DATA SHEET

Hybrid Bi-Sector™ Array

HBSA65R-KUE9B

- Nine foot (2.7 m), multiband, eight port Hybrid Bi-Sector™ Antenna. Deploying two high performing 65° HBW covering 694-960 MHz and 1695-2690 MHz frequency bands and a pair of CCI's Patented Asymmetrical 33° Shaped Beams covering 1695-2400 MHz frequencies
- Two wide high band ports covering 1695-2690 MHz, four separate high band ports covering 1695-2400 MHz and two wide low band ports covering 694-960 MHz in a single antenna
- Narrow Enclosure, 13.4" (340 mm) width. Narrowest Enclosure in the Industry for this type of Antenna.
- Full Spectrum Compliance for 694-960 MHz / 1695-2690 Mhz
- LTE Optimized Asymmetric Shaped Beams for improved LTE data throughput by minimizing beam crossover, providing for an efficient use of valuable radio capacity and frequency spectrum
- LTE Optimized FBR, SPR and Boresight/Sector XPD Performance. Essential for today's LTE Data Networks
- Exceeds minimum PIM performance requirements
- Ordering options include either Four Field Replaceable, integrated AISG 2.0 compliant External (Type 2) Remote Electrical Tilt (RET) or Four Variable Electrical Control Knobs (VET)

Overview

This CCI Hybrid Bi-Sector™ Array has a unique configuration, which is designed to provide maximum deployment flexibility. This is an eight port antenna which contains two low band ports covering 694-960 MHz across a 65° HBW, two high band ports covering 1695-2690 MHz across a 65° HBW and four high band ports (two ports per beam) covering 1695-2400 MHz across two 33° asymmetrically shaped beams.

The antenna implements CCI's proven "Asymmetrical Beam for Spectrum Efficiency" patent which enables wireless operators to re-use their valuable spectrum and significantly increase capacity. The CCI Hybrid Bi-Sector™ Array provides two 33° asymmetrically shaped beams designed to maximize coverage while minimizing interference and overlap in dense LTE environments.

With this unique configuration, the antenna is capable of providing 2x2 Multiple-input Multiple-output (MIMO) across the 65° Low Band ports, 2x2 Multiple-input Multiple-output (MIMO) across the 65° High Band ports and Dual 2x2 Multiple-input Multiple-output (MIMO) across the two 33° asymmetrically shaped beams.

CCI's Hybrid Bi-Sector™ Array antennas allow operators to reduce antenna and site deployments, for either six sector or greenfield deployments, by replacing traditional 65° antennas with CCI's Patented Bi-Sector™ Array antennas containing two 33° Asymmetric Beams. This is achieved through a single panel array producing significant CAPEX and OPEX cost savings for the operator, while increasing cell site capacity and LTE data throughput.

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

Applications

- 2x2 MIMO on High Band 65° HBW and 2x2 MIMO on Low Band 65° HBW and Two 2x2 MIMO on High Band Split Beams
- Ideal Antenna Solution for structurally constrained sites, where data throughput, capacity and limited spectrum is a concern
- With CCI's Hybrid Bi-Sector™ Antenna, wireless operators can connect multiple platforms to a single antenna, reducing tower load, lease expense, deployment time and installation cost

SPECIFICATIONS

Hybrid Bi-Sector™ Array

HBSA65R-KUE9B

Electrical

Ports	2 x Low Band Ports for 694-960 MHz		2 x High Band Ports for 1695-2690 MHz			
Frequency Range	694-806 MHz	824-960 MHz	1695-1880 MHz	1920-2180 MHz	2300-2400 MHz	2496-2690
Gain[1]	16.3 dBi	16.5 dBi	16.6 dBi	16.7 dBi	16.9 dBi	16.9 dBi
Gain (Average)[2]	15.9 dBi	16.2 dBi	16.2 dBi	16.1 dBi	16.2 dBi	16.2 dBi
Azimuth Beamwidth (-3dB)	68°	68°	61°	69°	65°	59°
Elevation Beamwidth (-3dB)	8.2°	6.6°	7.4°	6.2°	5.4°	5.3°
Electrical Downtilt	2° to 10°	2° to 10°	0° to 9°	0° to 9°	0° to 9°	0° to 9°
Elevation Sidelobes (1st Upper)	< -18 dB	< -18 dB	< -18 dB	< -18 dB	< -17 dB	< -17 dB
Front-to-Back Ratio @180°	> 35 dB	> 35 dB	> 35 dB	> 35 dB	> 35 dB	> 35 dB
Front-to-Back Ratio over ± 20°	> 32 dB	> 35 dB	> 32 dB	> 33 dB	> 31 dB	> 31 dB
Cross-Polar Discrimination (at Peak)	> 25 dB	> 25 dB	> 20 dB	> 17 dB	> 22 dB	> 20 dB
Cross-Polar Discrimination (at ± 60°)[2]	11.4 dB	12.5 dB	13.0 dB	12.6 dB	10.2 dB	7.5 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Voltage Standing Wave Ratio(VSWR)	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc
Input Power Continuous Wave (CW)	500 watts	500 watts	300 watts	300 watts	300 watts	300 watts
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

[1]Peak gain across sub-bands.
[2]Electrical specifications follow document "Recommendation on Base Station Antenna Standards" (BASTA) V9.6.

Ports	4 x High Band Ports for 1695-2400 MHz		
Frequency Range	1695-1880 MHz	1920-2180 MHz	2300-2400 MHz
Gain[1]	19.1 dBi	19.7 dBi	19.8 dBi
Gain (Average)[2]	18.1 dBi	19.1 dBi	19.2 dBi
Azimuth Beamwidth (-3dB)	35°	30°	27°
Elevation Beamwidth (-3dB)	7.2°	6.2°	5.8°
Electrical Downtilt	0° to 10°	0° to 10°	0° to 10°
Elevation Sidelobes (1st Upper)	< -18 dB	< -17 dB	< -17 dB
Front-to-Back Ratio @180°	> 35 dB	> 35 dB	> 35 dB
Front-to-Back Ratio over ± 20°	> 32 dB	> 32 dB	> 32 dB
Cross-Polar Discrimination (at Peak)	> 25 dB	> 25 dB	> 25 dB
Cross-Polar Discrimination (at 3 dB°)[2]	17.8 dB	14.6 dB	14.9 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB
Voltage Standing Wave Ratio(VSWR)	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc
Input Power Continuous Wave (CW)	300 watts	300 watts	300 watts
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 ohms	50 ohms	50 ohms
Lightning Protection	DC Ground	DC Ground	DC Ground

[1]Peak gain across sub-bands.
[2]Electrical specifications follow document "Recommendation on Base Station Antenna Standards" (BASTA) V9.6.

SPECIFICATIONS

Hybrid Bi-Sector™ Array

HBSA65R-KUE9B

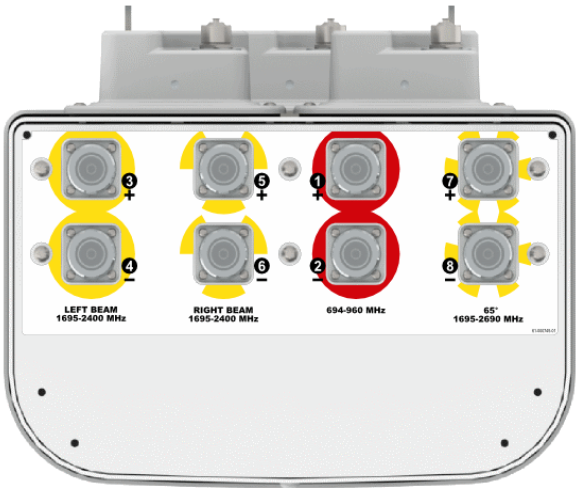
Mechanical

Dimensions (LxWxD)	106.3x13.4x8.5 in (2700x340x216 mm)
Survival Wind Speed	> 150 mph (> 241 kph)
Front Wind Load	362 lbs (1611 N) @ 100 mph (161 kph)
Side Wind Load	254 lbs (1132 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	14.1 ft^2 (1.3 m^2)
Weight[1]	67.0 lbs (30.4 kg)
RET System Weight	6.6 lbs (3.0 kg)
Weight (VET model)[2]	65.7 lbs (29.9 kg)
Connector	8 x 7-16 DIN long neck female
Mounting Pole	2 to 5 in (5 to 12 cm)

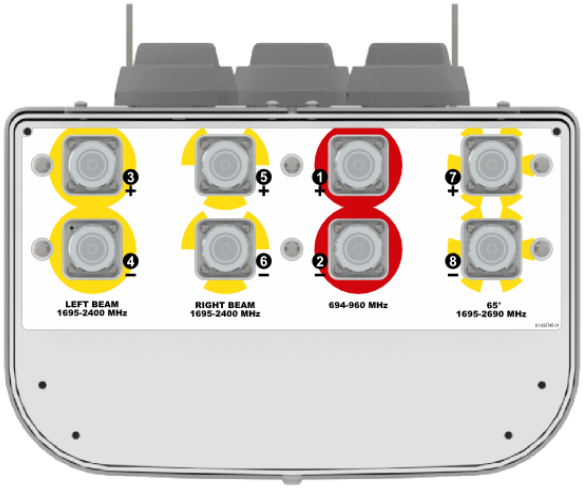
[1] Weight excludes mounting and RET
[2] Weight excludes mounting

Bottom View

HBSA65R-KUE9BA

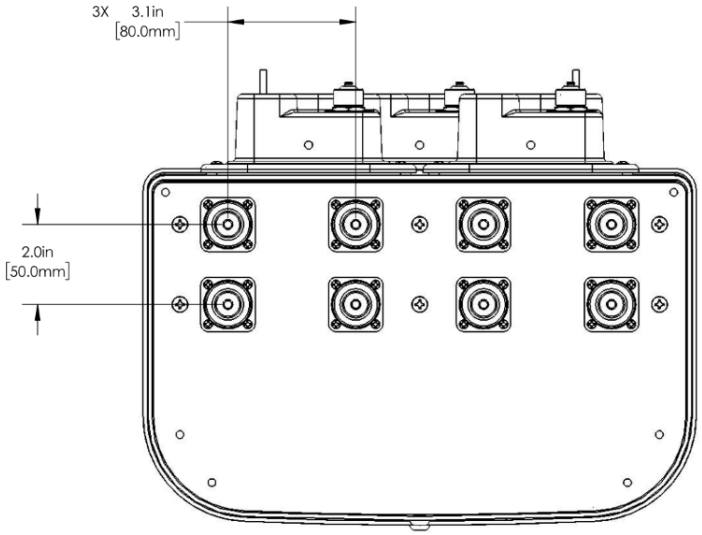


HBSA65V-KUE9BA



Connector Spacing

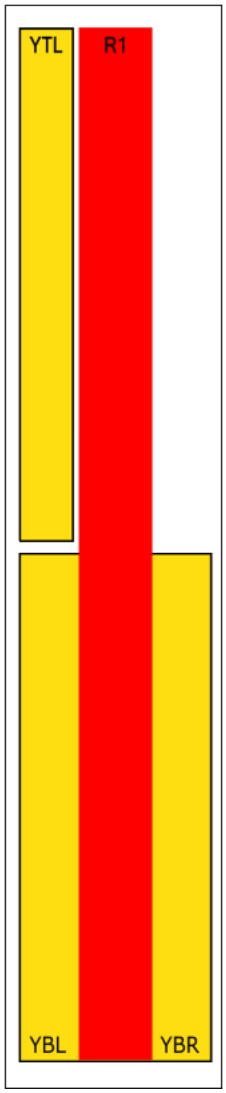
HBSA65R-KUE9BA and HBSA65V-KUE9BA



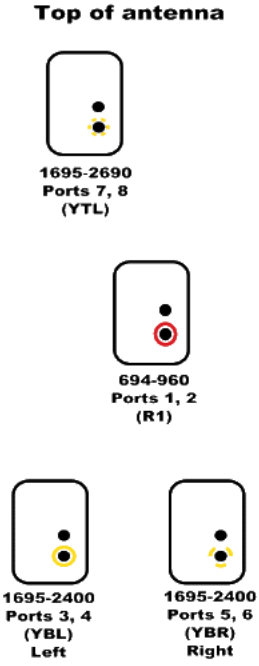
RET to Element Configuration

HBSA65R-KUE9BA

Top of antenna
Viewed from rear



RET placement as view from rear of antenna

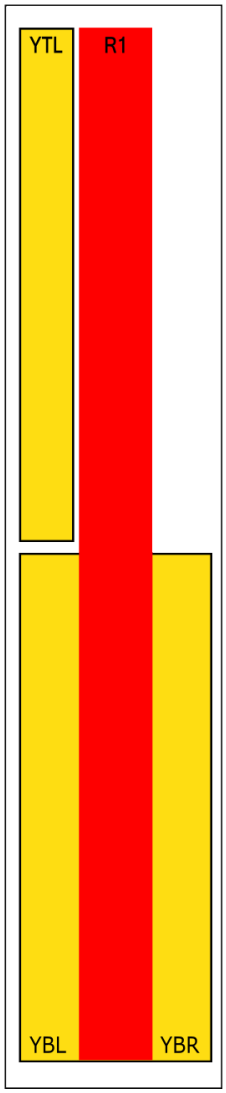


Array	Ports	Freq (MHz)	Ports controlled by common RET
R1	1, 2	694-960	1, 2
YBL	3, 4	1695-2400	3, 4
YBR	5, 6	1695-2400	5, 6
YTL	7, 8	1695-2690	7, 8

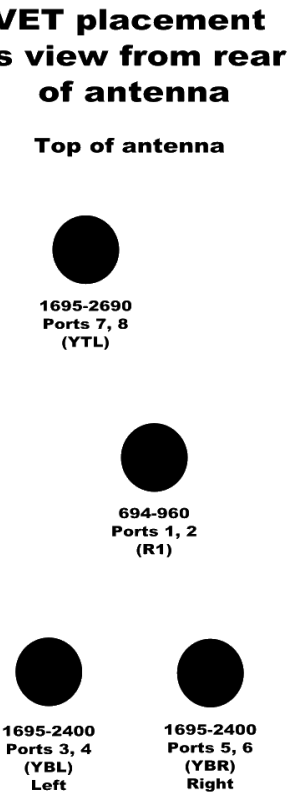
RET to Element Configuration

HBSA65V-KUE9BA

Top of antenna
Viewed from rear



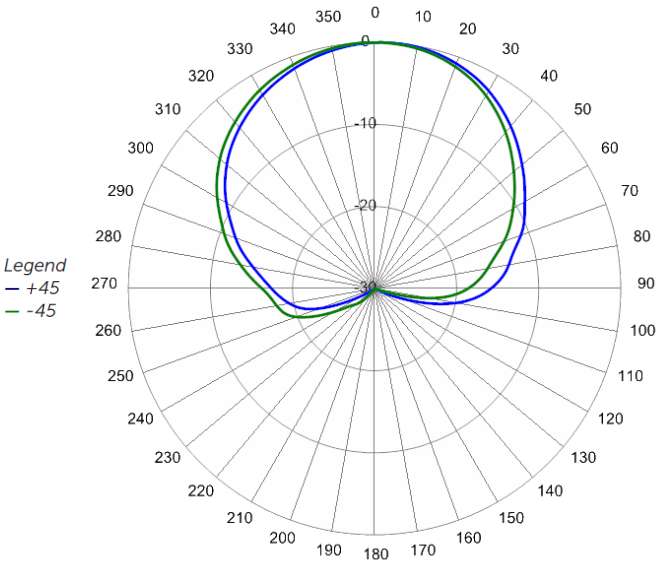
VET placement as view from rear of antenna



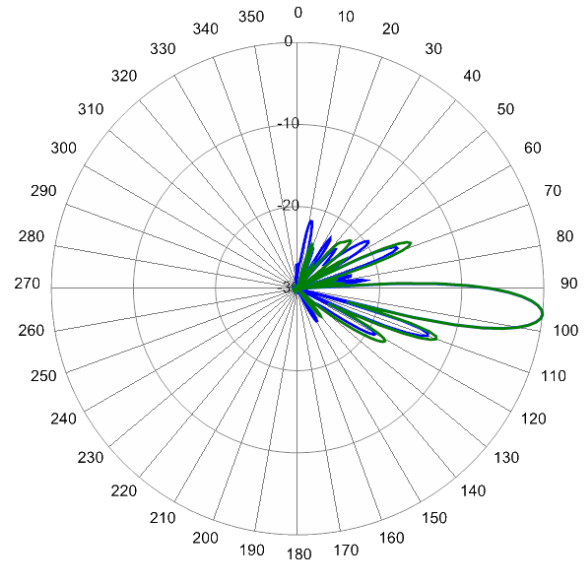
Array	Ports	Freq (MHz)	Ports controlled by common Knob
R1	1, 2	694-960	1, 2
YBL	3, 4	1695-2400	3, 4
YBR	5, 6	1695-2400	5, 6
YTL	7, 8	1695-2690	7, 8

Typical Antenna Patterns

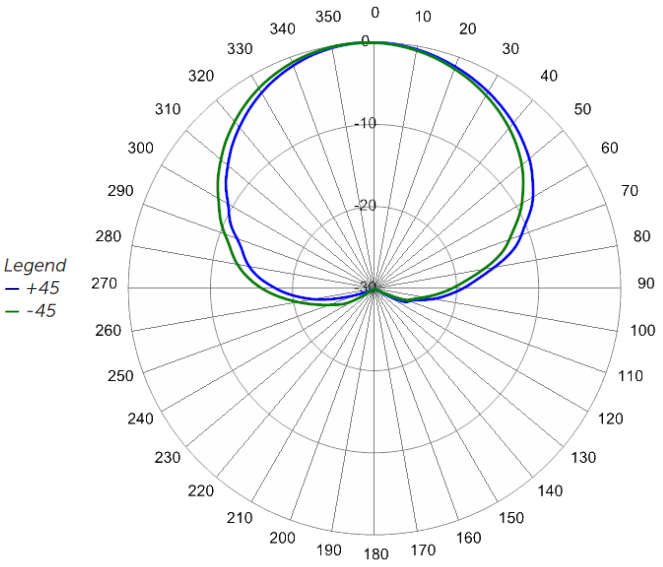
For detailed information on additional antenna patterns, contact customer support at support@cciproducts.com



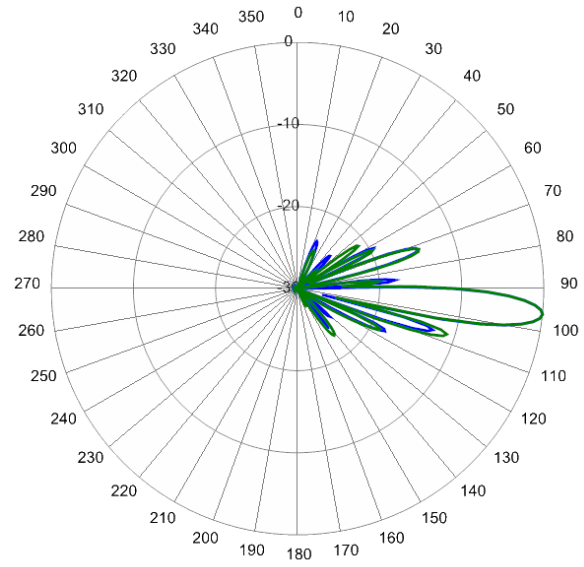
740 MHz Azimuth



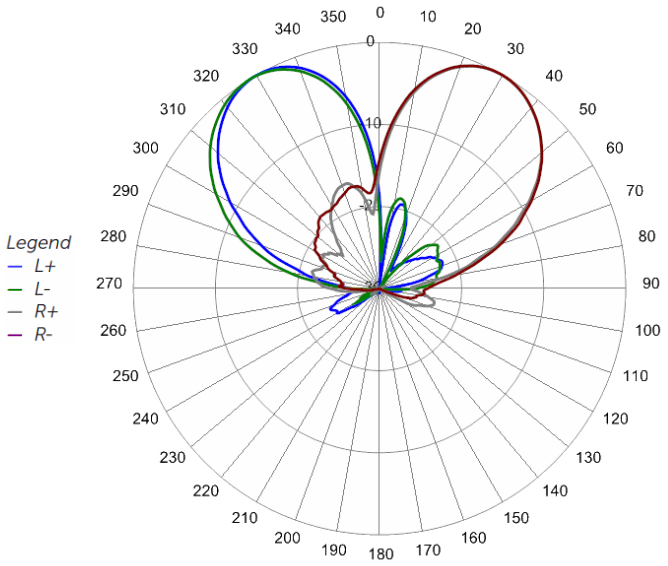
740 MHz Elevation 6°



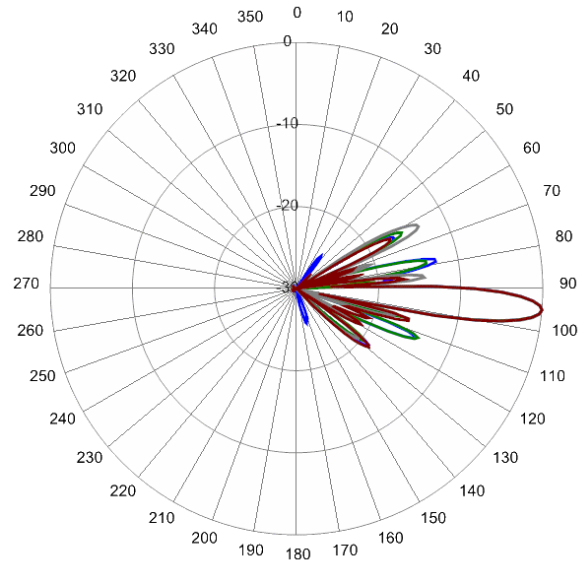
869 MHz Azimuth



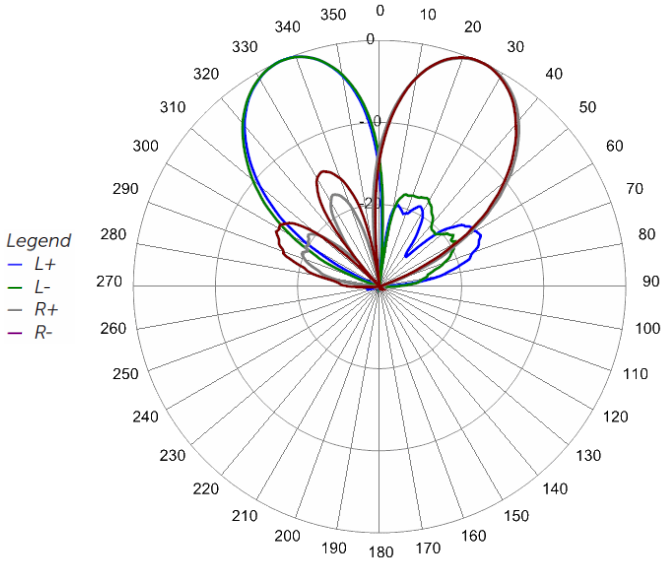
869 MHz Elevation 6°



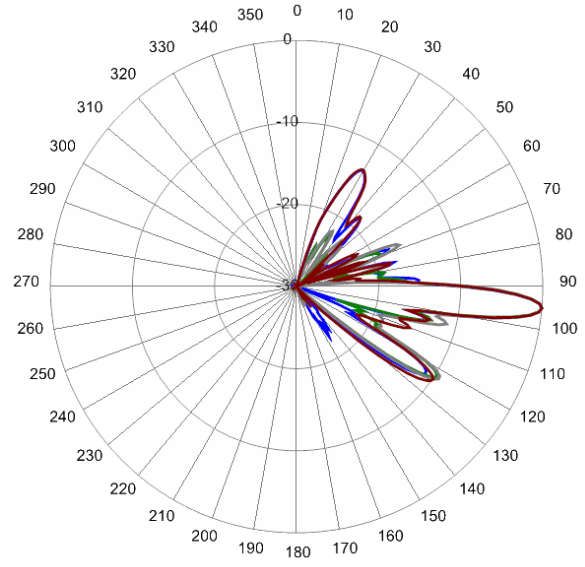
1940 MHz Azimuth Bi-Sector Ports



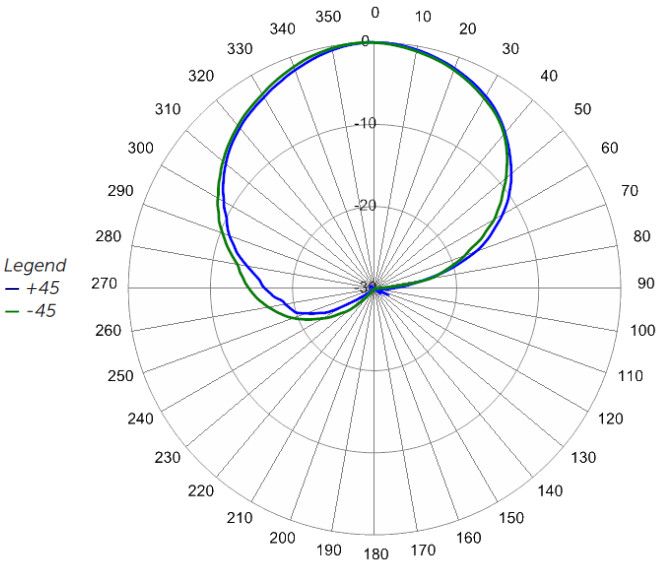
1940 MHz Elevation 5° Bi-Sector Ports



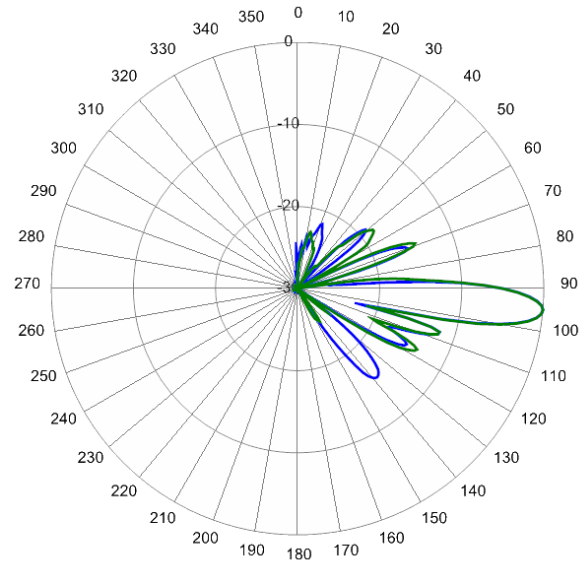
2360 MHz Azimuth Bi-Sector Ports



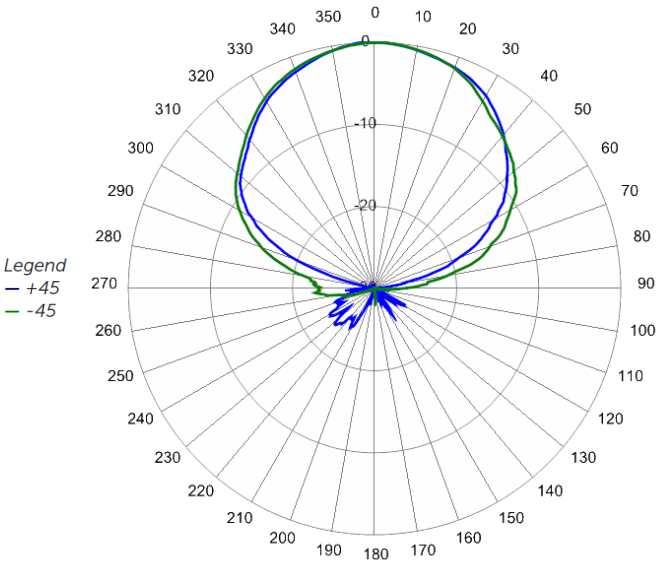
2360 MHz Elevation 5° Bi-Sector Ports



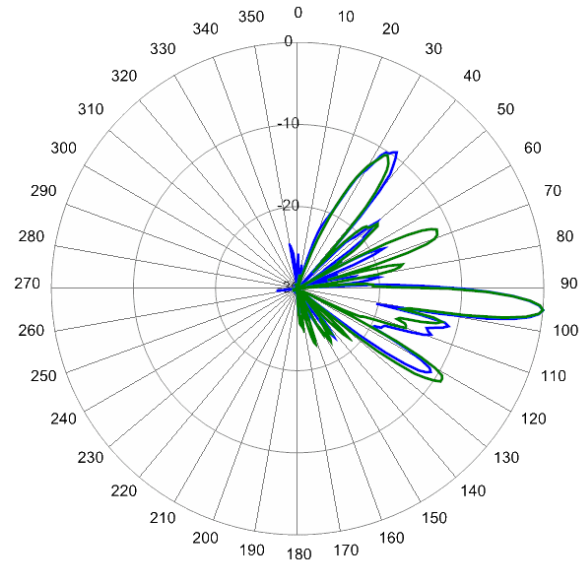
1755 MHz Azimuth



1755 MHz Elevation 5°



2630 MHz Azimuth



2630 MHz Elevation 5°

ORDERING

Hybrid Bi-Sector™ Array

Parts & Accessories

HBSA65R-KUE9BA-K	Nine foot (2.7 m) Hybrid Bi-Sector™ Antenna Array with 7-16 DIN long neck female connector, 4 factory installed external BSA-RET200 RET actuators (Type 1 External) and MBK-01 mounting brackets
HBSA65V-KUE9BA-K	Nine foot (2.7 m) Hybrid Bi-Sector™ Antenna Array with 7-16 DIN long neck female connector, 4 factory installed manual (VET) knobs and MBK-01 mounting brackets
MBK-01	Mounting bracket kit (top and bottom) with 0° to 10° mechanical tilt adjustment
BSA-RET200	Remote electrical tilt actuator
KUE-CBK-AG-RRU	Four RET, KUE antenna to RRU AISG cable kit
KUE-CBK-RA-AG-RRU	Four RET, KUE antenna to RRU AISG right angle cable kit

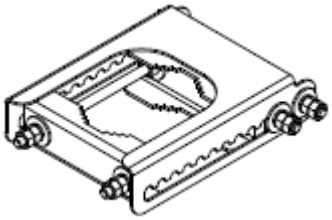
ACCESSORIES

Mounting Bracket Kit

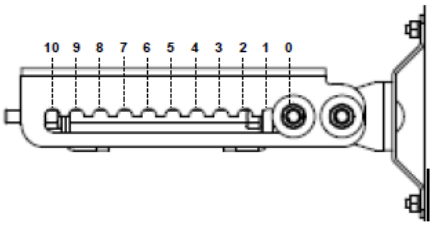
MBK-01

Mechanical

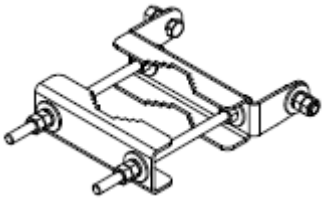
Weight	12.6 lbs (5.7 kg)
Hinge Pitch	47.25 in (1200 mm)
Mounting Pole Dimension	2 to 5 in (5 to 12 cm)
Fastener Size	M12
Installation Torque	40 ft·lb (54 N·m)
Mechanical Tilt Adjustment	0° - 10°



MBK-01 Top Adjustable Bracket



MBK-01 Top Adjustable Bracket Side View



MBK-01 Bottom Fixed Bracket

Remote Electrical Tilt Actuator (RET)

BSA-RET200

General Specifications

Part Number	BSA-RET200
Protocols	AISG 2.0
RET Type	Type 1
Adjustment Cycles	>10,000 cycles
Tilt Accuracy	±0.1°
Temperature Range	-40° C to 70° C

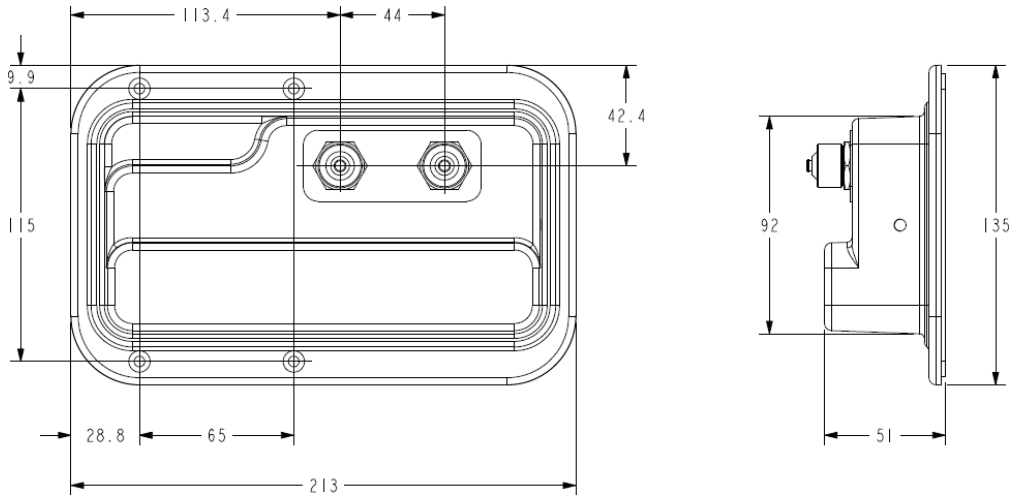
Electrical

Data Interface Signal	DC
Input Voltage	10-30 Vdc
Current Consumption Tilt	120 mA at V_{in}=24
Current Consumption Idle	55 mA at V_{in}=24
Hardware Interface	AISG-RS 485 A/B
Input Connector	Male 1 x 8 pin Daisy Chain
Output Connector	Female 1 x 8 pin Daisy Chain

Mechanical

Dimensions (LxWxD)	8.0x5.0x2.0 in. (213x135x51 mm)
Housing	ASA/ABS/Aluminum
Weight	1.7 lbs (0.75 kg)

ASA= Acrylic Styrene Acrylonitrile
ABS=Acrylanitrile Butadiene Styrene



ACCESSORIES

AISG Cable Kit

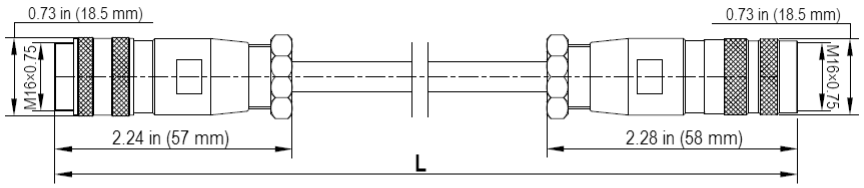
KUE-CBK-AG-RRU

Electrical Specifications

Individual Cable Part Number	AISGC-M-F-34	AISGC-M-F-10FT
Cable style	UL2464	UL2464
Protocol	AISG 1.1 and AISG 2.0	AISG 1.1 and AISG 2.0
Maximum voltage	300 V	300 V
Rated current	5 A at 104° F (40° C)	5 A at 104° F (40° C)

Mechanical Specifications

Individual Cable Part Number	AISGC-M-F-34	AISGC-M-F-10FT
Cables per kit	3	2
Connectors	2 x 8 pin IEC 60130-9 Straight male/straight female	2 x 8 pin IEC 60130-9 Straight male/straight female
Tightening torque	Hand tighten only ≈ 1.84 ft-lbs (2.5 N·m)	Hand tighten only ≈ 1.84 ft-lbs (2.5 N·m)
Construction	Shielded (Tinned Copper Braid)	Shielded (Tinned Copper Braid)
Braid coverage	85%	85%
Jacket Material	Matte Polyurethane (Black)	Matte Polyurethane (Black)
Conductors	1 twisted pair - 24 AWG 3 conductors - 19 AWG AWM style 2464	1 twisted pair - 24 AWG 3 conductors - 19 AWG AWM style 2464
Cable Diameter	0.307 in (7.8 mm)	0.307 in (7.8 mm)
Length	34 in (864 mm)	120 in (3048 mm)
Weight	0.33 lbs (0.15 kg)	0.69 lbs (.31 kg)
Minimum bend radius	3.9 in (100 mm)	3.9 in (100 mm)



AISG 2.0 Pin Assignments	AISG Standard
1	+12 V DC nominal (optional)
2	No conductor
3	RS485 B
4	No conductor
5	RS485 A
6	10 - 30 V DC
7	DC Return (not DC power ground)
8	No conductor

AISG-Male to AISG-Female Jumper Cable

Environmental Specifications

Individual Cable Part Number	AISGC-M-F-34	AISGC-M-F-10FT
Temperature Range	-40° to 80° C	-40° to 80° C
Flammability	UL 1581 VW-1	UL 1581 VW-1
Ingress Protection	IEC 60529:2001, IP67	IEC 60529:2001, IP67

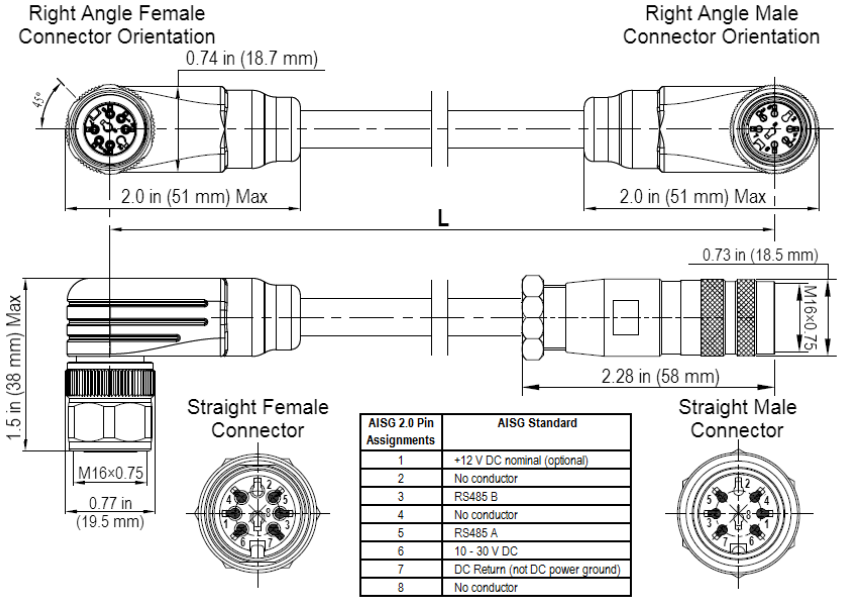
AISG Cable Kit

KUE-CBK-RA-AG-RRU

Electrical/Mechanical/Environmental Specifications

	RET to RET Cables	RRU to Antenna Cables
Individual Cable Part Number	AISGC-MRA-FRA-36	AISGC-M-FRA-10FT
Cable style	UL2464	
Protocol	AISG 1.1 and AISG 2.0	
Maximum voltage	300 V	
Rated current	5 A at 104° F (40° C)	
Temperature Range	-40° to 80° C	
Flammability	UL 1581 VW-1	
Ingress Protection	IEC 60529:2001, IP67	
Tightening torque	Hand tighten only ≈ 1.84 ft-lbs (2.5 N·m)	
Construction	Shielded (Tinned Copper Braid)	
Braid coverage	85%	
Jacket Material	Matte Polyurethane (Black)	
Conductors	1 twisted pair - 24 AWG 3 conductors - 19 AWG AWM style 2464	
Cable Diameter	0.307 in (7.8 mm)	
Minimum bend radius	3.9 in (100 mm)	
Connectors	2 x 8 pin IEC 60130-9 Right angle male/right angle female	2 x 8 pin IEC 60130-9 Straight male/right angle female
Length	36 in (914 mm)	120 in (3048 mm)
Weight	0.23 lbs (0.10 kg)	0.77 lbs (0.35 kg)
Cables per kit	3	2

Mechanical Specifications



AISG 2.0 Pin Assignments	AISG Standard
1	+12 V DC nominal (optional)
2	No conductor
3	RS485 B
4	No conductor
5	RS485 A
6	10 - 30 V DC
7	DC Return (not DC power ground)
8	No conductor

Right Angle to Right Angle and Right Angle to Straight Jumper Cable

STANDARDS & CERTIFICATIONS

Hybrid Bi-Sector™ Array

HBSA65R-KUE9B

Standards & Compliance

Safety	EN 60950-1, UL 60950-1
Emission	EN 55022
Immunity	EN 55024
Environmental	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