



Cisco ONS 15454 RAN Service Module Installation Instructions

February 11, 2008

OL-12941-02

Product Number: 15454E-RAN-SVC (ETSI) or 15454-RAN-SVC (ANSI)

This document provides module/card specifications and describes installation and removal procedures for the Cisco ONS 15454 RAN Service Module. Use this document in conjunction with the *Cisco ONS 15454 Procedure Guide* or the *Cisco ONS 15454 SDH Procedure Guide*, the *Cisco ONS 15454 Reference Manual* or the *Cisco ONS 15454 SDH Reference Guide*, and the *Cisco ONS 15454 Troubleshooting Guide* or the *Cisco ONS 15454 SDH Troubleshooting Guide* when working with RAN Service Modules.

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Document Revision History

The Document Revision History table below records technical changes to this document. The table shows the document revision number for the change, the date of the change, and a brief summary of the change. Note that not all Cisco documents use a Document Revision History table.

Revision	Date	Change Summary
78-17278-02	February 11, 2008	Updates to LED operation, hardware description, and installation.
78-17278-01	February 2, 2007	This is the first release of this guide.

Introduction

A typical RAN is composed of thousands of Base Transceiver Stations/Node Bs, hundreds of Base Station Controllers/Radio Network Controllers (BSCs/RNCs), and several Mobile Switching Centers (MSCs). The BTSs/Node Bs and BSCs/RNCs are often separated by large geographic distances, with the BTSs/Node Bs located in cell sites uniformly distributed throughout a region, and the BSCs, RNCs, and MSCs located at suitably selected Central Offices (COs) and/or Mobile Telephone Switching Offices (MTSOs). The traffic generated by a BTS/Node B is transported to the corresponding BSC/RNC across a network, referred to as the *backhaul network*, which is often a hub-and-spoke topology with hundreds of BTSs/Node Bs connected to a given BSC/RNC by point-to-point TDM trunks. These TDM trunks may be leased line T1/E1s or their logical equivalents, such as microwave links or satellite channels. The interface between the BTS and BSC in Global System for Communication (GSM) and Code Division Multiplex Access (CDMA) systems is called the *Abis interface*. The interface between the Node B and RNC in a Universal Mobile Telecommunication System (UMTS) is called the *Iub interface*.

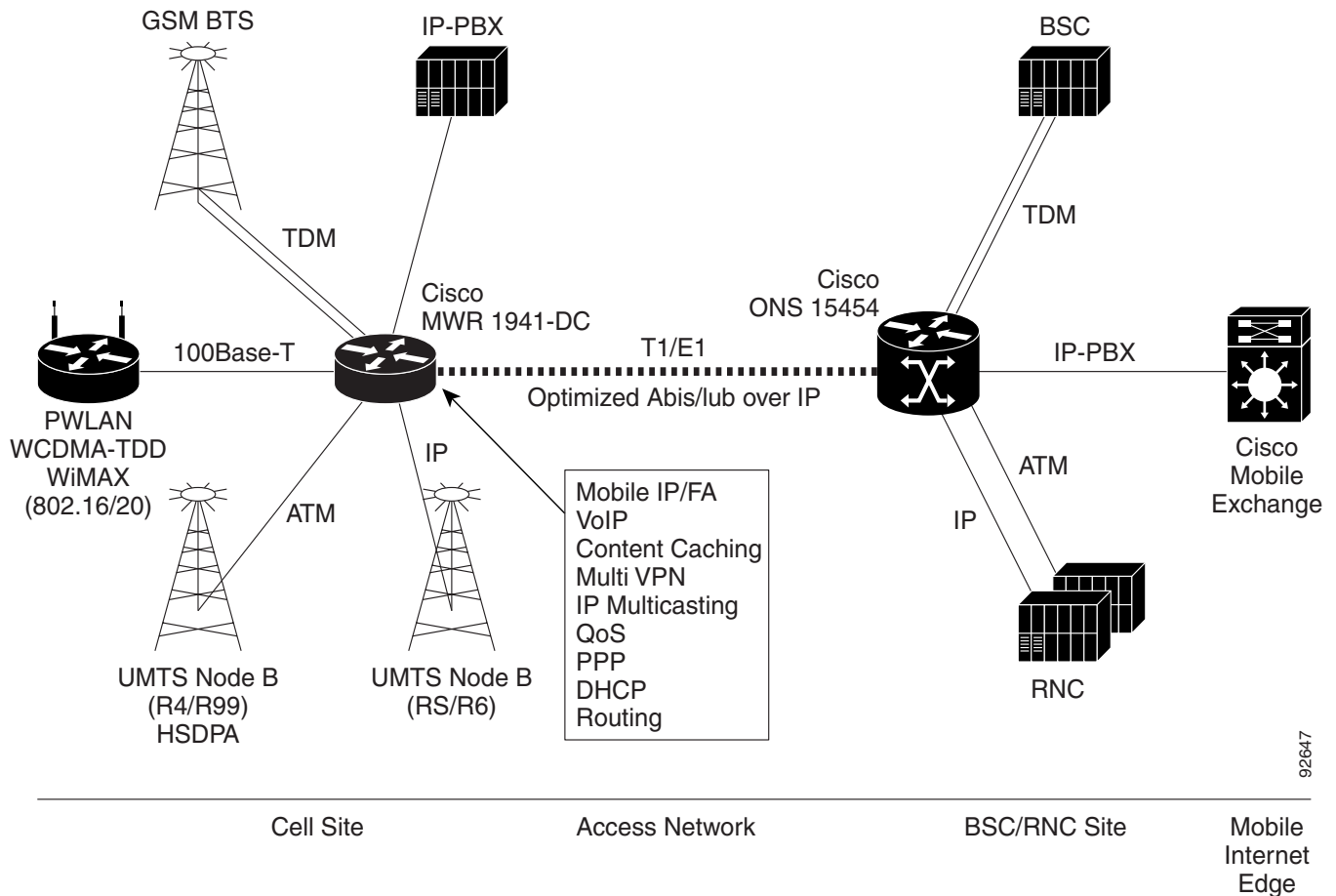
RAN Optimization Implementation

In RAN Optimization (RAN-O), the Cisco MWR 1941-DC-A router extends IP connectivity to the cell site and the BTS/Node B. The router provides bandwidth-efficient IP transport of GSM and UMTS voice and data bearer traffic, as well as maintenance, control, and signaling traffic, over the leased line backhaul network between the BTS/Node B and leased line termination and the Cisco ONS 15454 aggregation node via compression (cRTP/cUDP) and packet multiplexing (Multilink PPP).

The Cisco ONS 15454 RAN Service Module implements the aggregation node functionality with the Cisco RAN -O solution. In the Cisco ONS 15454, the Cisco ONS RAN Service Module transmits and receives E1 data streams (for Abis) and OC-3 data streams (for UMTS) via the cross-connect cards.

[Figure 1 on page 3](#) shows an example of the Cisco MWR 1941-DC-A and Cisco ONS 15454 connected via an optimized Abis and Iub over IP interface.

Figure 1 Example of Cisco MWR 1941-DC-A and Cisco ONS 15454 in a Cell Site POP



Cisco ONS 15454 RAN Service Module

Residing in a Cisco ONS 15454, the Cisco RAN Service Module provides aggregation for traffic originating from multiple MWR cell site routers. The RAN Service Module transmits and receives short haul DS0 level data streams (for GSM applications) and shorthaul VC-4 level data streams (for UMTS applications) through ONS 15454 cross-connect cards. DS0 level channel cards connect both the long haul to the remote cell site and the short haul to GSM BSC. Clear channel VC-4 level interface cards are used on the Cisco ONS 15454 to provide the interface from the UMTS RNC to the ONS RAN Service Module.

In the Cisco ONS 15454 SDH, the Cisco E1-42 cards are used to connect both the long haul E1 to the remote cell site and also the short haul E1 to the BSCs/RNCs. The Cisco ONS 15454 RAN Service Module transmits and receives E1 data streams (for GSM applications) and OC-3 data streams (for UMTS applications) via the Cross Connect cards. For E1 connections (GSM and/or backhaul), as many as 126 E1 interfaces from multiple E1-42 cards may be groomed by the Cross Connect card to form two STM-1 data streams which are directed to and terminated on the Cisco ONS 15454 RAN Service Module. For OC-3 interfaces (Packet of Sonet [POS] and/or ATM), as many as eight OC-3 interfaces from multiple OC-3 cards may be groomed by the Cross Connect card to form two STM-4 data streams which are directed to and terminated on the Cisco ONS 15454 RAN Service Module as well.

Hardware Description

The Cisco RAN Service Module consists of four independent IOS processors. Contained in a circuit card enclosure, the Cisco ONS 15454 RAN Service Module weighs 3.1 pounds (1.3 kg) and measures 12.65 in. high x 0.716 in. wide x 9.0 in. deep (32.13 cm x 1.82 cm x 22.86 cm).

Each Cisco RAN Service Module has four 10/100/1000 Gigabit Ethernet (RJ-45) ports with one port connected to each IOS processor. The Cisco RAN Service Module is also equipped with four VC-4 level Packet over SONET (POS) interfaces and four VC-4 level ATM interfaces. The DSO are mapped with a maximum of 126 DSO/E1 interfaces that are distributed among the traffic CPUs for backhaul and shorthaul interfaces depending upon the application. We support a maximum of 96 for GSM-ABIS shorthaul interfaces and a maximum of 48 HDLC/PPP/backhaul interfaces



Note

ATM interfaces on the RAN-SVC module support a maximum MTU of 4064. This differs with some other Cisco devices as well as other vendors equipment. IP equipment directly connected to the RAN-SVC ATM interfaces should set their MTU to 4064 for optimum operation.

One IOS processor is dedicated as a service processor while the remaining three IOS processors are dedicated as traffic processors. The Cisco ONS 15454 RAN Service Module also includes two RJ-45 ports, one used as a DCE console (labeled Console) and the other used as a debug port (covered with a tab plate).

The Cisco ONS 15454 shelf assembly has 17 card slots that are numbered sequentially from left to right. Slots 1 – 4 and 14 – 17 are multispeed slots. Slots 5, 6, 12 and 13 are high-speed slots. Slots 7 and 11 are dedicated to TCC-I cards. Slots 8 and 10 are dedicated to cross-connect (XC10G) cards. Slot 9 is dedicated to the AIC card. Slots 3 and 15 can host E1N-14 and DS3i-N-12 cards that are used in 1:N protection. The Cisco ONS RAN Service Module can be installed in Slots 1 thru 6 or 12 thru 17 depending on the application and line card configuration.



Note

See the *Cisco ONS 15454 SDH Installation and Operations Guide* for proper installation of the RAN Service Module and other Cisco ONS 15454 cards.

Faceplate Features

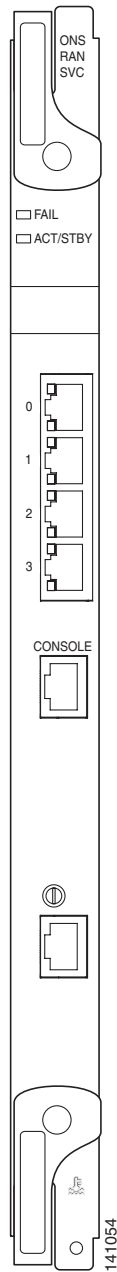
On the Cisco ONS 15454 RAN Service Module faceplate (see [Figure 2 on page 5](#)), two LEDs (labeled FAIL (for board failure) and ACT/STBY (for active and standby) are provided (see [Table 1 on page 6](#) for a description). The 10/100/1000 Ethernet (RJ-45) ports (also located on the front panel) are labeled 0, 1, 2, and 3. Each port has two status LEDs, a link status LED (steady green indicating a link up) and a link activity LED (blinking yellow indicating RX/TX activity).



Note

Shelf assembly slots have symbols indicating the type of cards that you can install in the slots. Each Cisco ONS 15454 RAN Service Module has a corresponding symbol (Orange/Circle). The symbol on the card must match the symbol on the slot (see the *Cisco ONS 15454 SDH Installation and Operations Guide* for more detailed information).

Figure 2 Cisco ONS 15454 RAN Service Module Front Panel



Cisco ONS 15454 RAN Service Module Card-Level Indicators

The Cisco ONS 15454 RAN Service Module has two card-level LEDs as described in [Table 1 on page 6](#).

Table 1 Cisco ONS 15454 RAN Service Module LEDs

LED	Color	State	Description
Fail (labeled FAIL)	Red	On	The red FAIL LED indicates that the card's processor is not ready. Replace the card if the red FAIL LED persists.
Active/Standby (labeled ACT/STBY)	Green	On	When the ACT/STBY LED is green, the RAN Service Module is operational and ready to carry traffic.
	Amber	Off	When the ACT/STBY LED is amber, the RAN Service Module is operational but in standby (protect) mode while the image is being downloaded from TCC-I.

Cisco ONS 15454 RAN Service Module Port-Level Indicators

You can find the status of the Cisco ONS 15454 RAN Service Module ports using the LCD screen on the ONS 15454 SDH fan tray assembly. Use the LCD to view the status of any port or card slot; the screen displays the number and severity of alarms for a given port or slot. Refer the *Cisco ONS 15454 SDH Troubleshooting Guide* for a complete description of the alarm messages.

Specifications

The Cisco ONS 15454 RAN Service Module has the following specifications:

- Environmental
 - Operating temperature:
C-Temp: 32 to 104°F (0 to 40°C)
 - Operating humidity: 5 to 95%, non-condensing
 - Power Consumption: 82 W
- Dimensions
 - Height: 12.65 in. (32.13 cm)
 - Width: 0.716 in. (1.82 cm)
 - Depth: 9.0 in. (22.86 cm)
 - Card weight: 3.1 lb (1.4 kg)
- Compliance
 - For compliance information, see the *Cisco Regulatory Compliance and Safety Information for the Cisco ONS 15454 RAN Service Module*.

Installing the Cisco ONS 15454 RAN Service Module

Use this section if you are installing the Cisco ONS 15454 RAN Service Module for the first time. After you become familiar with the Cisco ONS 15454 RAN Service Module installation, use this section as a reference.

**Note**

All cards boot from the active TCC-I card, which houses the Cisco ONS 15454 SDH software. Therefore, you must install the TCC-I card to boot any other cards (see the *Cisco ONS 15454 SDH Installation and Operations Guide* for more detailed information).

**Note**

Figure 3 shows an example of a general card installation.

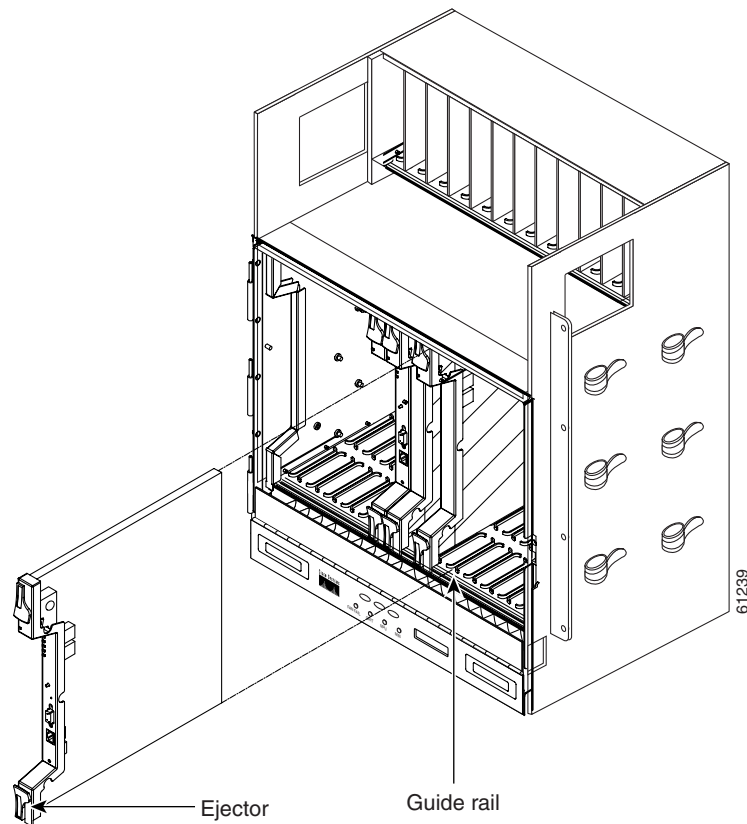
**Caution**

Always use the supplied electrostatic discharge (ESD) wristband when working with a powered Cisco ONS 15454. Plug the wristband cable into the ESD jack located on the lower right outside edge of the shelf assembly and ensure the shelf assembly is properly grounded.

**Warning**

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.
Statement 1030

Figure 3 Installing cards in an ONS 15454 SDH



Step 1 Open the card ejectors.

Step 2 Slide the card along the guide rails of the desired slot (typically, the active card resides in Slots 5 and 12, with the standby card residing in Slots 6 and 13).



Note The followings slots (1-6 and 12-17) are available for use.

Step 3 Push the card into the connector on the back plane by closing the ejectors.

Step 4 Verify the LED activity:

- The red FAIL LED turns on for 20 to 30 seconds.
- The amber ACT/STBY LED blinks for 35-40 seconds.
- All LEDs blink once and turn off.
- The ACT/STBY LED turns on.



Note If the red FAIL LED does not turn on, check the power.



Note If you insert a card into a slot provisioned for a different card, all LEDs turn off.



Note The RAN-SVC is downloading its software form the TCC-I when the amber light is blinking for 30-40 seconds.

Step 5 Verify that the ACT/STBY LED is the correct color for the card (green for active, amber for standby).



Note Use CTC to verify that the card appears in the correct slot on the CTC node view. See the *Cisco ONS 15454 SDH Installation and Operations Guide* for more detailed information.

Connecting the Cisco ONS 15454 RAN Service Module

How you connect the ports of the Cisco ONS 15454 RAN Service Module depends on whether you are using the Cisco ONS 15454-SDH in a redundant or a non-redundant configuration.



Note It is likely that during the initial boot, the Cisco ONS 15454 RAN Service Module will need to upgrade some of the cards' firmware. This will cause the card to reboot at least once, possibly more.

For information on Cisco ONS 15454-SDH implementations, refer to the *Cisco ONS 15454-SDH Software Configuration Guide*.

Related Documentation

This document provides information on the Cisco ONS 15454 RAN Service Module and supplements the *Cisco Interface Modules Hardware Installation Guide*.

Use this document with the following guides:

- Cisco ONS 15454-SDH Documents
 - *Cisco ONS 15454-SDH Hardware Installation Guide*
 - *Cisco ONS 15454-SDH Software Configuration Guide*
 - *Cisco Regulatory Compliance and Safety Information for the Cisco ONS 15454 RAN Service Module*
- Cisco Network Modules Installation Guides
 - *Network Modules Quick Start Guide*
 - *Cisco Network Modules Hardware Installation Guide*
- Release Notes

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly *What's New* in Cisco Product Documentation, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

This document is to be used in conjunction with the documents listed in the “Obtaining Documentation, Obtaining Support, and Security Guidelines” section.

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