

# Cisco RF Gateway 1

## Product Overview

The Cisco® RF Gateway 1 is a standards-based universal edge QAM (U-EQAM) solution for convergence of high-speed and high-bandwidth data and video distribution at the edge of the cable access network. It is the first product in the Cisco RF Gateway product series. The Cisco RF Gateway 1 offers leading edge density, modularity, and flexibility with support for Switched Digital Video (SDV), VoD, Broadcast Video, and DOCSIS 3.0/Modular CMTS (M-CMTS) on a single QAM platform.

The Cisco RF Gateway 1 is a 4<sup>th</sup> generation QAM product that enhances SDV support, higher density (48 QAMs per RU), improved reliability, superior RF performance, 1 GHz RF output, and DOCSIS 3.0/M-CMTS capability. Cisco RF Gateway 1 is fully integrated and tested as part of the Cisco Digital Broadband Delivery System (DBDS) and the Cisco uBR10012 M-CMTS solution, accelerating the deployment and easing the management of digital video and DOCSIS services. The Cisco RF Gateway 1 enables the converged next-generation cable access network by offering comprehensive video and DOCSIS functions in a single U-EQAM platform.

**Figure 1.** Cisco RF Gateway 1



## Applications

- Switched Digital Video
- VoD (and other unicast services)
- Broadcast Video
- High Definition or Standard Definition Content
- DOCSIS 3.0 / M-CMTS Architecture
- 1 GHz Expansion

## Features and Benefits

### Primary Benefits

The new compact Cisco RF Gateway 1 provides the following benefits for cable operators:

- Rapid time-to-market of QAM-based services to generate incremental revenue through a modular, flexible design based on a proven, fourth-generation QAM architecture
- Efficient use of capital expenditures through maximum spectrum efficiency (SDV, QAM Sharing, 1 GHz) and U-EQAM functionality (video and data) for flexibility and optimization in a variety of video and data network architectures
- Quality and reliability through a redundant architecture; full testing and integration with the Cisco DBDS Video Delivery System and the Cisco uBR10012 M-CMTS Architecture

### Primary Features

The Cisco RF Gateway 1 provides up to 48 U-EQAM channels (for SDV, Broadcast, VoD, and DOCSIS 3.0/M-CMTS) in a compact 1 RU chassis. The modular design supports eight QAM channels per module, with four QAM channels per RF output port and frequency agility up to 1 GHz.

Primary features include:

- True U-EQAM video (broadcast, SDV, SD/HD, MPEG-2, AVC) and high speed data
- (M-CMTS/DTI, DOCSIS 3.0) in 1 RU form factor
- Table-based or session-based functionality
- Utilizes Direct Digital Synthesis (DDS) QAM technology which allows superior RF performance and stability
- 48 configurable QAM channels; each of which is fully agile 45–1000 MHz
- RF performance meets or exceeds CableLabs® DRFI specification CM-SP-DRFI-I06-080215
- Modular, hot-swappable, and Auto-configurable QAM cards
- Support for up to 2048 streams in 1 RU
- Fully redundant design with redundant Gigabit Ethernet ports and power supplies (AC/AC, AC/DC, or DC/DC)
- Front-to-back airflow to allow self-cooling and stacking
- Compliance with ITU-T J.83 standard, Annex A (DVB), Annex B (ATSC), or Annex C (Japan)
- Internet Group Management Protocol Version 3 (IGMPv3) support
- Low power consumption
- Four QAM channels per RF port available - independent of channel bandwidth (6, 7, and 8 MHz)

**Table 1.** Product Specifications

Specification	Value
<b>Gigabit Ethernet Input Interface</b>	
Number of inputs	2+2 (for redundancy) or 4 Independent (Not to exceed 2 Gbps max)
Connector	Optical/electrical Small Form Factor Pluggable (SFP)
Interface type	Gigabit Ethernet according to IEEE 802.3ab (Electrical) or IEEE 802.3z (Optical)
Input Data rate	Full line rate
Syntax	VBR and CBR MPEG SPTS and MPTS on UDP (RFC-768), RTP, L2TPv3, IGMPv3
Dejitter Buffering	150 ms
<b>RF Outputs</b>	
Number of outputs	Maximum 12 physical RF ports (each with 4 QAM channels)
Connector	F-type, 75 $\Omega$
Frequency Range	Channel edges between 45 and 1000 MHz (tunable)
Step size	1 kHz
Stability	$\pm 3$ ppm
Accuracy	$\pm 3$ ppm
Channel Bandwidth	6, 7, or 8 MHz depending on QAM transmission standard
Level	
4-Channel Mode	• 53 dBmV RMS Max per QAM Channel in 0.5 dB steps
2-Channel Mode	• 57 dBmV RMS Max per QAM Channel in 0.5 dB steps
1-Channel Mode	• 61 dBmV RMS Max per QAM Channel in 0.5 dB steps
Stability	$\pm 1$ dB
Accuracy	$\pm 1$ dB
Return loss	>14 dB 45-750 MHz >13 dB 750-870 MHz >12 dB 870-1000 MHz  Per DOCSIS 3.0 DRFI specification CM-SP-DRFI-03-060106
<b>Management Interface</b>	
Interface type	Ethernet 10/100 BASE-T
Connector	RJ-45
Protocols	HTTP, SNMP, FTP, RPC
<b>Other Interfaces</b>	
DTI	2 RJ-45 Primary and Redundant
Conditional Access	Ethernet 10/100 BASE-T
<b>Signal Specifications</b>	
Channel encoding	Randomization, Reed-Solomon, Trellis Encoding, and Interleaving configurable to ITU Annex A, B, or C
MER (before equalizer)	$\geq 40$ dB (at RF)
MER (after equalizer)	$\geq 45$ dB (at RF)
QAM constellations	64 and 256 QAM
<b>Environmental Specifications</b>	
Operating temperature	32 to 122°F (0 to 50°C)
Storage temperature	-40 to 158°F (-40 to 70°C)

<b>Altitude</b>	-200 to 10,000 feet AMSL
<b>Operating humidity</b>	5% to 95%, non-condensing
<b>Power supply (nominal)</b>	100 to 240V AC or -48V DC
<b>Normal service voltage range</b>	90 to 254V AC or -38 to -58V DC
<b>Power consumption (fully loaded)</b>	Typical 375 W, Maximum 410 W
<b>Chassis Mechanical Specifications</b>	
<b>Height</b>	1.75 in. (44.45 mm) (1 RU)
<b>Width</b>	19 in. (482.6 mm)
<b>Depth</b>	21.0 in. (533.4 mm)
<b>Weight</b>	27.5 lbs (12.5 kg)

**Table 2.** Ordering Information

Cisco RF Gateway 1	Part Number: RFGW-1
<b>Configured Units (examples of configured units*)</b>	
1 RU Chassis, Video – 48 QAMs, AC/AC, North America	RFGW1A6AAUV0400000
1 RU Chassis, Video – 48 QAMs, DC/DC	RFGW1A6DD0V0400000
1 RU Chassis, Data – 48 QAMs, AC/AC, North America	RFGW1A6AAUD0400000
1 RU Chassis, Data – 48 QAMs, DC/DC	RFGW1A6DD0D0400000
*Other Chassis Configurations available	Please contact your account team
<b>AC Power Cords</b>	
Argentina	207340
Australia	1000897
China	745415
Europe	3989835
Italy	3993130
Japan	3993133
UK	3989836
US	3989838
<b>SFP Plug-ins – WDM types</b>	
GE SFP Module 850 nm (LC, up to 500 m)	4002019
<b>SFP Plug-ins – 1000 BT copper</b>	
GE SFP Module 1000 BT copper	4006222

## 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

To learn more about the Cisco RF Gateway Series, contact Mega Hertz 800-883-8839.

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