# ONYX CFS–5250CS BreadCrumb®

## Portable Wireless Mesh Network Node


**The Rajant ONYX CFS–5250CS is an IP67 Kinetic Mesh® network device** intended for use in harsh environments on everything from heavy-duty machinery to light-duty vehicle applications. The ONYX CFS–5250CS is ideal for non-autonomous tele-remote construction and mining applications. This portable mesh network node contains two transceivers with up to four external antenna ports and provides Ethernet and Wi-Fi access point interfaces to enable data, voice, and low-bandwidth video applications. Housed in an environmentally robust metal case, the ONYX CFS–5250CS provides operational ruggedness, outstanding shock and vibration characteristics, and a wide-range temperature rating.

## Rajant ONYX CFS–5250CS Key Features

- Combines Kinetic Mesh backhaul, Wi-Fi access and layer 2 switching across interfaces in a single device
- Outdoor-rated:
  - -40°C to +65°C (-40°F to 149°F) temperature range
  - IP67 rating for protection against dust and water ingress
- Rajant's InstaMesh® networking software enables the network to quickly adapt to rapidly-deployed and quickly or constantly moving network elem®®ents
- 2.4 GHz, 4.9 GHz and 5 GHz radio frequencies supporting a wide variety of applications and environments
- Embedded ultra-robust, meter-level GNSS receiver with concurrent reception of up to four L1 GNSS (GPS, GLONASS, BeiDou, Galileo) constellation signals. Requires an external GNSS antenna.
- Includes a peripheral interface that allows connecting add-on modules, such as a 5G mobile network interface (pending).
- Lightweight and portable
- Support for several strong cryptographic options used for data and MAC-address encryption and per-hop, per-packet authentication
- High bandwidth for data, voice, and video applications
- Scalability to hundreds of mobile, high-bandwidth nodes
- Integrated 802.11ax Wi-Fi Access Point service for compatibility with millions of commercial off-the-shelf (COTS) client devices such as laptops, tablets, smart phones, IP cameras, sensors, and other IP devices
- Self-configuring operation for fast and easy deployments
- Reliable and fast off-loading to Ethernet via multiple, simultaneous bridge-mode links through Automatic Protocol Tunneling (APT) feature

## Rajant ONYX CFS–5250CS Advantages

At Rajant, we solve your Wi-Fi and LTE problems by extending the range of standard Wi-Fi and LTE, enabling machine-to-machine communications to see around obstructions, and providing sitewide ubiquitous Wi-Fi coverage to connect to Wi-Fi IoT devices including VoIP handsets.

The ONYX CFS–5250CS is intended for industrial IoT markets, including mining, construction, airports, oil & gas, utilities, solar, wind, smart cities, and public safety.

This is a robust product that can add connectivity to an existing network. The ONYX CFS–5250CS can be deployed as a mobile or infrastructure wireless node.

This industrial network node not only offers reliability, performance, and scalability but also security to support virtually any application operating in outdoor environments.

These BreadCrumbs adapt quickly to changing environments to eliminate communication gaps and provide higher reliability than any other wireless network available.

### InstaMesh®

InstaMesh is the advanced, patented[1] protocol developed by Rajant that directs the continuous and instantaneous forwarding of packets from wireless and wired connections. It enables complete network mobility, high throughput, and low latency with very low maintenance and administrative requirements. Operating at Layer 2 and not requiring a root node or LAN Controller, InstaMesh provides robust fault tolerance even if there is a connection or node outage.

No matter how you configure your network, InstaMesh networking software always determines the most efficient pathway between any two points, even when those points are in motion.

[1] U.S. Patent 9,001,645

| Model | Description |
|---|---|
| **CFS–5250CS** | CFS–5250CS with (1) dual-band 2.4/4.94-5.85 GHz, 2x2 MIMO, 573.5/1201 Mbps and (1) 4.94-5.85 GHz, 2x2 MIMO, 1201 Mbps transceivers. |

| Wireless | Dual-Band 2.4 GHz | Dual-Band 4.94-5.85 GHz | 4.94-5.85 GHz |
|---|---|---|---|
| **Antenna Connector** | (2) Type N (female) | (2) Type N (female) | (2) Type N (female) |
| **Frequency[2]** | 2402 – 2482 MHz | 4940 – 4990 MHz<br>U-NII-1: 5150 – 5250 MHz<br>U-NII-2A: 5250 – 5350 MHz<br>U-NII-2C: 5470 – 5725 MHz<br>U-NII-3: 5725 – 5850 MHz | 4940 – 4990 MHz<br>U-NII-1: 5150 – 5250 MHz<br>U-NII-2A: 5250 – 5350 MHz<br>U-NII-2C: 5470 – 5725 MHz<br>U-NII-3: 5725 – 5850 MHz |
| **Modulation** | DSSS, CCK, OFDM with up to 1024-QAM | OFDM with up to 1024-QAM | OFDM with up to 1024-QAM |
| **Max. Physical Layer Data Rate** | 573.5 Mbps (throughput varies) | 1201 Mbps (throughput varies) | 1201 Mbps (throughput varies) |
| **Max. RF Transmit Power[3]** | 30 dBm ± 2 dB | 30 dBm ± 2 dB | 30 dBm ± 2 dB |
| **Receive Sensitivity[4,5,6]** | TBD | TBD | TBD |

| Network & Security | |
|---|---|
| **Network Functionality** | VLAN and QoS support; Access Point; Bridge; Gateway; DHCP; NAT and Port Forwarding; Automatic Protocol Tunneling (APT). |
| **Security** | • Multiple cryptographic options, including NSA Suite B algorithms (implementation not certified). For information on models with full Suite B certification, contact Rajant or your authorized Rajant partner.<br>• Separately configurable data and MAC address encryption via AES256-GCM, AES192-GCM, AES128-GCM, AES256-CTR, AES192-CTR, AES128-CTR, XSalsa20, XSalsa20/12, and XSalsa20/8.<br>• Configurable per-hop, per-packet authentication between BreadCrumbs via AES256-GMAC, AES192-GMAC, AES128-GMAC, HMAC-SHA512, HMAC-SHA384, HMAC-SHA256, HMAC-SHA224, HMAC-SHA1, and Poly-1305-AES.<br>• Supports IEEE 802.11i: AES-CCMP encryption, WPA-Personal/Enterprise, WPA2-Personal/Enterprise, iPSK, 802.1x; Access Control Lists; Compatible with Layer-2 and Layer-3 client/server and peer-to-peer security solutions. |

| Power | |
|---|---|
| **PoE** | IEEE 802.3bt Type 3 / PoE++ or 41.1 — 57.0 VDC Passive PoE |
| **Power Consumption[7]** | Without an add-on module: 8.0 W (average, idle); 27 W (maximum, peak) @ 57 V<br>With an add-on module: 44 W (maximum, peak) @ 57 V |

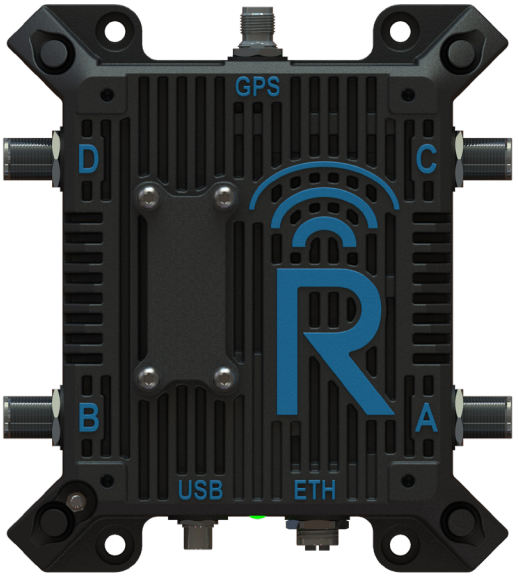
[2] Channel, frequency and bandwidth options vary based upon regional and local regulations and certifications
[3] RF transmit power is governed by local regulations and varies by frequency
[4] Receive sensitivity tolerance is ± 2 dB
[5] Receive sensitivity criteria is less than 10% packet error rate (PER)
[6] Pending test results
[7] Power consumption depends on transceiver configuration

| Input/Output | |
|---|---|
| **Ethernet** | (1) M12 X-Code female connector, 10/100/1000 Mbps, IEEE 802.3, auto MDI/MDIX |
| **USB** | USB port for firmware upgrades |
| **LED** | Status LED |
| **Switch** | LED Configuration / Zeroize Keys and Restore Factory Defaults (through optional adapter cable) |
| **Peripheral Interface** | Allows connecting add-on modules, such as a 5G mobile network interface (pending). |

| GNSS Receiver | | | | | |
|---|---|---|---|---|---|
| **Supported GNSS systems** | | **GPS/QZSS** | **GLONASS** | **Galileo** | **BeiDou** |
| **Signal** | | L1C/A (1575.42 MHz) | L1OF (1602 MHz + k*562.5 kHz, k = -7,...,5,6) | E1-B/C (1575.42 MHz) | B1I (1561.098 MHz) |
| **Acquisition** | **Cold Start** | 29 s | 27 s | 32 s | 42 s |
| | **Hot Start** | 2 s | 2 s | 2 s | 2 s |
| | **Aided Start** | 2 s | 2 s | 2 s | 5 s |
| **Max Navigation Update Rate** | **PVT** | 25 Hz | 25 Hz | 25 Hz | 25 Hz |
| **Sensitivity** | **Tracking and navigation** | -166 dBm | -166 dBm | -160 dBm | -159 dBm |
| | **Reacquisition** | -160 dBm | -156 dBm | -158 dBm | -154 dBm |
| | **Cold Start** | -148 dBm | -145 dBm | -145 dBm | -140 dBm |
| | **Hot Start** | -159 dBm | -156 dBm | -159 dBm | -154 dBm |
| **Position Accuracy** | **PVT** | 2.0 m CEP | 4.0 m CEP | 3.0 m CEP | 3.0 m CEP |
| **Antenna** | Requires an external GNSS antenna | | | | |
| **Antenna Connector** | TNC female | | | | |
| **Power Output for Active Antenna** | 3.2 V, max 50 mA | | | | |

| Physical | |
|---|---|
| **Dimensions** | 180 mm x 158 mm x 51 mm (7.09” x 6.22” x 2.01”) |
| **Weight** | 1238 g (2 lb 11.7 oz) |
| **Temperature**[8] | Ambient (operating): -40°C to 65°C (-40°F to 149°F)<br>System internal (operating): -40°C to 85°C (-40°F to 185°F)<br>Storage: -40°C to 85°C (-40°F to 185°F) |
| **Enclosure** | IP67 |
| **Certification** | FCC, IC, Peru (pending) |
| **Warranty** | 1 Year |

[8] The temperature specs apply to the ONYX only, without add-on modules connected to it

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