



# Antennas

DATA SHEET

## Single Band Beamforming Antenna

BFA4R-H3A



- Three foot (0.9 m), Beamforming Antenna, deploying a high performing 8T8R Beamforming array covering 3300-4200 MHz
- Eight wide high band ports covering 3300-4200 MHz
- Full Spectrum Compliance for 3300-4200 MHz
- Provides an 8T8R Beamforming array, with a calibration port, for RRU controlled Azimuth beam control and beamforming, for increased 5G services data throughput and decreased latency, by minimizing interference and increasing signal strength at directed users
- Beamforming array can be deployed with tapering (or without tapering), for improved Azimuth SLL performance
- Exceeds minimum PIM performance requirements
- Equipped with new 4.3-10 connector, which is 40% smaller than traditional 7/16 DIN connector
- Equipped with One Field Replaceable, integrated AISG 2.0 compliant Remote Electrical Tilt (RET)

### Overview

The CCI Beamforming Array is an Eight port antenna, deploying a high performance array across four single columns, covering 3300-4200 MHz. The CCI Beamforming Antenna utilizes One Type 17 RET controller, with RET control for the 8T8R Beamforming array, across all four columns.

CCI antennas are designed and produced to ISO 9001 certification standards for reliability and quality in our state-of-the-art manufacturing facilities.

### Applications

- 8T8R Beamforming, supporting 3.3 - 4.2 GHz, with calibration port
- With CCI's Beamforming Antennas, wireless providers can deploy 8T8R Beamforming for increased throughput and capacity, using multiple high gain and narrow beams to connect to multiple users, within a single adaptive beamforming array



# Antennas

## SPECIFICATIONS

### Single Band Beamforming Antenna

BFA4R-H3A

#### Electrical

| Ports  | 8 x High Band Ports for 3300-4200 MHz |                 |                 |                 |
|--|---------------------------------------|-----------------|-----------------|-----------------|
|  | Single Column                         |                 |                 |                 |
| Frequency Range  | 3300-3400 MHz                         | 3450-3550 MHz   | 3700-4000 MHz   | 4000-4200 MHz   |
| Gain <sup>1</sup>  | 15.6 dBi                              | 15.9 dBi        | 16.3 dBi        | 16.6 dBi        |
| Gain (Average) <sup>2</sup>                                      | 14.8 dBi                              | 15.0 dBi        | 15.5 dBi        | 15.6 dBi        |
| Azimuth Beamwidth (-3dB)   | 91.0° ±15.7°                          | 94.2° ±19.4°    | 89.5° ±12.0°    | 91.6° ±10.7°    |
| Elevation Beamwidth (-3dB)                                       | 6.7°                                  | 6.3°            | 5.6°            | 5.1°            |
| Electrical Downtilt  | 2° to 12°                             | 2° to 12°       | 2° to 12°       | 2° to 12°       |
| Elevation Sidelobes (1st Upper)                                  | < -21 dB                              | < -20 dB        | < -21 dB        | < -20 dB        |
| Front-to-Back Ratio @180°  | > 36 dB                               | > 38 dB         | > 38 dB         | > 36 dB         |
| Front-to-Back Ratio ±20°   | > 32 dB                               | > 34 dB         | > 34 dB         | > 33 dB         |
| Cross-Polar Discrimination at Peak                               | > 25 dB                               | > 23 dB         | > 20 dB         | > 18 dB         |
| CoPol Isolation between Columns                                  | > 20 dB                               | > 22 dB         | > 25 dB         | > 25 dB         |
| Cross-Polar Isolation  | > 20 dB                               | > 22 dB         | > 25 dB         | > 25 dB         |
| Coupling level, antenna port to cal port                         | 26 ±2                                 | 26 ±2           | 26 ±2           | 26 ±2           |
| Max Amplitude difference between antenna ports and Cal port (dB) | < ±1                                  | < ±1            | < ±1            | < ±1            |
| Max phase difference between antenna ports and Cal port (deg)    | < ±7                                  | < ±7            | < ±7            | < ±7            |
| Voltage Standing Wave Ratio (VSWR)                               | < 1.5:1                               | < 1.5:1         | < 1.5:1         | < 1.5:1         |
| Passive Intermodulation (2x20W)                                  | ≤ -153 dBc                            | ≤ -153 dBc      | ≤ -153 dBc      | ≤ -153 dBc      |
| Input Power Continuous Wave (CW)                                 | 100 watts                             | 100 watts       | 100 watts       | 100 watts       |
| Polarization   | Dual Linear 45°                       | Dual Linear 45° | Dual Linear 45° | Dual Linear 45° |
| Input Impedance  | 50 ohms                               | 50 ohms         | 50 ohms         | 50 ohms         |
| Lightning Protection   | DC Ground                             | DC Ground       | DC Ground       | DC Ground       |

<sup>1</sup>Peak gain across sub-bands.

<sup>2</sup>Electrical specifications follow document "Recommendation on Base Station Antenna Standards" (BASTA) V11.1.

| Ports                           | Broadcast and Service Beams |               |                     |               |
|---------------------------------|-----------------------------|---------------|---------------------|---------------|
|                                 | Broadcast                   |               | Service Beam at 0°* |               |
| Frequency Range                 | 3300-3600 MHz               | 3700-4200 MHz | 3300-3600 MHz       | 3300-3600 MHz |
| Gain <sup>1</sup>               | 17.2 dBi                    | 17.8 dBi      | 20.8 dBi            | 21.3 dBi      |
| Gain (Average) <sup>2</sup>     | 16.6 dBi                    | 16.8 dBi      | 20.3 dBi            | 20.6 dBi      |
| Azimuth Beamwidth (-3dB)        | 65.7° ±5.9°                 | 70.8° ±5.8°   | 27.3° ±0.9°         | 25.5° ±1.0°   |
| Elevation Beamwidth (-3dB)      | 6.7°                        | 6.7°          | 6.6°                | 5.6°          |
| Electrical Downtilt             | 2° to 12°                   | 2° to 12°     | 2° to 12°           | 2° to 12°     |
| Elevation Sidelobes (1st Upper) | < -19 dB                    | < -20 dB      | < -22 dB            | < -21 dB      |
| Front-to-Back Ratio @180°       | > 40 dB                     | > 40 dB       | > 40 dB             | > 40 dB       |
| Front-to-Back Ratio ±20°        | > 32 dB                     | > 35 dB       | > 38 dB             | > 38 dB       |

<sup>1</sup>Peak gain across sub-bands.

<sup>2</sup>Electrical specifications follow document "Recommendation on Base Station Antenna Standards" (BASTA) V11.1.

\* Performance is based on no tapering applied



# Antennas

## SPECIFICATIONS

### Single Band Beamforming Antenna

BFA4R-H3A

#### Electrical

| Ports                           | Broadcast and Service Beams |               |                            |               |
|---------------------------------|-----------------------------|---------------|----------------------------|---------------|
|                                 | Service Beam at 30°*        |               | Service Beam Soft BiSector |               |
| Frequency Range                 | 3300-3600 MHz               | 3700-4200 MHz | 3300-3600 MHz              | 3700-4200 MHz |
| Gain <sup>1</sup>               | 20.1 dBi                    | 21.0 dBi      | 19.7 dBi                   | 20.5 dBi      |
| Gain (Average) <sup>2</sup>     | 19.5 dBi                    | 20.4 dBi      | 19.2 dBi                   | 20.0 dBi      |
| Azimuth Beamwidth (-3dB)        | 29.4° ±1.4°                 | 25.6° ±1.6°   | 30.5° ±1.1°                | 28.0° ±1.2°   |
| Elevation Beamwidth (-3dB)      | 6.5°                        | 5.5°          | 6.5°                       | 5.5°          |
| Electrical Downtilt             | 2° to 12°                   | 2° to 12°     | 2° to 12°                  | 2° to 12°     |
| Elevation Sidelobes (1st Upper) | < -22 dB                    | < -21 dB      | < -20 dB                   | < -20 dB      |
| Front-to-Back Ratio @180°       | > 38 dB                     | > 40 dB       | > 38 dB                    | > 40 dB       |
| Front-to-Back Ratio ±20°        | > 35 dB                     | > 38 dB       | > 36 dB                    | > 38 dB       |

<sup>1</sup>Peak gain across sub-bands.

<sup>2</sup>Electrical specifications follow document "Recommendation on Base Station Antenna Standards" (BASTA) V11.1.

\* Performance is based on no tapering applied

#### Mechanical

|                            |   |
|----------------------------|---|
| Dimensions (LxWxD)         | 30.8x13.1x7.0 in (783x332x179 mm)         |
| Survival Wind Speed        | > 150 mph (> 241 kph)                     |
| Front Wind Load            | 86 lbs (382 N)-22 @ 100 mph (161 kph)     |
| Side Wind Load             | 50 lbs (220 N) @ 100 mph (161 kph)        |
| Equivalent Flat Plate Area | 3.4 ft <sup>2</sup> (0.3 m <sup>2</sup> ) |
| Weight *                   | 23.6 lbs (10.7 kg)                        |
| RF Connector               | 8 x 4.3-10 female                         |
| Calibration Interface      | 4.3-10 female                             |
| RET Connectors             | 1 female / 1 male                         |
| RET Interface              | 8-pin D female / 8-pin D male             |
| Mounting Pole              | 2 to 5 in (5 to 12 cm)                    |

\* Weight excludes mounting kit



# Antennas

## SPECIFICATIONS

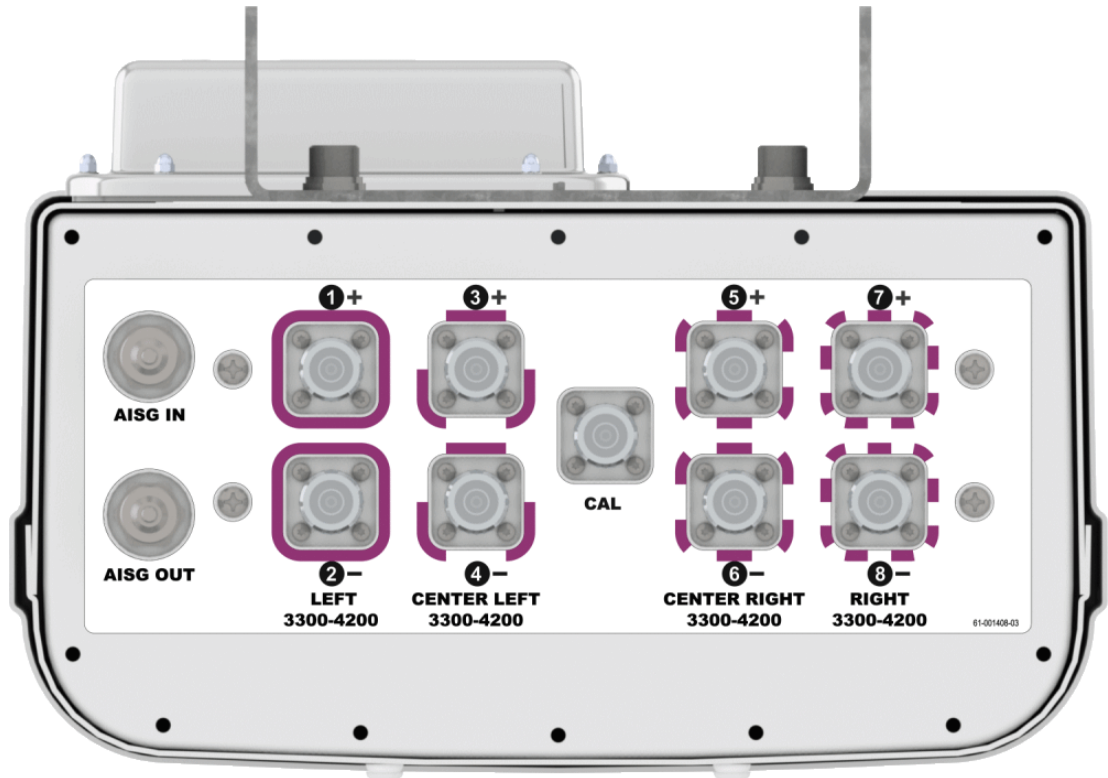
### Single Band Beamforming Antenna

BFA4R-H3A

Mechanical

Bottom View

BFA4R-H3AB





# Antennas

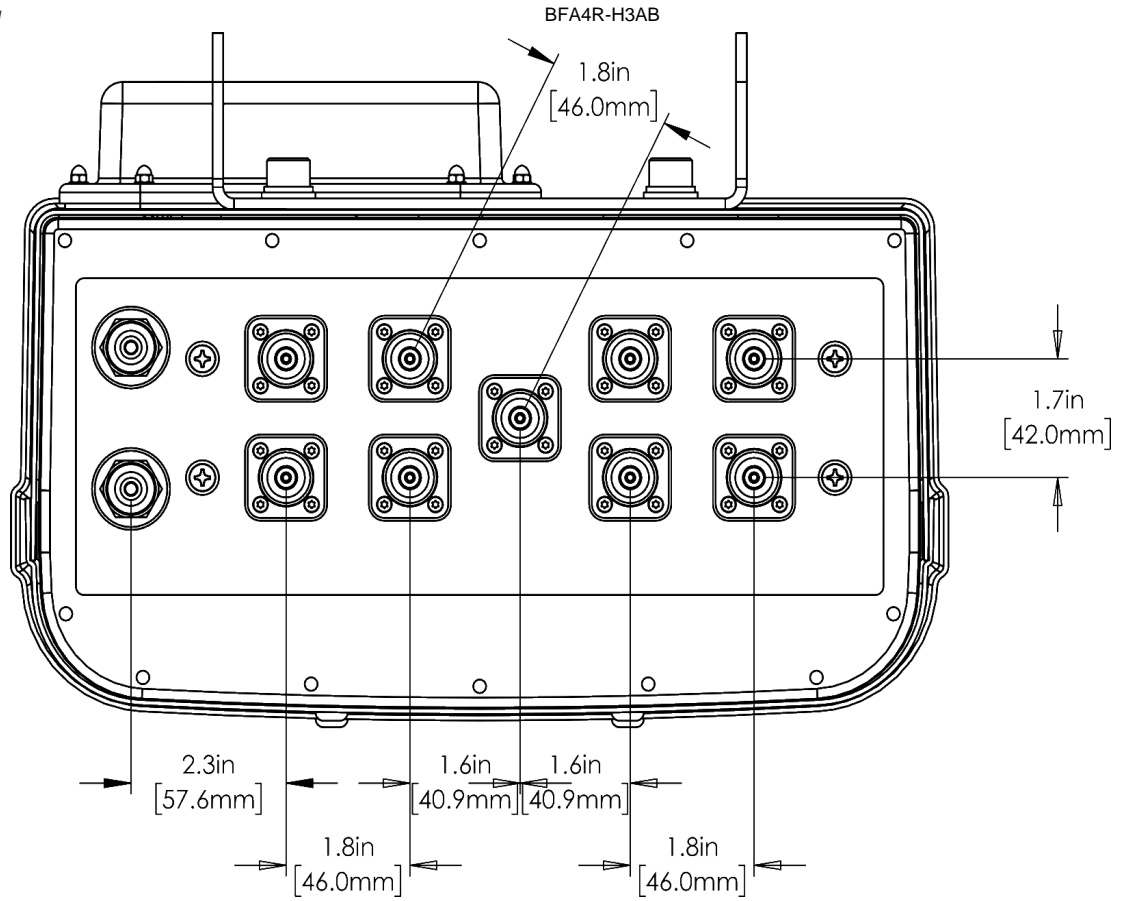
## Single Band Beamforming Antenna

BFA4R-H3A

### SPECIFICATIONS

#### Mechanical

Connector Spacing





# Antennas

## SPECIFICATIONS

### Single Band Beamforming Antenna

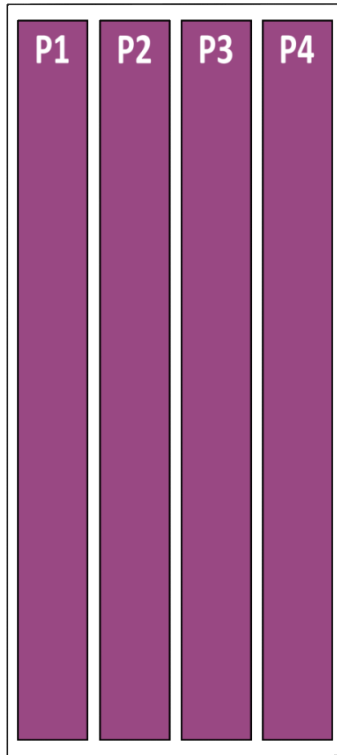
BFA4R-H3A

Mechanical

RET to Element Configuration

BFA4R-H3AB Element and RET configuration (Type 17 Internal RET)

### Element arrays as viewed from rear of antenna



### RET placement as viewed from rear of antenna

Top of antenna



**MM.1**

| Array | Ports | Freq (MHz) | Ports controlled by common RET | AISG RET UID |
|-------|-------|------------|--------------------------------|--------------|
| P1    | 1, 2  | 3300-4200  | 1, 2, 3, 4,<br>5, 6, 7, 8      | ClxxxxxMM.1  |
| P2    | 3, 4  | 3300-4200  |                                |              |
| P3    | 5, 6  | 3300-4200  |                                |              |
| P4    | 7, 8  | 3300-4200  |                                |              |



# Antennas

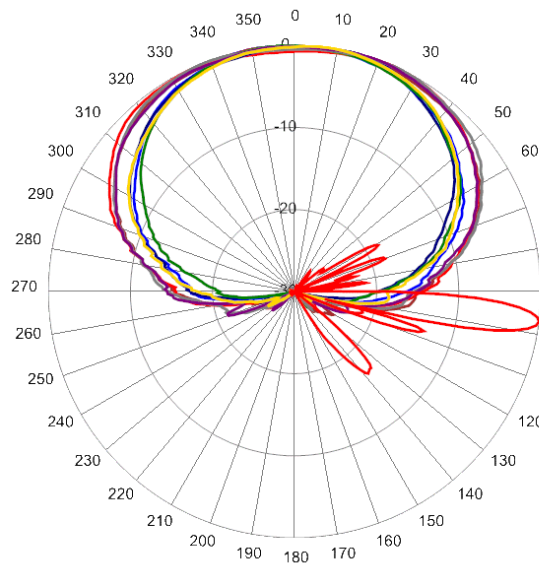
## SPECIFICATIONS

### Single Band Beamforming Antenna

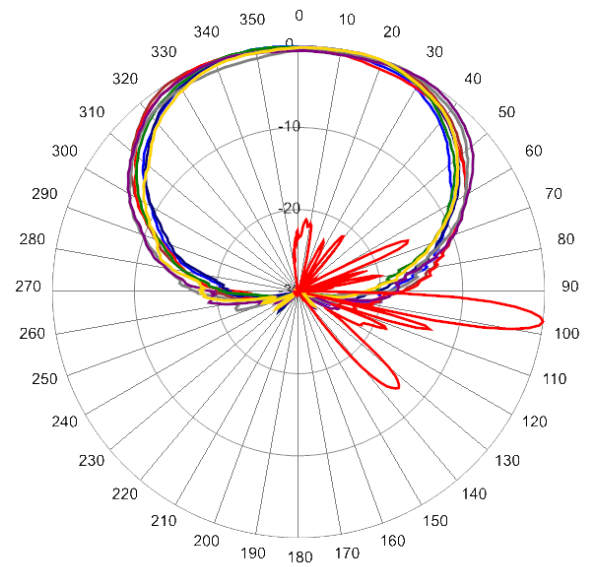
BFA4R-H3A

#### Typical Antenna Patterns

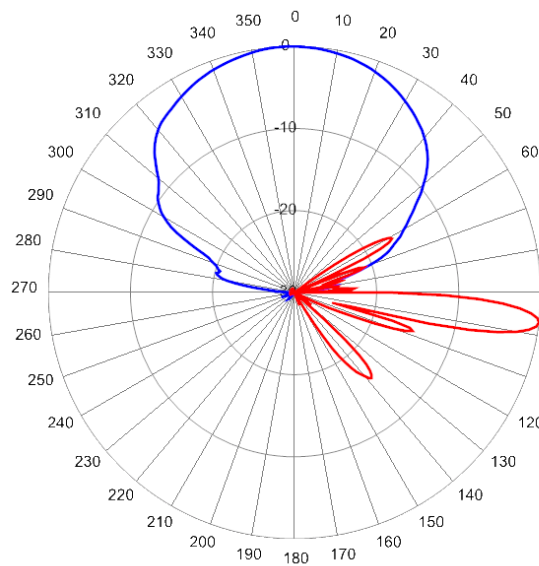
For detailed information on additional antenna patterns, contact customer support at [support@cciproducts.com](mailto:support@cciproducts.com)



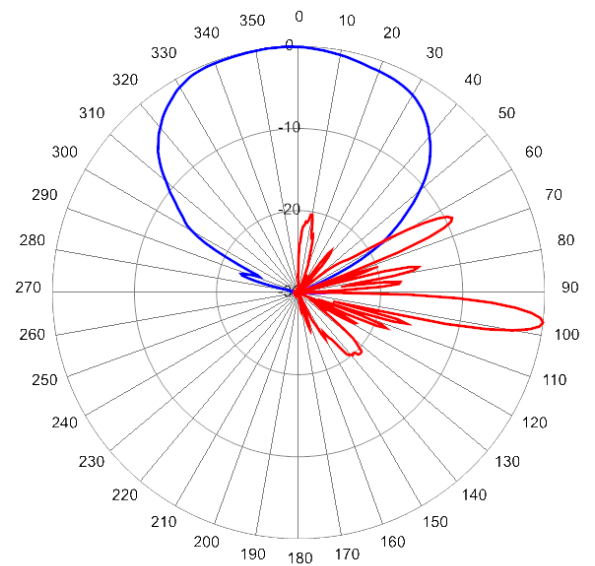
3500 MHz Azimuth with Elevation 7° Single Columns



3920 MHz Azimuth with Elevation 7° Single Columns



3500 MHz Azimuth with Elevation 7° Broadcast Beam



3920 MHz Azimuth with Elevation 7° Broadcast Beam



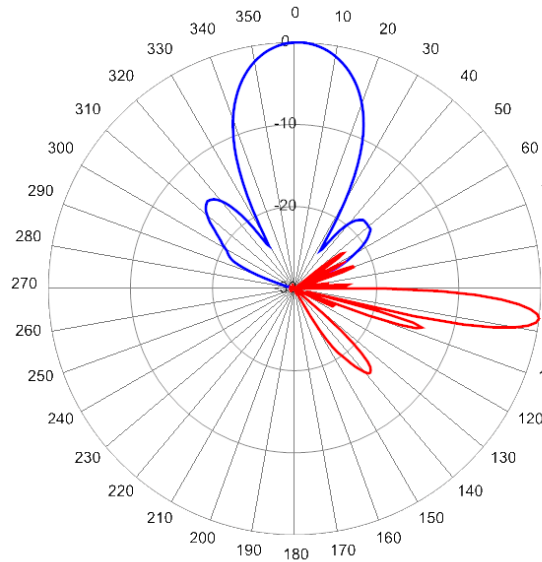
# Antennas

## SPECIFICATIONS

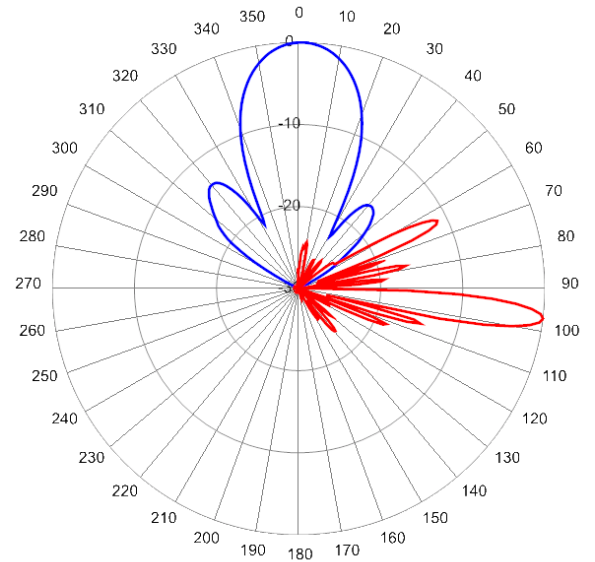
### Single Band Beamforming Antenna

BFA4R-H3A

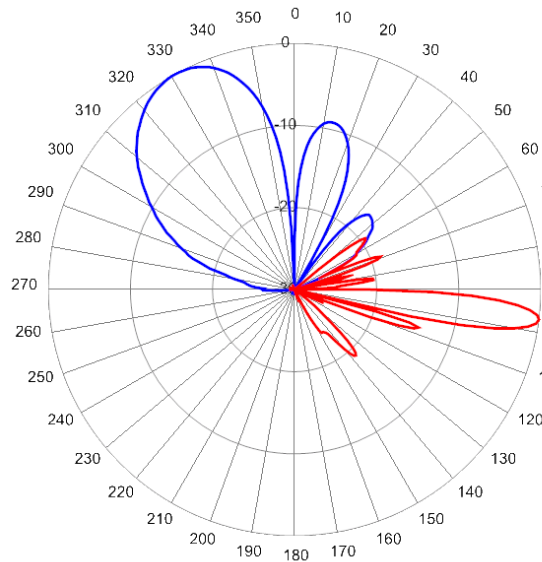
#### Typical Antenna Patterns



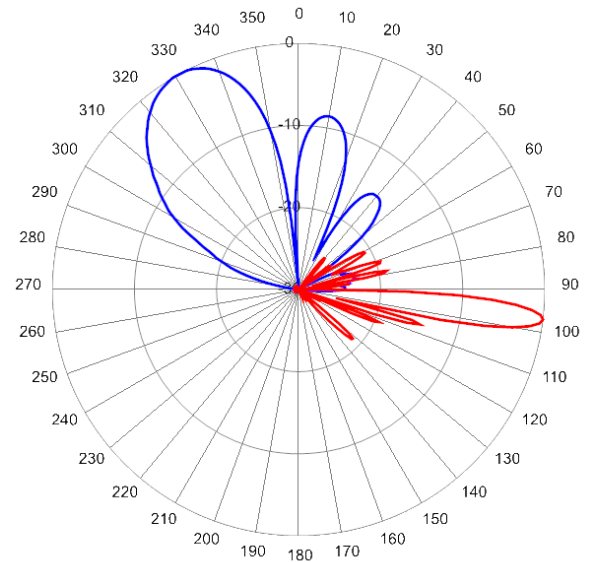
3500 MHz Azimuth 0° with Elevation 7° Service Beam



3920 MHz Azimuth 0° with Elevation 7° Service Beam



3500 MHz Azimuth 30° with Elevation 7° Service Beam



3920 MHz Azimuth 30° with Elevation 7° Service Beam





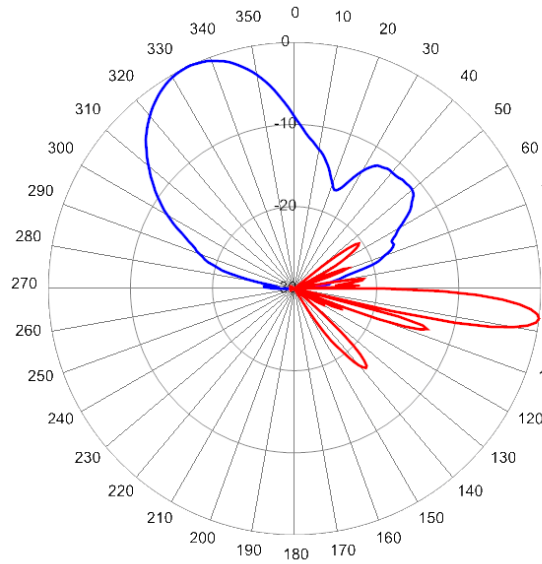
# Antennas

SPECIFICATIONS

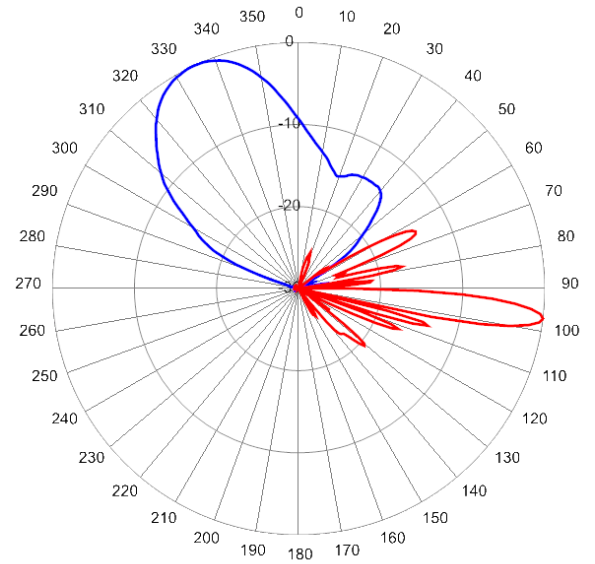
## Single Band Beamforming Antenna

BFA4R-H3A

Typical Antenna Patterns



3500 MHz Azimuth with Elevation 7° Soft Split Beam



3920 MHz Azimuth with Elevation 7° Soft Split Beam



# Antennas

ORDERING

## Single Band Beamforming Antenna

BFA4R-H3A

### Parts & Accessories

|                       |   |
|-----------------------|---|
| <b>BFA4R-H3AB-K</b>   | Three foot (0.9 m) beam forming antenna with 90° azimuth single column beamwidth, 9x 4.3-10 female connectors (including 1 calibration port), 1 factory installed BSA-RET400 RET actuators (Type 17 Internal) and MBK-15 mounting bracket |
| <b>MBK-15</b>         | Mounting bracket kit (top and bottom) with fixed 0° mechanical tilt   |
| <b>MBK-03</b>         | Mounting bracket kit (top and bottom) with 0° to 10° mechanical tilt adjustment   |
| <b>BSA-RET400</b>     | Type 17 remote electrical tilt actuator   |
| <b>AISGC-M-F-10FT</b> | 10 Ft (3 m) Male/Female RRU to Antenna AISG cable   |



# Antennas

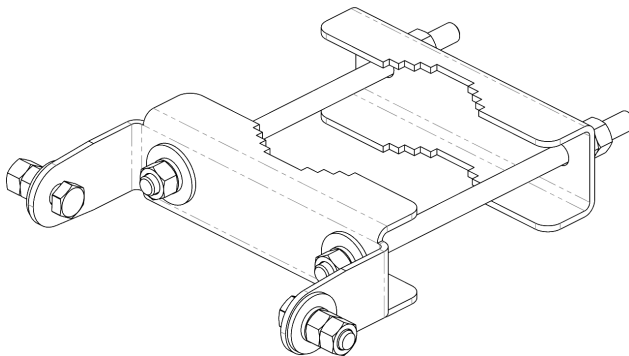
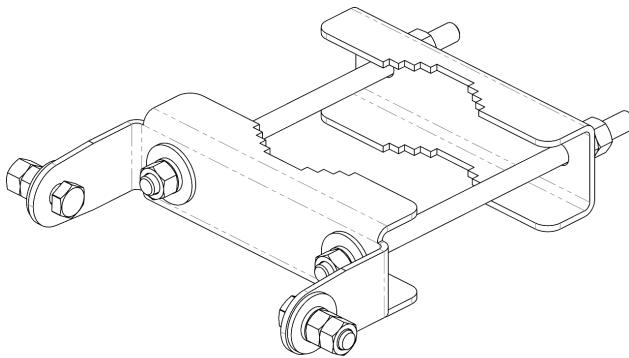
ACCESSORIES

## Mounting Bracket Kit

MBK-15

Mechanical

|                                |                        |
|--------------------------------|------------------------|
| <b>Weight</b>                  | 8.6 lbs (3.9 kg)       |
| <b>Hinge Pitch</b>             | 31.5 in (800 mm)       |
| <b>Mounting Pole Dimension</b> | 2 to 5 in (5 to 12 cm) |
| <b>Fastener Size</b>           | M10                    |
| <b>Installation Torque</b>     | 15 ft-lbs (20 N·m)     |
| <b>Mechanical Tilt</b>         | 0°                     |



MBK-15 Top and Bottom Bracket



# Antennas

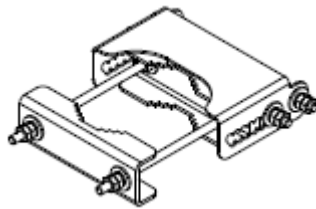
ACCESSORIES

## Mounting Bracket Kit

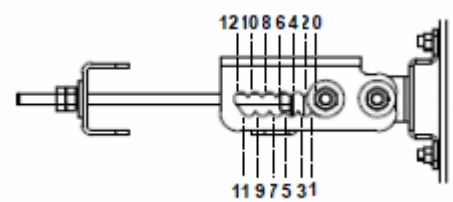
MBK-03

### Mechanical

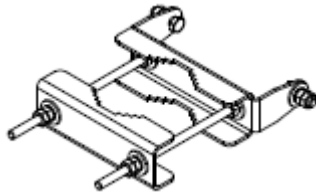
|                                   |                        |
|-----------------------------------|------------------------|
| <b>Weight</b>                     | 9.8 lbs (4.4 kg)       |
| <b>Hinge Pitch</b>                | 13 in (330 mm)         |
| <b>Mounting Pole Dimension</b>    | 2 to 5 in (5 to 12 cm) |
| <b>Fastener Size</b>              | M10                    |
| <b>Installation Torque</b>        | 15 ft·lbs (20 N·m)     |
| <b>Mechanical Tilt Adjustment</b> | 0° - 12°               |



MBK-03 Top Adjustable Bracket



MBK-03 Top Adjustable Bracket Side View



MBK-03 Bottom Fixed Bracket



# Antennas

ACCESSORIES

## Internal Remote Electrical Tilt (iRET)

BSA-RET400

### General Specifications

|                   |                 |
|-------------------|-----------------|
| Part Number       | BSA-RET400      |
| Protocols         | AISG 2.0        |
| RET Type          | Type 17         |
| Adjustment Cycles | >10,000 cycles  |
| Tilt Accuracy     | ±0.1°           |
| Temperature Range | -40° C to 70° C |

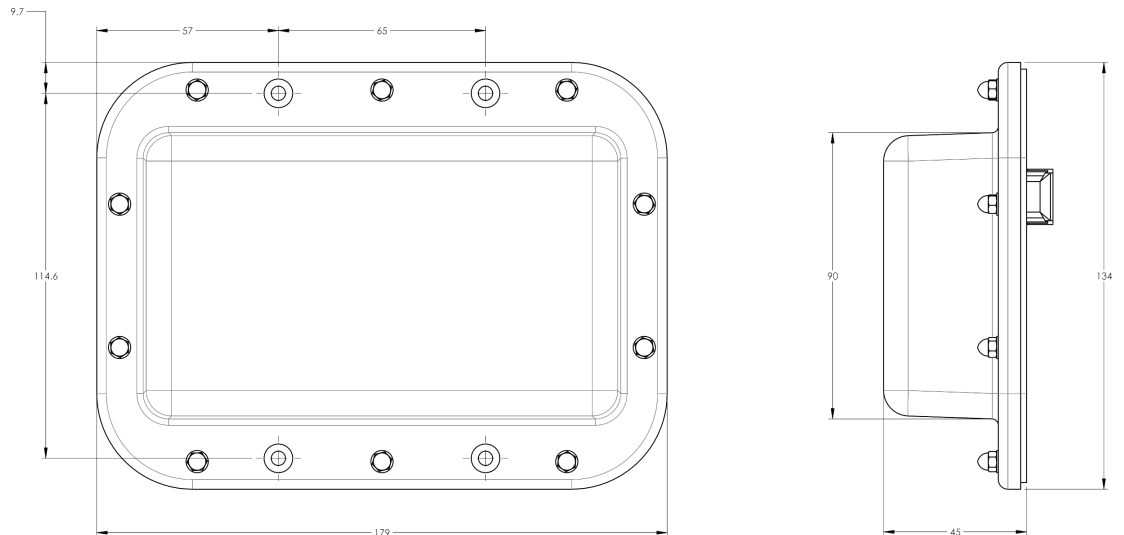
### Electrical

|                          |                                    |
|--------------------------|------------------------------------|
| Data Interface Signal    | DC                                 |
| Input Voltage            | 10-30 Vdc                          |
| Current Consumption Tilt | 100 mA at $V_{in}=24$ (500 mA MAX) |
| Current Consumption Idle | 10 mA at $V_{in}=24$               |

### Mechanical

|                    |                                 |
|--------------------|---------------------------------|
| Dimensions (LxWxD) | 7.0x5.3x1.8 in. (179x134x45 mm) |
| Housing            | ASA/ABS/Aluminum                |
| Weight             | 1.3 lbs (0.6 kg)                |

ASA= Acrylic Styrene Acrylonitrile  
ABS=Acrylonitrile Butadiene Styrene





# Antennas

ACCESSORIES

AISG Cable

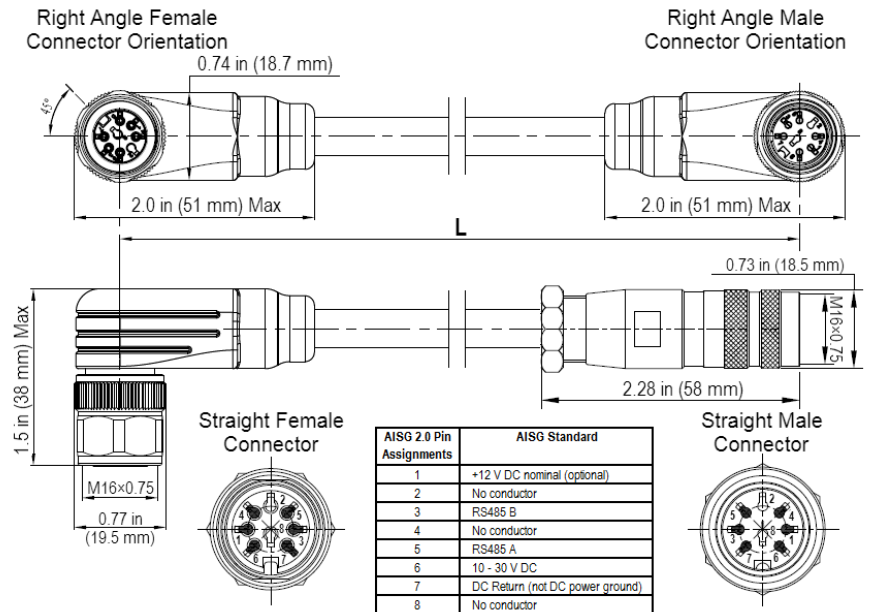
AISGC-M-F-xFT

## Electrical Specifications

|                              |                       |
|------------------------------|-----------------------|
| Individual Cable Part Number | AISGC-M-F-x(FT)       |
| Cable style                  | UL2464                |
| Protocol                     | AISG 1.1 and AISG 2.0 |
| Maximum voltage              | 300 V                 |
| Rated current                | 5 A at 104° F (40° C) |

## Mechanical Specifications

|                              |  |
|------------------------------|--|
| Individual Cable Part Number | AISGC-M-F-x(FT)  |
| Cables per kit               | 1  |
| Connectors                   | 2 x 8 pin IEC 60130-9<br>Straight male/straight female             |
| Tightening torque            | Hand tighten only $\approx$ 1.84 ft-lbs (2.5 Nm)                   |
| Construction                 | Shielded (Tinned Copper Braid)                                     |
| Braid coverage               | 85%  |
| Jacket Material              | Matte Polyurethane (Black)   |
| Conductors                   | 1 twisted pair - 24 AWG<br>3 conductors - 19 AWG<br>AWM style 2464 |
| Cable Diameter               | 0.307 in (7.8 mm)  |
| Length                       | See order details  |
| Minimum bend radius          | 3.15 in (80 mm)  |



AISG-Male to AISG-Female Jumper Cable



# Antennas

ACCESSORIES

AISG Cable

AISGC-M-F-xFT

Environmental Specifications

|                                     |                      |
|-------------------------------------|----------------------|
| <b>Individual Cable Part Number</b> | AISGC-M-F-xFT        |
| <b>Temperature Range</b>            | -40° to 80° C        |
| <b>Flammability</b>                 | UL 1581 VW-1         |
| <b>Ingress Protection</b>           | IEC 60529:2001, IP67 |



# Antennas

## STANDARDS & CERTIFICATIONS

### Single Band Beamforming Antenna

BFA4R-H3A

#### Standards & Compliance

|                      |  |
|----------------------|--|
| <b>Safety</b>        | EN 60950-1, UL 60950-1   |
| <b>Emission</b>      | EN 55022   |
| <b>Immunity</b>      | EN 55024   |
| <b>Environmental</b> | IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-5, IEC 60068-2-6, IEC-60068-2-11, IEC 60068-2-14, IEC 60068-2-18, IEC 60068-2-27, IEC 60068-2-29, IEC 60068-02-30, IEC 60068-2-52, IEC 60068-2-64, GR-63-CORE 4.3.1, EN 60529, IP 24 |

#### Certifications

Antenna Interface Standards Group (AISG), Federal Communication Commission (FCC) Part 15 Class B, CE, CSA US, ISO 9001

