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**CISCO**
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# Cisco FM4200 Fiber

## Ultra-Reliable Wireless Backhaul for moving vehicles (formerly Fluidmesh)

# Contents

The Cisco FM4200 Fiber is a high-performance mobility-communications radio transceiver, designed to deliver fast, stable connectivity from a wayside network to any slow- or fast-moving vehicle, particularly within mission-critical market sectors and in extreme environments.

The FM4200 Fiber has received numerous railway and transport certifications, making it a popular choice for deployment on many transportation systems in the USA and worldwide, as well as in ports, intermodal yards and mining environments. Its low-latency, high-bandwidth characteristics make it the class leader in a diverse portfolio of applications, including (but not limited to) computer-based train control, real-time situation monitoring, and on-board client services (such as Wi-Fi and VoIP).



**Figure 1.**
FM4200F radio model

### Wi-Fi on board

Your passengers expect wireless high-speed connectivity everywhere, and FLUIDITY delivers it. With our trackside technology we are able to deliver connectivity up to 100 Mbps to fast-moving vehicles and trains.

### Works with FLUIDITY, our unique mobility solution

The Cisco FM4200 Fiber supports FLUIDITY, the ultimate broadband connectivity solution for high-speed vehicles. Providing up to 100 Mbps of usable throughput to vehicles traveling up to 225 mph/360 kmh is now a reality.

There is no handoff time with FLUIDITY: thanks to the seamless "make before break" approach, it maintains persistent network sessions and streams for any type of traffic.

### Reduce the cost of network ownership by selecting the amount of throughput you need

Limit the cost of network ownership with FluidThrottle by selecting only the amount of throughput required. More throughput can be easily achieved by upgrading the system with software plug-ins when the traffic requirements increase. FluidThrottle makes Cisco FM cost-effective and future-ready.

### Prodigy 2.0 for reliable mission-critical applications

Our Multiprotocol Label Switching (MPLS)-based transmission protocol is built to overcome the limits of standard wireless protocols and to deliver an infrastructure with a higher level of reliability. At the base of our innovative transmission protocol is a traffic optimization algorithm that allows every Cisco FM radio to assign a specific level of priority and reliability to every packet transmitted. The result is a better, more reliable, multiservice wireless infrastructure.

### Web interface configures, monitors, and troubleshoots the wireless network

The Cisco FM4200 Fiber includes the FMQuadro web interface, which allows you to configure, monitor, and troubleshoot the wireless network in real time, without any additional software. To simplify the configuration of the wireless network, the radio has a built-in spectrum analyzer and a real-time bandwidth monitoring tool.

## Quick peek

### Rugged die-cast aluminum housing

Specific for harsh environments and long-lasting performance

### FluidThrottle

Select only the throughput you need

### Prodigy 2.0

MPLS transmission protocol with intelligent QoS

### FMQuadro

Web-based interface to easily configure, monitor, and troubleshoot the network

### FluidMAX

Change the network's architecture, not the radios

### FLUIDITY

Connectivity solution for vehicles and trains

### Multiple frequencies

4.9 GHz and 5.1 to 5.8 GHz

### Ethernet port

SFP fiber port with XCO connector

### Ports and connectors

Industrial-grade antivibration M12 ports and QMA connectors, EN 50155 certified.

## Operational applications

- Communication-Based Train Control (CBTC)
- Remote system configuration and diagnostics
- Telemetry
- 24/7 maintenance and service data
- Onboard ticketing
- Onboard Point of Sale (POS)
- VoIP communications

## Security applications

- Live video streaming
- Live front-facing camera streaming
- Level crossing monitoring
- Incident analysis
- Online virtual black box
- Emergency VoIP intercom

## Passenger services

- Internet on board (Wi-Fi)
- Passenger information system
- Entertainment
- Digital advertising
- Emergency service phone
- Onboard femtocells



**Figure 2.**
FM4200F front and rear view

**Table 1.**    FM4200F Product Specifications

| System | | |
|---|---|---|
| **Chipset** | CPU | 600 MHz MIPS network processor |
| | RF | MIMO 2x2 |
| **Interface** | SFP-Fiber | 1x dual LC ruggedized SFP XCO connector 100/1000 Mbps<br>1x 10/100/1000 M12 port |
| | Reset | Reset button for factory default |
| **LED 1** | | 1x Power |
| **LED 2** | | 1x Ethernet 1 |
| **LED 3** | | 1x Ethernet 2 |
| **LEDs 4 to 7** | | 4x RSSI |

| Radio | |
|---|---|
| **Operating frequencies**[*] | 4900 to 6080 MHz |
| **Channel width** | 5/10/20/40 MHz |
| **Data rate** | 6/9/12/18/24/36/48/54 Mbps<br>30/60/90/120/180/240/300 Mbps |
| **Modulation** | OFDM (BPSK, QPSK, 16QAM, 64QAM) |
| **Compatible standards** | IEEE 802.11p, IEEE 802.11e |
| **Coaxial connectors** | 2x Cu-Sn-Zn-plated QMA compliant with ASTM B-117 |
| **Supported roaming vehicle speed** | Up to 225 mph/360 kmh |
| **MPLS technology** | Yes |
| **Output power** | Up to 27 dBm[**] |
| **Handoff latency** | Make-before-break seamless handoff |
| **Receiving sensitivity** | -96 dB at 6.5 Mbps<br>-70 dB at 300 |

| Electrical | |
|---|---|
| Radio power input | 48 VDC active 802.3af PoE |
| | 48 VDC passive PoE input*** |
| | 24-48VDC M12 power input |
| Max power consumption | 8W |

| Physical | |
|---|---|
| Dimensions (in) | 6.59 (H) x 5.21 (W) x 2.39 (D) |
| Dimensions (mm) | 167.4 (H) x 132.4 (W) x 60.5 (D) |
| Weight | 25 oz (700 g) |
| Finishing | Powder coating Pantone cool gray 10c |

| Regulatory compliance | |
|---|---|
| Approvals | FCC Part 15.B, FCC Part 15.C, FCC Part 15.E, NII/RSS-210 Annex 9, FCC Part 90y, OET 65 MPE/RSS102, EN893+DFS, EN301189-1-17/ EN55022 EN 623111, EN60950, IC RS210, CE, ROHS24, |
| Railway certifications | EN50155, EN50121, EN50121-3 EN50121-4, EN45545, EN50129 IEC 60571, AREMA 11.5.1, CBTC: EN50129 |
| Environmental specs | T3 |

| Environmental | |
|---|---|
| Operating temperature | -40° to 176°F |
| | -40° to 80°C |
| Humidity | 5% to 95% non condensing |
| Mounting | Pole mounting kit and DIN rail mounting included |
| Enclosure characteristic | Die-cast aluminum |
| IP rating | IP66 |
| Shock and vibration | ETSI 300 – 019 – 1.4 |

| Network | |
| --- | --- |
| **Protocols** | UDP, TCP, IP, RTP, RTCP, RTSP, HTTP, HTTPS, ICMP, ARP |
| **Web-based interface** | Yes |
| **Multicast support** | Yes |
| **UPnP support** | Yes |
| **SNMP support** | Yes |

| Security | |
| --- | --- |
| **VPN/L2TP** | Yes |
| **Full compatibility with AES, 3DES, RSA, HTTPS, SSL** | Yes |

** Depends on configuration and regulations.

*** PoE injector and PoE converters available upon request.

**Table 2.**     Cisco FM4200: Plugin and License Summary

| | | Cisco FM4200 Fiber: Plugin and License Summary | | |
| --- | --- | --- | --- | --- |
| **Type of Plugin or License** | **Fluidmesh Part Numbers** | **Description** | **Cisco PID** | |
| **Hardware P/N** | FM4200F-HW | Cisco FM4200 Fiber, 2x2 MIMO single-radio device, 15 Mpbs Ethernet Throughput, 4.9-5.8 GHz. One (1) M12 Ethernet Port and one SFP Port (Gigabit). EN 50121 DOES NOT INCLUDE FLUIDCARE SUPPORT PLAN. | FLMESH-HW-4200-1NA | NAM/LAM Version |
| | | | FLMESH-HW-4200-1 | Rest of the world |
| **Point-to-Multipoint (PtMP)** | FM4200-30 | Enable up to 30 Mpbs ethernet throughput in FM4200 Devices for fixed backhaul (No Mobility Option) | L-FLMESH-4200-11 | |
| | FM4200-60 | Enable up to 60 Mpbs ethernet throughput in FM4200 Devices for fixed backhaul (No Mobility Option) | L-FLMESH-4200-12 | |
| | FM4200-UN | Enable up to 150 Mpbs Ethernet throughput in FM4200 Devices for fixed backhaul (No Mobility Option) | L-FLMESH-4200-19 | |
| **Point-to-Point (PtP)** | FM4200-PTP-UN | Enable ETHERNET throughput UNLIMITED (up to 500 Mbit/s) in FM4200 for BRIDGE MODE ONLY | L-FLMESH-4200-18 | |

| | | Cisco FM4200 Fiber: Plugin and License Summary | |
|---|---|---|---|
| **Type of Plugin or License** | **Fluidmesh Part Numbers** | **Description** | **Cisco PID** |
| **Fluidity Licensing: Mobile** | FM4200-MOB-MOB-5 | Fluidity Fast-roaming Plug-in enable Mobility Option for Mobile-Unit up to 5 Mbps | L-FLMESH-4200-4 |
| | FM4200-MOB-MOB-10 | Fluidity Fast-roaming Plug-in enable Mobility Option for Mobile-Unit up to 10 Mbps | L-FLMESH-4200-13 |
| | FM4200-MOB-MOB-15 | Fluidity Fast-roaming Plug-in enable Mobility Option for Mobile-Unit up to 15 Mbps | L-FLMESH-4200-2 |
| | FM4200-MOB-MOB-20 | Fluidity Fast-roaming Plug-in enable Mobility Option for Mobile-Unit up to 20 Mbps | L-FLMESH-4200-21 |
| | FM4200-MOB-MOB-30 | Fluidity Fast-roaming Plug-in enable Mobility Option for Mobile-Unit up to 30Mbps | L-FLMESH-4200-3 |
| | FM4200-MOB-MOB-60 | Fluidity Fast-roaming Plug-in enable Mobility Option for Mobile-Unit up to 60 Mbps | L-FLMESH-4200-5 |
| | FM4200-MOB-MOB-UN | Fluidity Fast-roaming Plug-in enable Mobility Option for Mobile-Unit up to 150 Mbps | L-FLMESH-4200-6 |
| **Fluidity Licensing: Trackside** | FM4200-MOB-TRK-15 | Fluidity Fast-roaming Plug-in enables Mobility Option Infrastructure Mode up to 15 Mbps | L-FLMESH-4200-10 |
| | FM4200-MOB-TRK-20 | Fluidity Fast-roaming Plug-in enables Mobility Option Infrastructure Mode up to 20 Mbps | L-FLMESH-4200-14 |
| | FM4200-MOB-TRK-30 | Fluidity Fast-roaming Plug-in enables Mobility Option Infrastructure Mode up to 30 Mbps | L-FLMESH-4200-7 |
| | FM4200-MOB-TRK-60 | Fluidity Fast-roaming Plug-in enables Mobility Option Infrastructure Mode up to 60 Mbps | L-FLMESH-4200-8 |
| | FM4200-MOB-TRK-UN | Fluidity Fast-roaming Plug-in enables Mobility Option Infrastructure Mode up to 150 Mbps | L-FLMESH-4200-9 |

| Type of Plugin or License | Fluidmesh Part Numbers | Cisco FM4200 Fiber: Plugin and License Summary | |
|---|---|---|---|
| | | Description | Cisco PID |
| General Licenses | FM-AES | AES Plug-in. Enables One plug-in is required for each hardware device where encryption is desired. ECCN 5D002 (Export Licensed Required to be exported in certain countries; no license required to be sold in North America and in the European Union). | L-FLMESH-ENCR-1 |
| | FM-TITAN | TITAN Plug-in. Enables Fast Failover in case of network, radio or power failure on a single Fluidmesh product. All Fluidmesh devices in a network mush have a plugin-in to operate. | L-FLMESH-TITAN-1 |
| | FM-PROFINET | PROFINET Plug-in. Enables support to Layer 2 ethertype 0x8892 on one Fluidmesh product. It requires also QoS support and the VLAN plug-in. All Fluidmesh hardware devices in a network must have these plug-ins to operate. | L-FLMESH-PROFINET |
| | FM-VLAN | VLAN Plug-in. Enables port-based and MAC address-based VLANs on a single Fluidmesh product. All Fluidmesh hardware devices in a network must have a plug-in for VLAN to operate. | L-FLMESH-VLAN-1 |
| | FM-QNET | QNET Plug-in. Enables support to Layer 2 ethertype 0x8204 on one Fluidmesh product. All Fluidmesh hardware devices in a network must a plug-ins to operate. | L-FLMESH-QNET |
| | FM-CANBUS | CANBUS Plug-in. Enables CANBUS Support on Fluidmesh radios. All Fluidmesh devices in a network must have these plugin-ins to operate. | L-FLMESH-CANBUS |

## Product sustainability

Information about Cisco's Environmental, Social and Governance (ESG) initiatives and performance is provided in Cisco's CSR and sustainability reporting.

**Table 3.**     Cisco environmental sustainability information

| Sustainability Topic | | | Reference |
|---|---|---|---|
| **General** | Information on product-material-content laws and regulations | | Materials |
| | Sustainability Inquiries | | Contact: csr_inquiries@cisco.com |
| | **Countries and Regions Supported** | | Table: Regulatory compliance |
| **Power** | Power (Including Pluggable) | | Table: Electrical |
| **Material** | Product packaging weight and materials | | Contact: environment@cisco.com |
| | Weight | | Table: Physical |
| **Recycled Content** | Pre-consumer | 0.58% | Contact: csr_inquiries@cisco.com |
| | Post-consumer | 2.25% | |

## Cisco Capital

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Cisco Capital makes it easier to get the right technology to achieve your objectives, enable business transformation and help you stay competitive. We can help you reduce the total cost of ownership, conserve capital, and accelerate growth. In more than 100 countries, our flexible payment solutions can help you acquire hardware, software, services and complementary third-party equipment in easy, predictable payments. Learn more.

## Document history

| New or Revised Topic | Described In | Date |
|---|---|---|
| **Typos and missing captions fixed** | Figure 1. FM4200F radio model<br>Figure 2. FM4200F front and rear view<br>Table 1. FM4200F Product Specifications<br>Table 2 | |