

ANTENNAS | HELI-13 SERIES

DUAL FREQUENCY UNI-DIRECTIONAL MINE & TUNNEL ANTENNA

UNI-DIRECTIONAL 2400–2500 MHz & 5000–6000 MHz 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 options available**
- **Uni-directional – radiates in one direction in a tunnel**
- **Ruggedized & water ingress protected**
- **Ideal for Mining & Tunnel M2M and IoT deployments**



Mining and Surface



Mining



Tunnel

APPLICATION AREAS

Product Overview

The HELI-13 forms part of a series of Mini-HELI antennas. These antennas are only mini in size relative to their bigger brothers, the HELI-5 & HELI-6, HELI-11, HELI-12 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.

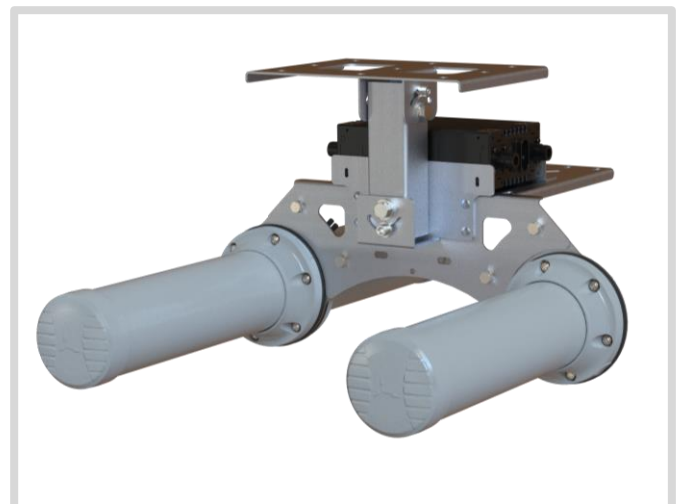
The HELI-13 is a set of dual 2.4GHz and 5GHz antennas, radiating in one direction (i.e. Uni-directional), which make them ideal for the coverage of both 2.4GHz and 5GHz in mining and other type of tunnels. These antennas are typically used for the deployment of IoT within the tunnel to provide telemetry and mine automation. These antennas are available in both Left Hand Circular (LHC) & Right Hand Circular (RHC) polarised antenna elements to provide optimal decorrelation within a MIMO deployment, resulting in the best of the two worlds; decorrelation due to the polarisation differences and also spatial diversity to enhance MIMO performance and RF reliability to service the most severe connectivity within a demanding mining tunnel. The dualband WiFi connection propagates around tunnel bends in a non-Line of Sight scenario and provides immunity to many of the WiFi signal disrupting objects such as trains and drilling machinery which appear to obscure the tunnel.

Features

- Dual 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 available (for MIMO).
- Intrinsically safe version available on request

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.



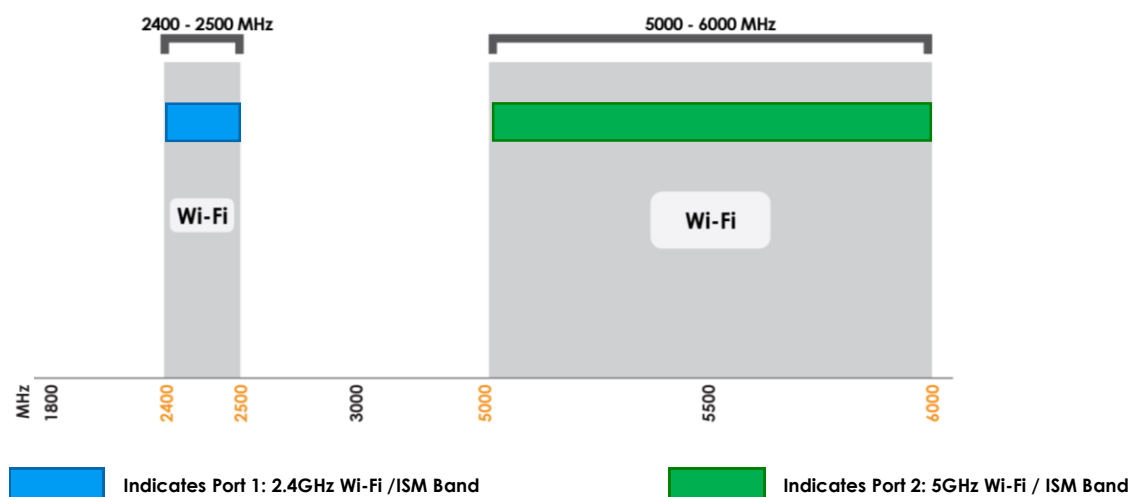
HELI-13

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Product Specifications may change without prior notice
Revised: August 2019



Frequency Bands

The HELI-13 is a wide-band antenna that works from 2400 – 2500 & 5000 - 6000 MHz



Antenna Overview

| |  |  |
|-------------------|---|---|
| Port | 1 | 2 |
| Frequency Bands | 2400 MHz - 2500 MHz | 5000 MHz - 6000 MHz |
| Peak Gain | 12 dBi | 13.0 dBi |
| Coax Cable Type | RG-58 | RG-58 |
| Coax Cable Length | 350mm | 350mm |
| Connector Type | N-Type Male | N-Type Male |

HELI-13

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Electrical Specifications

| | |
|----------------------|----------------------------------|
| Frequency bands: | 2400 MHz - 2500 MHz |
| | 5000 MHz - 6000 MHz |
| Gain (max): | 12.0 dBi for 2400 MHz – 2500 MHz |
| | 13.0 dBi for 5000 MHz - 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 or 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 |
|----------|-------------------|

Ordering Information (for Right Hand Circular)

| | |
|---------------------|---------------------|
| Commercial name: | HELI-13 |
| Order product code: | A-HELI-0013-V2-01-R |
| EAN number: | 6009693810013 |

Ordering Information (for Left Hand Circular)

| | |
|---------------------|---------------------|
| Commercial name: | HELI-13 |
| Order product code: | A-HELI-0013-V2-01-L |
| EAN number: | 6009693810006 |

Mechanical Specifications

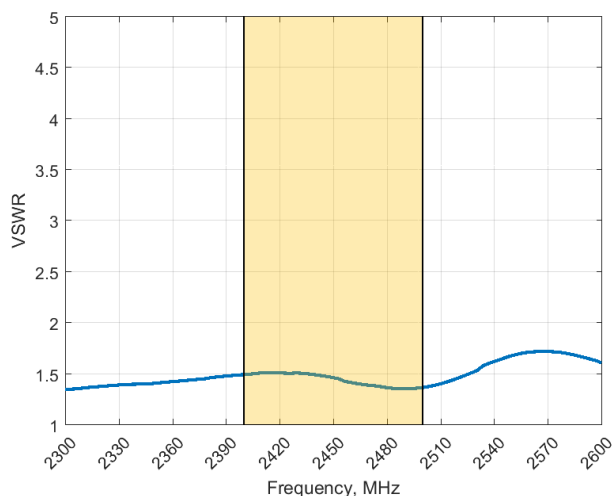
| | |
|----------------------|----------------------------|
| Product dimensions | ± 321 mm x 142 mm x 114 mm |
| Packaged dimensions: | 360mm x 160mm x 160mm |
| Weight: | 0.85 kg |
| Packaged weight: | 1.35 kg |
| Radome material: | ABS & PVC |
| Radome colour: | Grey |
| Mounting Type: | Ceiling mounted |

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 |



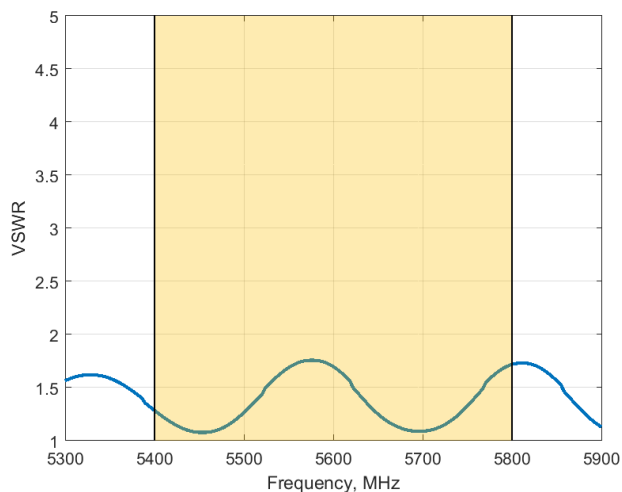
Antenna Performance Plots

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.

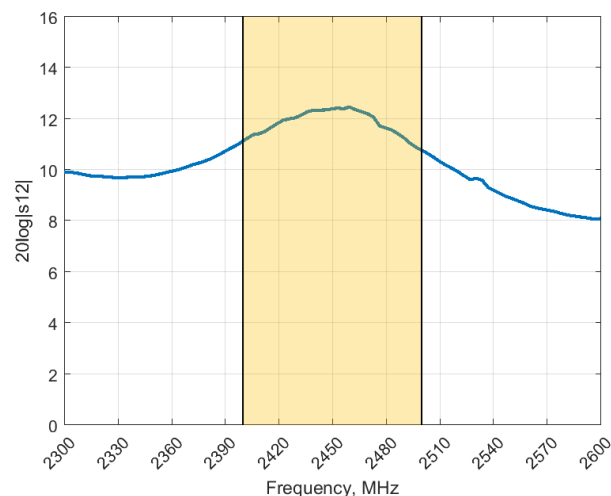
The HELI-13 delivers superior performance across all bands with a VSWR to 1.5:1 or better across 90% of the bands.

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.

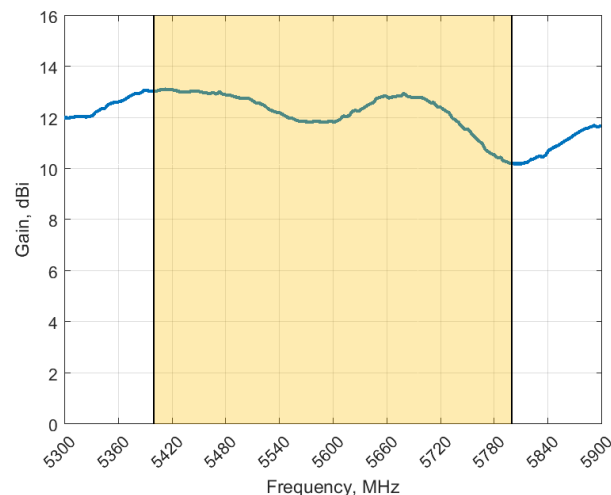
The HELI-13 delivers superior performance across all bands with a VSWR of 1.5:1 or better across 90% of the bands.

GAIN 2400-2500 MHz (EXCLUDING CABLE LOSS)


Gain* in dBi

12 dBi is the peak gain across all bands from 2400 – 2500 MHz

**Antenna gain measured with polarisation aligned standard antenna*

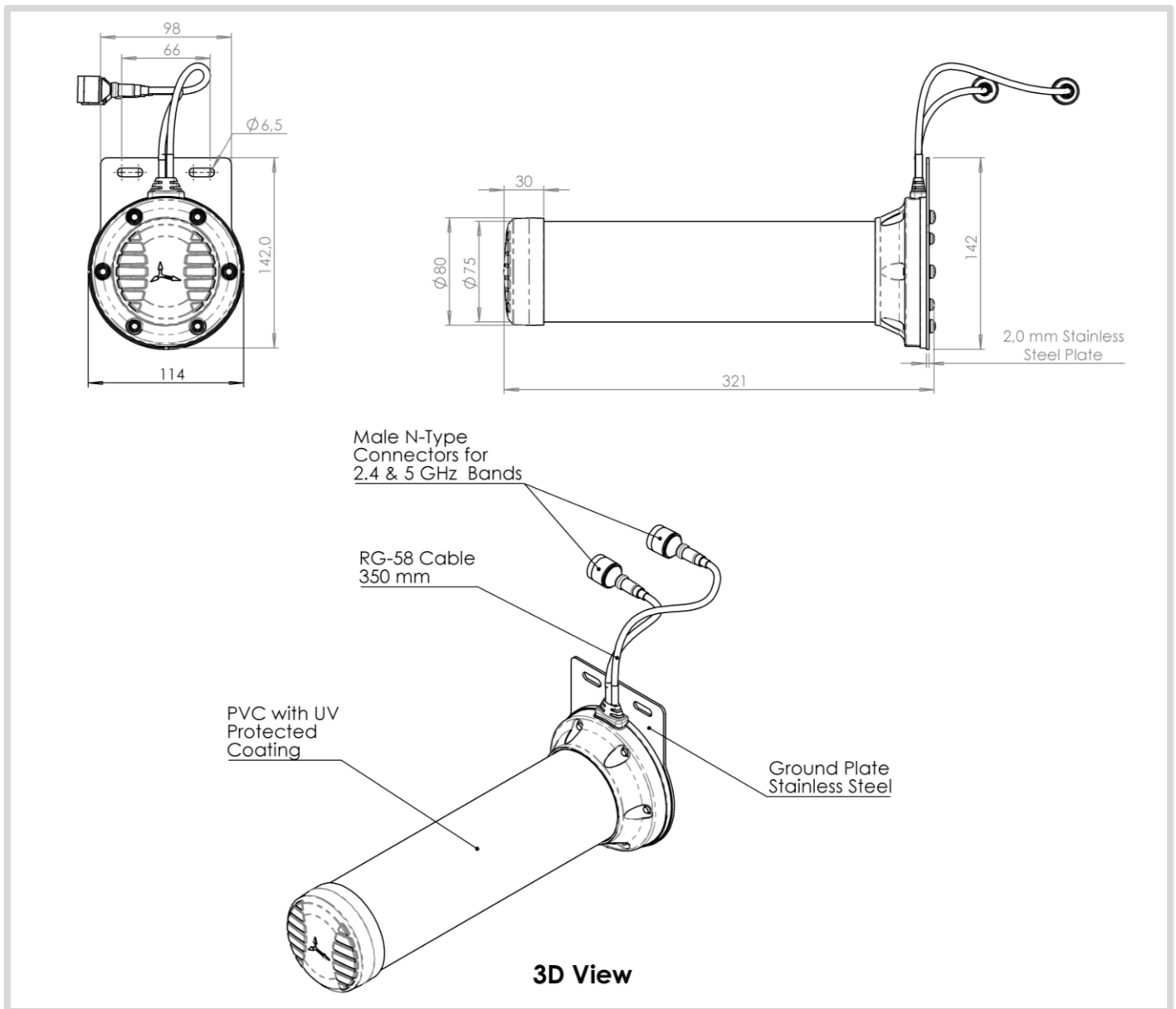
GAIN 5000-6000 MHz (EXCLUDING CABLE LOSS)


Gain* in dBi

13.0 dBi is the peak gain across all bands from 5000 – 6000 MHz

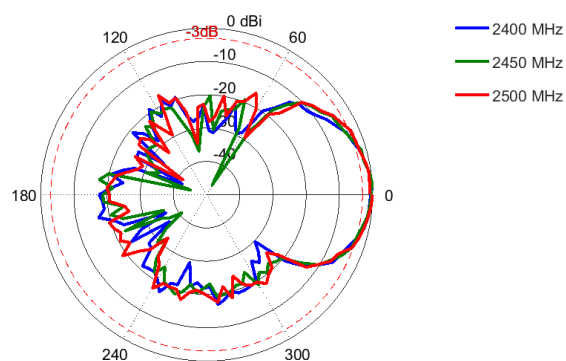
**Antenna gain measured with polarisation aligned standard antenna*

Technical Drawings

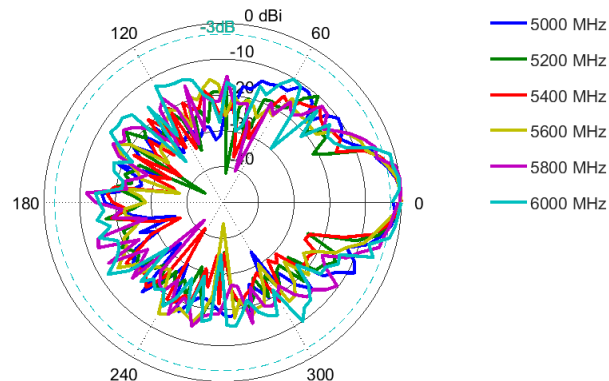


Radiation Patterns

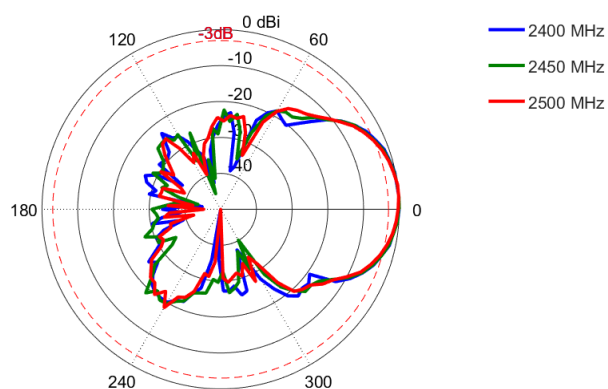
Elevation Port 1: [FREQUENCY 1]



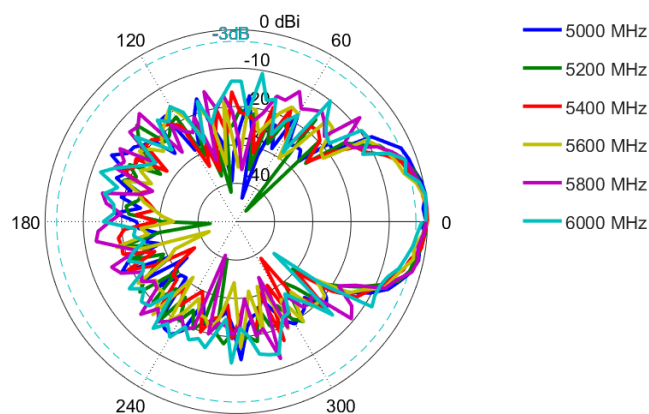
Elevation Port 2: [FREQUENCY 2]



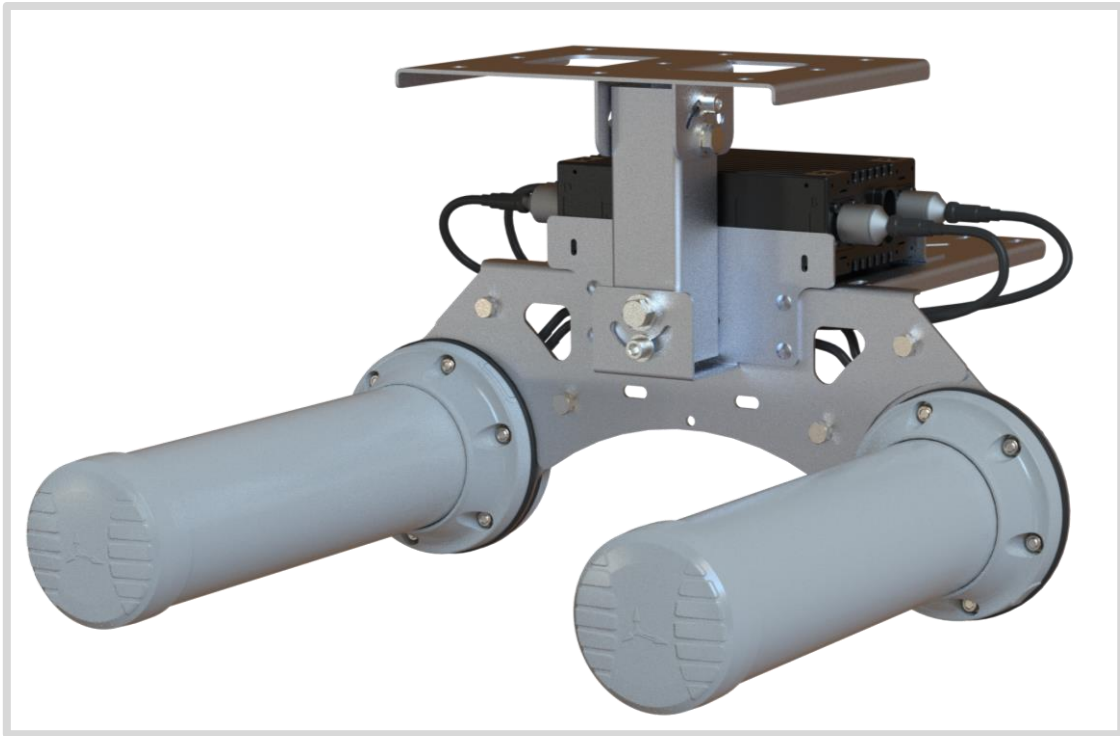
Azimuth Port 1: [FREQUENCY 1]



Azimuth Port 2: [FREQUENCY 2]



Additional Accessories



Complete assemblies available with antennas and brackets:

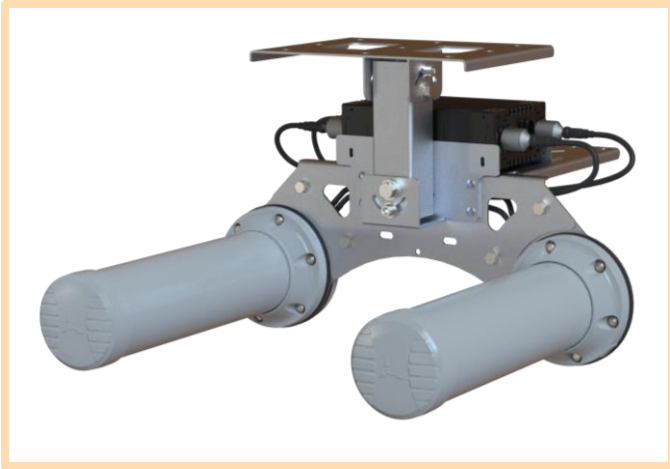
A-HELI-0021-V2-01 consists of:

- 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.



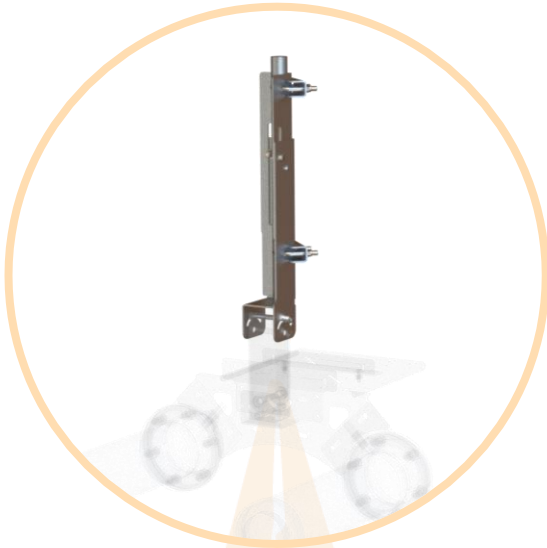
Mounting Rod

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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