

## SENCITY® Rail MULTI 9-Port Antenna

1399.99.0165

### Properties

- Railway rooftop antenna for 2G/3G/4G/5G cellular and Wi-Fi 7 bands
- Cellular 4x4 MIMO with four separate broadband integrated antennas and Wi-Fi 4x4 MIMO with four separate antennas
- Rugged design, meets EN 50155 Railway Standard
- Fire retardant according to EN 45545-2 and NFPA-130
- GNSS receiver supports GPS L1, Galileo E1, BeiDou B1, GLONASS G1 constellations



| Electrical data         |                     |                     |                       |                       |
|-------------------------|---------------------|---------------------|-----------------------|-----------------------|
|                         | Band 1              | Band 2              | Band 3                | Band 4                |
| Name                    | Cellular 1-4        | Cellular 1-4        | Cellular 1-4          | Cellular 1-4          |
| Frequency               | 617 MHz ... 694 MHz | 694 MHz ... 960 MHz | 1350 MHz ... 3300 MHz | 3300 MHz ... 4900 MHz |
| Impedance               | 50 Ω                | 50 Ω                | 50 Ω                  | 50 Ω                  |
| VSWR                    | 1.6                 | 1.8                 | 1.8                   | 1.8                   |
| Gain                    | 3.5 dBi             | 3.5 dBi             | 4 dBi                 | 6 dBi                 |
| Isolation between Ports | 13.5 dB             | 13.5 dB             | 21.5 dB               | 25 dB                 |
| Ambient Temperature     | 25 °C               | 25 °C               | 25 °C                 | 25 °C                 |
| Composite Power max     | 80 W                | 80 W                | 80 W                  | 80 W                  |

  

|                         | Band 5                | Band 6                | Band 7                | Band 8                |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Name                    | Cellular 1-4          | Wi-Fi 1-4             | Wi-Fi 1-4             | GNSS                  |
| Frequency               | 4900 MHz ... 7125 MHz | 2400 MHz ... 2500 MHz | 4900 MHz ... 7125 MHz | 1559 MHz ... 1610 MHz |
| Impedance               | 50 Ω                  | 50 Ω                  | 50 Ω                  | 50 Ω                  |
| VSWR                    | 2                     | 1.8                   | 2.2                   | 1.5                   |
| Gain                    | 6 dBi                 | 5 dBi                 | 5 dBi                 |                       |
| Isolation between Ports | 25 dB                 | 19 dB                 | 22 dB                 |                       |
| Ambient Temperature     | 25 °C                 | 25 °C                 | 25 °C                 |                       |
| Composite Power max     | 80 W                  | 80 W                  | 80 W                  |                       |

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| Ports        |                  |                  |                               |                |
|--------------|------------------|------------------|-------------------------------|----------------|
|              | Port 1           | Port 2           | Port 3                        | Port 4         |
| Port name    | Cellular 1       | Cellular 2       | Cellular 3                    | Cellular 4     |
| Connector    | N, jack (female) | N, jack (female) | N, jack (female), plug (male) | N-type Jack    |
| Cable type   | RADOX_RF_316_D   | RADOX_RF_316_D   | RADOX_RF_316_D                | RADOX_RF_316_D |
| Cable length | 0.4 m            | 0.53 m           | 0.53 m                        | 0.4 m          |
| Polarization | vertical         | vertical         | vertical                      | vertical       |
| DC grounded  | Yes              | Yes              | Yes                           | Yes            |

|              | Port 5           | Port 6           | Port 7           | Port 8           |
|--------------|------------------|------------------|------------------|------------------|
| Port name    | Wi-Fi 1          | Wi-Fi 2          | Wi-Fi 3          | Wi-Fi 4          |
| Connector    | N, jack (female) | N, jack (female) | N, jack (female) | N, jack (female) |
| Cable type   | RADOX_RF_316_D   | RADOX_RF_316_D   | RADOX_RF_316_D   | RADOX_RF_316_D   |
| Cable length | 0.46 m           | 0.48 m           | 0.48 m           | 0.46 m           |
| Polarization | vertical         | vertical         | vertical         | vertical         |
| DC grounded  | Yes              | Yes              | Yes              | Yes              |

|              | Port 9                |
|--------------|-----------------------|
| Port name    | GNSS                  |
| Connector    | TNC, TNC, plug (male) |
| Cable type   | RADOX_RF_316_D        |
| Cable length | 0.44 m                |
| Polarization | circular right        |
| DC grounded  | Yes                   |

| Connections |            |            |            |            |         |         |         |         |        |
|-------------|------------|------------|------------|------------|---------|---------|---------|---------|--------|
|             | Port 1     | Port 2     | Port 3     | Port 4     | Port 5  | Port 6  | Port 7  | Port 8  | Port 9 |
| Port name   | Cellular 1 | Cellular 2 | Cellular 3 | Cellular 4 | Wi-Fi 1 | Wi-Fi 2 | Wi-Fi 3 | Wi-Fi 4 | GNSS   |
| Band 1      | ✓          | ✓          | ✓          | ✓          |         |         |         |         |        |
| Band 2      | ✓          | ✓          | ✓          | ✓          |         |         |         |         |        |
| Band 3      | ✓          | ✓          | ✓          | ✓          |         |         |         |         |        |
| Band 4      | ✓          | ✓          | ✓          | ✓          |         |         |         |         |        |
| Band 5      | ✓          | ✓          | ✓          | ✓          |         |         |         |         |        |
| Band 6      |            |            |            |            | ✓       | ✓       | ✓       | ✓       |        |
| Band 7      |            |            |            |            | ✓       | ✓       | ✓       | ✓       |        |
| Band 9      |            |            |            |            |         |         |         |         | ✓      |

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| <b>Electrical data LNA</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current consumption            | 20 mA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Noise figure                   | 1.6 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Remarks                        | <p>This Antenna is compliant with the Radio Equipment Directive 2014/53/EU</p> <p>EMC: EN50121-3-2 (2016)</p> <p>ETSI EN 303 413 V1.1.1 (2017-06)</p> <p>ETSI EN 301 489-1 V2.2.3 (2019-03)</p> <p>ETSI EN 301 489-19 V2.1.1 (2019-04)</p> <p>LNA input voltage range: 3...5V</p> <p>Total gain @90° elevation: 30 dBiC</p> <p>Values for LNA power consumption, noise figure and gain are given for a 5V operating voltage and may differ slightly for a lower voltage.</p> <p>LNA is connected to Port 9</p>                                                                                           |
| <b>Mechanical data</b>         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Weight                         | 8 kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Dimensions                     | 84 mm x 380 mm x 439.5 mm (Height x Width x Depth)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Remarks                        | <p>High-voltage-protection: no voltage on RF port, if the catenary line touches antenna (EN 50124-1, 27.5 kVAC/1min).</p> <p>High-current-protection: Designed acc. to UIC 533, DC-grounded antenna element protection against lightning and short circuit with catenary lines (EN50388, EN 50122-1, 40kA/0.1sec)</p> <p>Corrosion: Low corrosion design according to MIL-F-14072(E), 96 hours Salt Spray test.</p> <p>Mounting: Shall be installed in longitudinal position to the wind/driving direction.</p> <p>Suitable for installation on high speed trains with a maximum speed of 500 km/hr.</p> |
| <b>Material data</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Radome material                | PC (Polycarbonate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Radome colour                  | RAL 7043 (dark grey)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Back plate/base plate material | Aluminium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Environmental data</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Operation temperature          | -40 °C ... 85 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Storage temperature            | -55 °C ... 85 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Transport temperature          | -40 °C ... 85 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Environment (application)      | Outdoor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Ingress protection (IP Rating) | IP69                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Flammability rating            | EN 45545-2 R24 HL3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Solar radiation                | UL 746C, F1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Standards                      | <p>Railway EN 50155</p> <p>Railway EN 45545</p> <p>Railway NFPA130</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

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**Environmental remarks**

Environmental tests: EN 50155:2022-06

§12.2.3 EN 60068-2-1 Cold temperature test Ad, -55°C, 16h

§12.2.4 EN 60068-2-2 Dry heat test Bd +85°C, 16h

§12.2.5 EN 60068-2-30 Damp heat cyclic test Db, +25/55°C, 2 cycles

§12.2.10 EN 60068-2-11 Salt Mist test Ka, 96h

§12.2.11 EN 61373 § 9 Random Vibration (Long life) test, Cat. 1 class B

§12.2.11 EN 61373 § 10 Mechanical shock test, Cat. 1 class B

§12.2.12 DIN EN 60529 Ingress protection test, IP69

Flammability rating: EN45545-2:2023, NFPA-130:2023

**Additional Information**

The antenna needs a customer specific bracket when mounted on a curved roof (not part of the delivery content of the antenna).

A standard bracket is available for the antenna mounting above an existing cable breakthrough on a flat roof (Article Number 9091.99.0270).

Protected by Patents: DE202015009331(U1), US10116056(B2), CN106663861B, US7327320B2, CN1765030B, AU2003218856A1, CA2521771C, SG114406, ZA200508290.

**Ordering information**

| Item description | Item number | Product name                       |
|------------------|-------------|------------------------------------|
| 1399.99.0165     | 85159949    | SENCITY® Rail MULTI 9-Port Antenna |

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