



Antennas

DATA SHEET

Three-Beam MultiPort Antenna

TSB20R-E7A



- Seven foot (2.3 m) tall and 19.4 inch (494 mm) wide, twelve port Single Band Tri-Split Beam array. Containing Three Independent LTE Optimized Beams with 4x4 MIMO capability covering 1695-2690 MHz frequencies, all with Independent RET for each Beam, an Industry First
- Twelve High Band Dual-Pol +45°/-45°ports (Four ports per Beam) covering 1695-2690 MHz in a single antenna
- Full Spectrum Compliance for 1695-2690 MHz Frequencies
- Unique Antenna Design provides the end user with unparalleled capacity offload for the Macro Network
- The electrical performance for each Beam is designed, so that the Tri-Split Beam array can seamlessly integrate within the Macro Network
- With the addition of independent RET control for each beam, this provides the user with added flexibility for network capacity offload and throughput increases for each 4x4 MIMO Beam, an Industry First
- Deployment of a 4x4 MIMO LTE Optimized Beam allows for greater capacity and data throughput over a conventional 2x2 MIMO LTE Optimized Beam deployment. Essential for today's LTE Data Driven Networks
- LTE Optimized Beams for improved LTE data throughput by minimizing beam crossover, providing for an efficient use of valuable radio capacity and frequency spectrum. Essential for today's LTE Data Driven Networks
- LTE Optimized FBR, USLS and Co-Pol Beam Isolation Performance. Essential for today's LTE Data Driven Networks
- Exceeds minimum PIM performance requirements

Overview

This CCI Single Band Tri-Split Beam Antenna contains Three Independent LTE Optimized Beams with 4x4 MIMO capability covering 1695-2690 MHz frequencies. This Single Band Tri-Split Beam Antenna is intended for use at data hotspots and other congested locals, within the Macro Network, where social media and the ability to share photos and videos and other high demand applications require high capacity and high data rates.

This Single Band Tri-Split Beam Antenna enables maximum spectrum re-use by sectorization, greatly increasing network capacity. With deployment of 4x4 MIMO (on any of the beams available), capacity and data throughput is greatly enhanced, over a conventional 2x2 MIMO beam deployment. Our LTE Optimized Beam Design approach provides fast roll off between beams, minimizing interference between sectors thus increasing the carrier to interference plus noise (CINR) ratio and lowering soft handover losses in LTE networks. Such an approach enhances data transfer rates within LTE network sectors and addresses "hotspots" in mobile wireless operator networks.

The single panel design of the CCI Single Band Tri-Split Beam Antenna offers the opportunity to reduce antenna count and directly replaces multiple narrow beam antennas. The antenna minimizes the need for optimization as each beam is spaced optimally for maximum throughput thus providing significant CAPEX and OPEX cost savings.

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



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Applications

- Upgrade of data-throughput and capacity, through the use of 4x4 MIMO deployment
- Antenna intended for use where data throughput and capacity needs are paramount
- Ready for Network Standardization on 4.3-10 DIN connectors



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SPECIFICATIONS

Electrical

Ports	12 x High Band Ports for 1695-2690 MHz				
Frequency Range	1695-1880 MHz	1850-1995 MHz	1920-2180 MHz	2300-2400 MHz	2496-2690 MHz
Gain ¹	20.6 dBi	21.1 dBi	21.8 dBi	22.4 dBi	22.3 dBi
Azimuth Beamwidth (-3dB)	21.5°	20.3°	19.3°	16.7°	15.0°
Azimuth Beam Crossover	7.3 dB	7.5 dB	7.6 dB	7.9 dB	7.5 dB
Elevation Beamwidth (-3dB)	8.1°	7.2°	6.7°	5.9°	5.7°
Electrical Downtilt	2° to 10°	2° to 10°	2° to 10°	2° to 10°	2° to 10°
Elevation Sidelobes (1st Upper) (Typ.)	< -19 dB	< -18 dB	< -18 dB	< -17 dB	< -17 dB
Front-to-Back Ratio @180° (Typ.)	> 35 dB	> 35 dB	> 35 dB	> 35 dB	> 35 dB
Cross-Polar Discrimination (at Peak)	> 17 dB	> 17 dB	> 20 dB	> 24 dB	> 22 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Interbeam Co-Pol Isolation (Adjacent Beams) (Worse Case)	> 20 dB	> 20 dB	> 20 dB	> 20 dB	> 20 dB
Interbeam Co-Pol isolation (Non-Adjacent Beams) (Worse Case)	> 15 dB	> 15 dB	> 15 dB	> 15 dB	> 15 dB
Voltage Standing Wave Ratio(VSWR)	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -153 dBc	≤ -153 dBc	≤ -153 dBc	≤ -153 dBc	≤ -153 dBc
Input Power Continuous Wave (CW)	200 watts	200 watts	200 watts	200 watts	200 watts
Polarization	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
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

¹Peak gain across sub-bands.

BASTA Electrical Specifications		1695-1880 MHz	1850-1995 MHz	1920-2180 MHz	2300-2400 MHz	2496-2690 MHz
Frequency Range		1695-1880 MHz	1850-1995 MHz	1920-2180 MHz	2300-2400 MHz	2496-2690 MHz
Gain over all Tilts (dBi)		19.4	20.2	20.6	21.4	21.2
Gain over all Tilts Tolerance (dB)		0.9	0.6	0.7	0.7	1.2
Gain at Low-Tilt (dBi)		19.3	20.3	20.7	21.7	21.6
Gain at Mid-Tilt (dBi)		19.4	20.2	20.6	21.5	21.4
Gain at High-Tilt (dBi)		19.4	20.1	20.4	20.8	20.7
Azimuth Beam Peak Tolerance (°)		0.9	0.5	0.8	0.4	0.6
Azimuth Beamwidth Tolerance (°)		1.6	1.6	1.8	1.1	1.1
Elevation Beamwidth Tolerance (°)		0.7	0.5	0.5	0.4	0.5
First Upper Sidelobes Suppression (dB)		16.9	14.4	13.4	12.8	15.3
Upper Sidelobe Suppression Peak to 20°(dB)		16.9	14.3	13.4	12.9	15.3
Front-to-Back Ratio over ±20° (dB)		25.9	30.4	31.8	36.5	36.2
Cross-Polar Discrimination at 3dB (dB)		8.8	10.6	12.8	16.2	15.4

* Electrical specifications follow document "Recommendation on Base Station Antenna Standards" (BASTA) V11.1. All specifications are subject to change without notice.



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SPECIFICATIONS

Three-Beam MultiPort Antenna

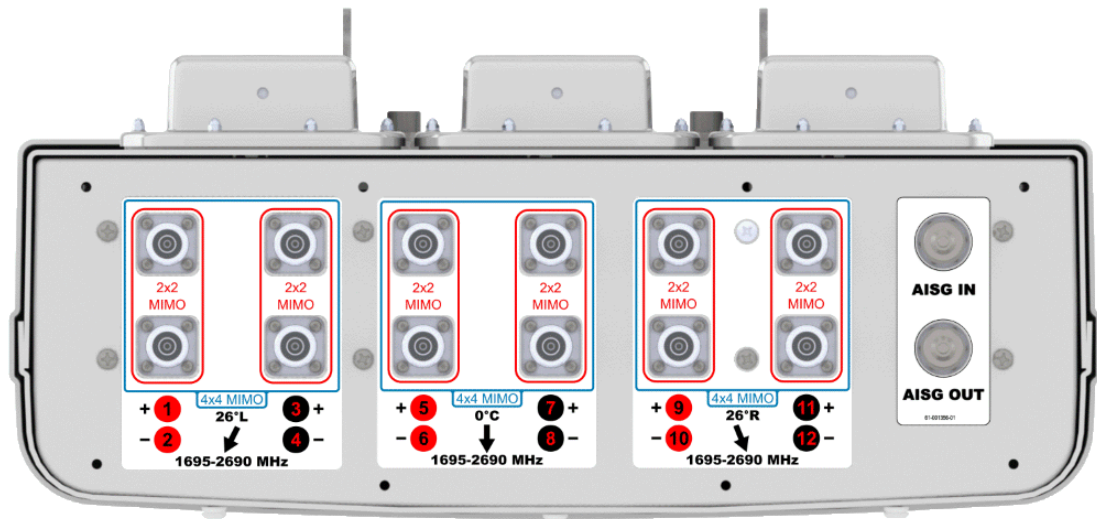
TSB20R-E7A

Mechanical

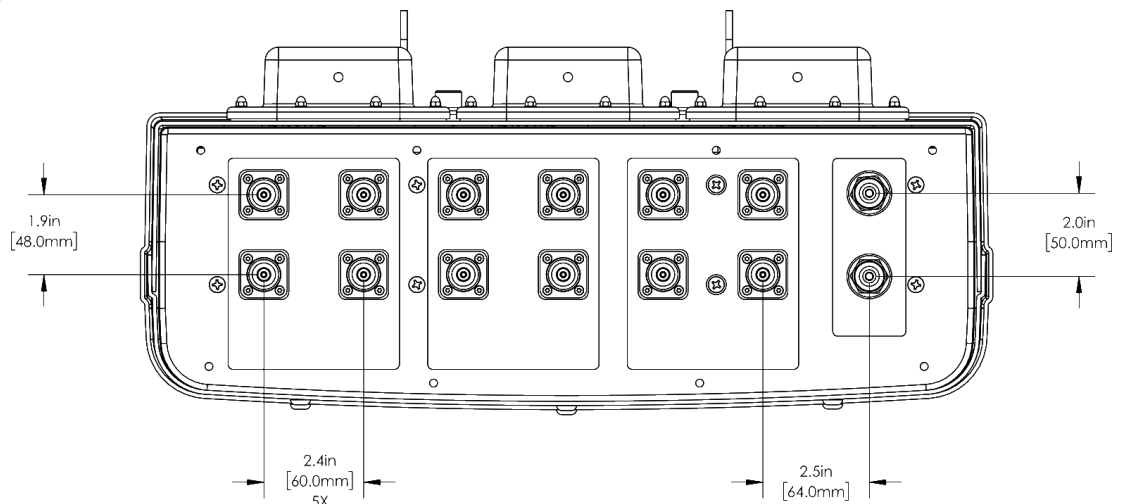
Dimensions (LxWxD)	89.4x19.4x6.7 in (2272x494x171 mm)
Survival Wind Speed	> 150 mph (> 241 kph)
Front Wind Load	400 lbs (1779 N) @ 100 mph (161 kph)
Side Wind Load	172 lbs (766 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	15.9 ft ² (1.5 m ²)
Weight *	85.8 lbs (38.9 kg)
Connector	12 x 4.3-10 female
Mounting Pole	2 to 5 in (5 to 12 cm)

* Weight excludes mounting

Bottom View



Connector Spacing





Antennas

SPECIFICATIONS

Three-Beam MultiPort Antenna

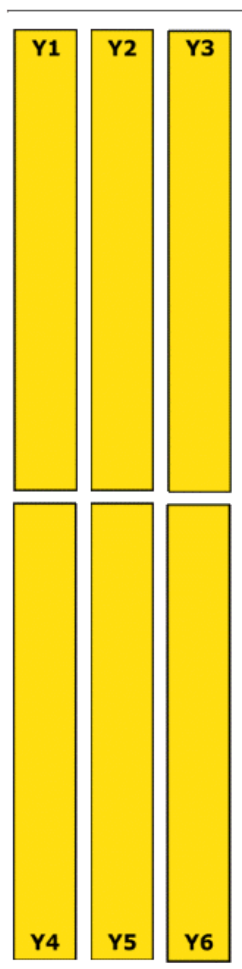
TSB20R-E7A

Mechanical

RET to Element Configuration

TSB20R-E7AA Element and RET configuration (Type 17 Internal RET)

Top of antenna Viewed from rear



RET placement as viewed from rear of antenna

Top of antenna



Array	Ports	Freq (MHz)	Beam	Ports controlled by common RET	AISG RET UID
Y1	1, 2	1695-2690	Left (Top Array)	1, 2, 3, 4	CxxxxxxxxMM.1
Y4	3, 4	1695-2690	Left (Bottom Array)		
Y2	5, 6	1695-2690	Center (Top Array)	5, 6, 7, 8	CxxxxxxxxMM.2
Y5	7, 8	1695-2690	Center (Bottom Array)		
Y3	9, 10	1695-2690	Right (Top Array)	9, 10, 11, 12	CxxxxxxxxMM.3
Y6	11, 12	1695-2690	Right (Bottom Array)		



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Three-Beam MultiPort Antenna

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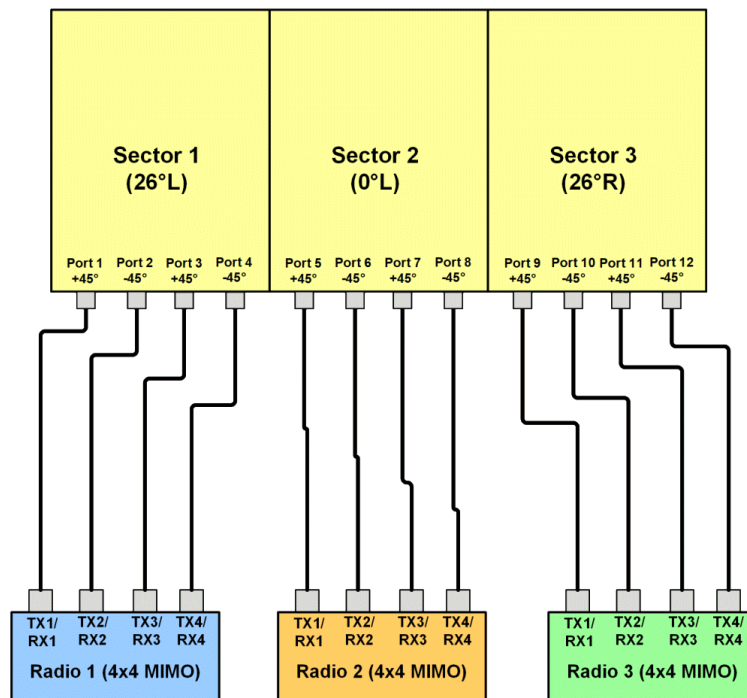
SPECIFICATIONS

Mechanical

Radio Connects Options

TSB20R-E7AA 4x4 Radio connections

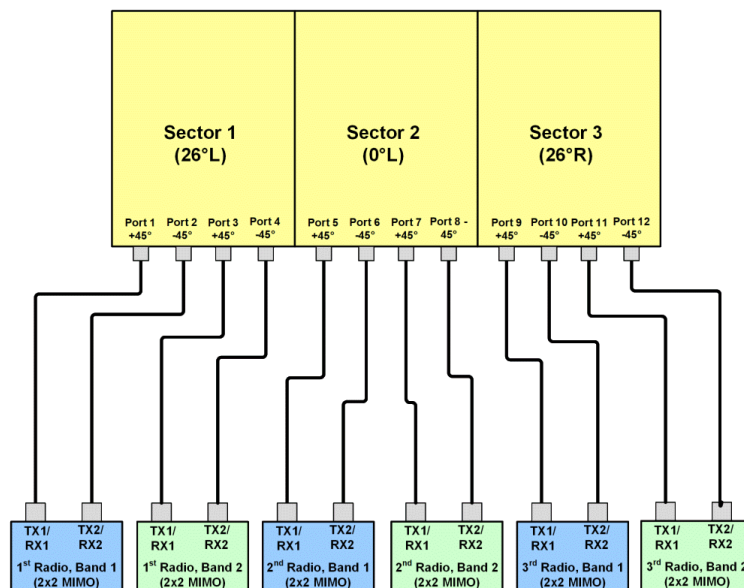
CCI Three Sector TSB20R Series (4x4 MIMO Capable) Antenna



Radio Connects Options

TSB20R-E7AA 2x2 Radio connections

CCI Three Sector TSB20R Series (4x4 MIMO Capable) Antenna





Antennas

SPECIFICATIONS

Three-Beam MultiPort Antenna

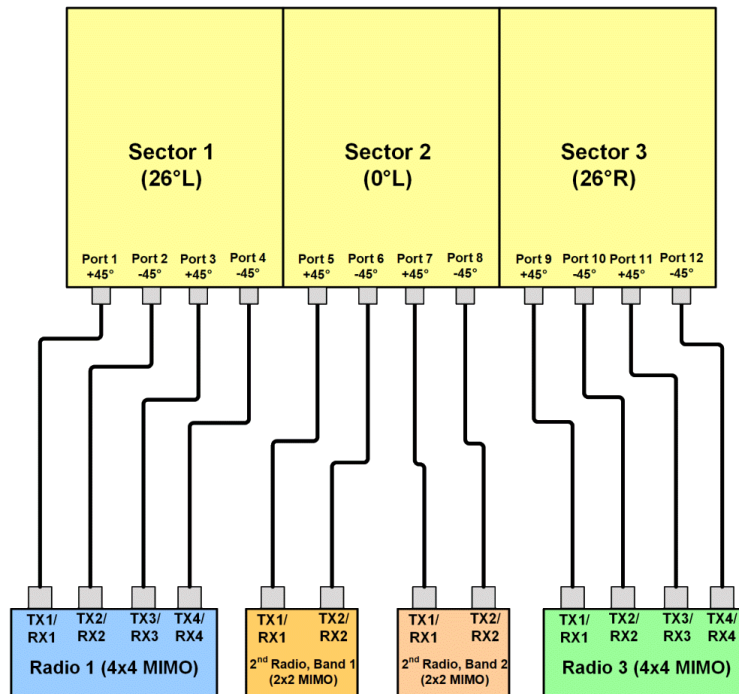
TSB20R-E7A

Mechanical

Radio Connects Options

TSB20R-E7AA 4x4 and 2x2 Mixed Radio connections

CCI Three Sector TSB20R Series (4x4 MIMO Capable) Antenna





Antennas

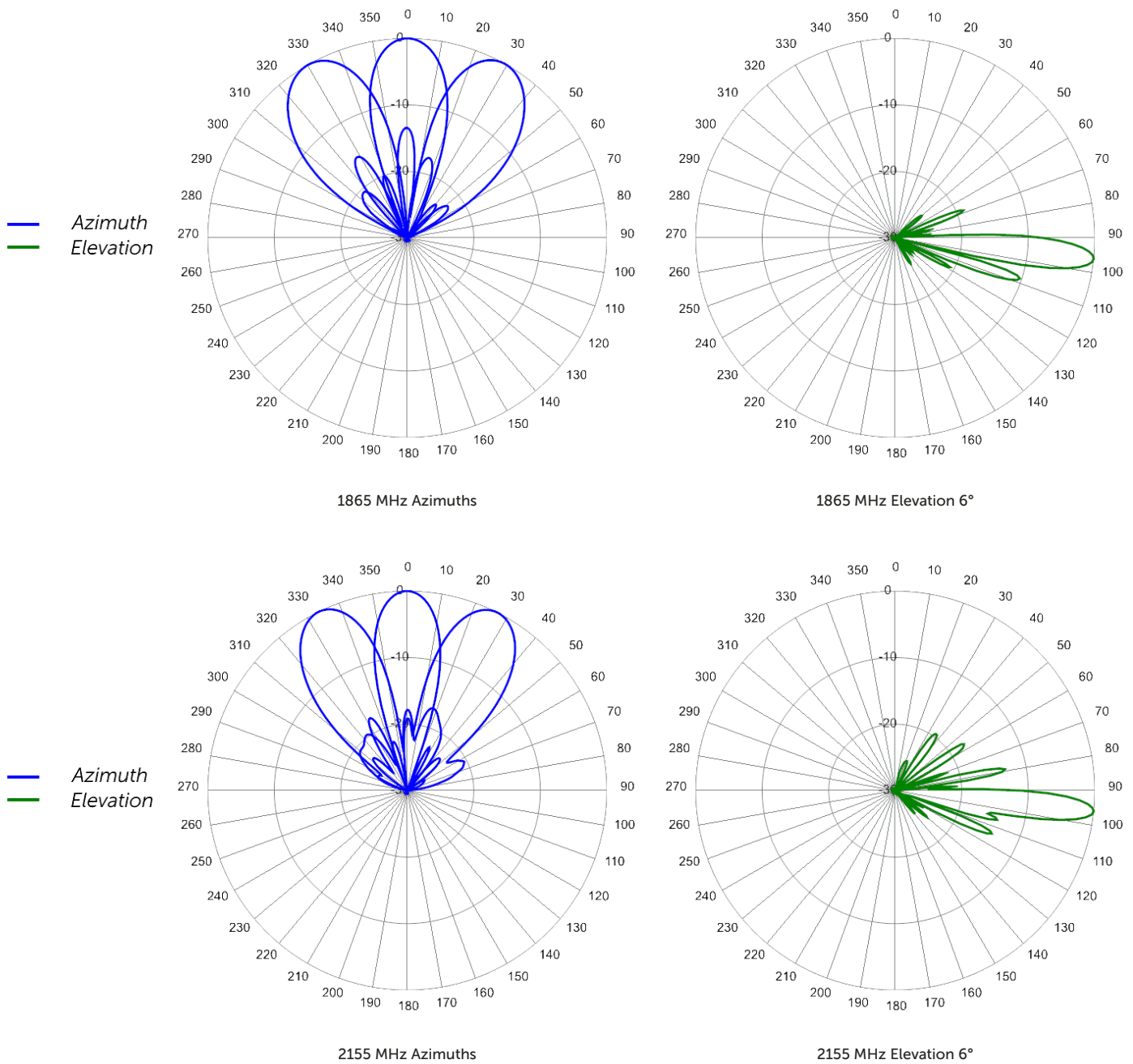
SPECIFICATIONS

Three-Beam MultiPort Antenna

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Typical Antenna Patterns

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





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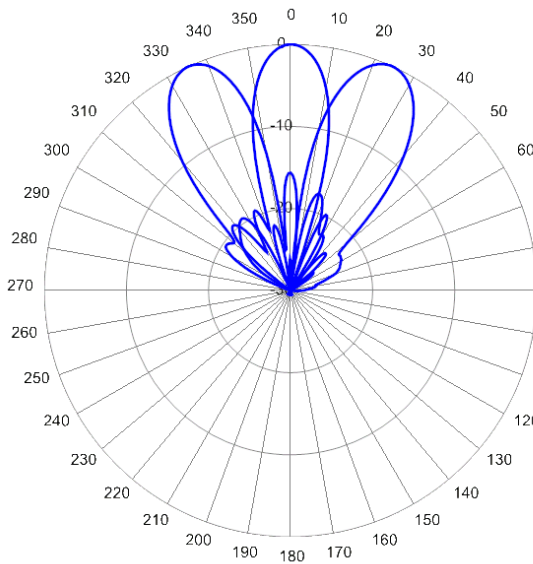
SPECIFICATIONS

Three-Beam MultiPort Antenna

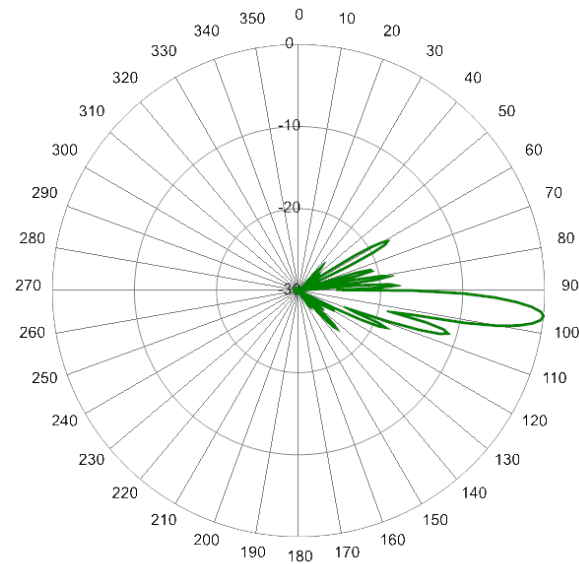
TSB20R-E7A

Typical Antenna Patterns

— Azimuth
— Elevation

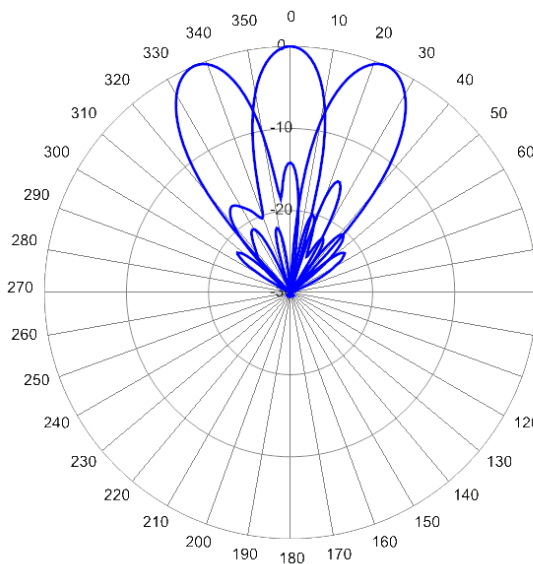


2360 MHz Azimuths

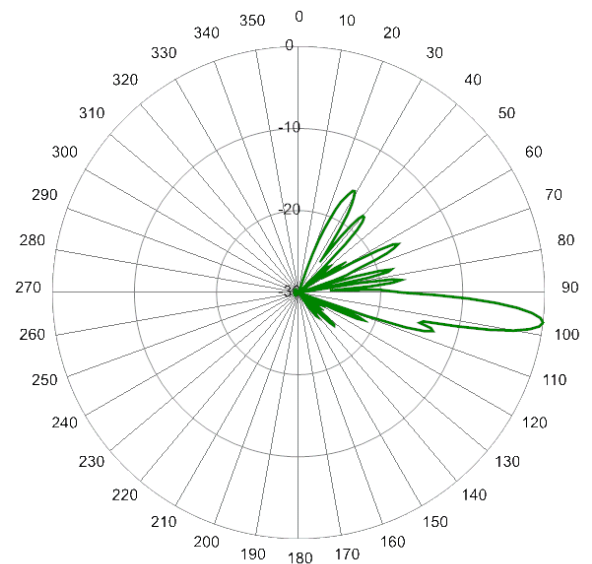


2360 MHz Elevation 6°

— Azimuth
— Elevation



2500 MHz Azimuths



2500 MHz Elevation 6°



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ORDERING

Three-Beam MultiPort Antenna

TSB20R-E7A

Parts & Accessories

TSB20R-E7AA-K	Seven foot (2.3 m) Tri-Split Beam Antenna with 4.3-10 female connectors, 3 factory installed BSA-RET400 RET actuators and MBK-01 mounting bracket
MBK-01	MBK-01 Mounting Kit with 0° - 10° mechanical tilt
MBK-16	MBK-16 Mounting Kit with fixed 0° mechanical tilt
BSA-RET400	Type 17 Internal Remote Electrical Tilt Actuator
AISGC-M-F-10FT	10 Ft (3 m) Male/Female RRU to Antenna AISG cable



Antennas

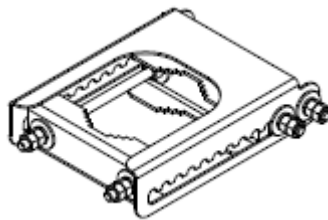
ACCESSORIES

Mounting Bracket Kit

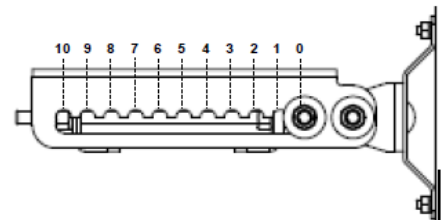
MBK-01

Mechanical

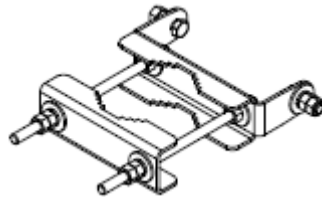
Weight	12.6 lbs (5.7 kg)
Hinge Pitch	47.25 in (1200 mm)
Mounting Pole Dimension	2 to 5 in (5 to 12 cm)
Fastener Size	M12
Installation Torque	40 ft·lb (54 N·m)
Mechanical Tilt Adjustment	0° - 10°



MBK-01 Top Adjustable Bracket



MBK-01 Top Adjustable Bracket Side View



MBK-01 Bottom Fixed Bracket



Antennas

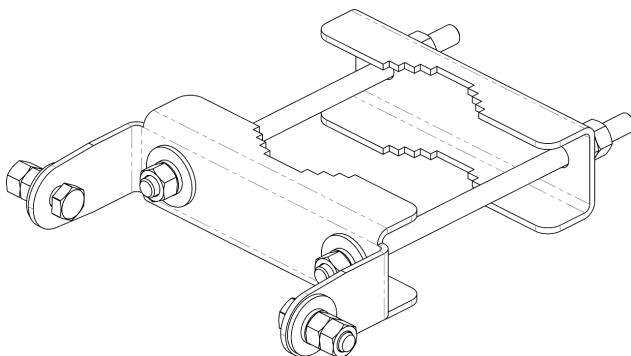
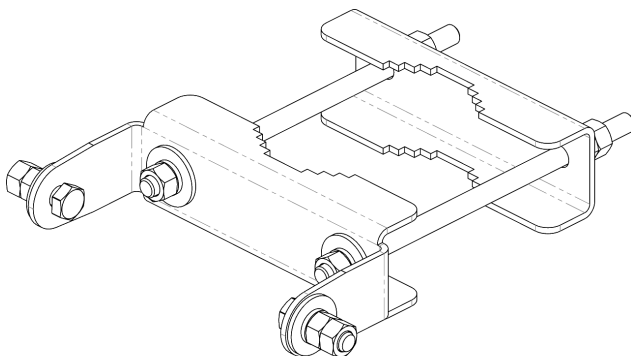
ACCESSORIES

Mounting Bracket Kit

MBK-16

Mechanical

Weight	9.9 lbs (4.5 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·lbs (54 N·m)
Mechanical Tilt	0°



MBK-16 Top and Bottom 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	$\pm 0.1^\circ$
Temperature Range	-40° C to 70° C

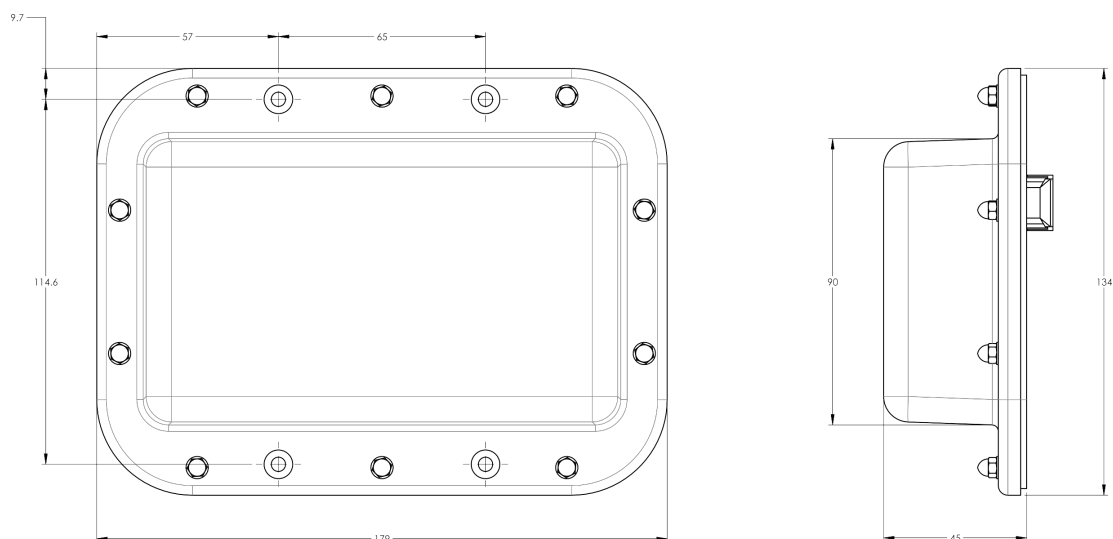
Electrical

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

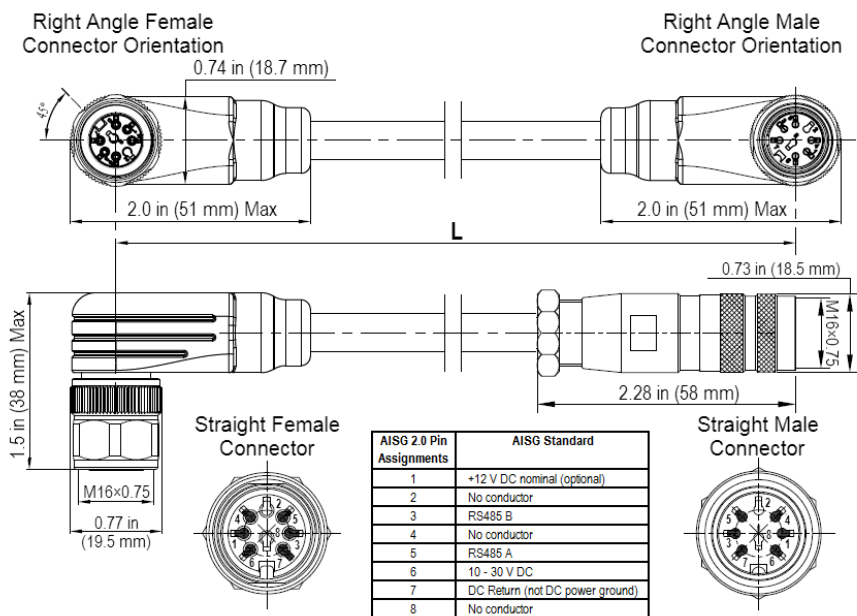
AISGC-M-F-xFT

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 Straight male/straight female
Tightening torque	Hand tighten only ≈ 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 3 conductors - 19 AWG 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

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



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STANDARDS & CERTIFICATIONS

Three-Beam MultiPort Antenna

TSB20R-E7A

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



CCI Communication Components Inc.
EXTENDING WIRELESS PERFORMANCE