Cisco RF Gateway 10 Universal Edge QAM

Product Overview

The Cisco® RF Gateway 10 defines a new category in cable network infrastructure — a highly intelligent, multifunction, carrier-class universal edge quadrature amplitude modulation modulator (U-EQAM) platform designed for high-availability services. The gateway 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. The chassis has twenty six interface slots to accommodate:

- Dual supervisor and Ethernet switching line cards
- 1:N universal edge QAM line cards
- Dual timing and control line cards
- Dual load balancing and load sharing power supplies
- Integrated RF switching modules

All of the applications supported on the platform are based on open standards and together provide new levels of performance, capacity, power consumption, ease of management, and scalability.

The Cisco RF Gateway 10, Figure 1, is part of the Cisco Cable Ecosystem and has been fully integrated and tested as part of the Cisco Digital Broadband Delivery System (DBDS) video solution, Cisco uBR10012 DOCSIS 3.0, and M–CMTS solution.

Figure 1. Cisco RF Gateway 10 Universal Edge QAM



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Applications

- Broadcast video
- SDV
- VoD
- Standard and high definition digital video
- DOCSIS 3.0 and M-CMTS

Features and Benefits

As cable operators expand their offerings of high definition services and accelerate the transition to a fully digital network through initiatives such as DOCSIS 3.0, SDV and analog reclamation, the number of QAM channels required is expected to grow exponentially. The Cisco RF Gateway 10 provides the capacity, scalability and high-availability features to enable this transition.

Key features of the Cisco RF Gateway 10 include:

- Up to 480 QAM channels per chassis with the Cisco RF Gateway 10 DS-48 universal edge QAM line card and the ability to grow to thousands of QAM channels per chassis with future QAM line cards
- Redundancy of all system components with RF Gateway 10 DS-48 universal edge QAM line card subsecond failover
- 100 percent link redundancy with 10 Gigabit Ethernet (10GE) and Gigabit Ethernet (GE) interfaces
- Universal edge QAM functionality to support all digital video and DOCSIS services concurrently on a single platform
- Non-service-affecting roadmap of incremental upgrades, including scalability to 200+ Gbps aggregate bandwidth per chassis

The primary features and benefits of the Cisco RF Gateway 10 are described in Table 1.

Table 1. Features and Benefits

Feature	Benefit
Standards-based universal edge QAM	• Supports CableLabs DOCSIS 3.0, M-CMTS, and universal edge QAM specifications to help ensure interoperability in multivendor system architectures • Supports advanced MPEG-2 transport stream processing and management functions to work with existing and new video solutions • Universal edge QAM platform reduces operational costs and helps enable evolution of services without stranding network capacity
Fully redundant, carrier-class architecture	• Protects all services in the event of a failure of any system component • Integrated RF switch improves reliability and reduces operational complexity compared to redundancy schemes with separate edge QAM devices with external RF combiners or RF switches • Simplifies HFC network design by eliminating the requirement to connect multiple edge QAM devices to each service group to avoid loss of QAM capacity • Two DOCSIS Timing Interface (DTI) modules per chassis reduce the cost of DTI system infrastructure in M-CMTS deployments
Midplane chassis with supervisor, QAM line cards, and WAN ports on front panel and RF ports on rear panel	• Enables the increase in system capacity without any RF network connection changes • Reduces time to upgrade and time to replace system components • Front-panel WAN ports and rear-panel RF ports improve rack cabling efficiencies and access

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Integrated Layer 3 switch with 10GE and GE WAN interfaces	• Enables any-to-any connectivity from WAN ports to QAM channels • 10GE interfaces reduce cost and complexity of wide area network connections for large installations • Integrates with a wide variety of network architectures requiring advanced Layer 2 and Layer 3 switching and routing features
Local and remote management	• Supports Cisco command-line interface (CLI), web-based GUI, and Simple Network Management Protocol (SNMP) for local and remote management • Supports Cisco and industry-standard Management Information Bases (MIBs) for IP network elements and edge QAM devices, including DOCSIS M-CMTS and the Society of Cable Telecommunications Engineers Hybrid Management Sub-Layer (SCTE HMS) QAM MIBs
Fully tested with Cisco M-CMTS and DBDS solutions	• Faster deployment of new services • Reduces operational support associated with integration testing and troubleshooting
Comprehensive technical support services	• Experienced support team for digital video and DOCSIS networks

For specific feature details supported on the RF Gateway-10, refer to the RF Gateway Supervisor (RFGW-X4516-10GE) data sheet and the RF Gateway Downstream 48 (RFGW-DS48) data sheet.

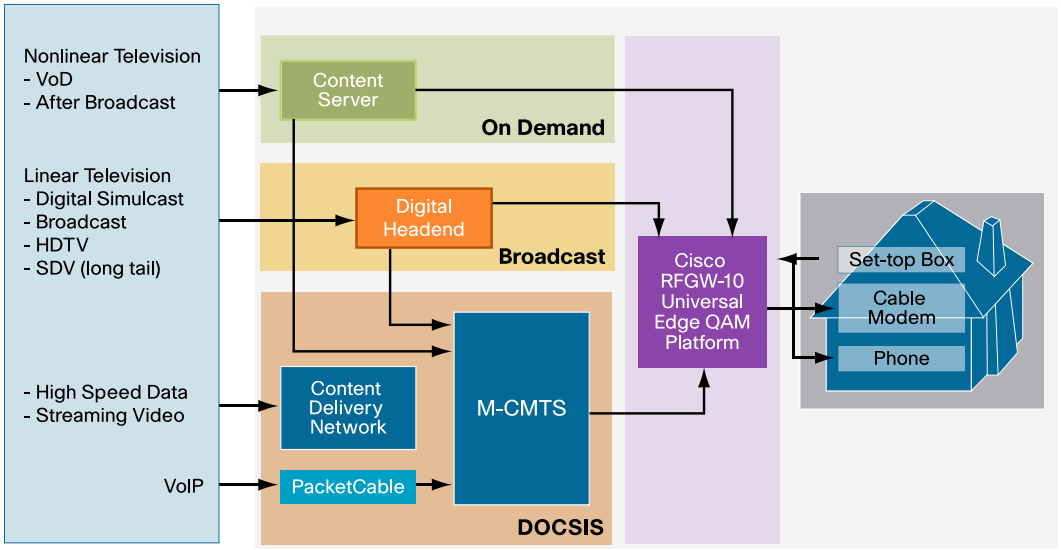
Product Architecture

The Cisco RF Gateway 10 is a member of the Cisco RF Gateway product series and is designed to meet the most demanding requirements of cable operators worldwide. It is optimized for operators wanting to provide carrier-class high-availability solutions while also collapsing video and data traffic over cable edge QAM functions into one common platform (Figure 2).

A collapsed universal edge QAM architecture achieves the following business benefits:

- Enhanced edge QAM resource utilization
- Cost efficiencies
- Optimized rack space
- Reduced cost and complexity of management
- Concurrent high availability for all services

Figure 2. Universal Edge QAM Solution High-Level Architecture



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Designed for high availability, with the equivalent Ethernet and IP routing performance and features of a large-scale Cisco router, the Cisco RF Gateway 10 provides the industry's highest universal edge QAM line card RF fast failover performance. The gateway's modular and hot-swappable design provides unsurpassed reliability and high QAM capacity for highly efficient QAM sharing in a converged MPEG and IP environment. It also features very low power consumption per QAM channel and the flexibility to deliver next-generation services to medium-sized to large-sized hub sites.

The Cisco RF Gateway 10 provides ease of operations with a single point of management for the entire chassis and offers feature compatibility, similar look and feel, consistent graphical style user management interface, and common engineering and testing processes with the RF Gateway 1 small form factor universal edge QAM. With the Cisco RF Gateway 10, cable operators now have a choice of purchasing a carrier-class, high-availability, multifunctional gateway instead of multiple separate devices.

Product Specifications

Hardware

Table 2 lists hardware specifications for the Cisco RF Gateway 10.

Table 2. Hardware Specifications for the Cisco RF Gateway 10

Specifications	Value
Chassis dimensions	Height: 22.75 in. (578 mm) Width: 17 in. (432 mm) Depth: 23 in. (584 mm)
Dimensions in rack	• 13 rack units (RUs) high with up to three chassis per 7-foot rack (39 RUs) • Depth from the front rack mount bracket including rear UCH-2 cable headers, power supply handles, and RF cable management bracket 26 in. (660 mm)
Slots	2 supervisor slots, 10 universal RF slots, 2 timing and control module slots, 12 RF switch slots, 2 power supply slots, 1 fan tray, 1 front panel display module. All line cards and modules are hot-swappable.
Weight	Fully loaded: 275 lb (125 kg)
Mounting options	Front and midchassis mountable in a 19 in. (480mm) EIA standard two- or four-post rack
Power consumption	• Single or dual redundant, load-sharing and load-balancing DC power supplies. • DC input voltage –48 to –60 VDC with chassis capacity of 4536 W. • Fully loaded typical power consumption of 2250 W (480 QAMs @ 4.7W/QAM)
Front panel display	40 character front panel display (FPD) with push-button controls
Backplane capacity	240 Gbps
Operating temperature	Operating temperature: 32º to 104ºF (0º to 40ºC) Storage temperature: –40º to 158ºF (–40º to 70ºC)
Airflow	Front to back flow with 800 CFM exhaust volume (main fan tray plus PS fans) at full flow
Relative humidity	10 to 85 percent, noncondensing
Altitude	Operating altitude: –60 to 3000 m
Timing	• 2 timing and control modules, Compliant with CableLabs DOCSIS Timing Interface specification • 2 DTI client ports per module • Full-mesh redundancy for DTI modules and DTI ports

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Physical Interfaces	• 10GE uplinks: X2 pluggable optics • GE uplinks: SFP pluggable optics • RF ports: UCH-2 header blocks holding 10 MCX RF connectors using mini coaxial cable. • DTI ports: UTP cable • Console ports: UTP cable • Management ports: UTP cable

Regulatory Compliance

Table 3 provides information about regulatory compliance.

Table 3. Compliance and Emissions for the Cisco RF Gateway 10

Specification	Value
Network Equipment Building Standards (NEBS)/European Telecommunications Standards Institute (ETSI)	UL 60950CAN/CSA-C22.2 No. 60950, EN 60950, IEC 60950, TS 001, AS/NZS 3260
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
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

System Requirements

Table 4 lists system requirements for the Cisco RF Gateway 10.

Table 4. System Requirements for the Cisco RF Gateway 10

Requirement	Description
Software	Cisco IOS® Software version 12.2(44)SQ

Ordering Information

Table 5 lists ordering information for the Cisco RF Gateway 10. To place an order, visit the Cisco Ordering Homepage. To download software, visit the Cisco Software Center.

Table 5. Ordering Information for the Cisco RF Gateway 10

Product Name	Product Description
Cisco RFGW System Bundles	
RFGW-10-36HA	RFGW-10 system bundle including RFGW-10 chassis, two supervisors, two TCC cards, two DC Power Entry Modules (PEMs), four DS48 universal edge QAM line cards
RFGW-10-72HA	RFGW-10 system bundle including RFGW-10 chassis, two supervisors, two TCC, two DC PEMs, seven DS48 universal edge QAM line cards
RFGW-10-108HA	RFGW-10 system bundle including RFGW-10 chassis, two supervisors, two TCC, two DC PEMs, 10 DS48 universal edge QAM line cards
Cisco RFGW Chassis	
RFGW-10	RFGW-10 with the following slots: Two supervisor, 10 RF, two TCC, and 12 RFSW slots. Front panel display, fan tray Also includes 12x RFGW-10-RFSW1 modules.

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Cisco RFGW Series Supervisors	
RFGW-X4516-10GE	RFGW supervisor V-10GE, 2x10GE (X2) and 4x1GE (SFP)
RFGW-X4516-10GE=	RFGW supervisor V-10GE, 2x10GE (X2) and 4x1GE (SFP) spare
Cisco RFGW Series TCC+ Cards	
RFGW-TCC1	RFGW timing, communication, and control card v1
RFGW-TCC1=	RFGW timing, communication, and control card v1 spare
Cisco RFGW Series Line Cards	
RFGW-DS48	RFGW universal downstream edge QAM card, 12 RF ports,48 QAMs
RFGW-DS48=	RFGW universal downstream edge QAM card, 12 RF ports, 48 QAMs spare
Cisco RFGW Series RF Switch Cards	
RFGW-10-RFSW1=	RFGW RF switch v1 spare
Cisco RFGW Series Power Supply Options	
RFGW-10-PWR-DC1	RFGW DC PEM with monitoring v1
RFGW-10-PWR-DC1=	RFGW DC PEM with monitoring v1 spare
Cisco RFGW Series Supervisor Memory Options	
MEM-C4K-FLD128M	Cat 4500 IOS-based supervisor, compact Flash, 128MB option
MEM-C4K-FLD128M=	Cat 4500 IOS-based supervisor, compact Flash, 128MB spare
Cisco RFGW Series Transceiver Modules	
SFP-GE-T*	1000BASE-T SFP (NEBS 3 ESD) (100m on Cat5 UTP)
SFP-GE-S	1000BASE-SX short wavelength; with DOM (550m of MMF)
SFP-GE-L	1000BASE-LX/LH short wavelength; with DOM (10Km on SMF)
X2-10GB-SR	10GBASE-SR X2 module (26m on MMF)
X2-10GB-LR	10GBASE-LR X2 module (10Km on SMF)
*Only supported on the RFGW-DS48	
Cisco RFGW Series Spares and Accessories	
CHAS-RFGW-10=	RFGW-10 chassis includes front panel display and fan tray spare
RFGW-10-FAN-ASSY=	RFGW-10 fan assembly spare
RFGW-10-FPD-KIT=	RFGW-10 front panel display kit, LCD, buttons, two cables, spare
RFGW-SUP-COVER	RFGW supervisor slot cover
RFGW-SUP-COVER=	RFGW supervisor slot cover spare
RFGW-LC-COVER	RFGW line card cover
RFGW-LC-COVER=	RFGW line card cover spare
RFGW-TCC-COVER	RFGW TCC card cover
RFGW-TCC-COVER=	RFGW TCC card cover spare
RFGW-10-PWR-COVER	RFGW power entry module cover
RFGW-10-PWR-COVER=	RFGW power entry module cover spare
CAB-520-UCH2=	Universal cable holder for MCX connectors, second generation, spare
CAB-RFSW520QTPMF	Quad-shield RF cable bundle, MC520/RFSW/RFGW to HFC plant,3m
CAB-RFSW520QTPMF=	Quad-shield RF cable bundle, MC520/RFSW/RFGW to HFC plant,3m, spare
RFGW-10-PKG-CRATE	RFGW-10 wooden crate packaging option
RFGW-10-PKG-CRATE=	RFGW-10 wooden crate packaging option spare

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Service and Support

Using the Cisco lifecycle services approach, Cisco and its partners provide a broad portfolio of end-to-end services and support that can help increase your network's business value and return on investment. This approach defines the minimum set of activities needed, by technology and by network complexity, to help you successfully deploy and operate Cisco technologies and optimize their performance throughout the lifecycle of your network.

For More Information

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

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