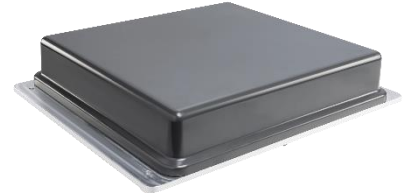


SENCITY® Rail MIMO+ 4x4 Antenna with GNSS 1399.99.0303

Description

5-Port Railway rooftop antenna for cellular bands.
 Enables 4x4 MIMO with true polarisation diversity for high data throughput.
 Supporting 2G/3G/4G/5G bands between 694-4200 MHz.
 Average combined condition number on the supported cellular bands of <10dB on the primary antennas.
 Embedded Dual-Band GNSS antenna with integrated LNA.
 Rugged design, meets EN 50155 railway standard.
 Fire retardant acc. to EN 45545-2 and NFPA130.
 High Voltage and High Current protection for use under catenary lines.



Product Configuration

Technical Data

Electrical Data

	Band 1	Band 2	Band 3	Band 4
Band Name	Vertical Polarisation	Vertical Polarisation	Vertical Polarisation	Horizontal Polarisation
Frequency (MHz)	617 - 960	1425 - 2690	3300 - 4200	694 - 960
VSWR	2.0	2.1	2.1	1.8
Impedance (Ohm)	50	50	50	50
Gain (dBi)	7	8	9	7
Composite power max (W)	80	80	80	80
Ambient temperature (°C)	25	25	25	25
Port Isolation (dB)	30	28	35	30

	Band 5	Band 6	Band 7	Band 8
Band Name	Horizontal Polarisation	Horizontal Polarisation	GNSS 1	GNSS 2
Frequency (MHz)	1515 - 2690	3300 - 4200	1164 - 1279	1555 - 1610
VSWR	1.9	2.2	1.5	1.5
Impedance (Ohm)	50	50	50	50
Gain (dBi)	9	9		
Composite power max (W)	80	80		
Ambient temperature (°C)	25	25	25	25
Port Isolation (dB)	28	35		

Ports

	Port 1	Port 2	Port 3	Port 4	Port 5
Port name	Vertical	Horizontal	Vertical	Vertical	GNSS
Connector	N, jack (female)	N, jack (female)	N, jack (female)	N, jack (female)	TNC, plug (male)
Cable Type	RADOX_RF_142	RADOX_RF_142	RADOX_RF_142	RADOX_RF_142	RADOX_RF_316_D
Cable Length (m)	0.3	0.3	0.3	0.3	0.27
Polarization	vertical	horizontal	vertical	vertical	circular right
DC grounded	Yes	Yes	Yes	Yes	No

Connections

	Band 1	Band 2	Band 3	Band 4	Band 5	Band 6	Band 7	Band 8
Port 1	X	X	X					
Port 2				X	X	X		
Port 3	X	X	X					

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Port 4	X	X	X		
Port 5				X	X

General Data

Ground plane: VSWR and gain values are based on a reference ground plane of 1000x500mm. The tolerance of the VSWR and Isolation values is 0.5dB. The Cellular and Wi-Fi 6E bands from 4900 - 7125 MHz are supported on the vertically polarised ports (no ground plane requirements). The isolation values are valid only for the ports with common bands. The best indicator for the actual antenna performance is the average combined condition number.

The isolation values mentioned on page 1 refers to the isolation between Port 1 (vertical) and Port 2 (horizontal). The Isolation limit values between the other ports are below:

Port 3 (vertical) to Port 4 (vertical):	
Frequency 617-960 MHz, Isolation:	16dB
Frequency 1425-2700 MHz, Isolation:	22dB
Frequency 3300-7125 MHz, Isolation:	25dB
Port 3 (vertical) to Port 2 (horizontal):	
Frequency 694-960 MHz, Isolation:	23dB
Frequency 1515-2700 MHz, Isolation:	30dB
Frequency 3300-4200 MHz, Isolation:	35dB
Port 4 (vertical) to Port 2 (horizontal):	
Frequency 694-960 MHz, Isolation:	21dB
Frequency 1515-2700 MHz, Isolation:	29dB
Frequency 3300-4200 MHz, Isolation:	33dB
Port 1 (vertical) to Port 3 (vertical):	
Frequency 617-960 MHz, Isolation:	26dB
Frequency 1425-2700 MHz, Isolation:	27dB
Frequency 3300-7125 MHz, Isolation:	30dB
Port 1 (vertical) to Port 4 (vertical):	
Frequency 617-960 MHz, Isolation:	26dB
Frequency 1425-2700 MHz, Isolation:	27dB
Frequency 3300-7125 MHz, Isolation:	30dB

Electrical Data LNA

LNA gain (dB)	38
LNA noise figure dB	2
LNA current consumption (mA)	45
LNA is connected to	Port 5

This Antenna is compliant with the Radio Equipment Directive 2014/53/EU

EMC: EN50121-3-2 (2016)

LNA input voltage range: 3..5.5V

Total gain @90° elevation: 38 dBiC

Values for LNA power consumption, noise figure and gain are given for a 5V operating voltage and may differ slightly for a lower voltage

Mechanical Data

Dimensions (mm)	90 x 489 x 392 (Height x Width x Depth)
Weight (kg)	8.15 (without packaging)

High-voltage-protection: no voltage on RF port, if the catenary line touches the antenna (EN 50124-1, 3.8 kVDC, 27.5 kVAC, 1min).

High-current-protection: Designed acc. to UIC 533, DC-grounded antenna element (protection against lightning and short circuit with catenary lines(40kA/0.125s).

Corrosion: Low corrosion design acc. to MIL-DTL-14072(E), 96 hours Salt Spray test.

Mounting: Shall be installed in longitudinal position to the wind/driving direction.

Suitable for installation on high speed trains with a maximum speed of 500 km/hr.

4x composite sealing washers included for silicone-free sealing of the mounting screws.

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Environmental Data

Environmental conditions	outdoor
Operation temperature (°C)	-55 to 85
Storage temperature (°C)	-55 to 85
Transport temperature (°C)	-55 to 85
IP rating	IP69
Flammability rating	EN 45545-2 R24 HL3
Solar radiation	UL 746C, F1
2011/65/EU (RoHS -including 2015/863 and 2017/2102)	compliant acc. Annex III
Lead-free soldered	yes
WEEE 2012/19/EU	no special marking needed
ELV 2000/53/EC	compliant
REACH 1907/2006/EC	compliant

Flammability rating: EN45545-2:2013 + A1:2015, NFPA-130:2017
Tested according to ISO 4589-2:2017, NFX 70-100-1:2006, ISO 5659-2:2011.

Environmental tests: EN 50155:2018-05

- §13.4.6 EN 60068-2-1:2008-01 Cold temperature test Ab, -55°C, 16h
- §13.4.5 EN 60068-2-2:2008-01 Dry heat test Be +85°C, 16h
- §13.4.7 EN 60068-2-30:2006-06 Damp heat cyclic test Db, +25/55°C, 2 cycles
- §13.4.10 EN 60068-2-11:2000-02 Salt mist test, 96h
- §13.4.11 EN 61373:2011-04 § 8, Cat. 1B Broadband Random Vibration
- §13.4.11 EN 61373:2011-04 § 9, Cat. 1B Increased Random Vibration
- §13.4.11 EN 61373:2011-04 § 10, Cat. 1B Mechanical shock
- §13.4.12 Ingress Protection EN 60529:2014-09 IP6X, IPX7, IPX9

Material Data

Radome colour	RAL 7043 (dark grey)
Radome material	PC (Polycarbonate)
Back plate/base plate colour	grey
Back plate/base plate material	Aluminium

Related Documents

Painting instruction	DOC-0000256180
Security instruction	DOC-0000278984

Additional Information

Protected by Patents: DE202015009331(U1), US10116056(B2), CN106663861B, US7327320B2, CN1765030B, AU2003218856A1, CA2521771C, SG114406, ZA200508290, CN214313519. Further patents pending including Schweizer Patentanmeldung Nr. 01582/19.