power is transmitted from a power source, through a transmission line, into a load. In an ideal system, 100% of the energy is transmitted which corresponds to a VSWR of 1:1.

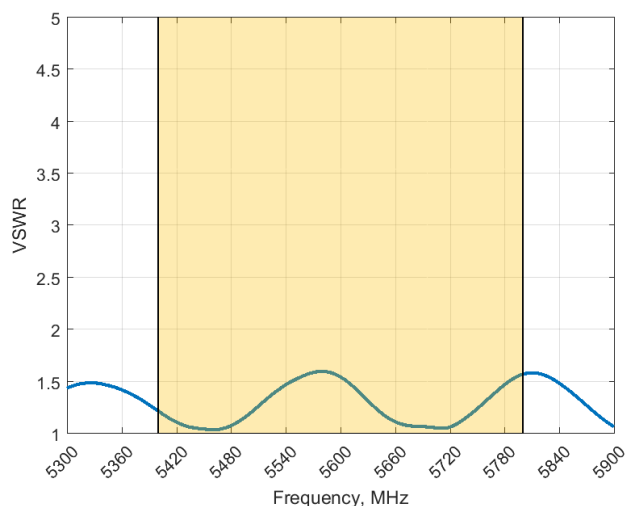
The HELI-21 delivers superior performance across all bands with a VSWR of 1.5:1 or better across 90% of the band.

GAIN 2400 – 2500 MHz (EXCLUDING CABLE LOSS)


Gain* in dBi

12.0 dBi for 2400 – 2500 MHz is the peak gain.

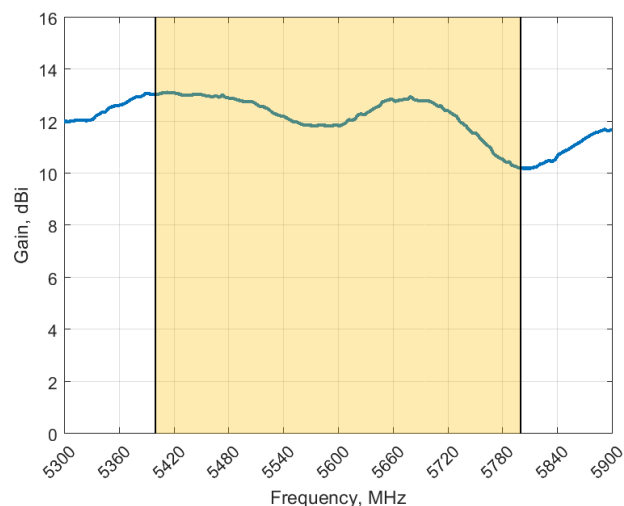
**Antenna gain measured with polarisation aligned standard antenna*

VSWR 5000 – 6000 MHz


Voltage Standing Wave Ratio (VSWR)

VSWR is a measure of how efficiently radio-frequency power is transmitted from a power source, through a transmission line, into a load. In an ideal system, 100% of the energy is transmitted which corresponds to a VSWR of 1:1.

The HELI-21 delivers superior performance across all bands with a VSWR of 1.5:1 or better across 90% of the band.

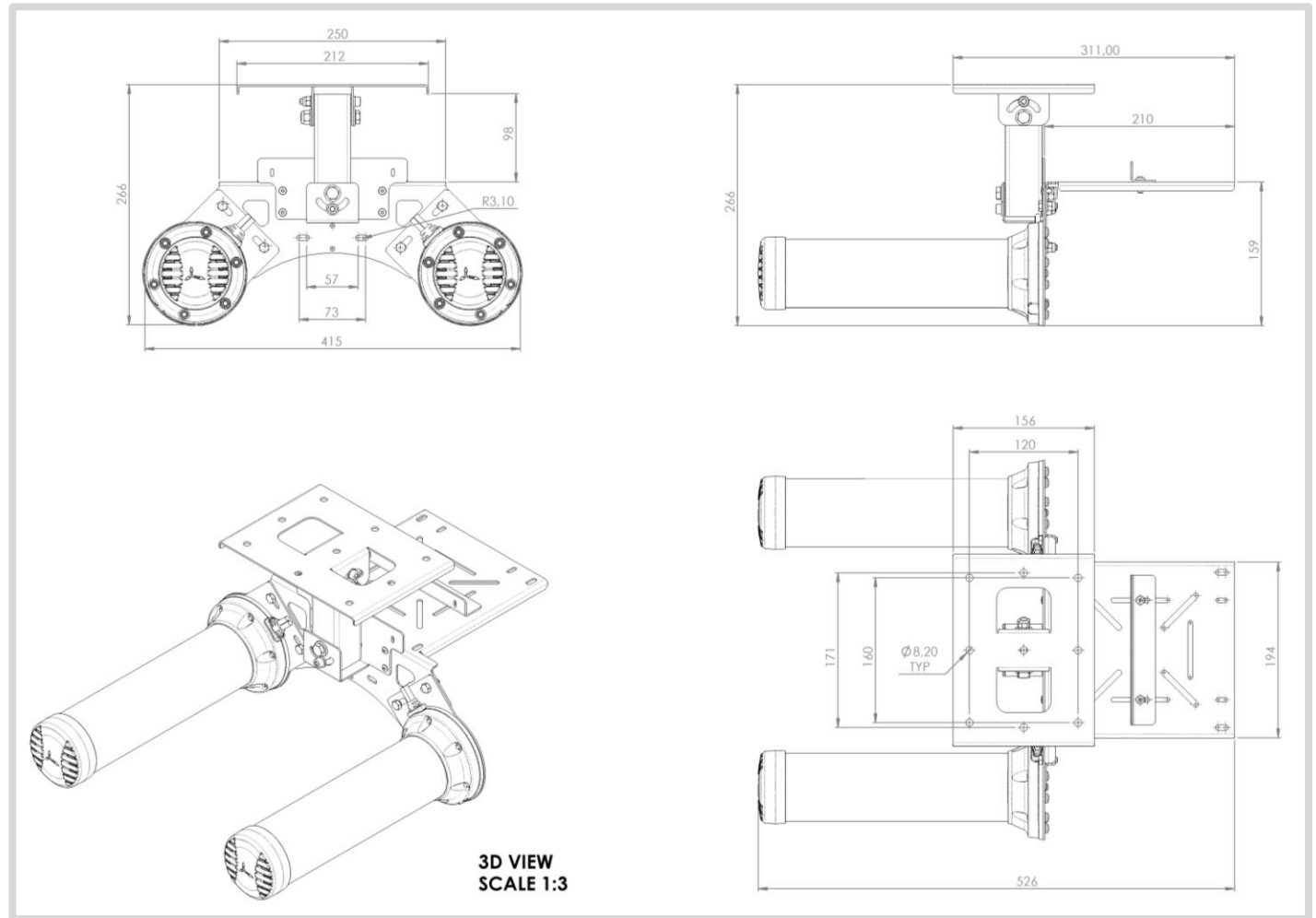
GAIN 5000 – 6000 MHz (EXCLUDING CABLE LOSS)


Gain* in dBi

13.0 dBi for 5000 MHz – 6000 MHz is the peak gain.

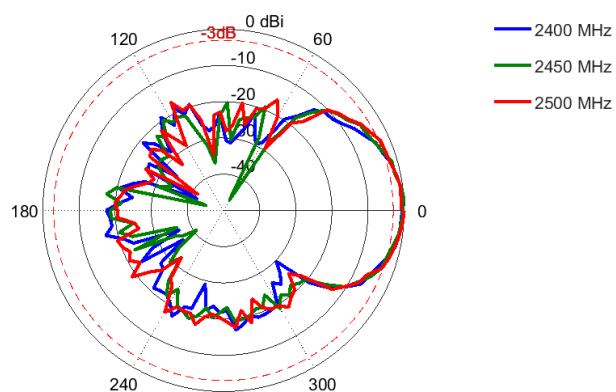
**Antenna gain measured with polarisation aligned standard antenna*

Technical Drawings

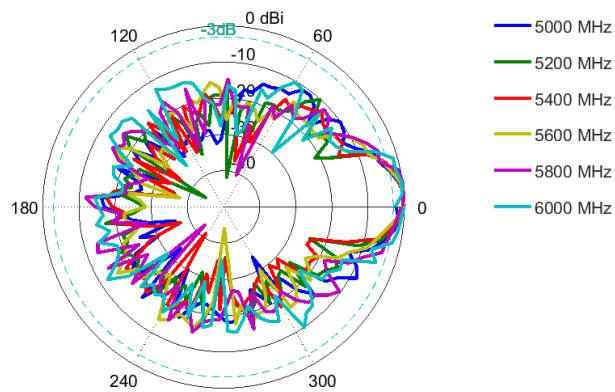


Radiation Patterns

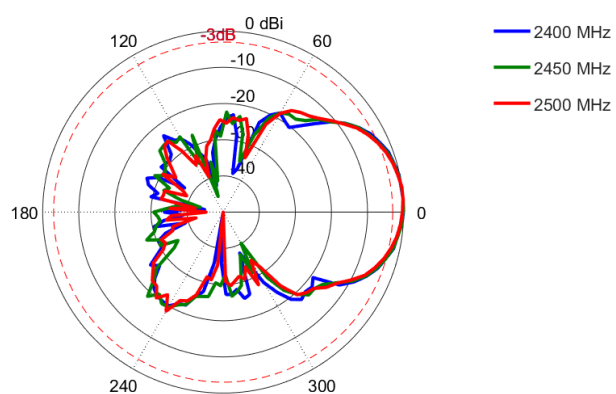
Elevation Port 1 & 3: 2400-2500 MHz



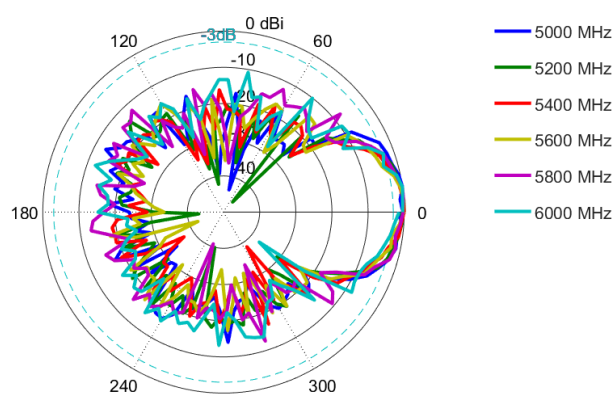
Elevation Port 2 & 4: 5000-6000 MHz



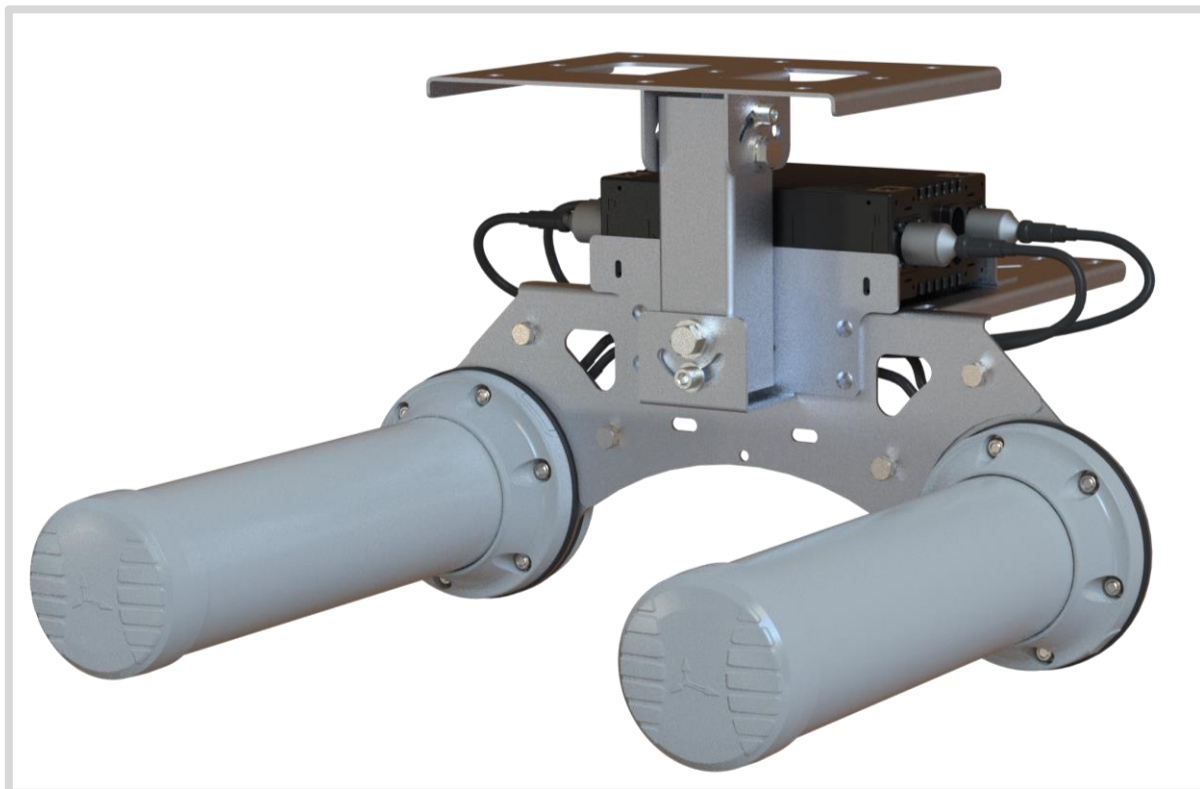
Azimuth Port 1 & 3: 2400-2500 MHz



Azimuth Port 2 & 4: 5000-6000 MHz



Antenna Assembly Options



Complete assemblies available with antennas and brackets:

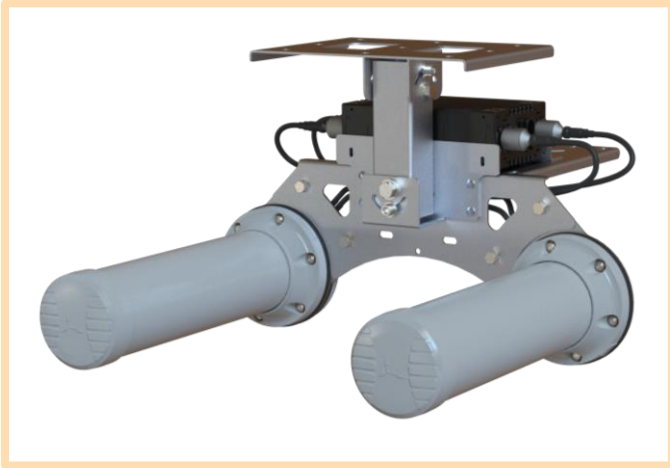
A-HELI-0021-V2-01 consists of:

- A-HELI-0013-V2-01-L _ Left Hand, Circular polarised uni-directional antenna
- A-HELI-0013-V2-01-R _ Right Hand, Circular polarised uni-directional antenna
- A-BRKT-045-V2-01 _ Ceiling Mount, swivel bracket

A-HELI-0021-V2-02 consists of:

- A-HELI-0013-V2-01-L _ Left Hand, Circular polarised uni-directional antenna
- A-HELI-0013-V2-01-R _ Right Hand, Circular polarised uni-directional antenna
- A-BRKT-045-V2-01 _ Ceiling Mount, swivel bracket
- A-BRKT-047-V1-01 _ Mine roof bolt attachment accessory

Mounting Options



Ceiling Mount

Multi directional swivel bracket for mounting the antenna to a ceiling.

This option uses A-BRKT-045-V2-01.



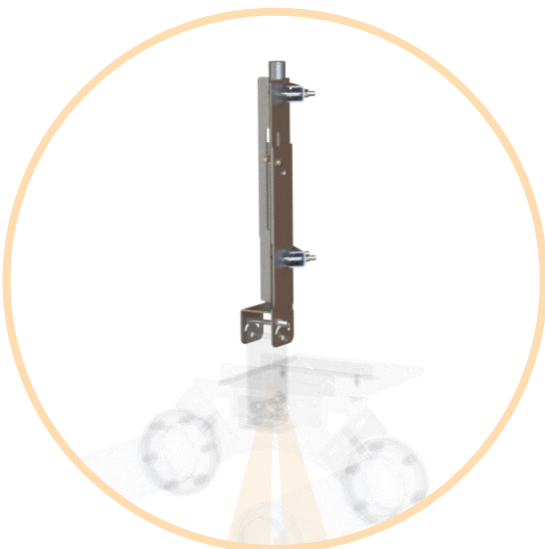
Mounting Rod

Ceiling 20mm rod mounting bracket attachment to use with bracket 45 for holding Heli-13 right hand circular and left hand circular polarised antennas.

This option uses A-BRKT-047-V2-01.

Additional Accessories**A - BRKT - 045 - V2 - 01**

Ceiling mounting bracket for holding Heli -19 Right hand and Left hand circular polarized antennas.

**A - BRKT - 047 - V1 - 01**

Ceiling 20mm Rod mounting bracket attachment to use with Bracket 45 for holding Heli -19 Right hand and Left hand circular polarized antennas

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