Cisco RF Gateway Downstream 384 Universal Edge QAM Line Card

Product Overview

The Cisco® RF Gateway Downstream 384 (RFGW-DS384) line card is an 8-port, 384-channel universal edge quadrature amplitude modulation (U-EQAM) modulator designed for operation in the Cisco RF Gateway 10 platform. The Cisco RF Gateway Downstream 384 Universal Edge QAM Line Card provides dramatically increased density and functionality as compared to the Cisco RF Gateway DS48-1G Universal Edge QAM Line Card.

The Cisco RFGW-DS384 offers concurrent support for standard and high-definition digital broadcast television, switched digital video (SDV), video-on-demand (VoD), and DOCSIS® modular cable modem termination system (M-CMTS) services. Cable operators can choose to configure the line card as DOCSIS only, video only, or DOCSIS and video shared universal edge QAM.

In the 10-slot Cisco RF Gateway 10 platform, the Cisco RFGW-DS384 line cards (Figure 1) can be configured with 1:N redundancy (up to 1:9), or 2:N redundancy (up to 2:8), resulting in a fully protected, high-capacity, and highly dense edge QAM solution. For video services, the line cards can accept multiple formats of video content and perform a wide array of video processing features. Leading-edge RF technology is used to perform QAM modulation and RF up-conversion at significant space and power savings compared to previous up-conversion architectures.

Figure 1. Cisco RF Gateway Downstream 384 Universal Edge QAM Line Card

Applications

- Broadcast video
- SDV
- VoD and Network Digital Video Recorder (NDVR)
- Standard and high-definition digital video
- DOCSIS 3.0 and M-CMTS

Features and Benefits

Table 1 lists the features and benefits of the Cisco RF Gateway Downstream 384 Universal Edge QAM Line Card.

Table 1. Features and Benefits

Feature	Benefit
Video	
• Concurrent support for Digital Video Broadcast, SDV, VoD, and NDVR	• Supports a very wide variety of video solution architectures
• Concurrent support for standard and high-definition services	• Achieves greater investment protection through the flexibility to evolve as service and capacity requirements change
• Concurrent support for multiple video encoding formats, including MPEG-2 and MPEG-4/H.264	• Can maximize QAM channel utilization
• Table-based and session-based edge QAM operation	• Helps to ensure a smooth transition from current video system architectures to future video system architectures
DOCSIS	
• Designed to meet CableLabs® DOCSIS 3.0 and M-CMTS specifications	• Industry-recognized common specifications with multivendor interoperability
• Fully tested with the Cisco uBR10012 M-CMTS solution	• Full-featured and tested end-to-end M-CMTS solution offering stability, scalability, and availability
• Supports downstream external PHY interface (DEPI) control plane features	• Simplifies setup and operations in an M-CMTS environment
Universal Edge QAM	
• Concurrent support for video and DOCSIS on the same line card	• Allows amortization of expenditures for video and DOCSIS edge QAM resources by sharing a common platform and universal edge QAM line card
• Standards-based universal edge QAM resource management	• Designed to support CableLabs-defined universal edge QAM specification for multiple vendor interoperability
• Concurrent support for Annex A, B, and C operations on the same line card	• Can support mixed annex environments on the same line card with granularity per port (for example, Annex B for DOCSIS, Annex A for video)
• 384 QAM channels per line card, 640 replicated QAMs per line card, up to 128 QAMs per port, up to 10 line cards per Cisco RF Gateway 10 chassis (up to 3840 QAMs per chassis)	• High capacity edge QAM solution reduces the total number of devices to manage and provides
• Non-adjacent frequency support	• Allows flexibility on assigning output frequencies
• Optional integrated Cisco PowerKEY® and Digital Video Broadcasting (DVB) encryption	• Minimizes cost and complexity of deploying encrypted services
• Flexible licensing of QAM capacity and encryption	• Supports pay-as-you-grow
High Availability	
• Supports high availability for universal edge QAM applications	• Industry's first carrier-class edge QAM platform provides continuous service availability and reduces the duration of planned service outages
Operations and Management	
• Software based on QNX microkernel-based real-time, high-performance operating system	• As in the Cisco Carrier Routing System 1 (CRS-1) range of products, QNX is the basis of the Cisco RFGW-DS384 software architecture, providing a very stable, scalable, and efficient operating system

Product Specifications and System Requirements

Table 2 gives product specifications for the Cisco RF Gateway Downstream 384 Universal Edge QAM Line Card. Table 3 lists system requirements.

Table 2. Product Specifications

Specification	Value
Hardware Specifications	
Physical	Occupies a single RF slot in the Cisco RF Gateway 10 chassis
RF ports	8 RF ports with up to 128 QAM channels per port for a total of 384 QAMs
Dimensions (H x W x D)	1.28 x 15.35 x 15 in. (33 x 390 x 381 mm)
Weight	9.5 lb (4.32 kg)
Power consumption	270W
Environmental	• Operating altitude: -60 to 3000m • Storage temperature: -40 to 158°F (-40 to 70°C) • Operating temperature, nominal: 32 to 104°F (0 to 4 0°C) • Operating relative humidity: 10 to 85%, noncondensing
LEDs	Status, alarm, traffic, Gigabit Ethernet port link and activity
Ethernet Uplink Interfaces	
Uplinks	2 x Gigabit Ethernet and 2 x 1 Gigabit Ethernet or 10 Gigabit Ethernet
Uplink optic types	Small Form Factor Pluggable (SFP) Gigabit Ethernet and Enhanced SFP (SFP+) 10 Gigabit Ethernet
Video Specifications	
Video format	• MPEG-2 SPTS and MPTS encapsulated in User Datagram Protocol (UDP)/IP (RFC-768) • Up to seven 188-byte MPEG-2 packets per UDP datagram • MPEG-2 and MPEG-4/H.264 content • Standard and high definition • Constant bit rate (CBR) and variable bit rate (VBR)
Video processing	• Packet Identification (PID) remapping • Program Clock Reference (PCR) restamping • Program Specific Information (PSI) extraction, generation, and insertion • Multiple program transport stream (MPTS) passthrough • Stream replication • Session statistics
Video redundancy	• Redundant source failover • Link redundancy
Multicast	• IP multicast routing protocols: Protocol Independent Multicast (PIM), including sparse mode and dense mode • Source Specific Multicast (SSM) and Any Source Multicast (ASM) • Internet Group Management Protocol (IGMP)
Dejitter buffering	300 ms, configurable
TS bit rate	VBR and CBR
DOCSIS Specifications	
CableLabs specifications supported	DEPI DEPI-CP DOCSIS Timing Interface (DTI) M-CMTS Operations Support System Interface (OSSI) ERMI-1 and 2 Converged Cable Access Platform (CCAP)

Specification	Value
RF Specifications	
DOCSIS Downstream RF Interface (DRFI)	CM-SP-DRFI-I10-100611

Table 3. System Requirements

Specification	Value
Chassis compatibility	Cisco RFGW-10
Software	Cisco IOS® XE Software version 3.2.0 SQ

Regulatory Compliance

Table 4 provides information about regulatory compliance.

Table 4. Regulatory Compliance

Specification	Value
Network Equipment Building Standards (NEBS) and European Telecommunications Standards Institute (ETSI)	UL 60950CAN/CSA-C22.2 No. 60950, EN 60950, IEC 60950, TS 001, AS/NZS 3260
Electromagnetic compatibility (EMC)	FCC Part 15 (CFR 47) Class A, ICES-003 Class A, EN55022 Class A, AS/NZS CISPR22 Class A, AS/NZS 3548 Class A, VCCI Class A, ETS 300 386, EN 55022, KN22, EN 61000-3-2, EN 61000-3-3
Electromagnetic interference (EMI)	EN550082-1, EN55024, EN61000-4-2, EN61000-4-3, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, EN61000-6-1
Safety	GR-1089-Core Level 3, ETS 300 019 Storage Class 1.1, ETS 300 019 Transportation Class 2.3 (pending), ETS 300 019 Stationary Use Class 3.1, ETS 300 386
Industry EMC, safety, and environmental standards	Designed to meet NEBS standard GR-63-CORE and GR-1089-CORE
Other industry standards	Cisco corporate compliance standards

Ordering Information

Table 5 provides ordering information. To place an order, visit the Cisco Ordering Home Page. To download software, visit the Cisco Software Center.

Table 5. Ordering Information

Product Number	Description
RF Line Cards and Cables	
RFGW-DS384(=)	RFGW DS384 Universal Downstream EQAM Card, base hardware
SWLIC-DS384	QAM DS-384 Single QAM License (minimum 64)
CAB-RFGW3G60QTIMF(=)	Ten quad-shield RF cables in UCH-2, RFGW/3G60 to HFC, 3m
eDelivery Upgrade Licenses	
L-DS384-SWLIC=	Container product number for upgrade licenses applicable to DS384
L-DS384	1 Count QAM License for RFGW-DS384

A minimum configuration of 64 counts of SWLIC-DS384 is required when purchasing Cisco RFGW-DS384 hardware.

Notes on Licenses

- If purchasing multiple line cards, each line card in the order must have the same number of upstream and downstream licenses. Upgrade licenses may be purchased in case customers need line cards with different licenses.
- eDelivery allows for electronic delivery of purchased license product activation key (PAK).
- Partial fulfillment is supported. If customers wish to purchase upgrade licenses for multiple hardware devices (for example, if they wish to upgrade all their Cisco RFGW-DS384), partial fulfillment allows all upgrade licenses to be generated using a single PAK if the customer desires. This can greatly increase operational ease of license upgrades.
- Return materials authorization (RMA): Cisco Services will replace faulty hardware with hardware that has no downstream or upstream licenses. Customers will need to transfer licenses from the failed board to the new board to make it operational.

For More Information

For more information about the Cisco RF Gateway 10 Supervisor Engine 7-E, visit http://www.cisco.com/en/US/products/ps8360/index.html or contact your local account representative.

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