



Thermal Management

The Cisco RF Gateway 10 (RFGW-10) Universal Edge Quadrature Amplitude Modulation (UEQAM) is capable of dissipating 4535W (15,474.06 Btu/hour) of heat load to the facility via forced air cooling. The forced air cooling flows front to back with 800 cubic feet per minute (CFM) exhaust volume (main fan tray and power supply fans) at full flow.

The system cooling, which is a multi-speed controlled system, is triggered by the ambient air inlet temperature readings from the DS-48 line cards. It is important to understand the thermal features of the unit to physically configure the unit in the rack and to monitor the environment.

[Table 4-1](#) outlines the operational environmental limits of the system.

Table 4-1 Cisco RFGW-10 UEQAM Operational Environmental Limits

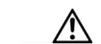
Operating temperature (nominal)	32 to 104°F (0 to 40°C)
Operating temperature (short-term)	23 to 122°F (-5 to 50°C)
Operating humidity (nominal) (relative humidity)	10 to 85%
Operating humidity (short-term)	5 to 90%
Operating altitude	-200 to 10000 feet (-60 to 3050 m)

Blank Panels



Warning

Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029



Caution

Never operate the Cisco RFGW-10 UEQAM for prolonged periods without a line card or blank panel in each slot of the chassis. Use of the chassis with open slots degrades the cooling performance of the chassis and can cause over-temperature conditions on adjacent cards due to air flow bypass. Card slots can be left open only during card replacement.

Table 4-2 outlines the card blanks available for the Cisco RFGW-10 UEQAM.

Table 4-2 Available Blank Covers for the Cisco RFGW-10

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 PEM cover
RFGW-10-PWR-COVER=	RFGW PEM cover spare



Note

The RF switch card does not have blank panels. The system requires all the 12 RF switch cards to be installed all the time for proper system operation.

Cooling Path

The Cisco RFGW-10 UEQAM has a single air intake in the front lower portion of the chassis, and has multiple exhausts in the rear of the chassis from the fan tray and the DC PEMs. See [Figure 1-4](#).



Note

Keep all obstructions at least 4 inches away from the system's air intake or exhausts. Any close obstruction will choke the airflow and impact the system's cooling performance.

Fan Tray Removal

The Cisco RFGW-10 UEQAM has a single fan tray module, which cools the Supervisor Cards, Universal RF slots, TCC cards and the fan tray as well. The Cisco RFGW-10 UEQAM supports hot-swapping, which lets you install, remove, and replace without powering off the system.

Removal and replacement of the fan tray must be coordinated so that the time to remove and replace the fan tray does not exceed 1.5 minutes.



Note

If the replacement takes more than 1.5 minutes, the system software will generate an alarm and power down the entire system.



Warning

When removing the fan tray, keep your hands and fingers away from the spinning fan blades. Let the fan blades completely stop before you remove the fan tray. Statement 258

**Caution**

Never operate the system for more than three minutes when the fan assembly is removed. An over-temperature condition can cause severe equipment damage.

Environmental Monitoring

The Cisco RFGW-10 UEQAM is equipped to monitor the ambient air intake and exhaust temperatures. Each RF line card has ambient air intake sensors that are located on the leading edge of the line card and are used for monitoring the ambient air inlet temperatures. These temperature readings are used as input for the fan tray speed control system for optimized system cooling, acoustics, and system thermal alarms.

The Supervisors have thermal sensors located at various locations on the printed circuit board (PCB). These sensors monitor board level temperatures only. Temperatures read from these sensors are used for Supervisor board level thermal alarming and board thermal protection shutdown.

**Note**

The temperatures read from the Supervisor Cards are not ambient intake temperatures but specific board location temperatures used for board level thermal alarming.

The fan tray is equipped with exhaust sensors located over the Supervisor slots. These are for additional temperature monitoring on the Supervisors. These temperature readings are used as input for the fan tray speed control system for optimized system cooling, acoustics, and system thermal alarms.

