NOKIA

5620 SAM
SERVICE AWARE MANAGER
14.0R1

Commissioning and Power Balancing User Guide

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Legal notice

Contents

About this document

Purpose

This guide describes how to perform commissioning and power balancing using the 5620 SAM Commissioning and Power Balancing application for the 1830 PSS photonic devices.

1830 PSS reference documentation

See the following documents for more information about the 1830 PSS:

- *Nokia 1830 Photonic Service Switch 1 (PSS-1) GBEH Edge Device User Guide*
- *Nokia 1830 Photonic Service Switch 1 (PSS-1) MD4H Edge Device User Guide*
- *Nokia 1830 Photonic Service Switch (PSS-1) AHP Amplifier User Guide*
- *Nokia 1830 Photonic Service Switch 4 (PSS-4) User Guide*
- *Nokia 1830 Photonic Service Switch User Provisioning Guide*
- *Nokia 1830 Photonic Service Switch Product Information and Planning Guide*
- *Nokia 1830 Photonic Service Switch Maintenance and Trouble-Clearing Guide*
- *Nokia 1830 Photonic Service Switch 32/16 (PSS-32/PSS-16) Installation and System Turn-Up Guide*
- *Nokia 1830 Photonic Service Switch (PSS) Safety Guide*
- *Nokia 1830 Photonic Service Switch (PSS) Command Line Interface Guide*
- *Nokia 1830 Photonic Service Switch (PSS) TL1 Commands and Messages Guide*
- *Nokia 1830 Photonic Service Switch (PSS) Engineering and Planning Tool User Guide*

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1 Introduction

1.1 Overview

1.1.1 Purpose

This chapter describes the 1830 PSS network planning and provides that workflow to perform commissioning and power balancing of 1830 PSS photonic devices.

1.1.2 Contents

1.2 Network planning and design

1.2.1 EPT

The 1830 PSS Engineering and Planning Tool (EPT) is used to design the networks comprising 1830 PSS-1, 1830 PSS-4, 1830 PSS-8, 1830 PSS-16, 1830 PSS-16II, and 1830 PSS-32 NEs. The EPT supports initial designs and incremental additions to existing networks. See the *Nokia 1830 Photonic Service Switch Engineering and Planning Tool User Guide* for more information about network planning and design.

1.2.2 System

The EPT divides a network into a set of commissioning systems. A system is a set of amplifiers, wavelength routers, and filters that form a ring or linear DWDM domain subnetwork to the overall network.

Systems can be:

- FOADM (based on Interleaver (ITL)/Static Filter DWDM (SFDs) and amplifiers)
- ROADM (based on ITL/SFDs, Wavelength Routers (WRs) and amplifiers)
- TOADM (based on ITL/SFDs, Colourless Wavelength Routers (CWRs), Wavelength Routers (WRs) and amplifiers)
- CDC-F topology

1.2.3 Commissioning file

The EPT generates a commissioning file for all the systems in a network. The commissioning file is used for provisioning, commissioning, and power balancing the 1830 PSS devices. The commissioning file is an XML file that describe the equipment placement, physical cabling, and all power parameters needed in the equipment.

1.2.4 Import network data

The 5620 SAM CPB application supports the generation of an network data XML File that can be uploaded to the EPT.

The import network data function has two purposes.

- The imported network data file can be used to make necessary modifications to the EPT design, as a result of expansion of the network. The inventory information is available in the upload file. You can import the network data to EPT using the upload file.
- The imported network data file can be used to verify that the network and NEs deployed match the plan.

1.3 Commissioning and power balancing

1.3.1 5620 SAM CPB application

The 5620 SAM Commissioning and Power Balancing application automatically performs the following for the 1830 PSS photonic devices:

- Uploads the commissioning file
- Validates the system
- Provisions the system
- Adjusts the greenfield ASE power
- Adjusts the channel power
- Generates the system loss report
- Exports the network data file to the EPT

1.3.2 Greenfield network commissioning

A greenfield network is one with no services or cross-connections in the system. The greenfield network commissioning process requires network connectivity between the NEs and uses ASE (Amplified Spontaneous Emission) power at each point around the ring to adjust the power and commission optical connections ready for service delivery.

1.3.3 ASE

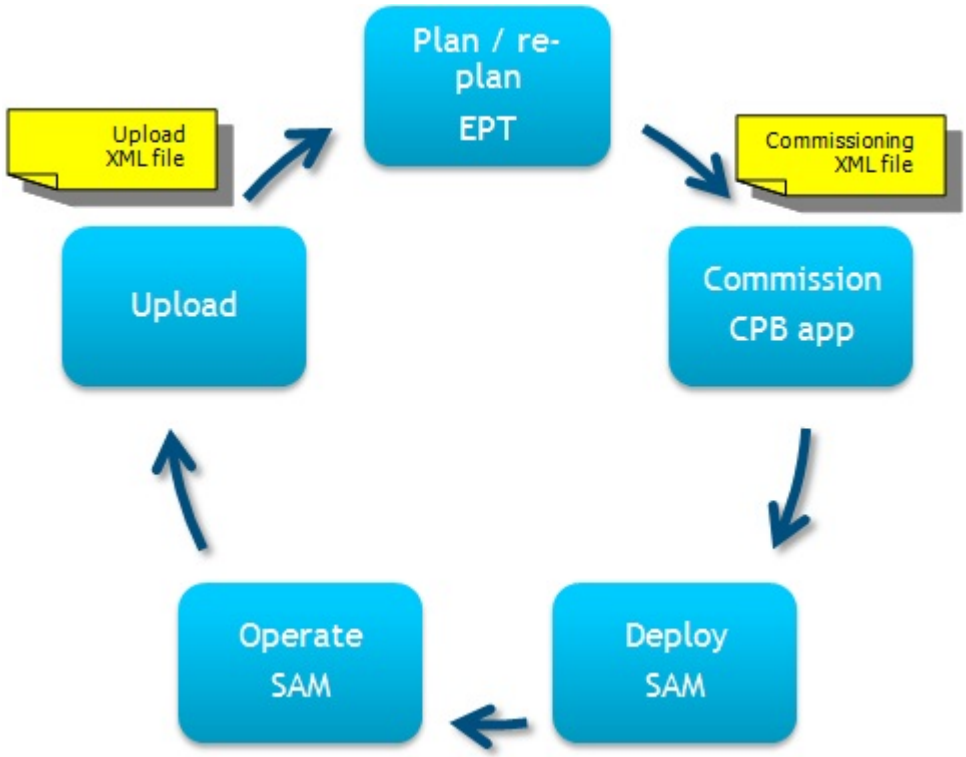
Amplified spontaneous emission (ASE) or superluminescence is light, produced by spontaneous emission, that is optically amplified by the process of stimulated emission in a gain medium.

1.4 Workflow to commission and power balance an 1830 PSS photonic device

1.4.1 Workflow

The workflow to commission and power balance an 1830 PSS photonic device using the 5620 SAM CPB application is as shown in Figure 1, “CPB workflow” (p. 10).

Figure 1 CPB workflow



1.4.2 Stages

1

Perform the network planning and design using the 1830 PSS EPT. See *Nokia 1830 PSS DCN Planning and Engineering Guide* for more information about performing the network planning and design.

2

Perform the commissioning and power balancing using the 5620 SAM CPB application.

1. Open the 5620 SAM CPB application. See Chapter 2, “The 5620 SAM CPB application” for more information.
2. Load the commissioning file generated by the EPT to the 5620 SAM CPB application and validate the system with respect to the commissioning file. See Chapter 3, “System commissioning and validation” for more information.
3. Perform system provisioning with respect to the file loaded in step 1. See Chapter 4, “System provisioning” for more information.
4. Power balance using greenfield ASE or channel power. See Chapter 5, “Power adjustment” for more information.
5. Generate loss report, as required. See 6.2 “System loss report generation” (p. 38) for more information.

3

Deploy and operate the 5620 SAM to perform network management. See the *5620 SAM Optical User Guide* for more information.

4

Upload inventory and configuration information to the EPT using the 5620 SAM CPB application. See 6.4 “Upload configuration to the EPT” (p. 40) for more information.

2 The 5620 SAM CPB application

2.1 Overview

2.1.1 Purpose

This chapter provides the procedure to start up the 5620 SAM CPB application.

2.1.2 Contents

2.2 Web access

2.2.1 Web server

The 5620 SAM CPB application has a web presentation layer that is viewed in a browser. The CPB application uses a common web server that is integrated with 5620 SAM.

2.2.2 Supported browsers

The 5620 SAM CPB application is supported on the following browsers:

- Microsoft Internet Explorer 11
- Latest version of Mozilla Firefox
- Latest version of Google Chrome

Note: When both the active and standby 5620 SAM servers are up, you can connect to either to open the application. If only one of the servers is up, you must connect to that server.

2.3 To start up the 5620 SAM CPB application

2.3.1 Steps

1

Perform one of the following to start up the 5620 SAM CPB application using a web browser:

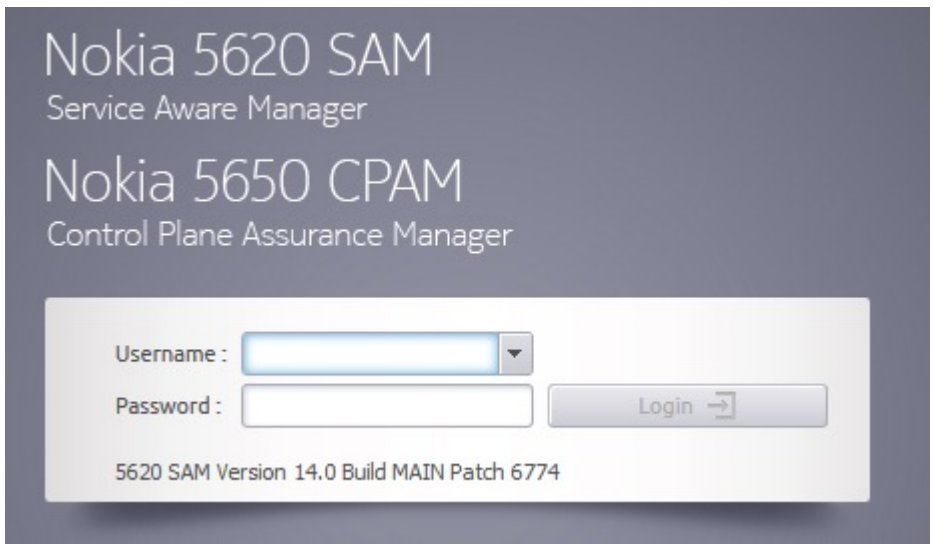
a. For a non-secured connection, use the browser to open the following URL:

http://server/Cpb *where server is the hostname or IP address of the 5620 SAM server (active or standby).*

b. For secured connection, use the browser to open the following URL:

https://server/Cpb *where server is the hostname or IP address of the 5620 SAM server (active or standby).*

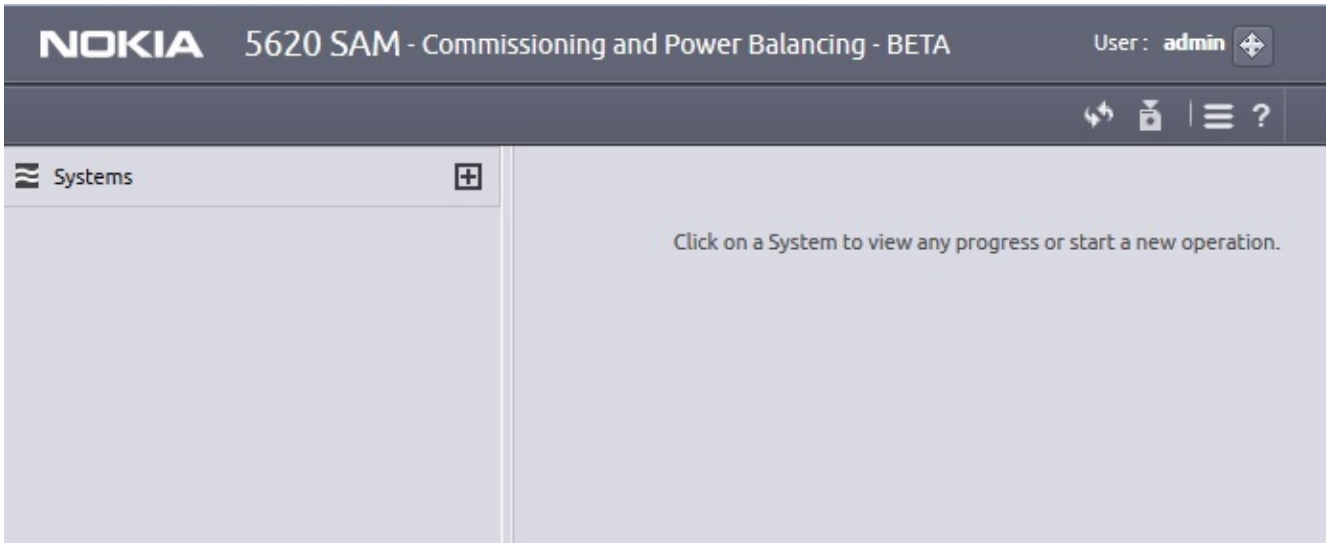
Result: The following login page is displayed:



2

Enter the required username and password and click Login.

Result: The 5620 SAM CPB application starts up.


NOKIA
5620 SAM - Commissioning and Power Balancing - BETA
User : admin
Systems
Click on a System to view any progress or start a new operation.

End of steps

3 System commissioning and validation

3.1 Overview

3.1.1 Purpose

This chapter describes the commissioning file and provides the procedures to upload the commissioning file to the 5620 SAM CPB application and to delete a previously loaded file.

This chapter also describes the system validation and provides the procedure to perform system validation.

3.1.2 Contents

3.2 System commissioning

3.2.1 Automatic commissioning

A commissioning file is necessary to automatically commission an 1830 PSS network using the 5620 SAM CPB application. The loss and power levels associated with the EPT design file must be consistent with the field values; otherwise the automated, commissioning process will not succeed.

The purpose of commissioning is to:

- Set the power, gain, loss, tilt, and other values and ranges in the network with the designed values.
- Provision the designed card types and locations.
- Provision the topological connections between packs for the NE configuration designed.
- Provision the network configuration, and link topology between the NEs.

3.2.2 Commissioning systems

The EPT divides a network into a set of commissioning systems for automatic commissioning. A system is a set of DWDM links that are arranged in a closed ring or point-to-point linear configuration.

3.2.3 Full system commissioning

A full system commissioning contains the linear or ring path extending on the THRU path through each node until it connects to a node degree without a THRU path, or a one degree node, or circles back on itself in a ring.

3.2.4 Partial system commissioning

In a system that has no rings, if you follow the THRU paths through every node, and the THRU path traverses one node several times, you must use partial system commissioning.

3.2.5 Commissioning file

The EPT creates one commissioning file for all the systems in a network, in the XML format. The commissioning file is used to provision the following 1830 PSS device parameters and values:

- NE type, system Identifiers, shelf types, node types, shelf numbers, and so on
- Card types, slot locations, SFP, XFP, CFP pluggable types and locations
- Topological connections between card ports
- Amplifier target power, nominal gain, power and gain ranges, tilt, ripple, and other parameters used by the transmission software on the 1830 PSS devices

- Network topology; that is, the NE-to-NE fiber links and orientation with respect to each other
- Port-to-port and fiber span loss information
- Optical Channel Power Offsets

The commissioning file is uploaded to the 5620 SAM CPB application and is used for commissioning the systems. The 5620 SAM CPB application can commission multiple systems simultaneously, and reducing the total commissioning time.

3.3 To load the commissioning file

3.3.1 Before you begin

Ensure that:

- 1830 PSS devices are discovered from the 5620 SAM. See the *5620 SAM Optical User Guide* for more information about NE mediation and device discovery.
- device names are aligned with the names defined in the EPT.

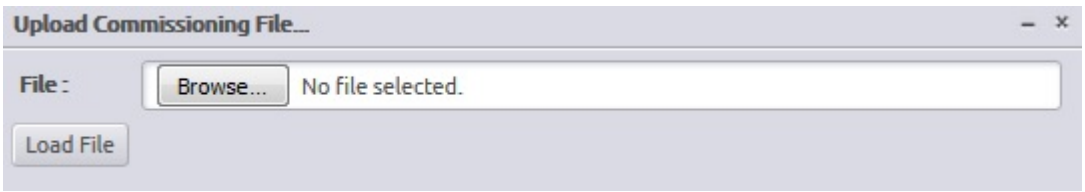
3.3.2 Steps

Perform the following to load the commissioning file to the 5620 SAM CPB application.

1

Click the ⊞ icon.

Result: The Upload Commissioning File form opens.



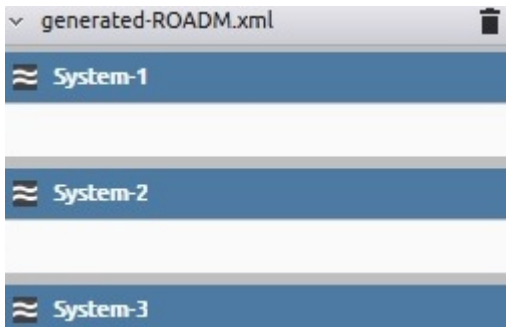
2

Click Browse and navigate to the commissioning file.

3

Click Load File.

Result: The 5620 SAM CPB application displays all the systems in the network.



End of steps

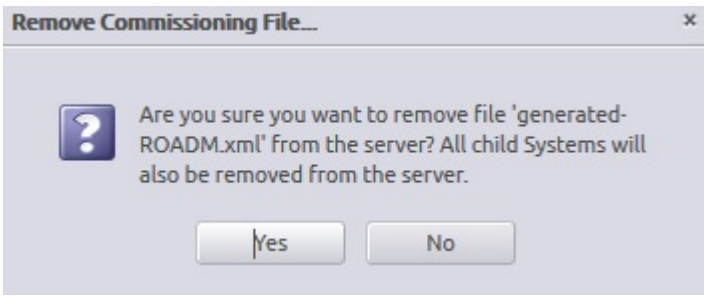
3.4 To delete the commissioning file

3.4.1 Steps

1

Click the delete icon in the left panel of the 5620 SAM CPB application.

Result: A confirmation dialog box appears.



2

Click Yes to remove the commissioning file and all the systems from the server.

END OF STEPS

3.5 System validation

3.5.1 Validation process

After the system is loaded, perform validation to ensure that the EPT plan matches the node inventory before performing the provisioning and power balancing. After the validation, a discrepancy report is generated that is used to correct the errors. The system validation process helps to reduce the chance of discovering an error later in the cycle.

The validation process involves querying the 5620 SAM database, comparing the following, as currently provisioned, against those specified in the commissioning file:

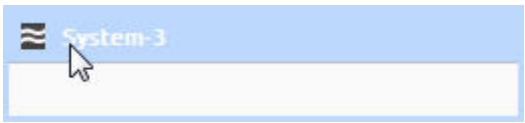
- shelves
- card slots
- internal topologies
- external topologies

3.6 To validate the system

3.6.1 Steps

1

Click on the system in the list of systems under the required commissioning file in the Systems panel.



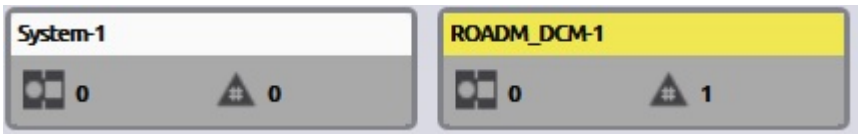
2

Hover over the system icon.

3

Click on the Perform System Validation icon.

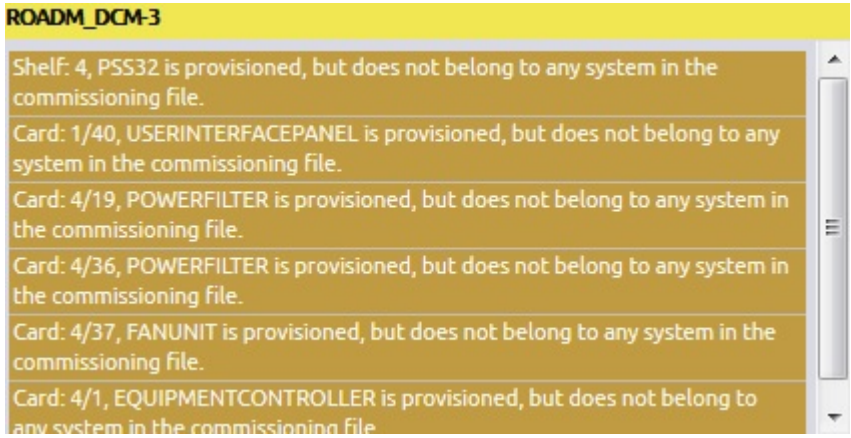
Result: The validation results are displayed for the system and the nodes.



4

Click on the individual node to display the errors.

Result: The errors are displayed as follows:



The result of system validation can be one of the following:

- — validation is in progress.
- — validation has completed successfully.
- — validation did not complete and has an error. If there is an error, click on the system or node status tab to troubleshoot the cause of the error and perform the validation again.

End of steps

4 System provisioning

4.1 Overview

4.1.1 Purpose

This chapter describes provisioning systems in a network and how to perform the provisioning using the CPB application.

4.1.2 Contents

4.2 Provisioning

4.2.1 Overview

The provisioning option in the CPB application provisions the NEs in a network as configured in the commissioning file. You can provision the system after the system validation is completed. In this part of commissioning a network, the cards, ports, optical links, and power attributes are provisioned.

4.2.2 Provisioning steps in 5620 SAM CPB application

Provisioning a system includes the following steps:

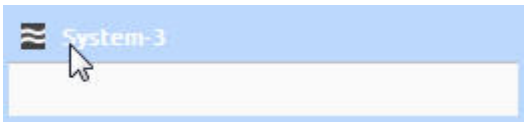
- Querying inventory — The inventory information from the uploaded commissioning file is collected.
- Provisioning inventory — The shelves and cards of all the devices in the systems of the network are provisioned as per the design in the uploaded commissioning file.
- Waiting for ports — CPB waits for the ports to be configured as per the commissioning file.
- Provision external topology — The external optical links are configured.
- Provision internal topology — The internal optical links are configured.
- Provision SEAM topology — The SEAM topology is configured between the THRU ports of a WR or CWR card between two systems.
- Provision power attributes — The power attributes such as power gain and nominal loss, are provisioned.

4.3 To provision a system

4.3.1 Steps

1

Click on a system in the list of systems under the required commissioning file in the Systems panel.



2

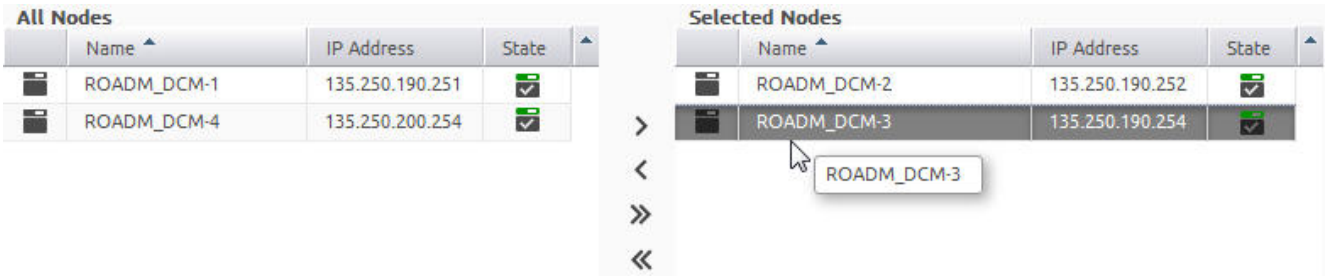
Hover over the system icon.

3

Click on the provisioning system icon. By default, all available nodes in a system are added in the Selected Nodes list in the Select Nodes step on the main window.

4

Use the arrow icons between the All Nodes and Selected Nodes lists to move the nodes to and from the lists, as required.



5

Click Choose Options and perform one of the following:

a. Click Select Defaults to choose the default provisioning options.

b. Click Select All to choose all provisioning options.

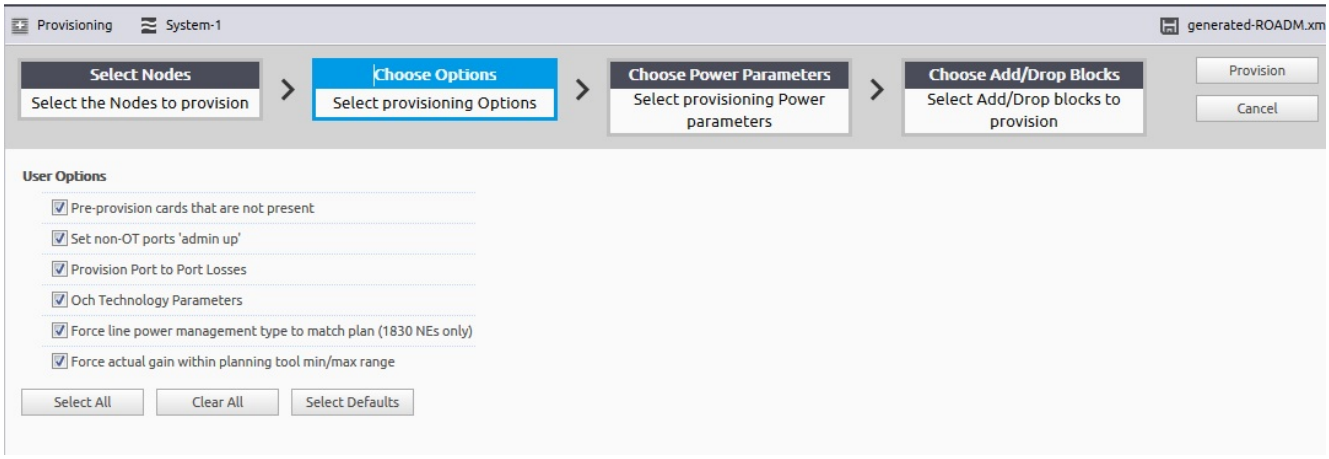
c. Configure the parameters:

- **Pre provision cards** – if a slot in a node is programmed as empty and the plan specifies a card for that slot, the application sets the programmed card type for that slot to match the plan (i.e. preprovision the slot).

- **Set non-OT ports 'admin up'** – the application sets the administrative state to up for every port (with the topology connection) in the node that is a non OT card .

d. Click Clear All to choose the provisioning options that you require.

Result:



6

Click Choose Power Parameters and select power parameters in one of the following ways.

a. Click Select Defaults to choose the default parameter options.

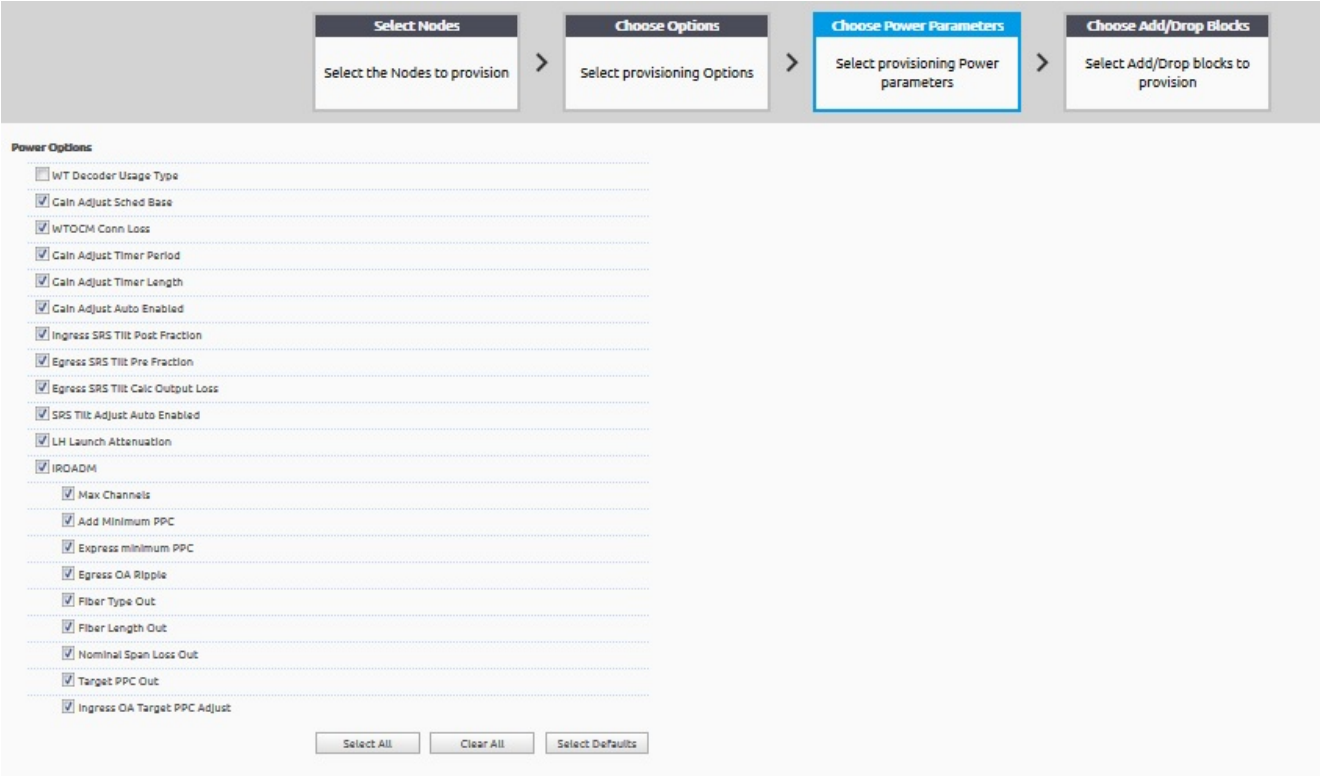
b. Click Select All to choose all parameter options.

The following parameters are configured:

- WT Decoder Usage Type
- Gain Adjust Sched Base
- WTOCM Conn Loss
- Gain Adjust Timer Period
- Gain Adjust Timer Length
- Gain Adjust Auto Enabled
- Ingress SRS Tilt Post Fraction
- Egress SRS Tilt Pre Fraction
- Egress SRS Tilt Calc Output Loss
- SRS Tilt Adjust Auto Enabled
- LH Launch Attenuation
- IROADM

c. Click Clear All to choose the parameter options that you require.

Result:



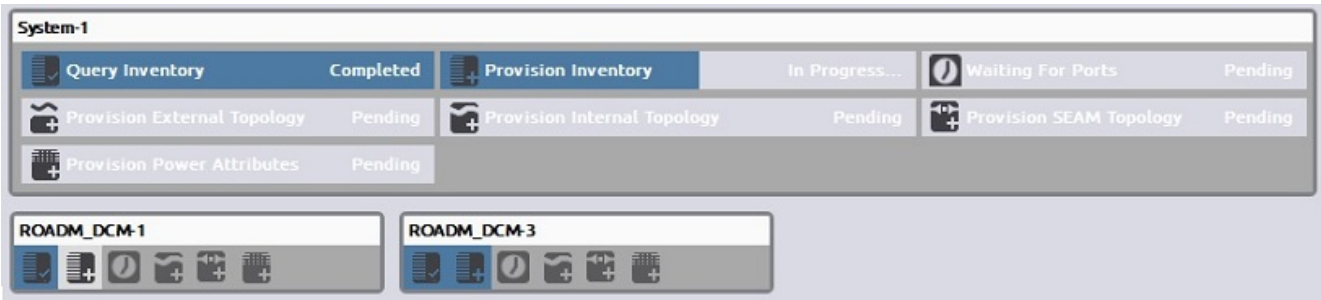
7

Click Choose Add/Drop Blocks and click on the arrow icons between the All Add /Drop Blocks and Selected Add/Drop Blocks lists to select the add/drop blocks to be provisioned.

8

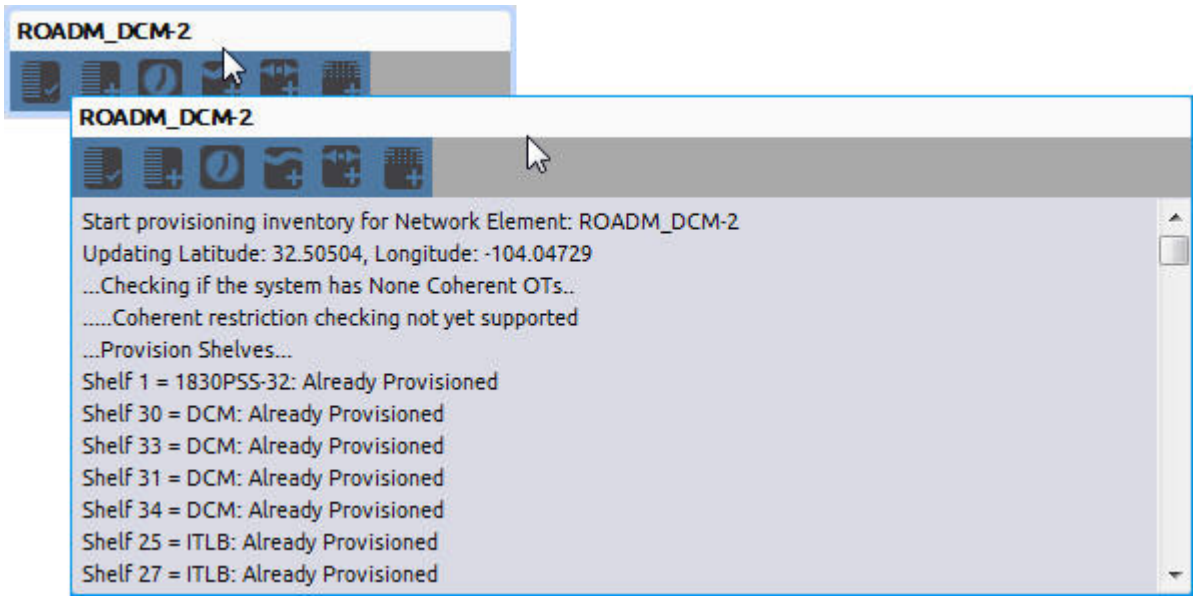
Click on each of the steps to review the selections, then click Provision. The status for each step of the provisioning is provided at a system and at each node level.

Result:



9

Click on the system or node status tab to get more information about the provisioning status of the system or nodes.



Result:

The result of system provisioning can be one of the following:

- — provisioning is in progress.
- — provisioning has completed successfully.
- — provisioning did not complete and has an error. If there is an error, click on the system or node status tab to troubleshoot the cause of the error and perform provisioning again.

END OF STEPS

5 Power adjustment

5.1 Overview

5.1.1 Purpose

You can perform power adjustment using greenfield ASE power or channel power. This chapter describes both greenfield ASE power adjustment and in-service channel power adjustment.

5.1.2 Contents

5.2 Greenfield commissioning using ASE power adjustment

5.2.1 Greenfield network and ASE power

A greenfield network is one that has no services or cross-connects. Greenfield network commissioning requires network connectivity between the NEs and uses the ASE power generated by line drivers in the system to adjust power levels and commission optical connections ready for service delivery.

You can commission a greenfield using ASE power adjustment in two ways using the CPB application:

- clean slate
- continue

A clean slate commissioning resets the commissioned flags on the nodes of the system and performs the power adjustment from the beginning.

A continued commissioning performs the power adjustment on the nodes that were not commissioned previously.

5.2.2 Greenfield ASE power adjustment steps in CPB

Greenfield ASE power adjustment includes the following steps:

- Querying inventory — The inventory information from the uploaded commissioning file is collected.
- Verifying card admin up — The administrative status of the cards are verified.
- Setting NE not commissioned — The commissioning flag on the system is set to not commissioned.
- Performing ASE power adjustment — The ASE power adjustment is performed.
- Setting NE commissioned — The commissioning flag on the system is set to commissioned.
- Creating system loss report — The system loss report is generated.

5.3 To perform greenfield ASE power adjustment

5.3.1 Steps

1

Click on a system in the list of systems under the required commissioning file in the Systems panel.

2

Hover over the ≋ system icon.

3

Click on the ▦ greenfield ASE power adjustment icon. The Choose Greenfield ASE Power Adjustment Options window opens.

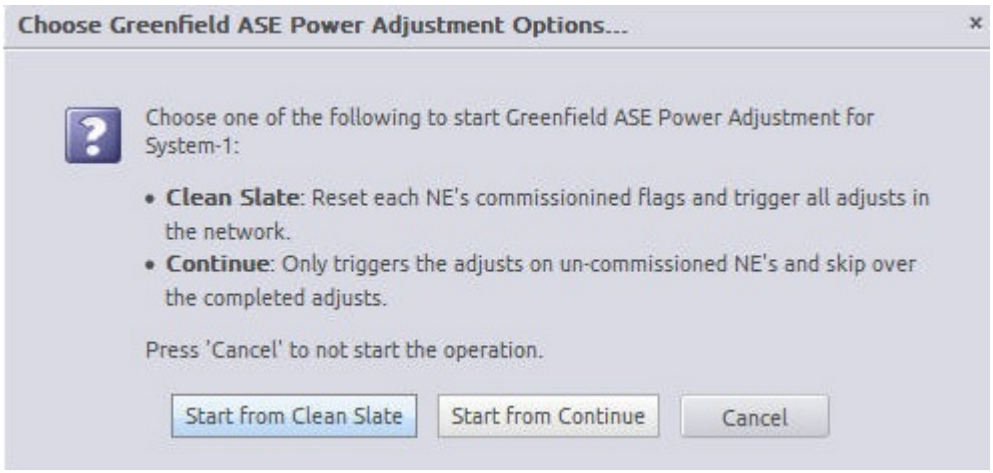
4

Perform one of the following actions in the Choose Greenfield ASE Power Adjustment Options window.

a. Click Start from Clean Slate to perform greenfield ASE power adjustment for the first time.

b. Click Start from Continue to perform greenfield ASE power adjustment on nodes with incomplete ASE power adjustment.

c. Click Cancel to abort the greenfield ASE power adjustment.



The status of the greenfield ASE power adjustment is provided for a system as well as for each direction.

5

Click on the system or the direction status tab to get more information about the greenfield ASE power adjustment status of the system or direction.

Result:

The result of greenfield ASE power adjustment can be one of the following:

- — adjustment is in progress.
- — adjustment has completed successfully.
- — adjustment did not complete and has an error. If there is an error, click on the system or direction status tab to troubleshoot the cause of the error and perform greenfield ASE power adjustment again.

END OF STEPS

5.4 Channel power adjustment

5.4.1 In-service channel power

You can use the channel power adjustment option of the 5620 SAM CPB application to perform in-service channel power adjustment in a system. While performing this task, the channel power levels are adjusted to attempt to reach target levels using a wavelength service created through all nodes defined in the commissioning file.

5.4.2 Channel power adjustment steps in CPB

Channel power adjustment includes the following steps:

- Querying inventory — The inventory information from the uploaded commissioning file is collected.
- Verifying card admin up — The administrative status of the cards are verified.
- Setting NE not commissioned — The commissioning flag on the system is set to not commissioned.
- Performing in-service power adjust — The in-service channel power adjustment is performed.
- Setting NE commissioned — The commissioning flag on the system is set to commissioned.
- Creating power adjust report — The power adjustment report is generated.

5.5 To perform channel power adjustment

5.5.1 Steps

1

Click on a system in the list of systems under the required commissioning file in the Systems panel.

2

Hover over the system icon.

3

Click on the channel power adjust icon. The Start Channel Power Adjustment window opens.

4

Perform one of the following actions in the Start Channel Power Adjustment window.

a. Click Start to begin the channel power adjustment.

b. Click Cancel to abort the channel power adjustment.

The status of the channel power adjustment is provided for the system and for each direction.

5

Click on the system or direction status tab to get more information about the channel power adjustment status of the system or direction.

Result:

The result of channel power adjustment can be one of the following:

- — adjustment is in progress.
- — adjustment has completed successfully.
- — adjustment did not complete and has an error. If there is an error, click on the system or direction status tab to troubleshoot the cause of the error and perform channel power adjustment again.

END OF STEPS

6 System loss report and EPT upload

6.1 Overview

6.1.1 Purpose

A system loss can be generated irrespective of whether the validation, provisioning, and power balancing is completed successfully. This chapter describes system loss reporting and how to generate a system loss report using the CPB application and how to upload configuration information to the EPT.

6.1.2 Contents

6.2 System loss report generation

6.2.1 System loss report

The CPB application can generate a loss report for a system and each of the add/drop blocks in the system in both A to Z and Z to A directions.

6.2.2 Loss report parameters

The report includes ingress and egress ports, actual loss, PT Min loss, PT Max loss, nominal loss, loss value, and notes with additional information. The following table describes the fields of the loss report table.

Field	Description
From	Starting point for the measured loss
To	End point for the measured loss
Actual Loss (dB)	Measured loss between the ports
PT Min Loss (dB)	Minimum expected card or span loss used to plan the network
PT Max Loss (dB)	Maximum expected card or span loss used to plan the network
Nominal Loss (dB)	Nominal card or span loss used to plan the network
Loss Value	How the loss value reported was obtained
Notes	Additional information

6.3 To generate a system loss report

6.3.1 Steps

1

Click on a system in the list of systems under the required commissioning file in the Systems panel.

2

Hover over the system icon.

3

Click on the generate system loss icon. The loss report for the system and each of the add/drop blocks in the system is displayed.

System Loss Report: System-1 04/12/15 - 01:14:09

System-1

A to Z

From	To	Actual Loss (dB)	PT Min Loss (dB)	PT Max Loss (dB)	Nominal Loss (dB)	Loss value	Notes
ROADM_DCM-1 AHPHG 1/15/4 (out)	**ROADM_DCM-3 ALPHG 2/6/4 (in)**	**0.0**	**5.1**	**7.1**	**6.1**	**Most recent**	**Error getting power Includes loss (gain) from: [AHPHG]**
ROADM_DCM-3 ALPHG 2/6/4 (in)	ROADM_DCM-3 ALPHG 2/6/1 (out)	0.0	0.0	0.0	0.0	Most recent	Error getting power

Z to A

From	To	Actual Loss (dB)	PT Min Loss (dB)	PT Max Loss (dB)	Nominal Loss (dB)	Loss value	Notes
ROADM_DCM-3 ALPHG 2/6/4 (out)	**ROADM_DCM-1 AHPHG 1/15/4 (in)**	**0.0**	**5.1**	**7.1**	**6.1**	**Most recent**	**Error getting power Includes loss (gain) from: [ALPHG]**
ROADM_DCM-1 AHPHG 1/15/4 (in)	ROADM_DCM-1 AHPHG 1/15/1 (out)	0.0	0.0	0.0	0.0	Most recent	Error getting power

Result: When the topology spanned is between two nodes in the system, the corresponding row is shown in bold.

The result of system loss report generation can be one of the following:

- — report generation is in progress.
- — report generation has completed successfully.

END OF STEPS

6.4 Upload configuration to the EPT

6.4.1 Export an EPT upload file

The 1830 PSS devices can be automatically commissioned using the commissioning file created from the EPT. An extension of the network or a modification requires recommissioning the network. The EPT design file should be updated before creating a new commissioning file.

The Export EPT upload file option in the 5620 SAM CPB application exports network information from the 1830 PSS network. The upload file is an XML file that contains inventory and configuration information that is used to update a previously created EPT design file.

6.4.2 Replanning a network

The network replanning can be performed to:

- change amplifier type
- add or remove a node in a ring or linear chain
- replace a fiber segment
- change the number of channels (migrate from 44 to 88 channels)

After the EPT design modifications are completed, bring the design to a complete or valid state again using the modified design in the EPT. If the network has demand deployments that are not reflected in the current EPT design file, you can use the upload file generated by the 5620 SAM CPB application to check the EPT design against the physical network, and add the additional demands from the physical network to the EPT design file.

6.5 To export a configuration to an EPT

6.5.1 Steps

1

On the toolbar, click on the export EPT upload icon to export the configuration on the CPB application to the EPT.

Result: The network design file is downloaded in XML format.

END OF STEPS