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. 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)™ all on a single QAM platform.

The Cisco RF Gateway 1 provides higher density (up to 96 QAMs per RU), improved reliability, superior RF performance, 1 GHz RF output, and DOCSIS 3.0/M-CMTS capability. It 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

- SDV
- 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 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 96 U-EQAM channels (for SDV, Broadcast, VoD, and DOCSIS 3.0/M-CMTS) in a compact 1 RU chassis. The modular design supports 16 QAM channels per module, with eight 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
- Manual or DEPI Control Plane modes supported
- Table-based or session-based video functionality
- Optional on-board Encryption: DVB® SimulCrypt and PowerKEY® SKS
- Utilizes Direct Digital Synthesis (DDS) QAM technology which allows superior RF performance and stability
- 96 configurable QAM channels; each of which is fully agile 45–1000 MHz
- RF performance typically meets or exceeds CableLabs® DRFI specification CM-SP-DRFI
- 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 per QAM
- Four or eight QAM channels per RF port available - independent of channel bandwidth (6, 7, and 8 MHz)
- Fully SNMP compliant

Table 1. Product Specifications

Specification	Value
Gigabit Ethernet Input Interface	
Number of inputs	2+2 (for redundancy) or 4 Independent
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	500 ms (configurable from 5ms - 400ms)
RF Outputs	
Number of outputs	Maximum 12 physical RF ports (each with 4 QAM channels)
Connector	F-type, 75 Ω

Specification	Value
Frequency	
Range	Channel edges between 45 and 1002 MHz (tunable)
Step size	1 kHz
Stability	± 3 ppm
Accuracy	± 3 ppm
Channel Bandwidth	6, 7, or 8 MHz depending on QAM transmission standard
Level	
8-Channel Mode	52 dBmV RMS Max per QAM Channel in 0.1 dB steps
4-Channel Mode	54 dBmV RMS Max per QAM Channel in 0.1 dB steps
3-Channel Mode	56 dBmV RMS Max per QAM Channel in 0.1 dB steps
2-Channel Mode	58 dBmV RMS Max per QAM Channel in 0.1 dB steps
1-Channel Mode	62 dBmV RMS Max per QAM Channel in 0.1 dB steps
Stability	± 1 dB
Accuracy	± 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
Management Interface	
Interface type	Ethernet 10/100 BASE-T
Connector	RJ-45
Protocols	HTTP, SNMP, FTP, RPC
Other Interfaces	
DTI	2 RJ-45 Primary and Redundant
Conditional Access	Ethernet 10/100 BASE-T
Signal Specifications	
Channel encoding	Randomization, Reed-Solomon, Trellis Encoding, and Interleaving configurable to ITU Annex A, B, or C
MER (before equalizer)	≥ 40 dB (at RF)
MER (after equalizer)	≥ 45 dB (at RF)
QAM constellations	64 and 256 QAM
Environmental Specifications	
Operating temperature	32 to 122℉ (0 to 50℃)
Storage temperature	–30 to 158℉ (–22 to 70℃)
Altitude	–200 to 10,000 feet AMSL
Operating humidity	5% to 95%, non-condensing
Power supply (nominal)	100 to 240 VAC or –48 VDC
Normal service voltage range	90 to 264 VAC or –38 to -58 VDC
Power consumption (fully loaded)	48 QAM Typical 345W 96QAM Typical x 360W
Chassis Mechanical Specifications	
Height	1.75 in. (44.45 mm) (1 RU)
Width	19 in. (482.6 mm)
Depth	21.0 in. (533.4 mm)
Weight	27.5 lbs (12.5 kg)

Table 2. Ordering Information

Product Name	Product Description
Cisco RF Gateway 1 Chassis	
RFGW-1	RFGW-1 with 2 Power Supply slots and 6 QAM Module slots. Includes Front Panel Display, IO Modules and Fans.
Cisco RF Gateway 1 QAM Modules	
RFGW-1-QAM-MOD	RFGW-1-D QAM MODULE (2x4QAM)
RFGW-1-QAM-MOD=	RFGW-1-D QAM MODULE (2x4QAM) spare
Cisco RFGW-1 Power Supplies and Power Cords	
RFGW-1-PS-AC	RFGW-1 AC power supply module
RFGW-1-PS-AC=	RFGW-1 AC power supply module spare
RFGW-1-PS-DC	RFGW-1 DC power supply module
RFGW-1-PS-DC=	RFGW-1 DC power supply module spare
RFGW1-AC-CORD-A	RFGW-1 Argentina AC power cord
RFGW1-AC-CORD-A=	RFGW-1 Argentina AC power cord spare
RFGW1-AC-CORD-C	RFGW-1 China AC power cord
RFGW1-AC-CORD-C=	RFGW-1 China AC power cord spare
RFGW1-AC-CORD-E	RFGW-1 European AC power cord
RFGW1-AC-CORD-E=	RFGW-1 European AC power cord spare
RFGW-1-AC-CORD-G	RFGW-1 United Kingdom AC power cord
RFGW-1-AC-CORD-G=	RFGW-1 United Kingdom AC power cord spare
RFGW1-AC-CORD-I	RFGW-1 Italy AC power cord
RFGW1-AC-CORD-I=	RFGW-1 Italy AC power cord spare
RFGW1-AC-CORD-J	RFGW-1 Japan AC power cord
RFGW1-AC-CORD-J=	RFGW-1 Japan AC power cord spare
RFGW1-AC-CORD-K	RFGW-1 Australia AC power cord
RFGW1-AC-CORD-K=	RFGW-1 Australia AC power cord spare
RFGW1-AC-CORD-U	RFGW-1 US AC power cord
RFGW1-AC-CORD-U=	RFGW-1 US AC power cord spare
RFGW1-DC-CORD	RFGW-1 3-PIN DC power cable 16AWG 3m
RFGW1-DC-CORD=	RFGW-1 3-PIN DC power cable 16AWG 3m spare
Cisco RF Gateway 1 Transceiver Modules	
SFP-WDM-850-0500=	SFP WDM 850nm (up to 500m)
SFP-WDM-1310-5=	SFP WDM 1310nm (up to 5km)
SFP-CU-RJ45=	SFP Copper (RJ45)
Cisco RF Gateway 1 Factory Installed Licenses (must configure with RFGW-1)	
SWLIC-RFGW1-OCTAL	RFGW-1 Octal QAM License
SWLIC-RFGW1-DATA	RFGW-1 Data License
SWLIC-RFGW1-DVB	RFGW-1 DVB Session Based Srambling License
SWLIC-RFGW1-PKEY	RFGW-1 PowerKey Scrambling License
Cisco RF Gateway 1 eDELIVERY Upgrade Licenses	
L-RFGW1-SWLIC=	PAK CONTAINER FOR RFGW-1 eDELIVERY License
L-RFGW1-OCTAL	RFGW-1 Octal QAM Upgrade License
L-RFGW1-DATA-LIC	RFGW-1 Data Upgrade License (2 required when combined with Octal License)

Product Name	Product Description
L-RFGW1-DVB	RFGW-1 DVB Session Based Scrambling Upgrade License (2 required when combined with Octal License)
L-RFGW1-PKEY	RFGW-1 PowerKey Scrambling Upgrade License (2 required when combined with Octal License)
Cisco RF Gateway 1 Spares and Accessories	
CHAS-RFGW-1=	RFGW-1 Spare Chassis with 2 Power Supply slots and 6 QAM Module slots. Includes Front Panel Display, IO Modules and Fans
RFGW-1-FAN=	RFGW-1 Fan Module Spare
RFGW-1-FPD=	RFGW-1 Front Panel Replacement Kit Spare
RFGW-1-IO-MOD=	RFGW-1-D I/O Module Spare
RFGW-1-RAIL24=	RFGW-1 24 inch Angle Bracket Kit Spare
RFGW-1-QAM-CVR6=	RFGW-1,QAM Cover Replacemnet Kit (Mult=6) Spare

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 your local account representative.

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