



Software License Activation for Cisco RF Gateway 10 Line Cards

First Published: October 2012

Last Updated: March 2015

Software licensing allows a product to ship with a base set of functionality enabled, while containing advanced functionality that can be offered without a change in the underlying hardware. Using executable licenses helps in preventing the illegal use of the advanced functions.

The Cisco Software License Activation feature contains a set of processes and license keys, and Cisco IOS commands used to activate Cisco IOS software feature sets by obtaining and validating fee-based Cisco software licenses. The Cisco RF Gateway 10 (RFGW-10) licenses are used to control access to the RF channels.

The Cisco RFGW-10 DS-384 line card supports QAM-capacity licensing where a partial QAM-capacity can be invested on the line card. There are two types of QAM-capacity licenses, downstream license for standard QAM channels (pilot QAM channels) and downstream span license (RF spanning license) for replicate QAM channels. The licensing feature on the Cisco RFGW-10 DS-384 line card also supports dual encryption features such as PowerKEY and Digital Video Broadcasting (DVB) scrambling that enable the customer to defer investing in QAM encryption until the entire network is ready for deployment.



Note

Effective with Cisco IOS-XE Release 3.3.0SQ, PowerKEY license is supported on the Cisco RFGW-10 DS-384 line card. Effective with Cisco IOS-XE Release 3.4.0SQ, DVB license is supported on the Cisco RFGW-10 DS-384 line card. PowerKEY and DVB licenses cannot be used simultaneously on a Cisco RFGW-10 DS-384 line card.

For detailed information on software activation, see [Cisco IOS Software Activation](#).

The following sections describe the procedures to install, upgrade, and maintain licenses on the Cisco RFGW-10 DS-384 line card. This document also discusses platform-specific features such as Online Insertion and Removal (OIR), license Return Merchandise Authorization (RMA), high-availability, and the implication of licensing on them.



Audience

This guide is intended for system and network administrators who configure and maintain the Cisco RFGW-10 platform.

This guide can be useful for application developers who are developing management applications for the Cisco RFGW-10.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the [“Understanding Cisco RFGW-10 Licensing”](#) section on page 4.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.

Licensing Workflow

Table 1 *Checklist for Licensing*

Tasks		Related Procedures and Topics
Step 1	Review the prerequisites and restrictions before installing the licenses on the Cisco RFGW-10 DS-384 line card.	<ul style="list-style-type: none"> • “Prerequisites” section on page 3 • “Understanding Cisco RFGW-10 Licensing” section on page 4
Step 2	Understand licensing concepts.	<ul style="list-style-type: none"> • “Understanding Cisco RFGW-10 Licensing” section on page 4 • <i>Software Activation Configuration Guide, Cisco IOS XE Release 3S</i>
	Learn about the different licenses on the Cisco RFGW-10 DS-384 line card and their operations.	<ul style="list-style-type: none"> • “Licensing on Cisco RFGW-10” section on page 4
	Understand how to transfer licenses and RMA.	<ul style="list-style-type: none"> • “License Transfer” section on page 13 • “RMA License Transfer” section on page 15
Step 3	Install licenses.	<ul style="list-style-type: none"> • “Installing Licenses Using the Cisco License Manager” section on page 16 • “Registering Licenses Using the Product License Registration Portal and CLI” section on page 17 • “Installing and Upgrading Licenses using Software Activation Commands” section on page 20

Table 1 **Checklist for Licensing**

Tasks	Related Procedures and Topics
Step 4 (Optional) Upgrade licenses on the Cisco RFGW-10 DS-384 line card.	<ul style="list-style-type: none"> • “Reloading the Cisco RFGW-10 DS-384 Line Card” section on page 18
Step 5 Verify the license after installation.	<ul style="list-style-type: none"> • “Verifying Activation of Licenses” section on page 23
Step 6 (Optional) Remove permanent license entries in license files.	<ul style="list-style-type: none"> • “Removing Licenses Using CLI” section on page 22 • Removing Licenses by Using Software Activation Commands
Step 7 (Optional) Review the troubleshooting section for assistance.	<ul style="list-style-type: none"> • “Troubleshooting Licensing” section on page 24
Step 8 Review the additional reference section for information about related documents, standards, MIBs, and technical assistance.	“Additional References” section on page 25
Step 9 (Optional) Review the feature information history table for updates to this feature.	“Feature Information for Licensing for Cisco RFGW-10” section on page 26

Prerequisites



Note

When you order a new Cisco RFGW-10 DS-384 Universal Edge QAM line card, it is shipped preinstalled with the software image and the corresponding permanent licenses for the packages and features. You do not need to activate or register the software before use.

To enable all software features, all new or upgraded Cisco devices that require software activation must be registered with Cisco. The registration process requires a Product Authorization Key (PAK), which is an 11-character alphanumeric key printed on the purchase order document shipped with your device hardware. The registration process converts the PAK to an electronic license file containing a unique key for your device hardware. The license file must then be installed on your device to unlock the product and its features.

The following prerequisites apply if you are upgrading or installing a new Cisco IOS-XE software license on the Cisco RFGW-10:

- Purchase the software package or feature you want to install. You will receive a product activation key (PAK) with your purchase.
- Register at Cisco.com if you do not have a cisco.com username and password.
- Understand the Cisco software licensing concepts detailed in the [Cisco Software Activation Conceptual Overview](#) chapter in *Software Activation Configuration Guide, Cisco IOS XE Release 3S*.

Software Releases

The following releases support software activation on Cisco RFGW-10.

- Cisco IOS-XE Release 3.2.0SQ
- Cisco IOS-XE Release 3.3.0SQ
- Cisco IOS-XE Release 3.4.0SQ

Understanding Cisco RFGW-10 Licensing

- [License Types for Cisco RFGW-10, page 4](#)
- [Licensing on Cisco RFGW-10, page 4](#)
- [License Transfer, page 13](#)

License Types for Cisco RFGW-10

- Permanent Licenses
- Temporary Licenses

For information on these licenses types, see the *Cisco Software Activation Conceptual Overview* chapter in the *Software Activation Configuration Guide, Cisco IOS XE Release 3S*.

Licenses of the following features can be activated separately:

- Standard QAM downstream channel capacity
- Replicate QAM downstream channel capacity
- PowerKEY encryption license capability
- DVB scrambling license capability

Embedded evaluation license is shipped with the line card for some features. The evaluation license is valid for 60 days.

**Note**

We recommend that you reserve the evaluation license for emergency operations.

The following features have an embedded evaluation license:

- PowerKEY encryption
- DVB scrambling
- Downstream license
- Downstream span license

Licensing on Cisco RFGW-10

- [Licenses on the Cisco RFGW-10 DS-384 Line Card, page 5](#)
- [License Operations, page 7](#)

- [Enforcement Policy](#), page 8
- [Downstream QAM License Enforcement](#), page 8
- [RF Spanning License Enforcement](#), page 12
- [Encryption License Enforcement](#), page 12
- [Licensing with SSO and Line Card Redundancy Configurations](#), page 13

Licenses on the Cisco RFGW-10 DS-384 Line Card

The Cisco RFGW-10 DS-384 line card is a high-density line card that is installed in the Cisco RFGW-10 UEQAM. This card supports 1, 2, 4, 8, 12, and up to 128 QAM channels per port, and up to 384 downstream channels. The Cisco RFGW-10 DS-384 line card requires software licensing to enable appropriate number of QAM channels per card. It supports a maximum of 384 downstream channels through flexible QAM-capacity licensing.

[Table 2](#) lists the different licenses available for the Cisco RFGW-10 DS-384 line card.

Table 2 Licenses for the Cisco RFGW-10 DS-384 Line Card

Cisco RFGW-10 Device	Release	Licensing Flavors
Cisco RFGW-10 DS-384 line card	Cisco IOS-XE Release 3.2.0SQ	<ul style="list-style-type: none"> • SWLIC-DS384-BUN (DS-384 QAM license [single QAM] bundle) • SWLIC-DS384 (DS-384 QAM license [single QAM]) • L-DS384 (DS-384 QAM upgrade licenses [single QAM])

Table 2 Licenses for the Cisco RFGW-10 DS-384 Line Card

Cisco RFGW-10 Device	Release	Licensing Flavors
Cisco RFGW-10 DS-384 line card	Cisco IOS-XE Release 3.3.0SQ	<ul style="list-style-type: none"> • SWLIC-POWERKEY (DS-384 PowerKEY license) <p>Note Effective with Cisco IOS-XE Release 3.4.1SQ, an evaluation license is shipped for PowerKEY with the Cisco DS-384 line card. This license is valid for 60 days. We recommend that you reserve it for emergency operations.</p> <ul style="list-style-type: none"> • L-POWERKEY (DS-384 PowerKEY encryption upgrade license) • SWCLIC-DS384-SPAN (DS-384 RF spanning license) • L-DS384-SPAN (DS-384 RF spanning upgrade license)
Cisco RFGW-10 DS-384 line card	Cisco IOS-XE Release 3.4.0SQ	<ul style="list-style-type: none"> • SWLIC-DVB (DS-384 DVB license) <p>Note Effective with Cisco IOS-XE Release 3.4.1SQ, an evaluation license is shipped for DVB with the Cisco DS-384 line card. This license is valid for 60 days. We recommend that you reserve it for emergency operations.</p> <ul style="list-style-type: none"> • L-DVB (DS-384 DVB encryption license)

The hardware components introduced in a given Cisco IOS-XE Release will be supported in all subsequent releases unless otherwise specified.

License Components on the Line Card

- [Quack, page 6](#)
- [License Storage, page 7](#)
- [License Infrastructure on the Line Card, page 7](#)
- [License Operations, page 7](#)
- [License Upgrade, page 10](#)
- [License Downgrade, page 11](#)
- [RMA of the Line Card, page 12](#)

Quack

Quack is a tamper-proof chip that stores the serial number and product ID combined to form the universal device identifier (UDI). The UDI has two main components: the product ID (PID) and the serial number (SN). The UDI is printed on a label located on the back of most Cisco hardware devices. The **show license udi** command displays the UDIs for the line card.



Note The **show license udi** command is executed only from the line card console. For more information, see the [“Installing and Upgrading Licenses using Software Activation Commands” section on page 20.](#)



Note When registering a license, you must use the correct UDI.

License Storage

The license storage for the Cisco RFGW-10 DS-384 line card is within the bootflash of the line card, which has two 1 MB partitions. It is accessible via the line card console for debugging.

License Infrastructure on the Line Card

The core license infrastructure is Portable Operating System Interface (POSIX) compliant. The software interacts with the:

- Quack to read the UDI.
- License storage to perform the license operations.
- Supervisor card for communication.

License Operations

All license operations on the Cisco RFGW-10 DS-384 line card such as installing, rehosting, upgrading, and downgrading licenses are performed using the Cisco License Manager (CLM) or by using the Cisco IOS commands.



Note

Cisco License Manager, Release 3.2.3 and later releases are supported on the Cisco RFGW-10.

The license commands available on the Cisco RFGW-10 DS-384 line card are:

- **license install**—Installs the license on the line card.
- **license clear**—Invalidates the installed license on the line card.
- **license comment**—Adds or removes a comment about a feature license.
- **license revoke**—Revokes a software license from one device and transfers it to another.
- **license save**—Saves a copy of the permanent license to a specified license file.
- **license save credentials**—Saves the identity information associated with a device to a specified URL.
- **license modify priority**—Modifies a priority of a license.
- **show license detail**—Displays detailed information about the license.
- **show license all**—Displays information about all licenses available on the line card.
- **show license feature**—Displays a list of licensed features available in an image.
- **show license statistics**—Displays license statistics information.
- **show license status**—Displays the status of the license.
- **show license udi**—Displays all the UDI values that can be licensed in a system.

**Note**

The above commands can only be executed on the line card console.

The license operations available on the Cisco RFGW-10 DS-384 line card are:

- **rehost license**—Revokes the license from the line card and issues a new node-locked license for another line card.
- **upgrade license**—Upgrades the licenses on the line card. New QAM licenses are enforced immediately.
- **downgrade license**—Downgrades the license on the line card.

The license operations available on the Supervisor engine are:

- **show cable licenses all** | *slot-id*—Displays all the licenses configured on the Supervisor card.
- **debug cable csl**—Enables license related debug information.

For information on managing licenses using the software activation commands, see the *Configuring the Cisco IOS Software Activation Feature* chapter in the *Software Activation Configuration Guide, Cisco IOS XE Release 3S*, and see the *Configuring the Cisco IOS Software Activation Feature*.

Enforcement Policy

The Cisco RFGW-10 DS-384 line card licensing feature provides flexible QAM capacity licensing. The number of downstream channels that can be licensed range from 0 to 384 QAM channels. When a Cisco RFGW-10 DS-384 line card is initially purchased, the card must be configured with a minimum of 64 QAM licenses. The RFGW-DS384-SP= which is used for sparing, is shipped with no licenses.

The licensing policy is enforced when a QAM channel is unshut (**rf-unshut** operation). For replicate QAM channels, the license policy is enforced when the corresponding pilot QAM channel is unshut. The Supervisor card enforces the license only after validating that the number of unshut QAM channels in the running configuration with the license. Based on the license, the first *n* channels are unshut, and the rest are shutdown.

The key characteristics of the license enforcement policy are:

- The policy is applicable to QAM channels that are marked as administration no shut.
- A line card reload is not required for new QAM license upgrade to take effect.
- The **show cable license** command displays the forced shut channels. If the line card has feature licenses, such as PowerKEY or DVB, then appropriate encryptions can be enabled or disabled. Though the encryption can be enabled per channel, the license enforcement is per line card.

Downstream QAM License Enforcement

The QAM module generates the configurations based on the downstream ports defined by the maximum port density. When the system boots up for the first time, the maximum port density may be zero and the line cards may boot up with the licenses. The QAM configurations can be set using the **cable downstream max-carriers** command.

If the max-carriers are set to 48 channels per port on a line card, then first 48 channels are configured.

**Note**

The sum of the maximum port density of all ports must not be greater than 384 channels.

The **rf-shutdown** command changes the QAM channel state to RF-SHUT state. If a license is available, the **no rf-shutdown** command changes the QAM channel state to the NOT-SHUT state. If the license is unavailable, the **no rf-shutdown** command cannot be used. Licenses are not consumed if the QAM channel is in RF-SHUT or LIC-SHUT state. The RF-SHUT state represents a QAM channel that is manually shut using the **rf-shutdown** command. The LIC-SHUT state represents a QAM channel that is forced shut due to insufficient QAM license capacity.

The default channel state for each QAM channel is RF-SHUT. The channels with license configurations can be in NOT-SHUT state, and the remaining channels are in either the manual RF-SHUT state or forced LIC-SHUT state. Therefore, if 192 licenses exist on a line card with a maximum port density of 384 QAM channels, 192 channels are marked are in NOT-SHUT state, and the remaining 192 channels are in the RF-SHUT state.

If a line card boots up with too few licenses available to support the QAM channels configured with the **no rf-shutdown** command, only the licensed channels remain in NOT-SHUT state. The state of non-licensed channels changes to LIC-SHUT state.

When there is a maximum port density change, the enforcement policy ensures that the new downstream configuration reflects the current port density, and the license state is synchronized with the new configuration.

**Note**

A license is consumed for each QAM channel in the NOT-SHUT state. Licenses become available if those channels are changed to the RF-SHUT state.

Increasing the maximum port density on the line card creates new QAM channels with the default RF-SHUT state.

[Table 3](#) shows an example where the maximum port density configuration for a QAM license count of 192 licenses is set to a maximum port density for 48 channels per port on a line card.

Table 3 Maximum Port Density Example: QAM License - 192; First 48 Channels Configuration

Port	Channel	Configured	Channel State
1	1-48	Yes	NOT-SHUT
1	48-128	No	NA
2	1-48	Yes	NOT-SHUT
2	48-128	No	NA
3	1-48	Yes	NOT-SHUT
3	48-128	No	NA
4	1-48	Yes	NOT-SHUT
4	48-128	No	NA
5	1-48	Yes	RF-SHUT
5	48-128	No	NA
6	1-48	Yes	RF-SHUT
6	48-128	No	NA
7	1-48	Yes	RF-SHUT
7	48-128	No	NA

Table 3 Maximum Port Density Example: QAM License - 192; First 48 Channels Configuration

Port	Channel	Configured	Channel State
8	1-48	Yes	RF-SHUT
8	48-128	No	NA

If all 128 channels are configured on the second, third and fourth port on the line card, the maximum port density should be set accordingly (see [Table 4](#)).

Table 4 Maximum Port Density Example: QAM License - 192, 128 Channels Configuration

Port	Channel	Configured	Channel State
1	1-128	No	NA
2	1-128	Yes	NOT-SHUT
3	1-64	Yes	NOT-SHUT
3	65-128	Yes	RF-SHUT
4	1-128	Yes	RF-SHUT
5	1-128	No	NA
6	1-128	No	NA
7	1-128	No	NA
8	1-128	No	NA

The **rf-shutdown** command can be used to shut down the desired licensed channels on the line card. Whenever a channel is manually shut, the channel state changes to RF-SHUT and the available license count increments. The **no rf-shutdown** command can be used if the available license count is greater than zero.

The **no rf-shutdown** command can be used to unshut a channel that is shut either by LIC-SHUT or RF-SHUT. The channel state then changes to NOT-SHUT.

License Upgrade

Upgrade licenses increase the QAM channel availability on the line card. For example, consider [Table 4](#) where you have the 192 QAM license are installed and the licenses are configured on second, third, and fourth QAM ports.

Now assume you have purchased an additional 32 QAM upgrade license, thus your total license count is 192+32= 224 licenses. The additional licenses are added to the QAM channel in NOT-SHUT state.

[Table 5](#) lists the maximum port density of 128 channels with a 32 upgrade QAM license.

Table 5 Maximum Port Density Example: QAM License - 192+32, 128 Channels Configuration

Port	Channel	Configured	Channel State
1	1-128	No	NA
2	1-128	Yes	NOT-SHUT
3	1-62	Yes	NOT-SHUT
3	63-64	Yes	RF-SHUT

Table 5 Maximum Port Density Example: QAM License - 192+32, 128 Channels Configuration

Port	Channel	Configured	Channel State
3	65–97	Yes	NOT-SHUT
3	98–128	Yes	RF-SHUT
4	1–2	Yes	NOT-SHUT
4	3–128	Yes	RF-SHUT
5	1–128	No	NA
6	1–128	No	NA
7	1–128	No	NA
8	1–128	No	NA

License Downgrade

An OIR or RMA of a line card may result in a license downgrade. Consider an example, where OIR is performed on the (192+32 licenses) line card and the replacement line card has only a 96 QAM upgrade license. When the line card boots, the maximum port density and the status of the line card is checked. The channels that are marked NOT-SHUT are checked and 96 licenses are used on these channels. The other NOT-SHUT channels are marked LIC-SHUT. The channels marked LIC-SHUT require to be shut down due to lack of licenses.

Table 6 lists the above scenario of a license downgrade.

Table 6 Maximum Port Density Example: QAM License - 96 QAM, 128 Channels Configuration

Port	Channel	Configured	Channel State
1	1–128	No	NA
1	1–96	Yes	NOT-SHUT
2	97–128	Yes	LIC-SHUT
3	1–62	Yes	LIC-SHUT
3	63–64	Yes	RF-SHUT
3	65–97	Yes	LIC-SHUT
3	98–128	Yes	RF-SHUT
4	1–2	Yes	LIC-SHUT
4	3–128	Yes	RF-SHUT
5	1–128	No	NA
6	1–128	No	NA
7	1–128	No	NA
8	1–128	No	NA

Perform the following steps to install a permanent license for the Cisco RFGW-10 DS-384 line card with a downstream count lower than the existing active permanent license:

- Step 1** Log in to the Cisco RFGW-10 DS-384 line card console.

- Step 2** Enable the Cisco RFGW-10 DS-384 line card evaluation license with the **license modify priority feature-name high** command.
 - Step 3** Clear the permanent license with higher downstream count using the **license clear feature-name** command.
 - Step 4** Install the new permanent license with lower downstream count.
 - Step 5** Disable the Cisco RFGW-10 DS-384 line card evaluation license using the **license modify priority feature-name low**.
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RMA of the Line Card

During a line card RMA, the faulty line card is replaced with another line card. The new line card boots up with zero downstream license count, which may not be the original license count on the line card. The original license count and configuration is restored after the line card is returned from repair.

RF Spanning License Enforcement

RF spanning license is used for the replicate QAM channels. Pilot QAM channels use the downstream QAM license. For replicate QAM channels, the license policy is enforced when the corresponding pilot QAM channel is unshut.

An RF spanning license is consumed when a replicate QAM is configured in a QAM Replication Group (QRG). When the replicate QAM is removed, the license becomes available.

During downgrade of the RF spanning license, replicate QAM channels without a license are changed to forced-shut state.

During upgrade of the RF spanning license, if licenses are available, the replicate QAM channels in forced-shut state are activated and the license is consumed.

Encryption License Enforcement

In the Cisco RFGW-10, encryption is applied on a line card, and the communication that occurs between the remote server and the Supervisor recognizes the messages on the line card. So, every time a line card boots up or whenever there is an encryption license change event, a discovery message is sent to the server from the Supervisor.

Effective with Cisco IOS-XE Release 3.3.0SQ, PowerKEY license is supported on the Cisco RFGW-10 DS-384 line card. Effective with Cisco IOS-XE Release 3.4.0SQ, DVB license is supported on the Cisco RFGW-10 DS-384 line card.



Note

PowerKEY and DVB licenses cannot be used simultaneously on a Cisco RFGW-10 DS-384 line card.

Minimum Mode Operation

The Minimum mode or M mode refers to the state where no valid licenses are available. The Cisco RFGW-10 DS-384 line card is always shipped with preinstalled licenses purchased with the order. The Minimum mode (besides the normal mode) is used to install a license for a new line card and perform any license operations when an error occurs due to non-availability of licenses.

The Cisco RFGW-10 DS-384 line card operates with the following minimum mode characteristics:

- Default line card with images loaded (may include encryption)
- Fully-functional license administrative interface
- Fully-functional license management interface
- DS configurations where RF channels cannot be unshut.
- Offline modems with no network traffic.

Licensing with SSO and Line Card Redundancy Configurations

Because Stateful Switchover (SSO) is supported on the Cisco RFGW-10, the state information is check-pointed across the secondary Supervisor.

When line card redundancy is configured on the Cisco RFGW-10 DS-384 line cards, the secondary line card has a superset of the licenses of the primary line card. The line cards (primary or secondary), are added to the redundancy configuration group if they obey the licensing count policy.

A secondary line card is not allowed to join the group if the (superset) policy is violated. A primary line card with a higher count than the secondary line card is allowed to join the group only with a count equal to the secondary line card. When the secondary is upgraded with a count equal to or greater than the primary line card, the primary line card is automatically allowed to use all the available licenses.

After a switchover, the active secondary card may have a higher license entitlement than the primary line card, and the QAM channels that are in LIC-SHUT state become active.



Note

If active QAM channels are not required, use the **rf-shutdown** command on the active QAM channels to deactivate them.



Note

Configuration changes, such as enabling the license on the channels beyond the entitlement of the primary line card, is not permitted.

Activating the Evaluation License

Perform the following steps to activate an embedded evaluation license for the features on the Cisco RFGW-10 DS-384 line card:

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- Step 1** Log in to the Cisco RFGW-10 DS-384 line card console.
 - Step 2** Activate the evaluation license using the **license activate** *feature-name* command.
 - Step 3** If there are no permanent licenses on the Cisco RFGW-10 DS-384 line card, reload the line card using the **cable linecard no. reset** command.
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License Transfer

The Cisco RFGW-10 support two scenarios to transfer licenses between devices:

- The first scenario has both the source and destination devices active and functional. In this scenario, the license is revoked on the source device and a new permanent license is issued for the destination device.
- The second is a failure scenario where one of the devices is unavailable. In this scenario, the license from the failed device is transferred to the RMA or to the replaced device by using the RMA License Transfer process on the Cisco Product License Registration portal.



Note

Transferring of licenses is limited to three license transfers.

License Transfer Between Two Working Devices

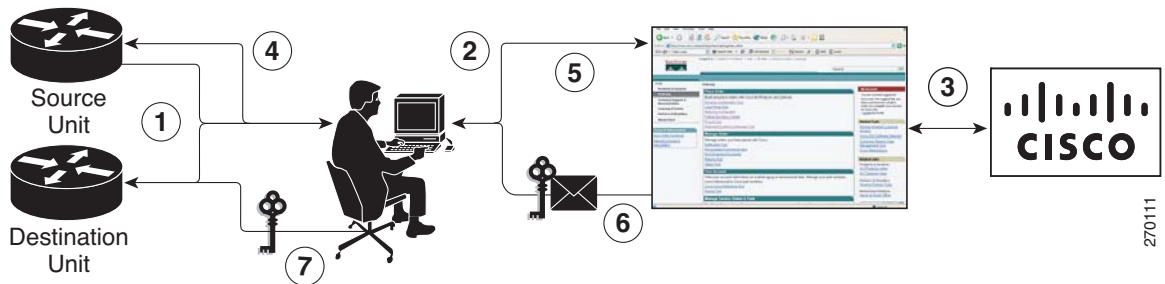
The Cisco RFGW-10 support fully automated, customer-initiated, transfer of licenses. Licenses can be transferred using a process known as rehosting. The rehosting process transfers a license from one UDI to another by revoking the license from the source device and installing it on a new device.

A license transfer (rehosting) can be performed by using one of these methods:

- Cisco Product License Registration portal
- Cisco License Manager application

Figure 1 shows the processes involved for rehosting (transferring) a license.

Figure 1 License Transfer Work Flow



This is a summary of a license transfer process:

1. Obtain the UDI and device credentials from the source and destination devices using the Cisco IOS-XE commands. For more information, see the *Configuring the Cisco IOS Software Activation Feature* module.
2. Go to the Product License Registration page on Cisco.com and enter the source device credentials and the UDI into the license transfer portal tool.
The portal displays licenses that can be transferred from the source device.
3. Select the licenses that need to be transferred. A permission ticket is issued. Use this permission ticket to start the rehost process using Cisco IOS-XE commands.
4. Apply the permissions ticket to the source device by using the **license revoke** command as described in the *Configuring the Cisco IOS Software Activation Feature* module. The source device then provides a rehost ticket indicating proof of revocation. A sixty-day grace period license is also installed on the device to allow enough time to transfer the licenses to the destination device.
5. Enter the rehost ticket into the license transfer portal tool on Cisco.com along with a destination device UDI.

6. Receive the license key through email.
7. Install the license key on the destination device.

By using Cisco License Manager, you can select the source and destination devices from a GUI wizard for automated processing.

RMA License Transfer

When a line card fails, a replacement card is required with equivalent licenses for restoring the services completely. If the failed line card has the same license as the shipping order, the RMA replacement and spares will also have the same license as the failed line card.



Note

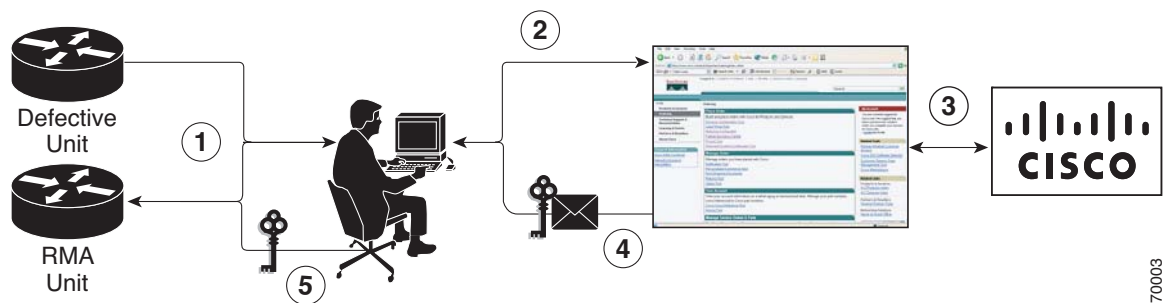
Base configuration licenses can be ported on to another line card.

To transfer a software license from a failed device to a new device, the devices must interact with the Cisco Product License Registration portal to initiate an RMA replacement license (<http://www.cisco.com/go/license>).

If you need assistance to obtain a license, contact Cisco technical support at: <http://www.cisco.com/cisco/web/support/index.html>

Figure 2 shows the RMA replacement license process.

Figure 2 RMA Replacement License Work Flow



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To initiate the RMA replacement license process:

- Step 1** Obtain the UDI of the defective and RMA devices.
- Step 2** Enter the UDI into the RMA License portal tool on Cisco.com.
The license portal determines licenses associated with defective device. The license portal issues replacement licenses.
- Step 3** Install the new license on the new device.



Note

During initial releases, the Cisco Service Depot will ship products with 0 and 0X0 license.

Restrictions for RMA

- If the line card is not part of the line card high availability (LCHA), follow the steps in [Upgrading the License](#).
- If the line card is part of the LCHA and the RMA is for the secondary line card, follow the steps listed in the [Troubleshooting Licensing](#).
- If the RMA is for the primary line card, the service automatically switches over to the secondary line card. To verify this:
 - Insert the replacement line card.
 - Verify the effective license for the primary line card by running the **show cable license** command.
- If effective license is not the same as the previous license in slot, do the following:
 - Upgrade the primary line card. For more information, see the “[Reloading the Cisco RFGW-10 DS-384 Line Card](#)” section on page 18.
 - Verify the installed license on the primary line card by running the **show cable license** command.
 - Ensure that the primary line card continues to be on the LCHA standby.
 - Reload the primary line card.
 - Verify the effective license by running the **show cable license** command.
 - Revert to the upgraded line card.

How to Install Licenses on the Cisco RFGW-10 DS-384 Line Card

The following sections describe how to activate the licensed features and register licenses on the Cisco RFGW-10 DS-384 line card:

- [Installing Licenses Using the Cisco License Manager](#), page 16
- [Registering Licenses Using the Product License Registration Portal and CLI](#), page 17



Note

During the initial product purchase Cisco installs the appropriate licenses based on the customer order. In this case, no license activation is required.

Installing Licenses Using the Cisco License Manager

The Cisco License Manager (CLM) is a software application that assists you in obtaining licenses from Cisco, deploying the licenses on to the Cisco devices in your network, discovering the devices, and managing and viewing your inventory of licenses and devices. CLM is used with Cisco devices that require Cisco licensing.



Note

You do not require Internet connectivity from your device to Cisco to activate the software licenses using CLM. You must add your Cisco devices to the CLM before you can request a license file.

For more information, see the *User Guide for Cisco License Manager*.

**Note**

Cisco License Manager, Release 3.2.3 and later releases are supported on the Cisco RFGW-10.

To use CLM to automate all license-related workflows:

-
- Step 1** Log in to CLM by clicking the Cisco License Manager Client icon on your desktop or select the Cisco License Manager Server.exe or Cisco License Manager Client.exe file. The Login window appears.
 - Step 2** Enter information for the User ID, Password, Server Host, and Server Port and click **OK**. The CLM GUI appears.
 - Step 3** Click **Manage > Manage Devices** or click **Devices** in the Quick Links pane. The Manage Devices explorer appears in the Content Area.
 - Step 4** Select an existing device group folder or create a new folder where you want to add a new device. Make sure you select a folder that so that you can easily locate so that you can and retrieve device and license information at a later date.
 - Step 5** Select the device group folder, right-click and select **New Device**. The New Device dialog box appears. Enter the requested information as prompted in CLM to add the new devices.
 - Step 6** Click **Get License** in the Quick Links pane, and follow the prompts to deploy the license to your device.
-

Registering Licenses Using the Product License Registration Portal and CLI

The Cisco Software License Activation feature includes Cisco IOS-XE EXEC commands that allow basic licensing tasks from the CLI.

To install a license using Cisco IOS-XE commands:

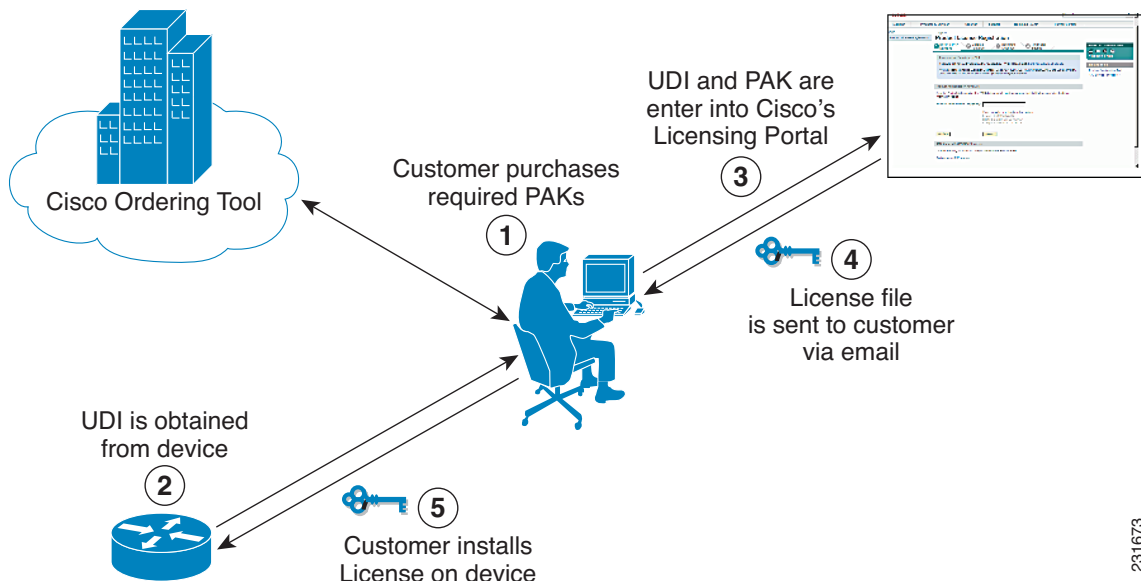
-
- Step 1** Obtain the PAK when you purchase Cisco devices or software upgrades.
 - Step 2** To obtain the specific UDI for your device, log in to your line card console and use the **show license udi** command.
 - Step 3** Convert the PAK to a license by entering the appropriate information at the following URL:

<http://www.cisco.com/go/license>.

Enter the PAK to retrieve the Stock Keeping Units (SKU) and enter the UDI of the device where the license should be installed. A Download License option appears on the screen. Select this option to download the license or use the license details provided in the e-mail sent to the customer.
 - Step 4** To install the licenses on the devices, use the **license install** command.
-

Figure 3 shows the process for registering a license using the Product License Registration Portal.

Figure 3 Product License Registration Work Flow



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Note View the license information applied to the downstream channels on the Cisco RFGW-10 by Supervisor console using the **show cable licenses all | slot-id** command.

For more information about configuring licenses using Software Activation License, see *Configuring the Cisco IOS Software Activation Feature*.

For more information about using commands for Cisco software activation, see the *Cisco Software Activation Tasks and Commands* document.

Reloading the Cisco RFGW-10 DS-384 Line Card

The Cisco RFGW-10 DS-384 line card does not require a reload for a new license upgrade or downgrade. However, if there are no licenses on the Cisco RFGW-10 DS-384 line card except the image in-built evaluation license, then to make that evaluation license effective, you must reload the line card.



Note Reload is not required for QAM channel licenses, and is required only for encryption license (PowerKEY,DVB and PME).

Restrictions

- Upgrade the secondary line card's license before upgrading the primary line card's license during the line card high availability issue.
- If the N+1 line card redundancy is configured, a secondary line card is not allowed to join the group if the (superset) policy is violated. A primary line card with a higher count than the secondary line card is allowed to join the group, only with a count equal to the secondary line card. When the secondary line card is upgraded with a count equal to or greater than the primary line card, the primary line card is automatically allowed to use all the available licenses. To view the restricted effect of the license, use the **show cable license** command.

- When the license is restricted, reload the primary line card for a complete license upgrade.
- If the N+1 line card redundancy is configured, and licenses on the line card are made effective such that the secondary line card no longer has the superset of the licenses, the line card that boots up with the violating license effective, is marked non-functional. In this case, the line card redundancy is lost and further line card switchovers are blocked.

Evaluation licenses can be made effective when:

- There are no effective licenses available. This requires a reload.
- The available licenses are of a lower value. This does not require a reload.

Following is a sample output when there are no effective licenses on the line card in Cisco IOS-XE Release 3.4.0SQ:

```
Router# show cable licenses 5

Slot 5 : License Capability : DS384_0_CLEAR
-----
Feature: Downstream Licenses
Installed: 0   Consumed: 0   Available: 0   Forced-Shut: 0

Feature: Downstream Span Licenses
Installed: 0   Consumed: 0   Available: 0   Forced-Shut: 0

Feature: PowerKEY License
Installed: NO  Enforced: NO

Feature: DVB License
Installed: NO  Enforced: NO
```

Upgrading the License

Perform the following to upgrade the licenses on the Cisco RFGW-10. [Table 2](#) lists the licenses available for upgrade.

- [Upgrading the Line Card Software License, page 19](#)
- [Installing and Upgrading Licenses using Software Activation Commands, page 20](#)
- [Upgrading the License When Line Card is in Redundancy Mode, page 22](#)

Upgrading the Line Card Software License

To upgrade and install a license:

-
- Step 1** Purchase a PAK for the required type of license. For example, the DS-384-192 (which provides the 192 downstream channel license for the Cisco RFGW-10 DS-384 line card).
 - Step 2** Submit the PAK code and UDI of the line card to the Cisco Product License Registration portal. The portal retrieves the SKUs associated with the PAK.
 - Step 3** Select the SKU and enter the UDI, which is a unique and unchangeable identifier of the device where the license should be installed. A license key is then e-mailed to you, which you can use to upgrade the license.
 - Step 4** Install the license file returned from the license portal by using Cisco IOS-XE commands. (This step can also be completed using the Cisco License Manager, which can be downloaded at <http://www.cisco.com/go/clm>.)



Note If you use Microsoft Entourage and receive the license file from Cisco in an e-mail attachment, the license file will contain UTF-8 marking. These extra bytes in the license file makes it unusable during license installation. To work around this issue, you can use a text editor to remove the extra characters and then install the license file. For more information about UTF-8 encoding, go to this URL: <http://www.w3.org/International/questions/qa-utf8-bom>.

You can manually upgrade a license by using the **install license** command. However, before you upgrade the license you must have already received the license file from Cisco Product License Registration at <http://www.cisco.com/go/license>.

Installing and Upgrading Licenses using Software Activation Commands

Prerequisites

- Understand the licensing concepts in the “[Licensing on Cisco RFGW-10](#)” section on page 4.
- To install or upgrade a license using the **license install** command, you must have already received the license file from the Cisco Product License Registration portal at <http://www.cisco.com/go/license> (or you have a back up of the license using the **license save** command).

SUMMARY STEPS

1. Obtain the PAK
2. Login to the line card console
3. View the UDI
4. Convert the PAK to a license
5. Copy the license to the line card flash
6. Login to the line card console
7. Install the license file

DETAILED STEPS

	Command or Action	Purpose
Step 1	Obtain the PAK.	The PAK is provided to you when you order or purchase the right to use a feature set for a particular platform. The PAK serves as a receipt and is used as part of the process to obtain a license.
Step 2	<pre>cable telnet slot-id</pre> <p>Example: Router# cable telnet 3 Trying 192.0.2.1 ... Open</p> <p>QNX Neutrino (slot3) (ttyp0)</p> <p>login: root No home directory. Logging in with home = "/". #</p>	<p>Exits the Supervisor console and logs in to the line card console with login as the root.</p> <ul style="list-style-type: none"> • <i>slot-id</i>—Line card slot. Valid range is from 3 to 12.
Step 3	<pre>show license udi</pre> <p>Example: # show license udi # exit</p>	<p>(Executes on line card console)</p> <p>Displays all the UDI values that can be licensed in a system.</p> <ul style="list-style-type: none"> • You need the UDI of the device as part of the process to obtain a license <p>Note This command is executed only from the line card console.</p> <p>Exit line card console.</p>
Step 4	Convert the PAK to a license by entering the PAK and the UDI into the Cisco Product License Registration portal: http://www.cisco.com/go/license .	After entering the appropriate information, you will receive an e-mail containing the license information that you can use to install the license.
Step 5	<pre>copy tftp://ip-address/license-file linecard -slot-id- flash:</pre> <p>Example: Router# Router# copy license-file linecard 3 flash: Router# exit</p>	<p>(Executes on Supervisor console)</p> <p>Login to Supervisor console.</p> <p>Copies the license file received from the Cisco Product License Registration portal to the line card boot flash.</p> <ul style="list-style-type: none"> • <i>slot-id</i>—Line card slot. Valid range is from 3 to 12. <p>Exit Supervisor console.</p>

	Command or Action	Purpose
Step 6	<p>cable telnet <i>slot-id</i></p> <p>Example: Router# cable telnet 3 Trying 192.0.2.1 ... Open</p> <p>QNX Neutrino (slot3) (tty0)</p> <p>login: root No home directory. Logging in with home = "/". #</p>	<p>Exits the Supervisor console and logs in to the line card console with login as the root.</p> <ul style="list-style-type: none"> <i>slot-id</i>—Line card slot. Valid range is from 3 to 12.
Step 7	<p>license install /flash/license-file</p> <p>Example: # license install /flash/38a.lic # exit</p>	<p>(Executes on line card console)</p> <p>Installs the license from the boot flash.</p> <ul style="list-style-type: none"> Accept the end-user license agreement if prompted. <p>Note This command is executed only from the line card console.</p> <p>Reboot the line card to enable the PowerKEY license. Exit line card console.</p>

Upgrading the License When Line Card is in Redundancy Mode



Note

Upgrade the secondary line card before upgrading the primary line card. If the primary line card is upgraded first, it leads to an error condition and the upgrade would be effective only for the number of downstream licenses effective on the secondary line card.

If the Cisco RFGW-10 DS-384 line card is in the LCHA mode, complete the following steps while upgrading:

- Step 1** Install the license on the secondary line card.
- Step 2** Verify the installed license by using the **show cable license** command.
- Step 3** Install the upgraded license on the active primary line card.
- Step 4** Verify the installed license by using the **show cable license** command.
- Step 5** Repeat [Step 2](#) through [Step 4](#) for each primary line card to be upgraded.

Removing Licenses Using CLI

The **license clear** command clears all licenses, but some licenses such as built-in licenses cannot be cleared. Only licenses that have been added by using the **license install** command are removed. Evaluation licenses are not removed.

If a license is not in use, the **license clear** command displays all the licenses related to this feature and prompts you to make a selection. Different prompts are displayed, depending upon whether single or multiple licenses are available on the device. The selected licenses are removed from the router or switch. If a license is in use, the **license clear** command might fail. However, depending on the application policy using the license, some licenses might be cleared.

For information on removing licenses from permanent license files, see the *Removing Licenses by Using Software Activation Commands* in the *Software Activation Configuration Guide, Cisco IOS XE Release 3S*, and also see *Configuring the Cisco IOS Software Activation Feature*.

Use the **license revoke** command to revoke or transfer licenses between two devices. For information on revoking or transferring licenses, see the *Removing Licenses by Using Software Activation Commands* in *Software Activation Configuration Guide, Cisco IOS XE Release 3S*, and also see *Configuring the Cisco IOS Software Activation Feature*.

Verifying Activation of Licenses

You can verify the license activation or license upgrade by using the following commands:

- **show cable license all**

This command displays details of all licenses in the chassis. This is the sample output from this command:

```
Router# show cable license all

Slot 3 : License Configuration : DS384_384_CLEAR
-----
Feature: Downstream Licenses

Installed: 384 Consumed: 384 Available: 0   Forced-Shut: 0

license_ipc_received : TRUE
```

Following is a sample output of the **show cable license all** command in Cisco IOS-XE Release 3.4.0SQ:

```
Router# show cable license all

Slot 3 : License Capability : DS384_384_PKEY_N_DVB
-----
Feature: Downstream Licenses
Installed: 384 Consumed: 224 Available: 160 Forced-Shut: 0

Feature: Downstream Span Licenses
Installed: 640 Consumed: 0   Available: 640 Forced-Shut: 0

Feature: PowerKEY License
Installed: YES Enforced: NO
      Note: Encryption license not enforced! Please check the encryption cli
Feature: DVB License
Installed: YES Enforced: YES

Slot 4 : License Capability : DS384_384_CLEAR
-----
Feature: Downstream Licenses
Installed: 384 Consumed: 0   Available: 384 Forced-Shut: 0

Feature: Downstream Span Licenses
Installed: 640 Consumed: 0   Available: 640 Forced-Shut: 0
```

Feature: PowerKEY License
 Installed: NO Enforced: NO

Feature: DVB License
 Installed: NO Enforced: NO

Troubleshooting Licensing

This section provides troubleshooting tips and procedures that you can use while activating the licenses on the different line cards.

Scenario	Workaround
License file from the SWIFT server is corrupted.	Reinstall the license file from Cisco.com or the SWIFT server.
Bootflash disk of line card is corrupted.	Ensure that the cable line card is in the minimum mode of operation. Reload the line card and reinstall the license file from Cisco.com .
The license storage partition space is full.	Run the license clear command to clear the storage space.
Quack Authentication Error	Ensure that the cable line card is in the normal mode of operation. If quack authentication error shutdowns the line card, RMA the line card.
no shut operation has failed.	Check the output of the show cable license all and show license detail commands and ensure that the required licenses are available.
License file has expired and results in the downgrade of the line card.	Install the permanent license as soon as warning messages are seen.

Additional References

These topics provide references related to the Software License Activation feature and the CMTS routers.

Related Documents

Document Title	URL
Software Activation Configuration Guide, Cisco IOS XE Release 3S	http://www.cisco.com/en/US/docs/ios-xml/ios/csa/configuration/xs-3s/csa-xe-3s-book.html
Cisco IOS Software Activation Command Reference	http://www.cisco.com/en/US/docs/ios-xml/ios/csa/command/csa-cr-book.html
Configuring the Cisco IOS Software Activation Feature	http://www.cisco.com/en/US/docs/ios/csa/configuration/guide/csa_commands.html
Introduction to Cisco Software Activation	http://www.cisco.com/assets/cdc_content_elements/flash/ios/csa/csa_softwareactivation.htm
Cisco RF Gateway 10 Command Reference	http://www.cisco.com/en/US/docs/cable/rf_gateway/command/reference/RFGW-10_Book.html
Cisco RF Gateway 10 Software Configuration Guide	http://www.cisco.com/en/US/docs/cable/rf_gateway/feature/guide/rfgw_scg.html

Standards

Standard	Title
ITU-T J.83-B	<i>Annex B to ITU-T Rec. J.83 (4/97), Digital multi-programme systems for television sound and data services for cable distribution.</i>
DOCSIS2	<i>Data-Over-Cable Service Interface Specifications, Radio Frequency Interface Specification v2.0, SP-RF1v2.0-111-060602, June 2, 2006, Cable Television Laboratories, Inc.</i>
DOCSIS Downstream RF Interface (DRFI)	<i>DOCSIS Downstream RF Interface (DRFI): CM-SP-DRFI-111-110210.</i>

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS-XE releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p>http://www.cisco.com/cisco/web/support/index.html</p>

Feature Information for Licensing for Cisco RFGW-10

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



Note

[Table 7](#) lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 7 Feature Information for Software Activation for Cisco RFGW-10

Feature Name	Releases	Feature Information
Software Activation on Cisco RFGW-10 DS-384 line card	Cisco IOS-XE Release 3.2.0SQ	<p>This feature is introduced to support the QAM-capacity on the Cisco RFGW-10 DS-384 line cards.</p> <p>The following commands were introduced or modified:</p> <ul style="list-style-type: none"> • license install • license clear • license comment • license revoke • license save • license save credentials • license modify priority • show license feature • show license all • show license detail • show license statistics • show cable licenses all slot-id • debug cable csl • rehost license • upgrade license • downgrade license
Software Licensing	Cisco IOS-XE Release 3.3.0SQ	This feature is introduced to support the PowerKEY and RF spanning licenses.
DVB Licensing	Cisco IOS-XE Release 3.4.0SQ	This feature is introduced to support the DVB license on the Cisco RGFW-10 DS-384 line card.
Embedded Evaluation License for PowerKEY and DVB	Cisco IOS-XE Release 3.4.1SQ	This feature is introduced to support the embedded evaluation licenses for PowerKEY and DVB.

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