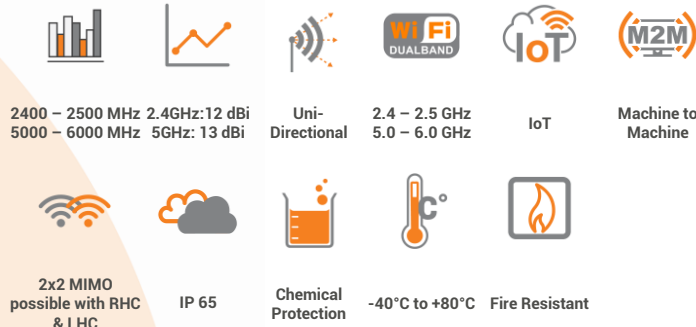
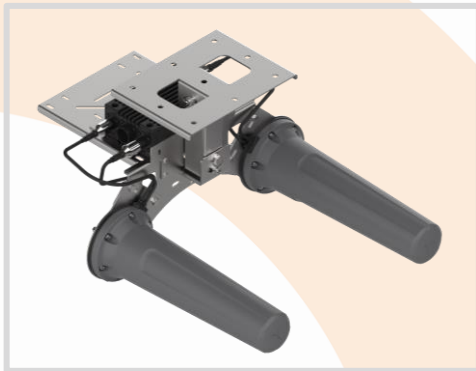


## ANTENNAS | HELI-21 SERIES

# CIRCULAR POLARISED, DIRECTIONAL MINE/TUNNEL WI-FI ANTENNA

Dual-band Wi-Fi; 2400 – 2500 MHz, 12 dBi; 5000 – 6000 MHz, 13 dBi



Mining



Tunnelling



Mining and  
Surface

APPLICATION AREAS

- 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 and dust ingress protected (IP 65)
- 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-3, HELI-4 & HELI-8, 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 dual-band 2.4 GHz and 5 GHz Wi-Fi antenna, radiating in one direction (i.e., uni-directional). This makes them ideal for the coverage of both Wi-Fi bands 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 when using the BRKT-45, resulting in optimum performance. The decorrelation is due to the polarisation difference and spatial diversity, between the two antenna elements, which enhances MIMO performance and RF reliability within a mining tunnel. The dual-band Wi-Fi connection propagates around tunnel bends in a Non-Line of Sight scenario and provides immunity to many Wi-Fi signal disrupting objects such as trains and drilling machinery which appear to obscure the tunnel.

## Features

- Four port 2.4 GHz and 5 GHz Wi-Fi antenna
- This antenna is especially designed for mining and other types of tunnels where rapid extension of network is required
- Uni-directional – radiates in one direction in a tunnel
- Left & Right-Hand Circular Polarised

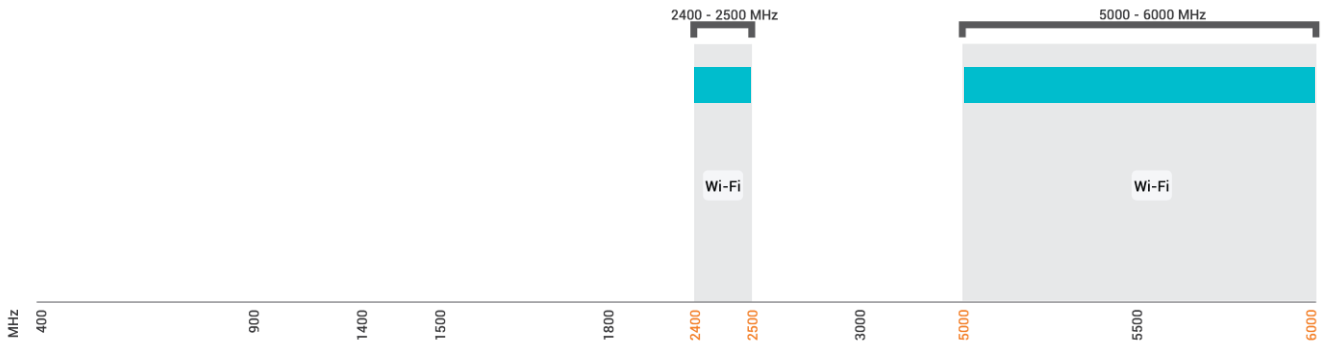
## Application Areas

- Supplementing fibre/leaky feeder cable "Hotspots" to areas to enhance mobility or extend networks to inaccessible areas
- 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 Wi-Fi / ISM antenna that works from | 2400 – 2500 MHz | and | 5000 – 6000 MHz |



Indicates the Wi-Fi bands on which Heli-21 works

**Antenna Derivatives**

| Product Order Code (SKU)  | A-HELI-0021-V3-01 | A-HELI-0021-V3-02                        |
|---------------------------|-------------------|--|
| Ports                     | 4                 | 4  |
| SISO / MIMO               | 2x2 MIMO          | 2x2 MIMO                                 |
| Coax Cable Type           | RG-141            | RG-141                                   |
| Coax Cable Length         | 400 mm            | 400 mm                                   |
| Connector Type            | N-Type (M)        | N-Type (M)                               |
| Included Mounting Bracket | A-BRKT-045-V2-01  | A-BRKT-045-V2-01 and<br>A-BRKT-047-V1-01 |
| EAN                       | 6009710925782     | 6009710925805                            |

*\*The coax cables & connectors are factory mounted to the antenna*

### Electrical Specifications

|                      |                                 |
|----------------------|---------------------------------|
| Frequency Bands:     | 2400 – 2500 MHz                 |
| Gain (Max):          | 5000 – 6000 MHz                 |
|                      | 12 dBi @ 2400 – 2500 MHz        |
|                      | 13 dBi @ 5000 – 6000 MHz        |
| VSWR:                | ≤1.5:1                          |
| Feed Power Handling: | 30 W                            |
| Input Impedance:     | 50 Ohm (nominal)                |
| Polarisation:        | Circular Polarised (LHC or RHC) |
| Coax Cable Loss:     | 0.84 dB /m @ 2400 MHz           |
|                      | 1.47 dB/m @ 6000 MHz            |
| DC Short:            | N/A                             |

### Product Box Content

|          |                     |
|----------|---------------------|
| Antenna: | A-HELI-0013-V3-01-L |
|          | A-HELI-0013-V3-01-R |

### Mechanical Specifications

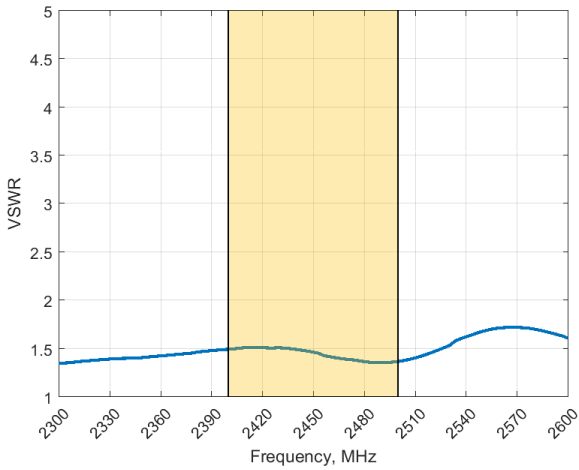
|                      |                          |
|----------------------|--------------------------|
| Product Dimensions:  | 526 mm x 419 mm x 266 mm |
| Packaged Dimensions: | 665 mm x 465 mm x 325 mm |
| Weight:              | 2.9 kg                   |
| Packaged Weight:     | 3.2 kg                   |
| Radome Material:     | UV Stable ASA            |
| Radome Colour:       | Grey                     |
|                      | Pantone-424C             |
| Mounting Type:       | Ceiling mounted          |

### Environmental Specifications, Certification & Approvals

|  |                                     |
|--|-------------------------------------|
| Wind Survival:                           | ≤120 km/h                           |
| Temperature Range (Operating):           | -40°C to +80°C                      |
| Environmental Conditions:                | Outdoor/Indoor                      |
| Water Ingress Protection Ratio/Standard: | IP 65                               |
| Salt Spray:                              | MIL-STD 810G/ASTM B117              |
| Operating Relative Humidity:             | Up to 98%                           |
| Storage Humidity:                        | 5% to 95% - non-condensing          |
| Storage Temperature:                     | -40°C to +80°C                      |
| Enclosure Flammability Rating:           | UL 94-HB                            |
| Impact Resistance:                       | IK 08                               |
| Product Safety & Environmental:          | Complies with CE and RoHS standards |

**Antenna Performance Plots**

**VSWR: 2400 – 2500 MHz**



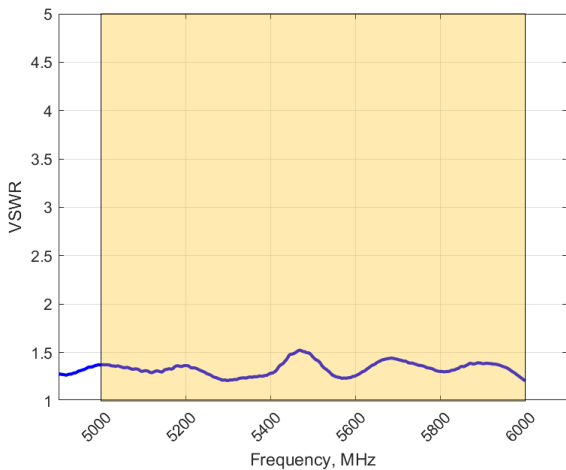
**Voltage Standing Wave Ratio (VSWR)\***

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  $\leq 1.5:1$ .

*\*VSWR measured with 400mm low loss cable*

**VSWR: 5000 – 6000 MHz**



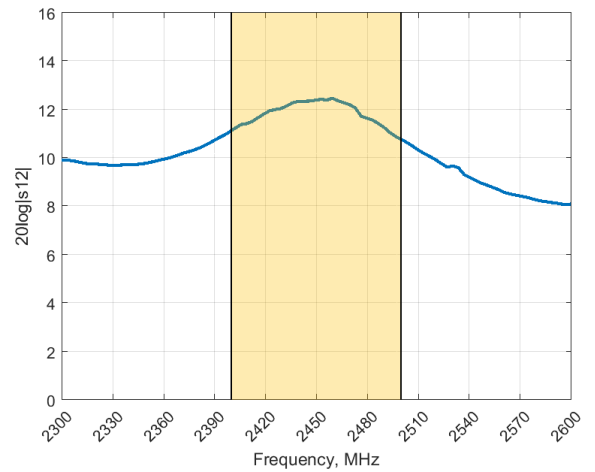
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VSWR is a measure of how efficiently radio-frequency power is transmitted from a power source, through a transmission line, into a load. In an ideal system, 100% of the energy is transmitted which corresponds to a VSWR of 1:1.

The HELI-21 delivers superior performance across all bands with a VSWR of  $\leq 1.5:1$ .

*\*VSWR measured with 400mm low loss cable*

**GAIN (EXCLUDING CABLE LOSS): 2400 – 2500 MHz**

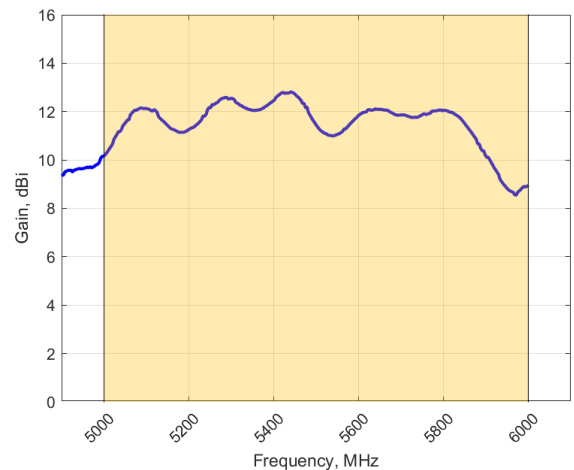


**Gain\* in dBi**

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

*\*Antenna gain measured with circular polarised standard antenna*

**GAIN (EXCLUDING CABLE LOSS): 5000 – 6000 MHz**

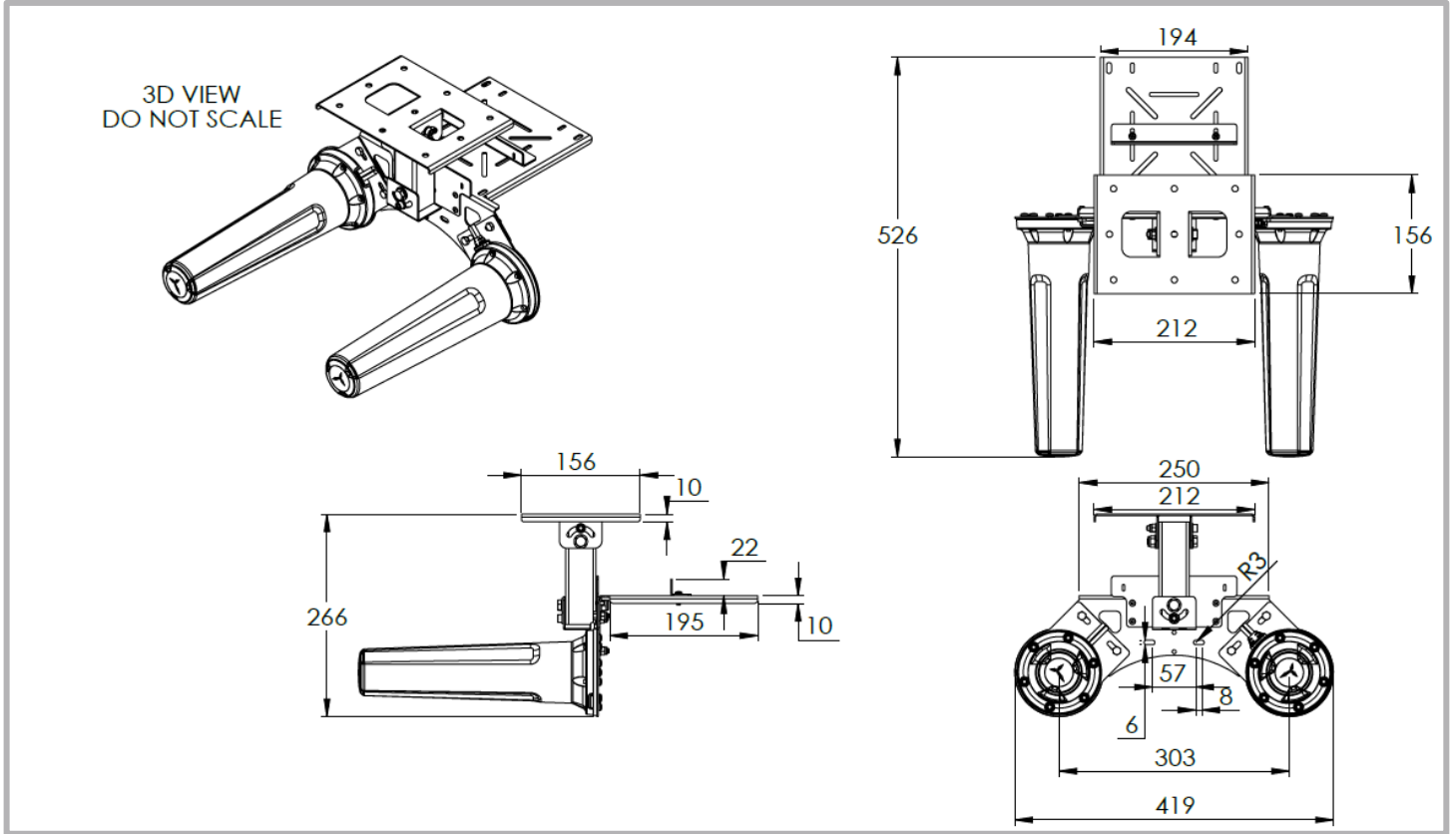


**Gain\* in dBi**

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

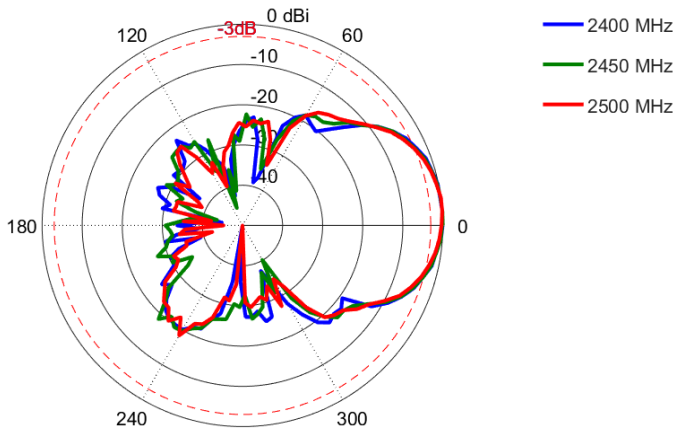
*\*Antenna gain measured with circular polarised standard antenna*

Technical Drawings

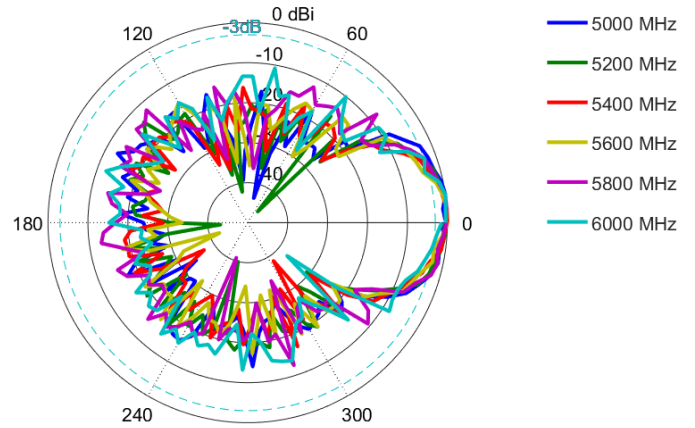


**Radiation Patterns**

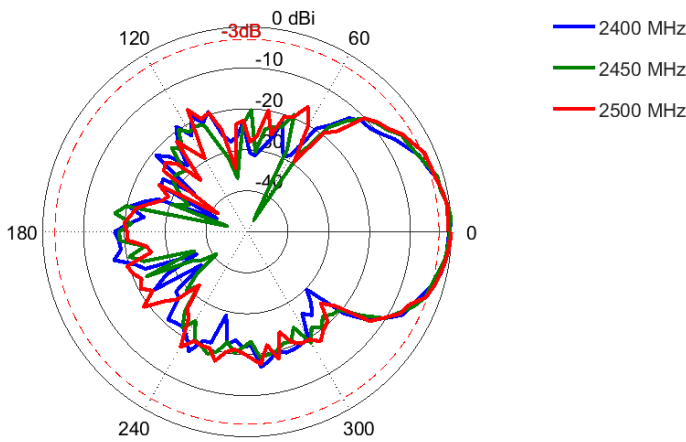
**Azimuth Port 1 & 3: 2400 – 2500 MHz**



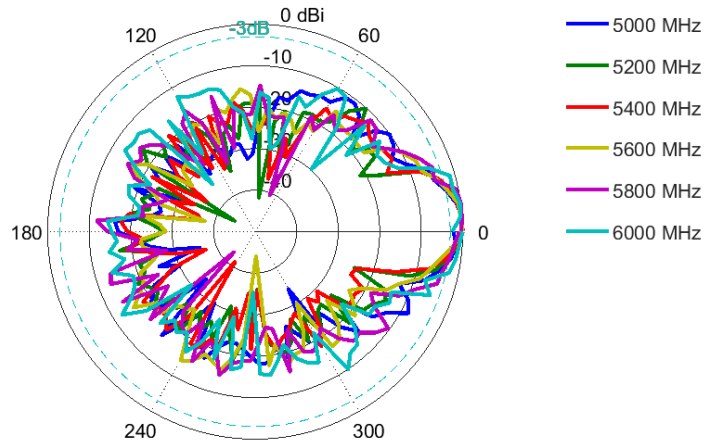
**Azimuth Port 2 & 4: 5000 – 6000 MHz**



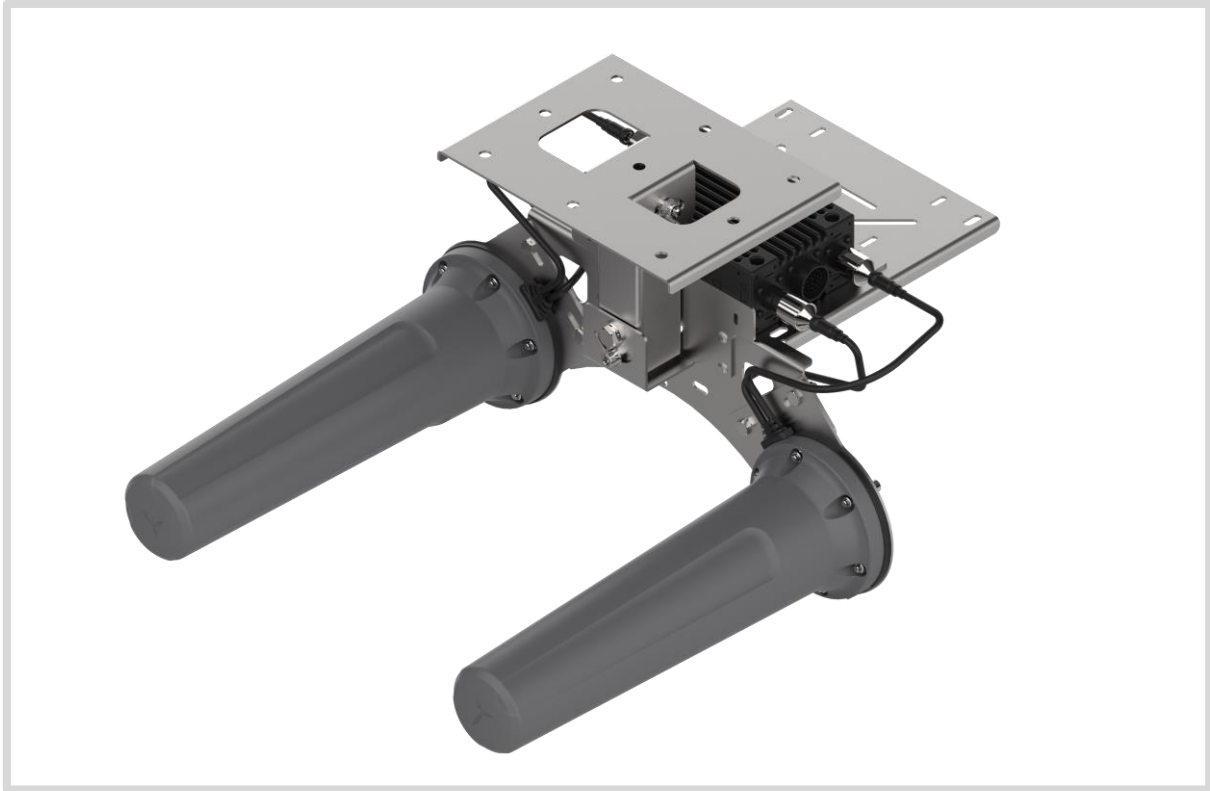
**Elevation Port 1 & 3: 2400 – 2500 MHz**



**Elevation Port 2 & 4: 5000 – 6000 MHz**



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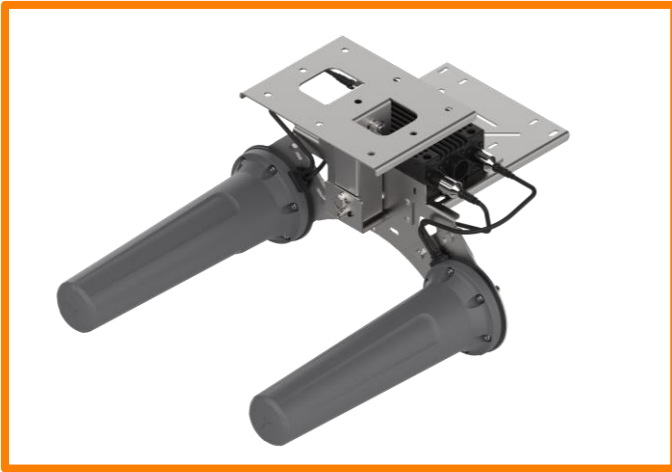
**Antenna Assembly Options****Complete assemblies available with antennas and brackets:****A-HELI-0021-V3-01 consists of:**

- A-HELI-0013-V3-01-L \_ Left-hand, Circular polarised uni-directional antenna
- A-HELI-0013-V3-01-R \_ Right-hand, Circular polarised uni-directional antenna
- A-BRKT-045-V2-01 \_ Ceiling Mount, swivel bracket

**A-HELI-0021-V3-02 consists of:**

- A-HELI-0013-V3-01-L \_ Left-hand, Circular polarised uni-directional antenna
- A-HELI-0013-V3-01-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



### Roof Bolt Mount (MIMO) - Optional

This optional 20mm roof bolt mounting bracket attachment is used in conjunction with BRKT-45 for mounting to standard mine roof bolts.


This option uses A-BRKT-047-V1-01.



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## Additional Accessories

See accessories technical specifications on [www.poynting.tech](http://www.poynting.tech)



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