

Tekelec EAGLE[®] 5 Integrated Signaling System

Feature Manual - A-Port

910-5786-001 Revision B

December 2009



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Table of Contents

Chapter 1: Introduction.....	6
Overview.....	7
Scope and Audience.....	7
Manual Organization.....	7
Documentation Admonishments.....	8
Customer Care Center.....	8
Emergency Response.....	10
Related Publications.....	11
Documentation Availability, Packaging, and Updates.....	11
Locate Product Documentation on the Customer Support Site.....	12
Chapter 2: Feature Description.....	13
Introduction.....	14
MPS/EPAP Platform.....	16
EPAP/PDBA Overview.....	18
Subscriber Data Provisioning.....	19
EPAP (EAGLE Provisioning Application Processor).....	21
Service Module Cards.....	22
Network Connections.....	25
Serviceability Hints.....	29
A-Port Considerations.....	30
General Numbering Requirements.....	31
Maintenance.....	31
A-Port Protocol.....	34
Main Functions.....	34
MNP SCCP Service Re-Route Capability.....	38
MTP Routed SCCP Traffic.....	41
MT-Based IS41 SMS NP.....	45
Options.....	45
Feature Control Requirements.....	45
System Options for MT-Based IS41 SMS NP.....	45
MT-Based IS41 SMS NP Call Flows.....	48
Chapter 3: Commands.....	51

Introduction.....	52
EAGLE 5 ISS Commands for A-Port.....	52
EAGLE 5 ISS IS41 Options Commands.....	52
EAGLE 5 ISS IS41 SMS Options Commands.....	56
EAGLE 5 ISS A-Port Service Selector Commands.....	57
EAGLE 5 ISS Feature Key Control Commands.....	60
EAGLE 5 ISS MNP SCCP Service Commands.....	60
Maintenance and Measurements User Interface Commands.....	62
Chapter 4: Feature Activation.....	67
Introduction.....	68
Prerequisites.....	69
Feature Activation Overview.....	70
A-Port Feature Activation Procedure.....	73
MT-Based IS41 SMS NP Feature Activation Procedure.....	91
Activating the 1100 TPS/DSM for ITU NP Feature	93
Activating the E5-SM4G Throughput Capacity Feature.....	98
Adding a Service Module Card.....	101
MTP Msgs for SCCP Apps Activation Procedure.....	103
Chapter 5: Maintenance and Measurements.....	105
Hardware Requirements.....	106
EPAP Status and Alarms.....	106
DSM Status Requests.....	107
A-Port System Status Reports.....	107
Code and Application Data Loading.....	108
EPAP Application Data Loading.....	109
State Transitions during Start-Up.....	111
A-Port Alarms.....	114
A-Port UIMs.....	116
A-Port Related Measurements.....	119
Glossary.....	122

List of Figures

Figure 1: MPS/EPAP Platform Architecture.....17

Figure 2: Subscriber Data Provisioning Architecture (High Level).....20

Figure 3: Database Administrative Architecture.....21

Figure 4: Customer Provisioning Network.....26

Figure 5: EPAP Sync Network.....27

Figure 6: DSM Networks.....27

Figure 7: Dial-Up PPP Network.....29

Figure 8: MT-Based IS41 SMS NP Call Flow for In-Network Subscriber.....48

Figure 9: MT-Based IS41 SMS NP Call Flow for Other-Network Subscriber.....49

Figure 10: Obit Message for Abort of Card Loading.....110

Figure 11: A-Port Enabled, Normal Operating Sequence.....111

Figure 12: A-Port Enabled, Service Module Card Not Connected to EPAP.....112

Figure 13: A-Port Enabled, Service Module card Memory Insufficient for Database.....112

Figure 14: A-Port Enabled, Database Exceeds Service Module Card Memory.....112

Figure 15: A-Port Not Enabled at First, but then Activated on Service Module Card.....113

Figure 16: A-Port Activation Unsuccessful Due to Insufficient Database.....113

List of Tables

Table 1: Admonishments.....	8
Table 2: Service Module Card Provisioning and Reload Settings.....	24
Table 3: EPAP IP Addresses in the DSM Network.....	28
Table 4: A-Port Message Processing.....	36
Table 5: DigitAction Applications.....	37
Table 6: MNP SCCP Service Re-Route Capability Summary.....	40
Table 7: Subscriber Portability Type.....	44
Table 8: MT-Based IS41 SMS NP Options.....	46
Table 9: Commands for EAGLE 5 ISS A-Port.....	52
Table 10: chg-is41opts Parameters - Class = DATABASE.....	53
Table 11: chg-is41smsopts Parameters - Class = DATABASE.....	56
Table 12: ent-srvsel Parameters - Class = DATABASE.....	58
Table 13: chg-srvsel Parameters - Class = DATABASE.....	58
Table 14: dlt-srvsel Parameters - Class = DATABASE.....	59
Table 15: rtrv-srvsel Parameters - Class = DATABASE.....	59
Table 16: chg-sccp-serv Parameters - Class = DATABASE.....	61
Table 17: dlt-sccp-serv Parameters - Class = DATABASE.....	62
Table 18: Feature Activation Summary.....	69
Table 19: Maximum E5-SM4G Card and System TPS Capacity	98
Table 20: System Prerequisites.....	99
Table 21: E5-SM4G Throughput Capacity Feature Prerequisite.....	100
Table 22: Service Module Card Locations.....	101
Table 23: A-Port Related UAMs.....	114
Table 24: A-Port UIMs.....	116
Table 25: Pegs for Per System A-Port Measurements.....	120
Table 26: Pegs for Per SSP A-Port Measurements.....	120
Table 27: Pegs for Per System and Per SSP A-Port Measurements.....	121

Chapter 1

Introduction

Topics:

- *Overview.....7*
- *Scope and Audience.....7*
- *Manual Organization.....7*
- *Documentation Admonishments.....8*
- *Customer Care Center.....8*
- *Emergency Response.....10*
- *Related Publications.....11*
- *Documentation Availability, Packaging, and Updates.....11*
- *Locate Product Documentation on the Customer Support Site.....12*

This chapter provides a brief description of the A-Port feature of the EAGLE 5 Integrated Signaling System. The chapter also includes the scope, audience, and organization of the manual; how to find related publications; and how to contact Tekelec for assistance.

Overview

This manual provides a description, along with commands, maintenance, measurements, and configuration details associated with the ANSI-41 Mobile Number Portability (A-Port) feature of the EAGLE 5 Integrated Signaling System (ISS) and other features for which the A-Port feature is a prerequisite. A-Port provides IS41 number portability functionality using a triggerless solution. In response to governmental mandates for telecommunication networks, this feature focuses on service provider number portability on IS41 networks.

A-Port minimizes the challenges for IS41 network operators while enabling them to meet their regulatory obligations. A-Port supports the Signaling Relay Function (SRF) for direct and indirect routing. SRF-based MNP processing examines MAP messages for ported numbers. For call-related messages, A-Port acts as an “NP HLR” for exported number by responding with a MAP SRI message; A-Port performs a message relay function for calls to imported numbers and non-call related messages.

A-Port is an optional feature on the EAGLE 5 ISS, and can be enabled and turned on, but not off, via a feature access key. Note that A-Port requires the Global Title Translation (GTT) feature and that A-Port and North American LNP (Local Number Portability) are mutually exclusive on an EAGLE 5 ISS node.

Scope and Audience

This manual is intended for anyone responsible for installing, maintaining, and using the A-Port feature in the EAGLE 5 ISS. Users of this manual and the others in the EAGLE 5 ISS family of documents must have a working knowledge of telecommunications and network installations.

Manual Organization

This document is organized into the following chapters:

- *Introduction* contains general information about the A-Port documentation, the organization of this manual, and how to request technical assistance.
- *Feature Description* provides a functional description of the A-Port and MT-Based IS41 SMS NP features, including network perspectives, assumptions and limitations, a database overview, Service Module card provisioning and reloading, A-Port user interface, and an audit overview.
- *Commands* describes the commands that support the A-Port and MT-Based IS41 SMS NP features.
- *Feature Activation* describes how to activate the A-Port and MT-Based IS41 SMS NP features.
- *Maintenance and Measurements* describes maintenance and measurements, including EPAP status and alarms, hardware verification messages, A-Port system status reports and commands, code and application data loading, and alarms.

Documentation Admonishments

Admonishments are icons and text throughout this manual that alert the reader to assure personal safety, to minimize possible service interruptions, and to warn of the potential for equipment damage.

Table 1: Admonishments

	<p>DANGER: (This icon and text indicate the possibility of <i>personal injury</i>.)</p>
	<p>WARNING: (This icon and text indicate the possibility of <i>equipment damage</i>.)</p>
	<p>CAUTION: (This icon and text indicate the possibility of <i>service interruption</i>.)</p>

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A critical situation is defined as a problem with an EAGLE 5 ISS that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical problems affect service and/or system operation resulting in:

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system

- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity/traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with the Tekelec Customer Care Center.

Related Publications

For information about additional publications that are related to this document, refer to the *Related Publications* document. The *Related Publications* document is published as a part of the *Release Documentation* and is also published as a separate document on the Tekelec Customer Support Site.

Documentation Availability, Packaging, and Updates

Tekelec provides documentation with each system and in accordance with contractual agreements. For General Availability (GA) releases, Tekelec publishes a complete EAGLE 5 ISS documentation set. For Limited Availability (LA) releases, Tekelec may publish a documentation subset tailored to specific feature content or hardware requirements. Documentation Bulletins announce a new or updated release.

The Tekelec EAGLE 5 ISS documentation set is released on an optical disc. This format allows for easy searches through all parts of the documentation set.

The electronic file of each manual is also available from the [Tekelec Customer Support](#) site. This site allows for 24-hour access to the most up-to-date documentation, including the latest versions of Feature Notices.

Printed documentation is available for GA releases on request only and with a lead time of six weeks. The printed documentation set includes pocket guides for commands and alarms. Pocket guides may also be ordered separately. Exceptions to printed documentation are:

- Hardware or Installation manuals are printed without the linked attachments found in the electronic version of the manuals.
- The Release Notice is available only on the Customer Support site.

Note: Customers may print a reasonable number of each manual for their own use.

Documentation is updated when significant changes are made that affect system operation. Updates resulting from Severity 1 and 2 PRs are made to existing manuals. Other changes are included in the documentation for the next scheduled release. Updates are made by re-issuing an electronic file to the customer support site. Customers with printed documentation should contact their Sales Representative for an addendum. Occasionally, changes are communicated first with a Documentation Bulletin to provide customers with an advanced notice of the issue until officially released in the documentation. Documentation Bulletins are posted on the Customer Support site and can be viewed per product and release.

Locate Product Documentation on the Customer Support Site

Access to Tekelec's Customer Support site is restricted to current Tekelec customers only. This section describes how to log into the Tekelec Customer Support site and locate a document. Viewing the document requires Adobe Acrobat Reader, which can be downloaded at www.adobe.com.

1. Log into the [Tekelec Customer Support](#) site.

Note: If you have not registered for this new site, click the **Register Here** link. Have your customer number available. The response time for registration requests is 24 to 48 hours.

2. Click the **Product Support** tab.
3. Use the Search field to locate a document by its part number, release number, document name, or document type. The Search field accepts both full and partial entries.
4. Click a subject folder to browse through a list of related files.
5. To download a file to your location, right-click the file name and select **Save Target As**.

Chapter 2

Feature Description

Topics:

- *Introduction.....14*
- *MPS/EPAP Platform.....16*
- *A-Port Protocol.....34*
- *MT-Based IS41 SMS NP.....45*

This chapter describes the A-Port feature and the MT-Based IS41 SMS NP feature.

Introduction

Throughout the world, an increasing number of governments are mandating that telecommunications network operators support service provider number portability. Number portability is primarily intended to promote competition among service providers, and applies to both wireline and mobile phone networks. In particular, the A-Port (IS41 Mobile Number Portability) feature provides the ability for IS41 subscribers to change service providers while retaining their current Mobile Directory Number (MDN).

A-Port utilizes the EPAP database to derive the portability status of a subscriber. This feature supports LOCREQ messages as well as SMSREQ messages, if the option is selected, for number portability handling. LOCREQ messages generate a LOCREQ response if the MDN is ported and also relays the LOCREQ if the MDN is not ported. Non-ported or ported in are handled the same way.

A-Port MNP is based on the EAGLE 5 ISS platform. It is deployed in a node that is also performing the STP function.

MTP Routed SCCP Traffic

When the MTP Msgs for SCCP Apps feature is turned on, all MTP routed UDT/non-segmented XUDT SCCP messages are routed to Service Module cards. When the MTP Routed GWS Stop Action feature is turned on, messages are filtered based on the provisioned Gateway Screening rules on a per linkset basis. The MTP Routed GWS Stop Action feature forwards only UDT, UDTS, XUDT and XUDTS SCCP messages to the Service Module cards for processing. The Service Module cards then perform SCCP decode and verification on the MTP routed messages.

MNP Circular Route Prevention

The MNP Circular Route Prevention (MNPCR) feature is an extension of the A-Port feature which detects and prevents circular routing caused by incorrect information in one or more of the network number portability databases. For example, a subscriber may have ported from network A to network B. Network A has the correct routing information, indicating the subscriber now belongs to network B. However, network B may have incorrect routing information, indicating that the subscriber still belongs to network A. Based on its portability data, network A routes the call to network B, but network B routes the call back to network A, based on the incorrect data of network B. This results in a circular route. The MNPCR feature provides the logic to prevent this circular routing scenario for all messages that receive A-Port service, including LOCREQ and SMSREQ. This feature is enabled and turned on using Feature Key Control commands.

DigitAction Expansion

The DigitAction Expansion feature provides more flexibility to formulate the SCCP Called Party Address (SCCP) Global Title Address (GTA) field of the MAP messages relayed by A-Port. DigitAction Expansion is provisioned via the PDBI Enter Network Entity or Update Network Entity commands. DigitAction Expansion can also be modified via the Add an NE and Update an NE GUI screens.

MNP SCCP Service Re-Route

The MNP SCCP Service Re-Route feature is used when the A-Port subscriber database is incoherent with MPS data and the GTT data is valid. The A-Port SCCP Service Re-Route feature provides the

capability to re-route the traffic from the EAGLE 5 ISS to other A-Port subscriber database nodes and inform the originating nodes to re-route the A-Port service related traffic to other A-Port service nodes.

The MNP SCCP Service Re-Route feature is designed to handle and control re-routing of A-Port traffic from an affected node to alternate nodes within the network of an operator. This feature is an optional feature and does not affect the normal A-Port functionality. This feature also provides the option to mark A-Port OFFLINE to perform a controlled re-routing during this state.

MO-Based IS41 SMS NP

The Mobile Originated Based IS41 SMS NP (MO-Based IS41 SMS NP) feature allows wireless operators to route Short Message Service (SMS) messages originating from a mobile subscriber within a Number Portability (NP) environment. For additional information about the MO-Based IS41 SMS NP feature, refer to *Feature Manual - MO SMS*.

MT-Based IS41 SMS NP

The Mobile Terminated Based IS41 SMS NP (MT-Based IS41 SMS NP) feature allows wireless operators to route Short Message Service (SMS) messages destined to mobile subscribers within a Number Portability (NP) environment. If the MT-Based IS41 SMS NP feature is not enabled and turned on, then messages are processed by the A-Port feature.

Two types of messages occur with respect to number portability: call related and non-call related. The call-related messages (LOCREQ) query the HLR in real time for delivering the call to the subscriber. The A-port feature handles these.

Non-call related messaging involves the short message service center (SMSC) querying the HLR for the destination subscriber for SMS delivery. For SMS, these query messages are called SMSREQ. The HLR responds to these messages with routing information that can be used by the querying node (SMSC) to deliver the SMS message. In this feature, the Eagle 5 ISS intercepts these SMSREQ messages destined to the HLR and replies with routing information for out-of-network destination subscribers.

The MT-Based SMS feature with A-Port functionality will:

- Intercept SMS routing information request from the SMSC before it reaches the HLR (A-Port function).
- Extract message destination address (SCCP Called Party GTA), condition the digits and perform lookup in the Real Time Database (RTDB) (A-Port function).
- For destination address/subscribers belonging to foreign networks, send reply message to the SMSC with routing information. This information can be used by the SMSC to route the message to their recipient networks.
- For in-network destination addresses, the SMS routing information request is relayed to the HLR according to the options set for normal A-Port routing.

Signaling Relay Function

Standards are defined such that carriers can choose to implement either Signaling Relay Function (SRF)-based (using MAP protocol) MNP or IN-based (using INAP protocol) MNP. A-Port supports only the SRF-based solution for MNP. INAP-based MNP processing is similar to wireline networks; this function is supported by the INP feature.

SRF-based MNP processing involves the “intercepting” of existing MAP messages to check for ported numbers. For call-related messages, A-Port acts as a number portability home location register (HLR) when the number has been exported by responding to the switch with a LOCREQ ACK message. For

calls to imported numbers and non-call related messages not selected for MT-Based IS41 SMS NP, A-Port performs message relay.

Routing Options

The ETSI standards for SRF-based MNP define two routing options, direct routing and indirect routing. A-Port supports both options:

- With direct routing, the network where the call is originated is responsible for determining whether the called party has ported and routing the call to the new subscription network.
- With indirect routing, this is the responsibility of the network that originally owned the number.

Number Length Differences

Number lengths vary between countries and may even vary within a country. As a result, the A-Port subscriber database structure supports numbers of varying length in a flexible way without necessitating software modifications. A maximum number length of 15 digits for ported numbers is supported.

A-Port Considerations

1. GTT must be on before the A-Port feature can be enabled.
2. The A-Port feature requires 4 GB Service Module cards.
3. A-Port can be turned on, but not turned off.
4. The A-Port, IGM, G-Port MNP, G-Flex C7 Relay, AINPQ, and INP features can run concurrently on an EAGLE 5 ISS node.
5. When A-Port and G-Flex are run on the same node, interactions between the two features must be addressed.
6. A-Port and North American LNP are mutually exclusive on an EAGLE 5 ISS node.

MPS/EPAP Platform

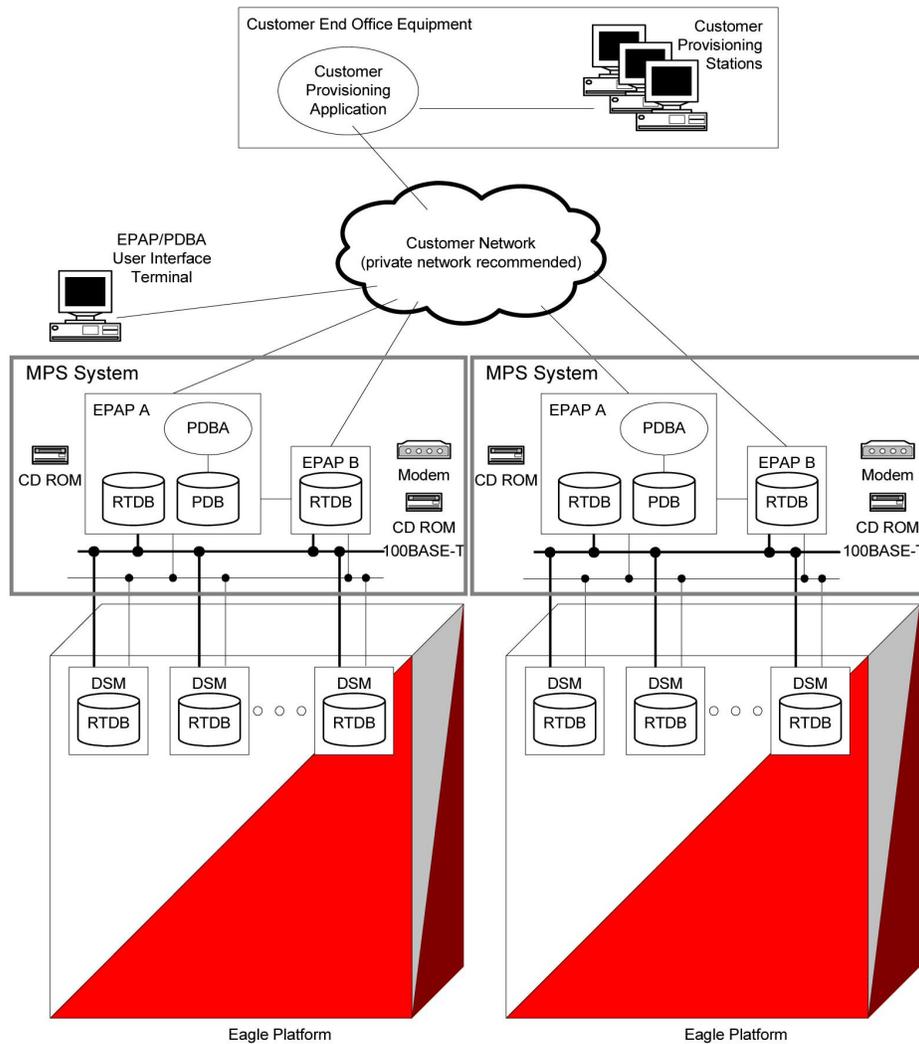
Tekelec provides the MPS (Multi-Purpose Server) platform as a subsystem of the EAGLE 5 ISS. The MPS provides support for the AINPQ, A-Port, EIR, G-Flex, G-Port, IGM, and INP features.

The MPS is composed of hardware and software components that interact to create a secure and reliable platform. (For details about the MPS hardware, refer to the *Tekelec 1000 Application Server Hardware Manual* or the *Tekelec 1200 Application Server Hardware Manual*.) The MPS provides the means of interfacing the customer provisioning application with the EAGLE 5 ISS. It connects the customer with the EAGLE 5 ISS and accepts the customer number portability data, while accommodating numbers of varying lengths.

The EAGLE Provisioning Application Processor (EPAP) is software that runs on the MPS hardware platform. It collects and organizes customer provisioning data, and forwards it to the EAGLE 5 ISS Service Module cards. [Figure 1: MPS/EPAP Platform Architecture](#) shows the overall system architecture, providing a graphic overview of MPS/EPAP platform from customer provisioning through the MPS subsystem to the EAGLE 5 ISS Service Module card databases.

Note: In this Manual, Service Module Card refers to either a DSM card or an E5-SM4G card unless a specific card is required. For more information about the supported cards, refer to the *EAGLE 5 ISS Hardware Manual*.

Figure 1: MPS/EPAP Platform Architecture



Design Overview and System Layout

Figure 1: MPS/EPAP Platform Architecture illustrates the overall system architecture and identifies the different tasks, databases and interfaces involved. The system consists of two mated MPS servers. Each MPS contains two EPAP platforms, EPAP A and EPAP B, each containing a RealTime Database (RTDB), a Provisioning Database (PDB), servers, optical media, modems, network hubs when using a T1000 AS system, or network switches when using a T1200 AS system . Each MPS and its EPAPs may be thought of as an ‘EPAP system’; the EPAP system and the mated EAGLE 5 ISS is referred to as the ‘mated EPAP system’. Each EPAP system is a T1000 or T1200 AS system with a total of four Ethernet interfaces: one from each EPAP to the 100BASE-T Ethernet and one from each EPAP to either a 10BASE-T or a 100BASE-T Ethernet. Refer to [Table 2: Service Module Card Provisioning and Reload Settings](#) for the link speed.

On the EAGLE 5 ISS platform side, a set of Service Module cards, which hold the RTDB database, is part of the STP. Two high-speed Ethernet links connect the Service Module cards and the EPAPs. One of the links is a 100BASE-T Ethernet bus, and the other is either a 10BASE-T or a 100BASE-T Ethernet bus. Refer to [Table 2: Service Module Card Provisioning and Reload Settings](#) for the speed.

The RTDB database is provisioned and maintained through the EPAPs. EPAP A and EPAP B act as the active EPAP and the standby EPAP. One link serves as the active link, and the other as the standby link. At any given time, there is only one active EPAP and one active link. The database is provisioned through the active link by the active EPAP; the other EPAP provides redundancy.

In case of failure of the active EPAP, the standby EPAP takes over the role of active EPAP and continues to provision the subscriber database. In the case where the active link fails, the active EPAP switches to the standby link to continue provisioning the Service Module cards. The two Ethernet links are part of the DSM network.

Another 100BASE-T Ethernet link exists between the EPAPs; that link is called the EPAP sync network.

The major modules on the EPAP are:

- Service Module card provisioning module
- Maintenance module
- RTDB module
- PDB module

The Service Module card provisioning module is responsible for updating subscriber databases on the EAGLE 5 ISS Service Module cards using the Reliable Multicast Transport Protocol (RMTP) multicast. The maintenance module is responsible for the proper functioning of the EPAP platform. The PDB module is responsible for preparing and maintaining the Real Time Database, which is the “golden copy” of the subscriber database. The PDB module can run on one of the EPAPs of either of the mated EAGLE 5 ISSs.

Functional Overview

The main function of the MPS / EPAP platform is to provision the data from the customer network to the Service Module cards on the EAGLE 5 ISS. Subscriber database records are continuously updated from the customer network to the PDB. The PDB module communicates with the maintenance module and the RTDB task over a TCP/IP connection to provision the Service Module cards on the EAGLE 5 ISS. The maintenance module is responsible for the overall stability and performance of the system.

It is possible for the current copy of the RTDB database on the Service Module cards to get out-of-sync due to missed provisioning or card rebooting. Therefore, the RTDB on the EPAP contains a coherent, current copy of the subscriber database. The EPAP-Service Module card provisioning task sends database information out on the provisioning link. The Service Module cards act as the receivers and are reprovisioned.

EPAP/PDBA Overview

The EAGLE Provisioning Application Processor (EPAP) platform and the Provisioning Database Application (PDBA), coupled with the Provisioning Database Interface (PDBI) facilitate the user database required for EAGLE 5 ISS EPAP-based features. The following functions are supported:

- Accept and store subscription data provisioned by the customer
- Update and reload subscriber databases on the Service Module cards

The PDBA operates on the master Provisioning Database (PDB). The EPAP and PDBA are both installed on the MPS hardware platform.

The EPAP platform performs the following:

- Maintains an exact copy of the real time database (RTDB) on the EPAP
- Distributes the subscription database to the Service Module cards
- Maintains a redundant copy of the RTDB database

The EPAP platform is a mated pair of processors (the upper processor, called EPAP A, and the lower processor, EPAP B) contained in one frame.

During normal operation, information flows through the EPAP/PDBA software with no intervention. Subscription data is generated at one or more operations centers and is delivered to the PDBA through a TCP socket interface (PDBI). The PDBA software stores and replicates data on EPAP A on the mated EPAP system. The data is then transmitted by the EPAPs across a private network to the Service Module cards located in the EAGLE 5 ISS frame.

The primary interface to the PDBA consists of machine-to-machine messages. The interface is defined by Tekelec and is described in the Provisioning Database Interface Manual. Provisioning software compatible with the EPAP socket interface can be created or updated using the interface described in that manual.

Additionally, a direct user interface is provided on each EPAP to allow for configuration, maintenance, debugging, and platform operations. A direct user interface is also provided by the PDBA for configuration and database maintenance.

The MPS/EPAP is an open-systems platform and easily accommodates the required high provisioning rates. Compared to the traditional OAM platform, the persistent database and provisioning in an open systems platform provides these benefits:

- Variety of hardware components and vendors
- Availability of third party communication and database tools
- Standard communication protocols
- Availability of personnel with related experience

Each EPAP server maintains a copy of the Real Time Database (RTDB) in order to provision the EAGLE 5 ISS Service Module cards. The EPAP server must comply with the hardware requirements in the *MPS Hardware Manual*. [Figure 1: MPS/EPAP Platform Architecture](#) illustrates the EPAP architecture contained in the MPS subsystem.

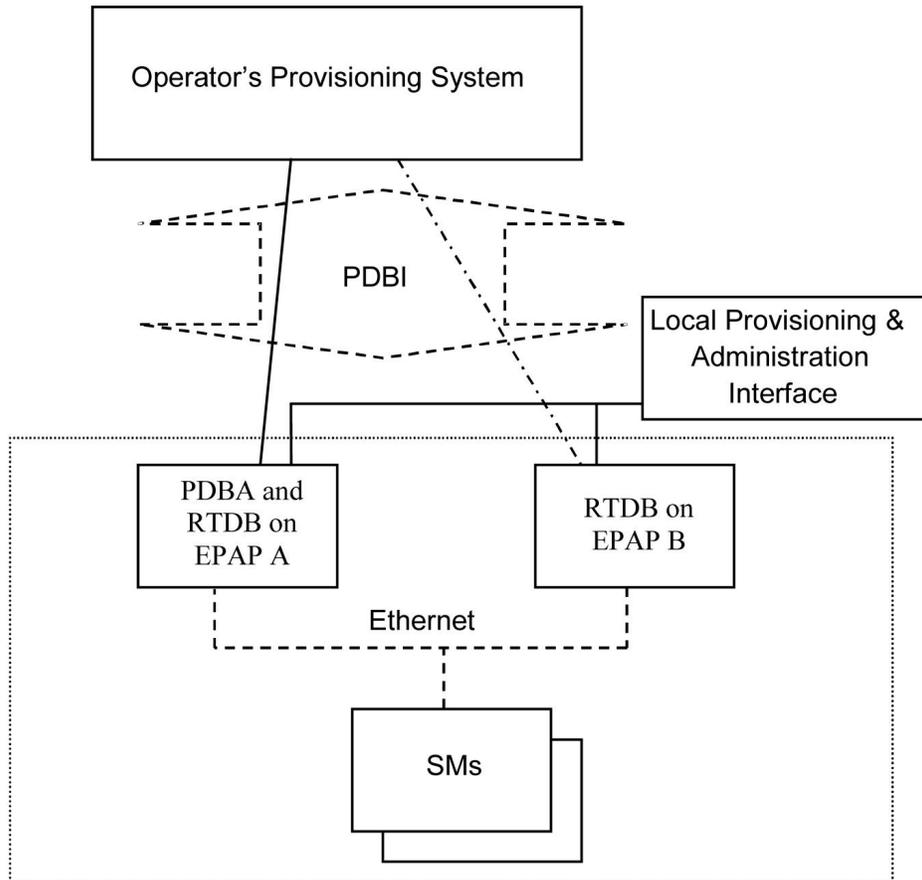
Each EPAP has a dedicated optical media drive. One EPAP per EAGLE 5 ISS platform has a modem capable of supporting remote diagnostics, configuration, and maintenance. These remote operations are performed through EPAP login sessions and are accessible across the customer network as well as through a direct terminal connection to the EPAP using an RS232 connection. Refer to the *Tekelec 1000 Application Server Hardware Manual* or the *Tekelec 1200 Application Server Hardware Manual* for details about the hardware devices and network connections.

Subscriber Data Provisioning

[Figure 2: Subscriber Data Provisioning Architecture \(High Level\)](#) shows the current high-level view of the subscriber data provisioning architecture. Only those parts of the EAGLE 5 ISS platform that are relevant to subscriber data provisioning are shown. This section defines requirements for the Provisioning Database Interface (PDBI) between the EPAP and the operator's provisioning system

(OPS). Provisioning clients connect to the EPAPs via the PDBI. This interface contains commands that allow all of the provisioning and retrieving of subscription data. The PDBI is used for real-time provisioning of subscriber and network entity data only. Refer to the *Provisioning Database Interface Manual* for more details.

Figure 2: Subscriber Data Provisioning Architecture (High Level)



A pair of active/standby EPAP servers provides the interface between the Real Time Database (RTDB) of the EAGLE 5 ISS Service Module cards and the OPS. EPAP A is equipped with both the PDB (Provisioning Database) and the RTDB, and EPAP B has just the RTDB. An EPAP with just the RTDB must be updated by the EPAP that has the PDB.

For more information about the EPAP, refer to the *EPAP Administration Manual*. For more information about the MPS hardware, refer to the *Tekelec 1000 Application Server Hardware Manual* or the *Tekelec 1200 Application Server Hardware Manual*.

Distributed Administrative Architecture

This section describes, at a high level, the distributed administrative architecture for the EAGLE 5 ISS, including the EPAP.

Databases requiring high update and retrieval rates, such as the EPAP RTDB, are populated using redundant Ethernet connections to Service Module cards from an EPAP MPS platform.

An EPAP consists of a combined Provisioning (MySQL) and Real Time Database (RTDB). The Provisioning Database (PDB) responds to requests for updates by the active and standby RTDBs on both mated EAGLE 5 ISSs. The active EPAP RTDB is responsible for initiating multi-cast updates of changed database records to the Service Module cards after the data has been committed to the EPAP disks. Furthermore, the PDB may accept and commit more database updates while the RTDBs are completing their previous updates.

It is this overlapping of database updates, coupled with an RTDB transactional database engine and fast download time, that allows larger amounts of data at a time to be transferred from the PDB. Committing larger amounts of data at a time to the RTDB (versus a single update at a time) allows faster overall transaction rates to be achieved. The boundaries of the transaction rates become more closely related to cache size and disk cache flush time than the disk access time of a single update. Thus, successful completion of EPAP database updates only guarantees that the PDB has been updated, but it does *not* mean the RTDB has completed the update and sent the new subscription data to the Service Module card.

The EPAP architecture contains a local provisioning terminal and a modem for remote access, as well as other functions. A backup device can be used to back up or restore the provisioning database. The local provisioning terminal is used to manually repair the standby EPAP RTDB or to turn the subscriber database audit on or off. For additional information, refer to the *Tekelec 1000 Application Server Hardware Manual*, *Tekelec 1200 Application Server Hardware Manual*, and *EPAP Administration Manual*.

EPAP (EAGLE Provisioning Application Processor)

As shown in [Figure 1: MPS/EPAP Platform Architecture](#), a single MPS system contains two EPAP (EAGLE Provisioning Application Processor) servers. At any given time, only one actively communicates with the Service Module cards. The other EPAP server is in standby mode. In addition, two MPS systems can be deployed in a mated-pair configuration.

The primary purpose of the EPAP systems is to maintain the RTDB and PDB and to download copies of the RTDB to the Service Module cards on the EAGLE 5 ISS.

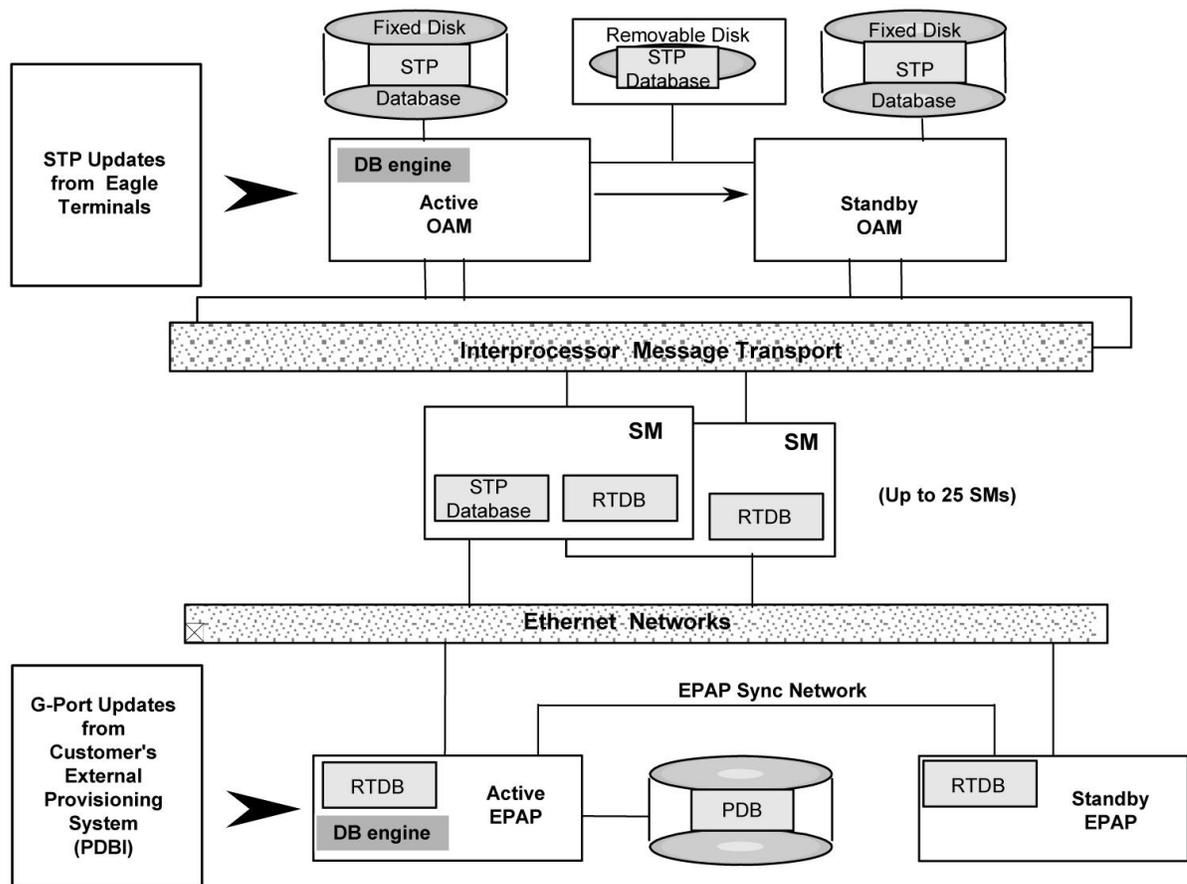
The PDB on the active EPAP receives subscription data from the customer network through the PDBI, the external source of provisioning information. The PDBA continually updates the active EPAP's PDB. The PDB uses MySQL database software. Once an update is applied to the active PDB, it is sent to the RTDBs on the active and standby EPAPs.

Both the active and standby EPAPs maintain copies of the RTDB. Periodically, the Service Module card polls the active EPAP RTDB for any new updates. The active EPAP downloads the updates to the Service Module for its own resident copy of the RTDB.

In a mated-pair configuration, there are two mated MPS Systems, as shown in [Figure 1: MPS/EPAP Platform Architecture](#). The PDB on the active EPAP automatically updates the PDB on the mate platform. The PDB on the mate platform then updates its EPAP RTDBs, which in turn update the RTDBs on the associated Service Module cards.

Provisioning of the EAGLE 5 ISS's Service Module cards is performed through two interfaces, using two different sets of commands. Provisioning is accomplished by the STP updates from EAGLE 5 ISS terminals and by updates from the customer's external provisioning system. This system of dual provisioning is illustrated in [Figure 3: Database Administrative Architecture](#).

Figure 3: Database Administrative Architecture



Service Module Cards

From 1 to 25 Service Module cards can be provisioned with one or more EPAP-related features enabled. EPAP-related features require that all Service Module cards contain 4 GB of memory. [Figure 3: Database Administrative Architecture](#) illustrates each Service Module card having two Ethernet links, the main Service Module network on the 100BASE-T link and the backup Service Module network. Refer to [Table 2: Service Module Card Provisioning and Reload Settings](#) for the link speed. The Service Module cards run the VSCCP software application.

The Service Module Ethernet ports are linked to the EPAP system to receive the downloaded Real Time database (RTDB). Multiple Service Module cards provide a means of load balancing in high-traffic situations. The RTDB on the Service Module card is in a format that facilitates rapid lookups.

Though the Service Module card copies of the RTDB are intended to be identical, the various databases may not be identical at all times for the following reasons:

- When a Service Module card is initialized, the card downloads the current copy of the database from the EPAP. While that card is being loaded, it cannot receive new updates that have arrived at the EPAP since reload began..
- Card databases can become out-of-sync with the EPAP RTDB when the EPAP receives updates from its provisioning source, but it has not yet sent the updates down to the Service Module cards. Updates are applied to the Provisioning Database (PDB) as they are received.

Two possible scenarios contribute to a condition where a Service Module card may not have enough memory to hold the entire database:

- The database is downloaded successfully to the Service Module card, but subsequent updates eventually increase the size of the database beyond the capacity of the Service Module card memory. In this situation, it is desirable for EPAP-related features to continue processing transactions, even though the database might not be up-to-date.
- When a Service Module card is booted and it is determined then that the card does not have enough memory for the entire database, the database is not loaded on that card. Each Service Module card is responsible for recognizing and reporting its out-of-memory conditions by means of alarms.

Overview of EPAP to Service Module Card Communications

Before discussing Service Module card status reporting or EPAP status reporting, it is helpful to understand the communications between the Service Module cards and the EPAP in broad terms.

- UDP - sending Service Module card status messages

The Service Module cards and EPAPs create a UDP (User Datagram Protocol) socket which is used for status messages. One of the last things a Service Module card does when it is initialized is to send a status message to the EPAP, containing the Service Module ID, database level, and memory size. The EPAP maintains tables containing the last known status of each Service Module card. EPAP uses these to determine whether or not the Service Module card needs to download the database.

- IP - reporting EPAP maintenance data

The Service Module cards create a TCP socket when they are initialized, and listen for connection requests. During initialization or after a loss of connectivity, the active EPAP chooses one of the Service Module cards and issues a *Connect* to establish the TCP/IP connection with that Service Module card (referred to as the primary Service Module). The purpose of this link is to provide a path for reporting EPAP alarms and to forward maintenance blocks to the Service Module card.

- IP Multicast - downloading GSM database

Because of the large size of the database and the need to download it quickly on up to 25 Service Module cards, EPAP-related features use a technique known as IP multicasting. This technique is based on Reliable Multicast Transport Protocol-II (RMTP-II), a product of Globalcast Communications. IP multicasting downloads the RTDB and database updates to all of the Service Module cards simultaneously.

The administration of IP multicasting is based on the concept of a “tree”, or stream of data, which is constantly being broadcast by the EPAP. Service Module cards that need to download the real time database or to receive database updates “join the tree”. Service Module cards can also “leave the tree”, typically when the database fills their available memory.

Service Module Card Provisioning and Reload

One of the core functions of the EPAP is to provision the Service Module cards with the Real Time Database (RTDB) updates. In order to provide redundancy for this feature, separate RMTP channels are created on each interface from each EPAP:

Table 2: Service Module Card Provisioning and Reload Settings

RMTP Channel	T1000	T1200 Running Only DSM cards	T1200 Running Only E5-SM4G cards	T1200 Running both DSM and E5-SM4G cards
EPAP A, Link A (on the main DSM network)	100BASE-T	100BASE-T	100BASE-T	100BASE-T
EPAP A, Link B (on the backup DSM network)	10BASE-T	10BASE-T	100BASE-T	10BASE-T
EPAP B, Link A (on the main DSM network)	100BASE-T	100BASE-T	100BASE-T	100BASE-T
EPAP B, Link B (on the backup DSM network)	10BASE-T	10BASE-T	100BASE-T	10BASE-T
Note: Full duplex mode is supported only when running all E5-SM4G cards on the T1200. In all other cases, half duplex mode is supported.				

Provisioning and other data is broadcast on one of these channels to all of the Service Module cards. Provisioning is done by database level in order to leave tables coherent between updates.

The Service Module cards do the following:

- Detect the need for incremental updates and send a status message to the EPAP.
- Discriminate between the various streams according to the database level contained in each message and accept updates based on the Service Module card database level.

Service Module Card Reload Model

Service Module cards may require a complete database reload in the event of reboot or loss of connectivity for a significant amount of time. The EPAP provides a mechanism to quickly load a number of Service Module cards with the current database. The database on the EPAP is large and may be updated constantly. The database sent to the Service Module card or cards will likely be missing some of these updates making it corrupt, in addition to being "back level."

EPAP Continuous Reload

It is important to understand how the EPAP handles reloading of multiple Service Module cards from different starting points. Reload begins when the first Service Module card requires it. Records are

read sequentially from the Real Time Database (RTDB) from an arbitrary starting point, wrapping back to the beginning. If another Service Module card requires reloading at this time, it uses the existing record stream and notifies the Service Module card provisioning task of the first record it read. This continues until all Service Module cards are satisfied.

Service Module Card Database Levels and Reloading

The current database level when the reload started is of special importance during reload. When a Service Module card detects that the last record has been received, it sends a status message back to the EPAP indicating the database level at the start of reload. This action starts incremental loading. The Service Module card continues to reload until it is completely caught up with the current level of the RTDB. As database records are sent to the Service Module cards during reload, normal provisioning can *change* those records. All records changed between the start and end of reloading must be incrementally loaded before the database is coherent and usable by the Service Module card.

The following terminology is used here for the stages of database reload for a given Service Module card.

- **Stage 1 loading:** The database is being copied record for record from the golden RTDB in the EPAP to the Service Module card RTDB. The database is incoherent during stage 1 loading.
- **Incremental update:** The database is receiving all of the updates missed during stage 1 loading or some other reason (e.g., network outage, processor limitation, lost communication, etc.). The database is coherent, but back-level during incremental update.
- **Current:** The database is receiving current updates from the Service Module card provisioning task.
- **Coherent:** The database is at a whole database level, that is, not currently updating records belonging to a database level.

EPAP Status and Error Reporting via Maintenance Blocks

The EPAPs forward all status and error messages to the Service Module cards in maintenance blocks. Maintenance blocks are asynchronously sent whenever the EPAP has something to report. The maintenance blocks eventually update EPAP Device Control Blocks (DCBs) located on the EAGLE 5 ISS. The DCBs provide the status information that is received when a `rept-stat-mps` command is issued.

Network Connections

Several customer and Tekelec-installed private networks are *required* to support the provisioning of subscription data. These networks are:

- *Customer Provisioning Network*
- *EPAP Sync Network*
- *DSM Networks*
- *Dial-Up PPP Network*

The following discussion is an overview of these private networks. It expands on the networks in the architecture diagram shown in *Figure 4: Customer Provisioning Network*. (For details about configuring these networks, refer to the *EPAP Administration Manual*.)

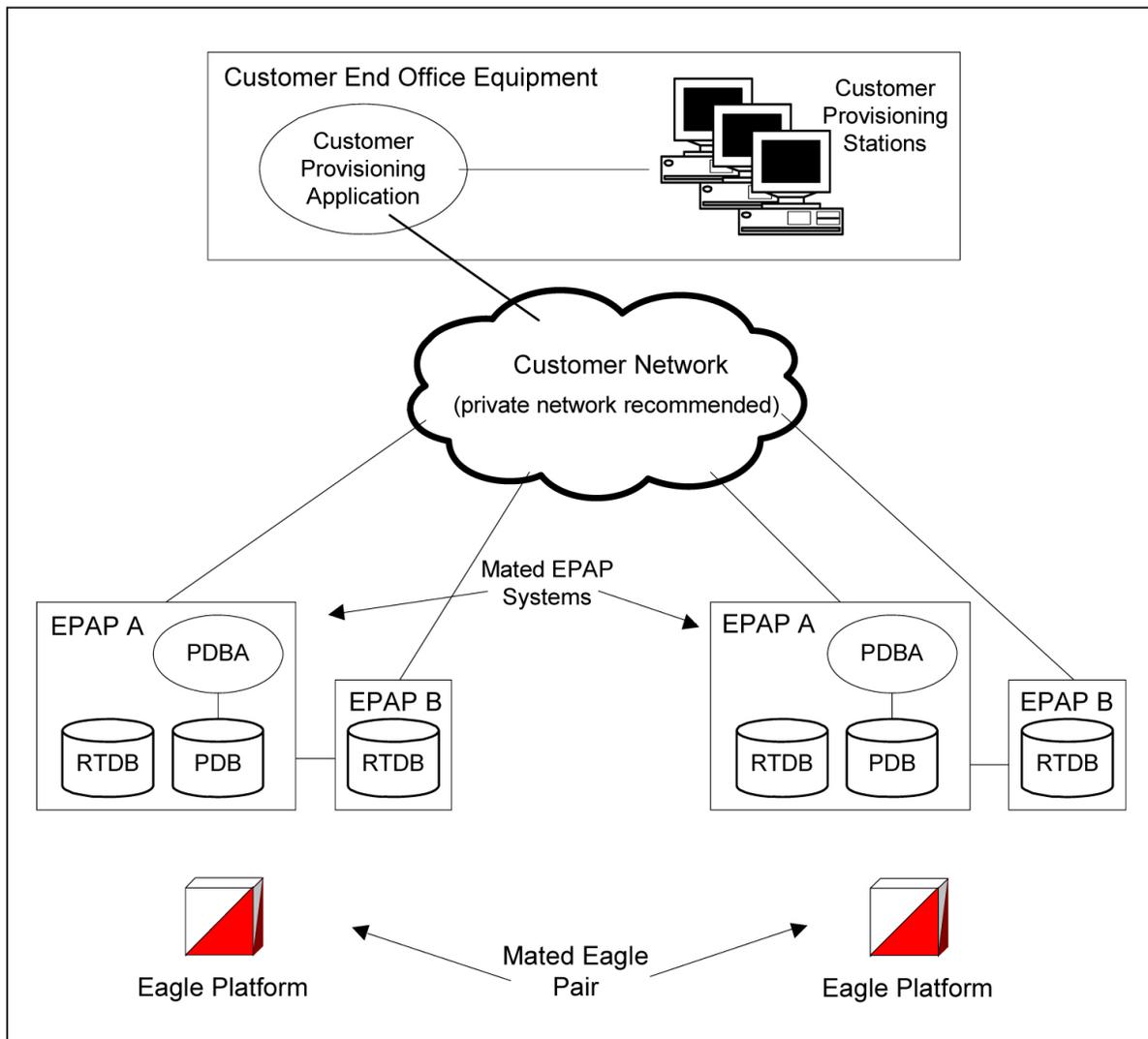
Customer Provisioning Network

The customer network carries the following traffic:

- Customer queries and responses to the PDB via the PDBI from the customer provisioning network
- Updates between PDBs of a mated EAGLE 5 ISS pair
- Updates between a PDB on one EAGLE 5 ISS and RTDBs on a mated EAGLE 5 ISS
- PDBA import/export (file transfer) traffic
- Traffic from a PDBA reloading from its mate
- EPAP and PDBA user interface traffic.

A typical customer network is shown in *Figure 4: Customer Provisioning Network*.

Figure 4: Customer Provisioning Network

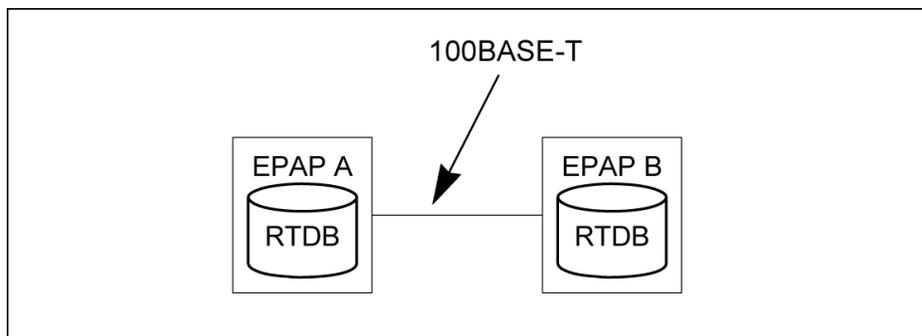


Although a dedicated network is recommended, it is possible that unrelated customer traffic can use the network as well. The determination, either to have a dedicated network or to allow other customer traffic, should be based on available external Ethernet bandwidth and network performance considerations.

EPAP Sync Network

The T100 EPAP sync network carries RTDB and maintenance application traffic between active and standby EPAP servers on an MPS system. It synchronizes the contents of the RTDBs of both EPAP A and B. The EPAP Sync network is a single Ethernet connection between EPAP A and EPAP B running at 100BASE-T, as shown in [Figure 5: EPAP Sync Network](#). The T1200 EPAP Sync network is truncated with the EPAP's back up DSM connection and communicates through the switch.

Figure 5: EPAP Sync Network

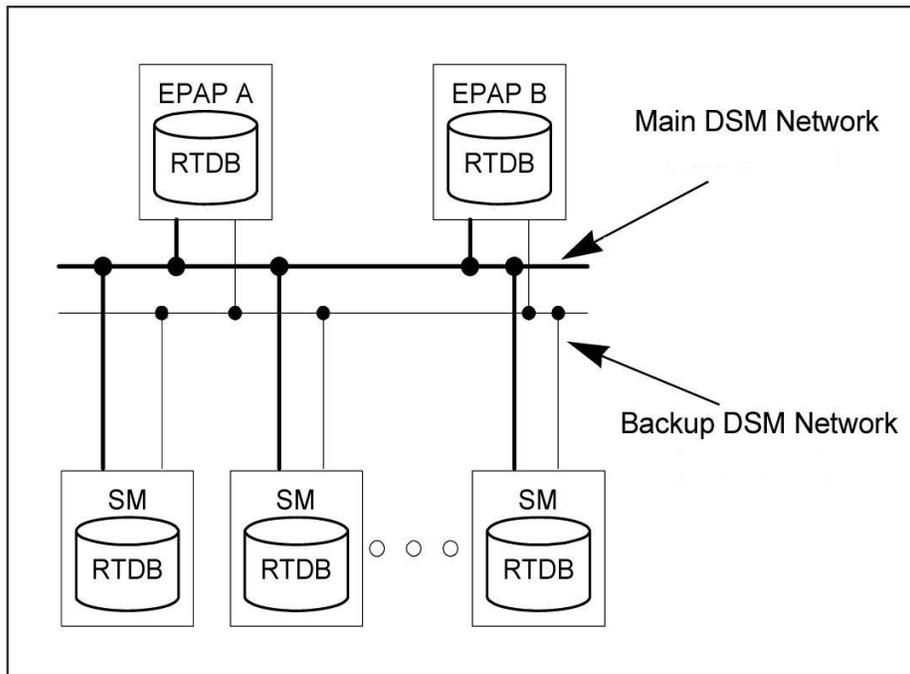


DSM Networks

The DSM networks are shown in [Figure 6: DSM Networks](#). They carry provisioning data from the active EPAP RTDB to the Service Module cards. They also carry reload and maintenance traffic to the Service Module cards.

The DSM networks consist of two Ethernet networks: the main DSM network running at 100BASE-T, and the backup DSM network running at either 10BASE-T or 100Base-T. Refer to [Table 2: Service Module Card Provisioning and Reload Settings](#) for the link speed. Both Ethernet networks connect EPAP A and EPAP B with every Service Module card on a single EAGLE 5 ISS platform.

Figure 6: DSM Networks



Maintenance information is sent from the active EPAP to an arbitrarily selected Service Module card. The selected Service Module card is known as the primary Service Module card. Static information is exchanged across this interface at initialization, and dynamic information is exchanged on occasion.

While much of the traditional OAM provisioning and database functionality is implemented on the EPAP, the maintenance reporting mechanism is still the OAM.

The first and second octets of the EPAP network addresses for this network are 192.168. (The first two octets for private class C networks are defined in RFC 1918.)

The third octet is customer specifiable for each DSM network. It is important to select values that do not interfere with the customer's network addressing scheme.

The fourth octet of the address is specified as follows:

- If the EPAP is configured as "EPAP A", the fourth octet has a value of 100.
- If the EPAP is configured as "EPAP B", the fourth octet has a value of 200.

Table 3: EPAP IP Addresses in the DSM Network summarizes the contents of each octet.

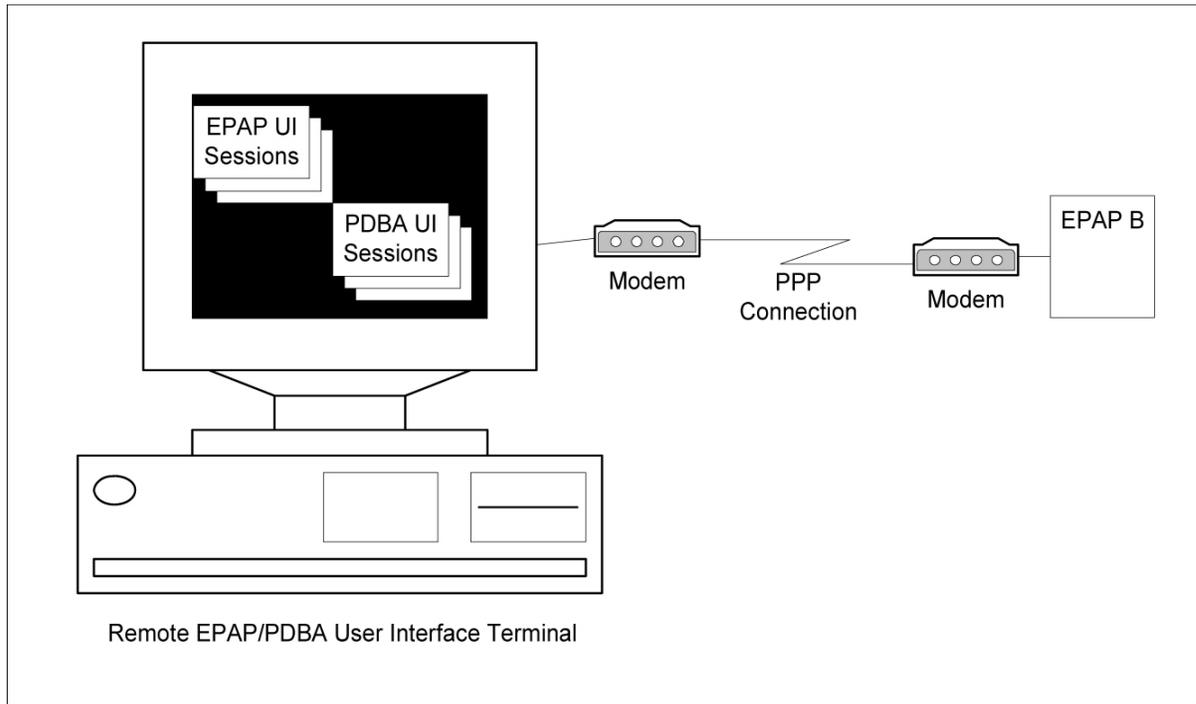
Table 3: EPAP IP Addresses in the DSM Network

Octet	Value
1	'192'
2	'168'
3	One customer-provisioned value for DSM network A, and another for DSM network B
4	'100' for EPAP A '200' for EPAP B

Dial-Up PPP Network

The dial-up PPP network allows multiple user-interface sessions to be established with the EPAP. The network connects a remote EPAP/PDBA user interface terminal with the EPAP in the EAGLE 5 ISS's MPS subsystem. The dial-up PPP network is illustrated in *Figure 7: Dial-Up PPP Network*.

Figure 7: Dial-Up PPP Network



Serviceability Hints

The following hints are offered to aid in the serviceability of A-Port databases:

- [Mated Application Considerations](#)
- [Entity Point Codes and Routes](#)

Mated Application Considerations

An EPAP-administered entity data can possibly become out-of-sync with the EAGLE 5 ISS mated application table because the creation of entity point codes (and/or subsystem numbers) in the mated application table is not performed at database administration time.

If this mismatch is discovered in real-time operations, a UIM message (such as "SCCP did not route - DPC not in MAP tbl" or "SCCP did not route - SS not in MAP tbl") is sent to the EAGLE 5 ISS maintenance terminal. This message means the MSU was discarded.

For this reason, it is recommended that the entity (SP or RN) not be administered until the entity point code (and/or subsystem number) has been entered into the EAGLE 5 ISS mated application (MAP) table.

Entity Point Codes and Routes

Verification that an entity point code exists in the route table and has a route is not performed at database administration time. Therefore, it is possible for the EPAP entity data to be out-of-sync with the EAGLE 5 ISS route table.

If an out-of-sync condition is discovered during real-time operation, a UIM is sent to the EAGLE 5 ISS maintenance terminal, indicating one of these conditions:

- Destination point code is not in the route table.
- Destination point code exists in the route table but is not assigned a route.
- Destination point code exists in the route table and has been assigned a route, but it is out of service.

A-Port Considerations

The following list should be considered before installing and operating the A-Port feature.

1. SRI responses are routed by both MTP and Global Title Translation.
2. The maximum length of the Application Context Name Object Identifier is 32 digits.
3. For A-Port Message Relay messages with E.164 numbers in the SCCP CdPA, it is assumed that no truncation occurred if and when the routing number was prepended and that SCCP CdPA contains the full Directory Number of the subscriber.
4. A-Port Message Relay to the EAGLE 5 ISS local subsystem is not supported.
5. Only the first 21 digits of the CdPA are decoded for A-Port Message Relay. For example, if the CdPA contains an RN prefixed to a DN, the RN is seven digits, and the DN is 15 digits, then the total is 22 digits. The DN used for processing will be only 14 digits (21 total digits less 7 RN digits).
6. With the Hex Digit Support for GTT feature enabled and turned on, Message Signaling Units (MSUs) containing either decimal or hexadecimal digits in the Called Party Address (CdPA) are processed. Unless the Hex Digit Support for GTT feature is enabled and turned on, GTT processes decimal digits only.

If the Hex Digit Support for GTT feature is not enabled and not turned on and an operator or country is using hexadecimal digits A through F in RNs and the operator is providing GTT to messages that have RN prefixes other than its own prefixes, then the operator must enter the RN + DN number ranges as DN ranges in the A-Port subscriber database. The beginning and ending DNs can be only 15 digits, which may not be sufficient for an RN + DN.

7. MNP applies within a single portability cluster. This is defined as a set of networks in a country or multi-country region having a common numbering plan and across which a subscriber, who is already inside the cluster, can port. Any individual A-Port node is required to support only an MNP within such a portability cluster.
8. The routing number found in the NP database is either prefixed to the dialed number to form a new concatenated Roaming Number that is returned to the switch, or is sent on its own as the Roaming Number.
9. All non-call related messages impacted by MNP contain the MSISDN number in the SCCP CdPA. In the case of the SRI message, A-Port may get the number from the MAP level.
10. TCAP operation codes uniquely distinguish Loc_req messages and do not change from one phase (or version) of MAP to another.

11. PCs and/or PC + SSNs that are in the entity table of the database and referenced by subscriber entries do not necessarily have the required data present on the EAGLE 5 ISS to route messages to them. For example, the point code may not have a route or the PC + SSN may not be in the MAP table for a final GTT. In this event, a UIM is output only when a message is discarded because of the lack of data.
12. The parameters of the SRI ACK message generated by A-Port are solely based on the provisioned data/options; they are not based on the MAP phase of the SRI message. For example, if the message received is phase 1 or 2, "MSRNDIG=RN", and the portability status is "NotKnowntobePorted", A-Port generates an SRI ACK contains IMSI, MSRN, MDN, and NPS parameters, despite the MDN and NPS parameters not being defined for phase 1 or 2.
13. If SRF IMSI is not provisioned with an RN entity and an incoming message is an SRI message, A-Port sets IMSI parameter as zero digits when the MAP phase is 1 or 2.
14. A-Port uses the MTP route for the SRI ACK response, even when the final GTT is performed on the response.
15. When the concatenated number (RN + MDN) option is selected for encoding the Routing Info (MSRN) in SRI ACK, A-Port encodes the complete concatenated number, because the concatenated number length may otherwise exceed 16 digits, which is the maximum allowed in MSRN.

General Numbering Requirements

Incoming called party numbers, from the SCCP portion, destined for A-Port processing are conditioned to fit the GDB requirements where possible. The following factors are used to condition the SCCP numbers.

- Based on provisioning: If the GTT selectors available in the incoming message match an entry in the A-Port selector table, then the service numbering plan from the selector table entry uses that number's numbering plan. Further conditioning is applied based on this new numbering plan.
- Based on configurable options: If the GTT selectors available in the incoming message match an entry in the A-Port selector table, then the service nature of address from the selector table entry uses that number's nature of address. Further conditioning is applied based on this new nature of address.
- If the nature of address is Subscriber, the default CC + default NC (network code for E.164) are prepended to the number. The default codes to be used by the EAGLE 5 ISS must be previously provisioned by the EAGLE 5 ISS operator. If not, a UIM is issued, and the message falls through to GTT.

Numbers with fewer than five digits after the above conditioning are not used for A-Port. In this case, a UIM is issued, and the message falls through to GTT.

Numbers with more than fifteen digits after the above conditioning are not used for A-Port. In this case, a UIM is issued, and the message falls through to GTT.

Maintenance

The following sections describe the maintenance consideration for A-Port, as follows:

- [Validation of A-Port Hardware Configuration](#)
- [Maintenance Commands](#)
- [A-Port Loading Mode Support](#)

- [Audit Requirements](#)

Validation of A-Port Hardware Configuration

Service Module card loading has been modified to verify the validity of the hardware configuration for the Service Module cards. Hardware verification includes the following:

- **Service Module card Verification**

An AMD-K6 (or better) main board is required to support the A-PortVSCCP application on the Service Module card. EAGLE 5 ISS maintenance stores the validity status of the main board configuration of the Service Module card.

Note:

The system does not allow the A-Port feature to be turned on if the hardware configuration is invalid.

When the VSCCP application is initializing, it determines the main board type. The SCCP maintenance block is the mechanism used to relay the main board information to OAM. This requires that the application software be loaded to the Service Module card and then the main board information received in the SCCP maintenance block must be verified. If the main board is determined to be invalid for the A-Port application, loading of the Service Module card is automatically inhibited.

- **Service Module card Applique Memory Verification**

The VSCCP application performs two types of memory validation to determine whether or not a Service Module card has sufficient memory to run A-Port:



CAUTION

CAUTION:

A-Port cannot be enabled if any of the Service Module cards have less than 4 GB of memory installed. Refer to the *Dimensioning Guide for EPAP Advanced DB Features* Technical Reference for important information on the dimensioning rules and the DSM database capacity requirements.

- *Local Memory Validation.* When the A-Port feature is first enabled, or any time the A-Port feature is enabled and the Service Module card is initializing, VSCCP checks to see if the Service Module card has at least 4 GB of memory installed.
- *Real-Time Memory Validation (during card initialization).* Once communications between the Service Module card and EPAP have been established, and the Service Module card has joined the RMTP Tree, the EPAP starts downloading the RTDB to the Service Module card. After the Service Module card has downloaded the RTDB, it continues to receive database updates as necessary. The EPAP includes the size of the current RTDB in all records sent to the Service Module card. The Service Module card compares the size required to the amount of memory installed, and issues a minor alarm when the database exceeds 80% of the Service Module card memory. If the database completely fills the Service Module card memory, a major alarm is issued, the Service Module card leaves the RMTP tree, and the status of the Service Module card changes to IS-ANR/Restricted. The Service Module card continues to carry traffic.
- **Actions Taken When Hardware is Determined to be Invalid**
When the hardware configuration for a Service Module card is determined to be invalid for the A-Port application, SCM automatically inhibits loading for that specific Service Module card. A major alarm is generated indicating that card loading for that Service Module card has failed and

has been automatically inhibited, which means it is prevented from reloading. Refer to [Maintenance and Measurements](#) for the specific alarm that is generated. When card loading has been inhibited, the primary state of the card is set to `oos-mt-dsbl'd`, and the secondary state of the card is set to MEA (Mismatch of Equipment and Attributes).

The following constraints apply to a Service Module card that is determined to be invalid:

- The Service Module card will not download the EAGLE 5 ISS databases.
- The Service Module card will not download the real-time RTDB from the EPAP.
- The Service Module card will not accept RTDB updates (including add, change, or delete) from the EPAP, nor will it accept STP database updates.

To activate loading of a Service Module card that has been automatically inhibited, the craftsperson must enter the `alw-card` command (`alw-card:loc=xxxx`).

- **Unstable Loading Mode**

At some point, having a number of invalid Service Module cards results in some of the LIMs (Link Interface Module) being denied SCCP services. A threshold must be monitored; if the number of valid Service Module cards is insufficient to provide service to at least 80% of the IS-NR LIMs, the system is said to be in an unstable loading mode. For other reasons why an EAGLE 5 ISS might be in an unstable loading mode, refer to [Loading Mode Support Status Reporting](#).

Maintenance Commands

The following commands are used for A-Port maintenance.

- The debug command `ent-trace` traps A-Port MSUs (Message Signaling Units) based on the point code of the switch that generated the MSU (SSP), a particular DN and entity ID. For MDN and entity ID, the comparison is based on the search key built from the CdPA GTAI (Global Title Address Information) after any conditioning. The existing GT SCCP trigger also applies to A-Port messages.
- The command `rept-stat-sccp` reports current A-Port statistics. An MSU is considered to be an A-Port MSU after SRVSEL. This command reports A-Port statistics on a single Service Module card basis or on an A-Port system basis.

For more information, refer to [Maintenance and Measurements](#).

A-Port Loading Mode Support

Loading mode support is not applicable for RTDB updates, since Service Module cards use incremental loading from the EPAP. STP Administrative updates are allowed while a Service Module card is loading and the system is above the 80% card stability threshold. If it is below the 80% threshold, loading mode support allows STP administrative updates to be rejected while cards finish loading and cross the 80% or greater threshold.

For A-Port, loading mode support is applicable for database updates originating from the EAGLE 5 ISSGSM-II cards (General Purpose Service Module II cards) destined for the Service Module cards.

Audit Requirements

The A-Port audit does not change EAGLE 5 ISS compliance to STP audit requirements, to which EAGLE 5 ISS currently adheres. A-Port subscriber database tables residing on the EAGLE 5 ISSTD fixed disks are audited by the existing STP audit, which only verifies tables on the EAGLE 5 ISS active and

standby TDMs. Audit mechanisms for A-Port tables residing on the EPAP platform are downloaded to the Service Module cards. The audit mechanisms consist of the following.

- On each Service Module card and on the standby EPAP, a background audit calculates checksums for each A-Port RTDB table record and compares the calculated checksum against the checksum value stored in each record. If the checksums are not the same, then a *database corrupt* alarm is issued.
- A process that runs approximately every five seconds or less on the active EPAP sends the latest RTDB database level to all the Service Module cards and the standby EPAP. If the database levels do not match, the standby EPAP or Service Module card issues a *diff level* alarm.

For more information on the audit mechanisms, refer to the *EPAP Administration Manual*.

A-Port Protocol

A-Port supports both Message Transfer Part (MTP) routed, if enabled, and Global Title (GT) routed messages. Service selection (SRVSEL) lookup is performed on GT-routed messages after Signaling Connection Control Part (SCCP) verification. GT routed messages support Unit Data Transfer (UDT) and non-segmented Extended Unit data (XUDT) message types.

Main Functions

A-Port and MNPCRCP provide the following main functions:

- *Message Discrimination*
- *RN Prefix Deletion - SCCP*
- *RN Prefix Deletion - TCAP*
- *Number Conditioning*
- *Database Lookup*
- *Message Relay*
- *Returning Acknowledgement*

Message Discrimination

Because A-Port provides translation of ported numbers, it provides a method to identify which messages should receive A-Port and which should receive GTT processing. This task of identification is provided via a service selector table (SRVSEL) in which the user can define A-Port service for messages matching a combination of selectors. If a selector match is not found, then the message falls through to GTT- or MTP- routing (in case of MTP routing).

RN Prefix Deletion - SCCP

The decoded SCCP CdPA digits can have a Routing Number (RN) concatenated with the Mobile Directory Number (MDN) number in two forms:

- RN + DN
- CC+RN+DN (where CC is the Country Code)

When the Service Nature of Address Indicator (SNAI) is one of the following, A-Port compares the decoded MDN number with the list of provisioned home RN prefixes defined in the Real Time Database (RTDB).

- RNIDN (Routing Number, International Directory Number)
- RNNNDN (Routing Number, National Directory Number)
- RNSDN (Routing Number, Subscriber Directory Number)
- CCRNDN (Country Code, Routing Number, National Directory Number)

If a match is found, A-Port strips off the RN digits from the number. Number conditioning, if required, is performed after deleting the RN.

When the SNAI is CCRNDN, A-Port first compares the CC to the DEFCC (Default Country Code) list:

- If CC is not equal to the DEFCC, the message falls through to GTT.
- If CC=DEFCC, then A-Port compares the digits after CC with the list of provisioned Home RN prefixes that are defined in the RTDB. If a match is found, then A-Port strips off the RN digits from the number. If no match is found, the no-prefix deletion is performed and A-Port processing continues.

RN Prefix Deletion - TCAP

The decoded MAP MDN digits can have a RN concatenated with the MDN number in two forms:

- RN + DN
- CC+RN+DN

The MAP NAI (Nature of Address Indicator) is used to determine the type: International, National, or Subscriber. If MNPCRCP is OFF, RN prefix deletion is not attempted. If MNPCRCP is ON, then RN prefix deletion is attempted on all MDNs. If the MAP NAI indicates International, then a check is performed for the DEFCC prefix on the MDN, as follows:

- If DEFCC is detected, then Home RN deletion is attempted using the CC+RN+DN format.
- All other MDNs will use the RN+DN format.

A-Port compares the decoded MDN number with the list of provisioned home RN prefixes defined in the RTDB. If a match is found, the A-Port strips off the RN digits from the number. If no match is found, then no prefix deletion is performed and A-Port processing continues with number conditioning.

Number conditioning, if required, is performed after deleting the RN.

Number Conditioning

The RTDB stores international MDNs only. The received MDN number or SCCP CdPA digits may need to be converted to an international number to perform a database lookup.

A-Port performs number conditioning upon successful decode and verification of the message. Home RN and IEC (International Escape Code) or NEC (National Escape Code) prefixes are removed. The MDN is conditioned to international number format based on the service Nature of Address Indicator: SNAI for SCCP, TCAP SNAI for TCAP, or MTP Location Request Message (LOCREQ) NAI for MTP.

Database Lookup

A-Port performs database lookup using the conditioned DN digits encoded in Called Party. The database lookup yields one of four possible outcomes:

- Match is Found with Network Entity (NE) Assigned

For subscriber entries with an RN and any Portability Type (PT), LOCREQ is returned with an RN and any IS41 messages are relayed. GTT is applied to any GSM or non-TCAP messages.

For subscriber entries with a Signalling Point (SP) and any Portability Type (PT), LOCREQ and any IS41 messages are relayed. GTT is applied to any GSM or non-TCAP messages.
- Match is Found Without NE

A data entry in the database is found if a subscriber entry in the database, either an individual DN entry or a DN block, matches the conditioned Called Party.

If an entry is found without an NE assigned and PT= 0, 1, 2, 36, or no PT, the LOCREQ is returned without an NE. GTT is applied to any IS41 message

If an entry is found without an NE assigned and PT= 5 or 6, the LOCREQ is routed via GTT.

GTT is applied to any IS41 message if an entry is found without an NE assigned. The EAGLE modifies only the MTP and SCCP information as required by standard GTT and keeps the TCAP portion of the message intact.
- Number conditioning fails. The DN is not found in the RTDB, or the DN is found with non-A-Port data.

Either the number has never been ported or is an unknown number. The EAGLE 5 ISS routes the message by normal GTT/MTP routing. The EAGLE 5 ISS modifies only the MTP and SCCP information as required by normal GTT/MTP routing, if required, as follows:

 - Perform GTT if the incoming message is sent to the EAGLE 5 ISS Self Point Code.
 - Route the message to the MTP Destination Point Code (DPC) if the incoming message is MTP-routed. (The MTP DPC of the message is not the EAGLE 5 ISS Self Point Code.)

The TCAP portion of the message remains intact.

Normal routing is performing GTT if the incoming message is sent to the EAGLE 5 ISS Self Point Code. Normal routing is routing the message to the MTPDPC if the incoming message is MTP-routed. (The MTPDPC of the message is not the EAGLE 5 ISS Self Point Code.)
- A-Port modifies the TCAP information for LOCREQ messages only when a HomeRN was deleted from the TCAP DN and LOCREQ RMHRN = YES. Any gaps in the data caused by a change in field length will be resolved by shifting the remaining information up. Any IEC or NEC code is left.

Because a DN may be the target of A-Port, G-Port, or Migration message processing in a hybrid network where an operator owns both GSM and IS41 network, message processing call disposition is based on which applications are turned on. [Table 4: A-Port Message Processing](#) summarizes A-Port message processing.

Table 4: A-Port Message Processing

NE/ PT	LOCREQ	Any IS41	Any GSM or non-TCAP
RN and any PT	ReturnResult (RN from RTDB)	Relay	GTT

NE/ PT	LOCREQ	Any IS41	Any GSM or non-TCAP
SP and any PT	Relay	Relay	GTT
No NE and PT= 0, 1, 2, 36, or no PT	ReturnResult (no NE)	GTT	GTT
No NE and PT= 5 or 6	GTT	GTT	GTT
No DN entry found	GTT	GTT	GTT

Database lookup results in the following:

1. Applying GTT or
2. Relaying the message to the destination as noted in the database or
3. Returning an acknowledge message to the originating switch.

Message Relay describes how the EAGLE 5 ISS formulates a relayed message or a returned ACK.

Message Relay

The rules for formatting the SCCP CdPA GTA field are based on the value specified in the DigitAction field. When a received IS41 message is relayed, the EAGLE formulates the SCCP CdPA GTA field of the outgoing message according to DigitAction specified:

- If DigitAction = none, the EAGLE 5 ISS does not overwrite the SCCP CdPA GTA.
- For all other values, the EAGLE 5 ISS formats the SCCP CdPA GTA according to the value assigned to DigitAction.

Table 5: DigitAction Applications identifies the required DigitAction options as well as examples of how the SCCP CdPA GTA of an outgoing message is formatted for each of the options. The example assumes the RN / SP ID is 1404 and default country code is 886.

Table 5: DigitAction Applications

DigitAction	Value in Incoming CdPA GTA	Value in Outgoing CdPA GTA	Meaning
none	886944000213	886944000213	No change to the Called Party GTA (default)
prefix	886944000213	1404886944000213	Prefix Called Party GTA with the entity id
replace	886944000213	1404	Replace Called Party GTA with the entity id
insert	886944000213	8861404944000213	Insert entity id after country code. (CC + Entity Id + NDC + SN)

DigitAction	Value in Incoming CdPA GTA	Value in Outgoing CdPA GTA	Meaning
delccprefix	886944000213	1404944000213	Delete country code and add prefix
delcc	886944000213	944000213	Delete country code
spare1	886944000213	treated as none	No change to the Called Party GTA (default)
spare2	886944000213	treated as none	No change to the Called Party GTA (default)

Returning Acknowledgement

When a LOCREQ response/ACK is returned, the EAGLE 5 ISS follows the LOCREQ encoding rules along with the following enhancements for added flexibility:

1. Allow users to specify which TCAP LOCREQ parameter (the TCAP Outgoing Called Party parameter) encodes the RN (and/or DN) information
2. Allow users to specify the Digit Type value to encode the TCAP Outgoing Called Party parameter
3. Allow users to specify the value to encode the Nature of Number field of the TCAP Outgoing Called Party parameter
4. Allow users to specify the value to encode the Numbering Plan field of the TCAP Outgoing Called Party parameter
5. Allow users to specify the digit encoding format of the LOCREQ TCAP Outgoing Called Party parameter;
6. Allow users to specify the MSCID values to be encoded in the LOCREQ message
7. Allow users to specify the Electronic Serial Number (ESN) values to be encoded in the LOCREQ message
8. Allow users to specify how the digits of the LOCREQ MIN parameter shall be encoded

MNP SCCP Service Re-Route Capability

This feature is designed to handle and control re-routing of MNP traffic from an affected node to alternate nodes within an operator's network. This feature is an optional feature and does not affect the normal MNP functionality. This feature consists of these main functions:

- [Service State Management](#)
- [MNP Re-Routing](#)
- [MNP Capability Point Codes](#)

Service State Management

Service state management is part of the MNP SCCP Service Re-Route Capability. Service state is used to indicate the current state of MNP, either *ONLINE* or *OFFLINE*. Service state also gives the user the option to mark MNP as *OFFLINE* or *ONLINE* based on the current behavior. If a MNP problem is identified, MNP can be marked *OFFLINE* to initiate the re-routing procedure. When Service Module cards need to be reloaded, MNP can be marked *OFFLINE* until enough cards are in-service and then bring MNP *ONLINE* in a controlled fashion.

When the MNP feature is turned on and the MNP service state is set to *OFFLINE*, the user can change the service to *ONLINE* at any point. Once the feature is turned *ONLINE*, MNP will start processing messages if at least one Service Module card is IS-NR (In Service - Normal).

The MNP service can be set to *OFFLINE* at any point. This causes the EAGLE 5 ISS to stop processing MNP traffic and re-routing is performed.

The MNP service state is persistent. Booting the OAM or all Service Module cards will not change the service state. Commands must be used to change the service state.

MNP Re-Routing

MNP Re-Routing is an optional feature and is enabled by defining a list of alternate PCs or by defining the GTT option. MNP re-routing is activated by marking MNP *OFFLINE*. When MNP is *OFFLINE* and alternate PCs are provisioned, any messages destined for MNP are re-routed to the available alternate PCs that are defined for MNP. If alternate PCs are not provisioned or none are available, then the GTT option is used. If the GTT option is set to YES, then messages destined for MNP will fall through to GTT as part of the re-routing procedure.

Re-Routing is applied to all MNP messages (based on SRVSEL). There is no distinction of Destination Point Code (DPC) of the messages. The DPC of the message can be either True, Secondary, or Capability Point code.

MNP Capability Point Codes

Capability Point Codes (CPC) are supported for MNP. The use of MNP capability point code allows the adjacent nodes to know about MNP outages. When MNP is taken offline through administrative commands, all traffic destined to that MNP node will result in a Transfer Prohibited (TFP) message being sent to the adjacent node about the MNP CPC. The TFP response to the adjacent node causes the traffic originating nodes to stop sending MNP traffic to this node. All MNP traffic coming into this node is sent to the alternate MNP nodes. Adjacent nodes will initiate route-set-test procedures after receipt of the TFP response.

If the messages are destined to the EAGLE 5 ISS true point code, then TFP messages are not generated when the MNP service is *OFFLINE*. The originator would not be aware of the outage.

Once MNP is back in service on the EAGLE 5 ISS, a Transfer Allowed (TFA) message is sent to the traffic adjacent nodes in response to route-set-test message. The traffic originating nodes will then start sending MNP traffic to the original MNP node.

MNP Capability point codes can be provisioned when the MNP feature is ON. There can be more than one Capability Point Code assigned to MNP CPC Type.

MNP supports up to 7 alternate PCs per domain. All 6 domains (ANSI, ITU-I, ITUN14, ITUN14 spare, ITU-I spare and ITUN24) are supported. An entire set of alternate PCs are considered as a re-route set. A GTT option is supported for MNP re-route. When the MNP service is *OFFLINE*, MNP messages fall through to GTT based on the GTT option. This option is set to YES by default.

MNP SCCP Service Re-Route Capability Summary

If the MNP service is not normal (because the RTDB is not in sync with MPS or if cards are misrouting MNP messages) then the MNP service state should be changed to *OFFLINE*.

Before changing MNP service to *OFFLINE*, it should be decided what kind of re-routing will be used during the outage. The EAGLE 5 ISS supports re-routing data to alternate point codes or falling through to GTT as two possible options. Rerouting to alternate point code has priority over falling through to GTT. Examples of these two options follow:

Option 1

Define alternate point codes to re-route MNP traffic. This is the recommended option. Up to 7 alternate MNP nodes can be provisioned to re-route all the incoming MNP traffic. Once provisioned, the MNP service can be changed to *OFFLINE*. This example has any incoming being MNP traffic being load-shared to point codes based on the relative cost.

```
chg-sccp-serv:serv=mnp:pci1=1-1-1:rc1=10:pci2=2-2-2:rc2=10:pci3=3-3-3:rc3=10:pci4=4-4-4:rc4=10
chg-sccp-serv:serv=mnp:pci1=1-1-1:rc1=10:pci2=2-2-2:rc2=10:pci3=3-3-3:rc3=10:pci4=4-4-4:rc4=10
chg-sccp-serv:serv=mnp:pci1=1-1-1:rc1=10:pci2=2-2-2:rc2=10:pci3=3-3-3:rc3=10:pci4=4-4-4:rc4=10
chg-sccp-serv:serv=mnp:pci1=5-5-5:rc1=10:pci2=6-6-6:rc2=10:pci3=7-7-7:rc3=10:pci4=8-8-8:rc4=10
chg-sccp-serv:serv=mnp:state=offline
```

Option 2

With this option, default GTT translations are provisioned for MNP service. Then the chg-sccp-serv command is used to provision GTT=YES. All MNP messages will fall through to GTT. An example command follows:

```
chg-sccp-serv:serv=mnp:gtt=yes
```

Once the MNP re-routing data is provisioned, MNP service can be changed to *OFFLINE*. At this point all MNP traffic will be re-routed. The user can take necessary steps to correct the MNP service on the node. Until all the cards or enough cards are in active state with valid MNP database, MNP service should not be changed to *ONLINE*.

[Table 6: MNP SCCP Service Re-Route Capability Summary](#) shows the actions taken when the MNP service is offline, a message arrives at the affected node requiring MNP service, and Service Module cards are available.

Table 6: MNP SCCP Service Re-Route Capability Summary

Result of service selector	DPC	Alternate point code defined and available	GTT to be performed as fall through	Message Handling	Network Management
MNP	MNP Capability PC	Yes	N/A	Re-Route to alternate point code based on relative cost	TFP concerning CPC
MNP	MNP Capability PC	No	Yes	Fall through to GTT and perform GTT	TFP concerning CPC
MNP	MNP Capability PC	No	No	Generate UDTS (return cause = network failure)	TFP concerning CPC
MNP	MNP Capability PC	Not Defined	Yes	Fall through to GTT and perform GTT	TFP concerning CPC
MNP	MNP Capability PC	Not Defined	No	Generate UDTS (return cause = no translation for this addr)	TFP concerning CPC
Not MNP	MNP Capability PC	N/A	N/A	Perform appropriate Service / GTT	None

Result of service selector	DPC	Alternate point code defined and available	GTT to be performed as fall through	Message Handling	Network Management
MNP	True or Secondary PC or non-MNPCPC	Yes	N/A	Re-Route to alternate point code based on relative cost	None
MNP	True or Secondary PC or non-MNPCPC	No	No	Generate UDTS (return cause = network failure)	None
MNP	True or Secondary PC or non-MNP CPC	No	Yes	Fall through to GTT and perform GTT	None
MNP	True or Secondary PC or non-MNPCPC	Not Defined	Yes	Fall through to GTT and perform GTT	None
MNP	True or Secondary PC or non-MNP CPC	Not Defined	No	Generate UDTS (return cause = no translation for this addr)	None
Not MNP	True or Secondary PC or non-MNP CPC	N/A	N/A	Perform appropriate Service/GTT	None
*Alternate point codes are defined and unavailable (prohibited or congested).					

MTP Routed SCCP Traffic

The MTP Msgs for SCCP Apps and MTP Routed GWS Stop Action features forward MTP routed SCCP messages to the Service Module cards. The SCCP messages forwarded by either feature are processed in the same way on the Service Module cards. The difference between the two features is that the MTP Routed GWS Stop Action feature filters messages based on provisioned Gateway Screening rules on a per linkset basis and forwards only UDT, UDTS, XUDT and XUDTS SCCP messages to Service Module cards, while the MTP Msgs for SCCP Apps feature forwards all MTP routed SCCP messages to the Service Module card without filtering. Because the MTP Routed GWS Stop Action feature selectively forwards the messages to the Service Module card, the feature has less impact on SCCP performance than the MTP Msgs for SCCP Apps feature. The features can coexist, which means that both features can be turned on in the same system.

MTP Msgs for SCCP Apps

MTP routed SCCP messages are supported with the MTP Msgs for SCCP Apps (MTPR) feature. LOCREQ and SMSREQ messages are supported. A Feature Access Key (FAK) for part number 893-0174-01 is required to enable the MTP Msgs for SCCP Apps feature. This feature can be turned on and off, but cannot be enabled with a temporary FAK. This feature can be enabled when at least one of these features is turned on:

- A-Port
- G-Flex
- IS41 GSM Migration (IGM)
- MO-Based IS41 SMS NP
- MO SMS ASD
- MO SMS B-Party Routing
- MO SMS GRN
- MO SMS IS41 to GSM Migration

After the MTP Msgs for SCCP Apps feature is turned on, all SCCP messages are routed to Service Module cards. The Service Module card then performs SCCP decode/verification. Use of the MTP Msgs for SCCP Apps feature adversely affects the SCCP capacity because all of these messages are counted under SCCP capacity.

If the MTP routed messages have CdPA RI=GT or SSN and GTI \neq 0, then a service selection (SRVSEL) lookup is performed using the SCCP CdPA information. If the result of the lookup is MNP service, then the message is sent to MNP handling. If a service selector does not match or the service is OFFLINE, then MTP routing is performed on the messages. MNP SCCP Service re-route is not performed on MTP routed messages.

If the MTP routed messages have CdPA GTI=0, the TCAP portion of ANSI TCAP messages is decoded. SMSMR service is invoked for SMDPP messages; IAR Base feature is invoked for Analyzsd messages. SMSMR service and IAR Base feature require the global title address to determine whether the destination of the message is Home SMSC or Home SCP. Because GTI=0 messages do not have a global title address, two additional parameters, `homesmsc` and `homescp`, for the `chg-dstn` and `ent-dstn` commands are provided for each provisioned point code to indicate whether the DPC is a Home SMSC (SMSMR service) or a Home SCP (IAR Base feature).

MNP handling checks whether the TCAP portion of the message is ITU or ANSI.

If the message has ANSI TCAP, then:

- General TCAP/MAP verification for A-Port is performed if the A-Port or IGM feature is turned on. Only LOCREQ and SMSREQ messages are handled by A-Port or IGM for MTP routed messages.
- When GTI \neq 0, message relay is performed on non-LOCREQ and non-SMSREQ ANSI TCAP messages based on the SCCP CdPA portion of the message.
- When GTI = 0, MTP routing is performed on non-LOCREQ ANSI TCAP messages.

If the message has ITU TCAP, the IGM feature is on, and GTI \neq 0, then:

- The message is considered for relaying based on the RTDB lookup results. General TCAP/MAP verification is not performed on the message.
- Message relay is performed based on the SCCP CdPA portion of the message with GTI = 2 or 4.

If the message has ITU TCAP, the IGM feature is on, and GTI = 0, then MTP routing of the message is performed.

ITUN-ANSI SMS Conversion is not affected by the MTP Msgs for SCCP Apps feature; ITUN-ANSI SMS Conversion handles only Registration Notification and SMS Notification messages.

MTP Routed GWS Stop Action

The MTP Routed GWS Stop Action feature provides a Gateway Screening (GWS) stop action: `sccp`. This stop action allows IS41-based features to process MTP routed traffic. GWS rules are used to filter MTP routed SCCP messages (UDT, UDTS, XUDT, and XUDTS) on a per linkset basis. The messages are then forwarded to Service Module cards for processing by features that support MTP routed messages based on Service Selection criteria. A Feature Access Key (FAK) for part number 893-0356-01 is required to enable the MTP Routed GWS Stop Action feature. This feature can be turned on and off, but cannot be enabled with a temporary FAK. The MTP Routed GWS Stop Action feature must be enabled before the `sccp` stop action can be provisioned, and before message processing can occur. The `sccp` stop action must be the last stop action in the GWS action set.

If the MTP Msgs for SCCP Apps (MTPR) feature is turned on, all SCCP messages are forwarded to Service Module cards without the `sccp` GWS stop action being executed, regardless of whether the MTP Routed GWS Stop Action feature is turned on.

After provisioning, the `sccp` stop action can be used by the following features, although at least one of these features must be turned on before the MTP Routed GWS Stop Action feature can be turned on:

- A-Port
- G-Flex
- Info Analyzed Relay ASD
- Info Analyzed Relay Base
- Info Analyzed Relay GRN
- Info Analyzed Relay NP
- IS41 GSM Migration (IGM)
- ITUN-ANSI SMS Conversion
- MNP Circular Route Prevention
- MO-Based IS41SMS NP
- MO SMS ASD
- MO SMS B-Party Routing
- MO SMS GRN
- MO SMS IS41 to GSM Migration
- MTP MAP Screening
- MT-Based IS41 SMS NP

Refer to *Database Administration – Gateway Screening* for additional information and provisioning procedures for the MTP Routed GWS Stop Action feature.

SMSREQ Handling for Migrated or Ported Subscribers

The SMSREQ Handling for Migrated or Ported Subscribers enhancement allows MTP routed SMSREQ messages to be supported by A-Port, IGM, MNP CRP, and MT-Based IS41 SMS NP features. Service selection criteria for MTP routed SMSREQ messages is the same for MTP routed LOCREQ messages. The MNP service processing for MTP routed SMSREQ messages is the same for Global Title (GT) routed SMSREQ messages. However, MTP routing is performed on MTP routed messages when these

messages fall through from the MNP service. Feature precedence is applied for SMSREQ messages as shown:

1. MNP CRP - If a circular route condition is detected, a UIM is generated and MTP routing is performed on the message.
2. IGM - If the DN is own-network GSM subscriber (Portability Type = 5) and SMSREQBYPASS = No, then send an SMSREQ Error Response (Return Result message) to the originator with SMS Access Denied Reason = 5.
3. MT-Based IS41 SMS NP - If the DN matches the MT-Based IS41 SMS NP feature criteria (IS41SMSOPTS:MTSMSTYPE), the SMSREQ response is generated.
4. A-Port - A-Port relays the message based on the RTDB lookup result. If relay information is not present in the RTDB data associated with the DN, then the message is MTP routed.
5. If A-Port is not turned on, then IGM relays the SMSREQ message for only own-network subscribers if the SMSREQ response is not previously sent for subscribers not handled by IGM. If relay information is not present in the Network Entity Type (RN/SP) associated with the DN or if Network Entity Type indicates an Other Licensed Operator (OLO) subscriber, then the message is MTP routed.
6. If none of the feature processing in the previous items is performed, then the message is MTP routed.

If a feature in the precedence list is off, processing by that feature is not performed.

Table 7: Subscriber Portability Type

Network Entity Type (NE)	Portability Type (PT)	Subscriber Type
RN	0	Own-network subscriber, if IGM or Service Portability is on Otherwise, Other Licensed Operator (OLO) subscriber
RN	any value other than 0	OLO subscriber
SP	any	Own-network subscriber
No entity, or any entity other than RN or SP	0, 1, 2, 36, or none (255)	OLO subscriber
No entity, or any entity other than RN or SP	any value other than 0, 1, 2, 36, or none (255)	Own-network subscriber

MT-Based IS41 SMS NP

The Mobile Terminated (MT)-Based IS41 SMS NP feature allows wireless operators to route short message service (SMS) messages destined to mobile subscriber within a number portability (NP) environment. If the MT-Based IS41 SMS NP feature is not enabled and turned on, then messages are processed by the A-Port feature.

The MT-Based IS41 SMS NP feature acts as follows:

1. Intercepts an SMSREQ message from the SMSC before the message reaches the home location register (HLR).
2. Extracts the message destination address (SCCP Called Party GTA), conditions the digits, and performs a lookup in the NP database.
3. If the destination address/subscribers belongs to a foreign network, then a reply message is sent to the SMSC with routing information. If the destination address/subscribers belongs to a local network, then the SMSREQ message is relayed to the HLR according to the options set for normal A-Port routing.

Options

The MT-Based IS41 SMS NP feature provides the following configurable options for controlling processing of SMS routing request messages and the content of the response:

- Selecting the Short Message Service Center (SMSC) response message type and digit format
- Specifying when an NP database lookup is considered to be successful
- Specifying the format of digits encoded in the response message.

Feature Control Requirements

The MT-Based IS41 SMS NP feature has the following control requirements:

- The `defcc` parameter in the `chg-stpopts` command must be set to a value other than **none** before the feature can be turned on.
- A FAK for part number 893-0199-01
- The A-Port feature must be enabled before the MT-Based IS41 SMS NP feature can be enabled.
- The A-Port feature must be turned on before the MT-Based IS41 SMS NP feature can be turned on.
- The feature cannot be enabled if the LNP feature is enabled.
- A temporary FAK cannot be used to enable the feature.
- The feature cannot be turned off after it has been turned on.

System Options for MT-Based IS41 SMS NP

The system level options that control the MT-Based IS41 SMS NP feature are stored in the IS41SMSOPTS database table. The MT-Based IS41 SMS NP feature must be enabled before the IS41SMSOPTS table can be provisioned.

The content of the IS41SMSOPTS table is used to help perform number conditioning, response generation, and other feature-specific options. [Table 8: MT-Based IS41 SMS NP Options](#) shows the options stored in the IS41SMSOPTS table, their possible values, and the action taken for each value.

Table 8: MT-Based IS41 SMS NP Options

IS41SMSOPTS Option	Value	Action in the EAGLE 5 ISS
MTSMSDNFMT	RN	This setting specifies the required format of digits which will be encoded in the "SMS_Address" parameter of the SMSREQ ACK return result response.
	RNDN (default)	
	CCRNDN	
	SRFIMSI	Note: <ol style="list-style-type: none"> 1. This feature requires STPOPTS:DefCC to be set before it can be activated. Also, DefCC is not be allowed to change to "NONE" as long as this feature is active. 2. MTSMSDNFMT is only used to handle digits if MTSMSPARM = DIGIT and MTSMSACKN = ACK.
MTSMSTYPE	SP	When the lookup in the NPDB has entitytype=SP, then the lookup is considered successful.
	RN (default)	When the lookup in the NPDB has entitytype=RN, then the lookup is considered successful.
	SPRN	When the lookup in the NPDB has entitytype=SP or RN, then the lookup is considered successful.
	ALL	When the lookup in the NPDB has entitytype=SP or RN or no_entity, then the lookup is considered successful.
	NONSP	When the lookup in the NPDB has entitytype!=SP (not SP), then the lookup is considered successful.
MTSMSPARM	DIGIT (default)	This specifies that the encoding of the SMS_ADDRESS parameter is in DIGIT format, as follows: Digit_type=IS41SMSOPTS:MTSMSDIGTYPE NAI=International NP=E164 Encoding=BCD
	PCSSN	This specifies that the encoding of the SMS_ADDRESS parameter is in PCSSN format. The PCSSN is taken from the entity_data (point code). If no data is present or if the entity data has a non-ANSI point code, then the EAGLE 5 ISS ANSI Point Code is encoded, if available. If no ANSI SID is available, the point code will be encoded as 0 (0-0-0). If SSN is not available from entity data, then the SSN is encoded as MTSMSSSN .

IS41SMSOPTS Option	Value	Action in the EAGLE 5 ISS
MTSMSDLTR	NO (default)	This option specifies if delimiter digit(s) need to be inserted in the MTSMSDNFMT digits. A value of NO means that no delimiter is inserted.
	PRERN	This option specifies if delimiter digit(s) need to be inserted in the MTSMSDNFMT digits. A value of PRERN means that this delimiter is inserted before the RN. That is, RN is considered as being DLT+RN.
	POSTRN	This specifies if a delimiter needs to be inserted in the MTSMSDNFMT digits. POSTRN means that this delimiter is inserted after the RN. That is, RN is considered as being RN + DLT.
MTSMSDLTRV	1-5 hex digits	This specifies the delimiter digit string that is inserted in the MTSMSDNFMT digits. This value can consist of 1-5 hexadecimal digits. A value must be defined here before MTSMSDLTR can be set to PRERN or POSTRN. The system default is "NONE". Once set, the MTSMSDLTRV can never be configured to "NONE" again.
MTSMSACKN	ACK (default)	This indicates that when the SMSREQ lookup is considered successful, a SMSREQ ACK is returned.
	NACK	This indicates that when SMSREQ look is considered successful, a SMSREQ NACK is returned.
MTSMSESN	NO (default)	This indicates that NO ESN parameter be encoded when generating the SMSREQ return result message
	YES	This indicates that the ESN parameter should be encoded when generating the SMSREQ return result message. The ESN is obtained from IS41OPTS:ESNMFG and IS41OPTS:ESNSN. Note: The default value of the ESNMFG (0x00) and ESNSN options is 0 (0x00,00,00).
MTSMSSSN	2-255	This specifies the SSN to be encoded if the MTSMSPARM is set to PCSSN. The default value is 6. Note: SSN 0 is considered to be invalid. SSN 1 is reserved for SCCP management.
MTSMSNAKERR	0-255 (default value is 5)	This specifies the TCAP Access Denied Reason to be included in the SMSREQ NACK generated by SMS-MT. The default value is 0x5 (Reserved).
MTSMSDIGTYPE	0-255 (default value is 6)	This specifies the Type of Digits to be encoded in the SMS_ADDRESS parameter "Type of Digits" field in the SMSREQ ACK message. The default value is 6 (Destination Number).

IS41SMSOPTS Option	Value	Action in the EAGLE 5 ISS
MTSMSCHKSRC	YES (default value is NO)	<p>This specifies that the SCCP CgPA GTA of the message will be used to determine whether the source of the message is a Home SMSC.</p> <p>If this option is YES and SCCP CgPA GTA is absent, then the source is assumed to be the Home SMSC.</p> <p>This is the recommended setting if it is necessary to ensure that the MT-Based SMS NP responses are received only by in-network SMSCs.</p>
	NO	<p>This specifies that Eagle will not validate the SCCP CgPA GTA. Effectively, the source of the message is considered to be Home SMSC without checking SCCP CgPA GTA.</p> <p>This may be used by the service provider to disable SCCP CgPA checking, if the service provide ensures that only in-network nodes will send SMSREQ and receive the response generated by this feature.</p>

MT-Based IS41 SMS NP Call Flows

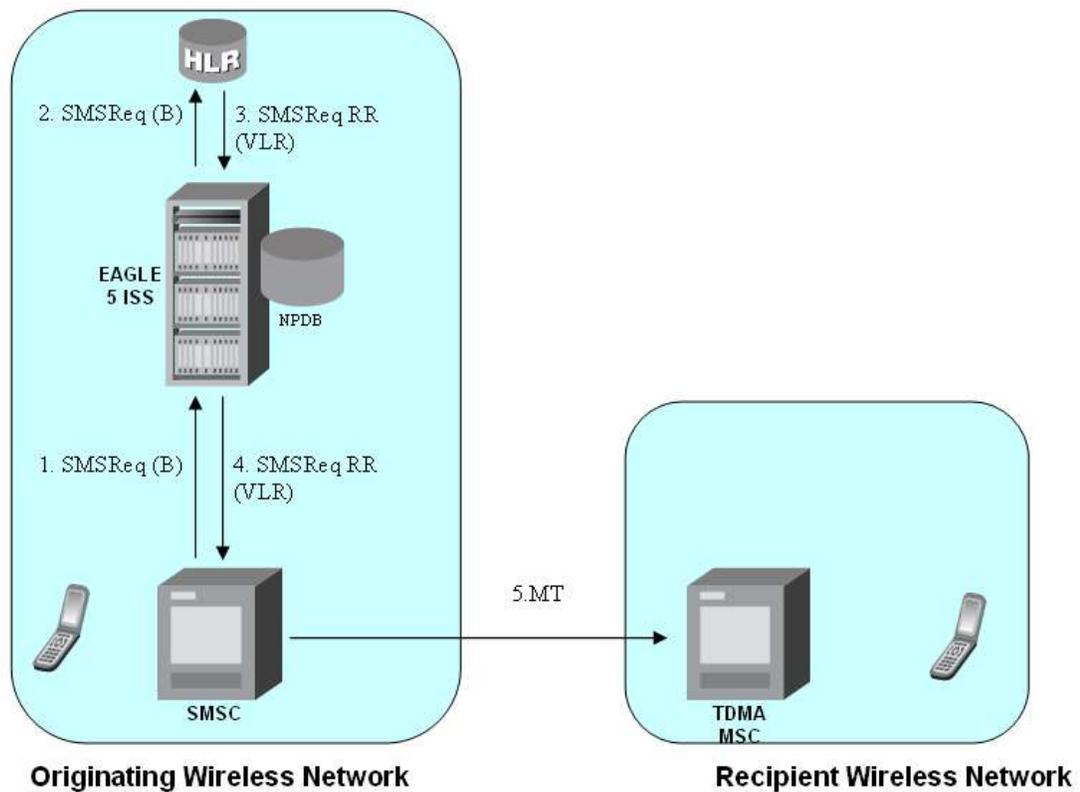
This section illustrates the sequence of messages that occur in the processing of SMS messages destined for mobile-terminated subscribers in a number portability environment. Two scenarios exist:

- The called subscriber who is in the same network as the calling subscriber
- The called subscriber who is in a different network from the calling subscriber

MT-Based IS41 SMS NP Call Flow for In-Network Subscriber

Figure 8: MT-Based IS41 SMS NP Call Flow for In-Network Subscriber depicts the message and control flows for a called subscriber who is in the same network as the calling subscriber.

Figure 8: MT-Based IS41 SMS NP Call Flow for In-Network Subscriber



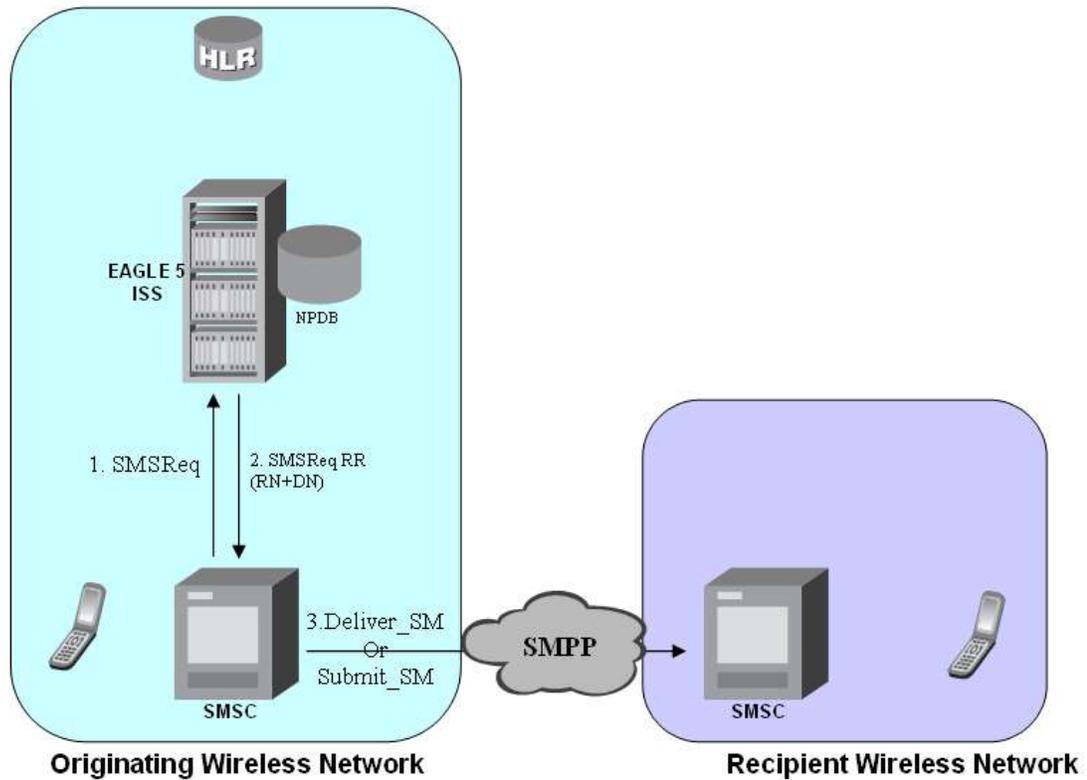
Call considerations:

- The TCAP calling party is a wireless IS41 subscriber.
- The TCAP called party is a non-porting or ported-in wireless subscriber that belongs to the same carrier as the TCAP calling party.
- The call type is SMS.
- SMSC has to be reconfigured to generate SMSReq to the HLR, regardless of called subscriber number being in or out of its own numbering range.
- If the called subscriber is ported-in, it has to be provisioned individually.
- If the called subscriber is GSM, Eagle Migration feature ensures that the message is delivered in the GSM network.

MT-Based IS41 SMS NP Call Flow for Other-Network Subscriber

Figure 9: MT-Based IS41 SMS NP Call Flow for Other-Network Subscriber depicts the message and control flows for a called subscriber who is in a different network from the calling subscriber.

Figure 9: MT-Based IS41 SMS NP Call Flow for Other-Network Subscriber



Call considerations:

- The TCAP calling party is a wireless TDMA subscriber.
- The TCAP called party is a non-ported or ported-out wireless subscriber that belongs to a different carrier from the TCAP calling party.
- The call type is SMS.
- The SMSC (Short Message Service Center) has to be configured to associate the RNs to their respective carriers.
- The called subscriber must be provisioned individually.

Chapter 3

Commands

Topics:

- [Introduction.....52](#)
- [EAGLE 5 ISS Commands for A-Port.....52](#)

This chapter contains brief descriptions of the EAGLE 5 ISS commands that are used for the configuration, control, maintenance, and measurements of the A-Port feature and the MT-Based IS 41 SMS NP feature.

Introduction

This chapter describes the commands for maintenance, measurements, and administration of the A-Port features. EAGLE 5 ISS A-Port commands provide for the provisioning, operations, and maintenance activities of the EAGLE 5 ISS Service Module cards and associated network connections.

EAGLE 5 ISS Commands for A-Port

This section includes the EAGLE 5 ISS commands that are either entirely new or modified for the A-Port feature. This chapter contains a brief description of the functions they provide and appropriate examples of their use. User commands are listed in [Table 9: Commands for EAGLE 5 ISS A-Port](#).

The command examples in this chapter illustrate the requirements and provide suggestions for suitable names and output. Complete descriptions of these commands are presented in the Commands Manual, including parameter names, valid values, and output examples for the commands.

Table 9: Commands for EAGLE 5 ISS A-Port

EAGLE 5 ISS Commands for A-Port Feature			
act-gpl	copy-gpl	inh-alm	rept-stat-trbl
alw-card	dlt-map	inh-card	rtrv-ctrl-feat
chg-ctrl-feat	dlt-card	rept-ftp-meas	rtrv-card
chg-db	dlt-sccp-serv	rept-meas	rtrv-gpl
chg-gpl	dlt-srvsel	rept-stat-alm	rtrv-is41opts
chg-is41opts	dlt-sid	rept-stat-db	rtrv-measopts
chg-measopts	enable-ctrl-feat	rept-stat-gpl	rtrv-sccp-serv
chg-sccp-serv	ent-card	rept-stat-meas	rtrv-sid
chg-sid	ent-map	rept-stat-mps	rtrv-srvsel
chg-srvsel	ent-srvsel	rept-stat-sccp	unhb-alm
		rept-stat-sys	

EAGLE 5 ISS IS41 Options Commands

The A-Port system options (is41opts) commands are used to change and report on the values of one or more of the STP node level processing option indicators maintained in the IS41option tables. All values are assigned initially to system defaults at STP installation time. The values can be updated later using the `chg-is41opts` command.

- **chg-is41opts: Change IS41 Options Command** – The `chg-is41opts` command changes IS41-specific options in the database. This command updates the IS41OPTS table. The default parameter values are always overwritten when specified. Refer to the *Commands Manual* for details of this command

Table 10: `chg-is41opts` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
esnmfg	Optional	0-255, none	TCAP LOCREQ ESN Manufacturer Code. This parameter specifies the value to be encoded in the TCAP LOCREQ ESN parameter in manufacturer code section.
esnsn	Optional	0-16777215	TCAP LOCREQ ESN Serial Number. This parameter specifies the value to be encoded in the TCAP LOCREQ ESN parameter in serial number section.
iec	Optional	digit string 1-5 digits, none	International escape code.
locreqdn	Optional	tcap, sccp	This parameter specifies whether the Called Party will be obtained from the SCCP layer or the TCAP layer of a received LOCREQ for database lookup.
locreqrmhrn	Optional	yes, no	LOCREQ RM HRN. This parameter specifies if HomeRN is to be removed from the TCAP Outgoing Called party for a relayed LOCREQ message.
mscmktid	Optional	0-65535	LOCREQ MSCID Market ID. This parameter specifies the value to be encoded in LOCREQ MSCID parameter for Market ID.
mscswitch	Optional	0-255	LOCREQ MSCID Market ID Switch. This parameter specifies the value to be encoded in LOCREQ MSCID parameter in the market id switch section.
mtplocreqlen	Optional	5-15	The parameter specifies the number of terminating called party digits to extract from the LOCREQ message.
mtplocreqnai	Optional	ccrndn, frmmsg, intl, natl, rnidn, rrndn, rnsdn, sub}, none	Message Translation Part LOCREQ Nature of Address Indicator. This parameter defines how Called Party obtained from the TCAP layer of a received MTP-routed LOCREQ message is interpreted.
nec	Optional	digit string 1-5 digits, none	National escape code

Parameter	Optional/ Mandatory	Range	Description
rspcdpapcp	Optional	off, on, frmmsg	Response called party point present. This parameter specifies the point code present bit that will encode the SCCP CdPA GTA of a LOCREQ response message.
rspcdpari	Optional	frmmsg, gt, ssn	Response Called Party Routing Indicator. This parameter specifies the value of the Routing Indicator bit to encode the SCCP CdPA GTA of a returned LOCREQ message.
rspcgpanai	Optional	ccrndn, frmmsg, intl, natl, rnidn, rnrndn, rnsdn, sub}, none	Response calling party nature of address indicator. This parameter specifies a new NAI value to override the NAI value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspcgpanp	Optional	0-15, none	Response calling party numbering plan. This parameter specifies a new Numbering Plan value to override the Numbering Plan value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspcgpapcp	Optional	frmmsg, included, notincluded	Response Calling Party Point Code Present. This parameter specifies the value of the Point Code Present bit to encode the SCCP CgPA GTA of a returned LOCREQ message.
rspcgpari	Optional	frmmsg, gt, ssn	Response Calling Party Routing Indicator. This parameter specifies the value of the Routing Indicator bit to encode the SCCP CgPA GTA of a returned LOCREQ message.
rspcgpatt	Optional	0-255, none	Response calling party translation type. This parameter specifies a new TT value to override the TT value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspdig	Optional	ccrndn, hrnrndn, rn, rndn	Routing number. This parameter specifies the digit encoding format of the LOCREQ TCAP Outgoing Called Party parameter on a per EAGLE 5 ISS node basis.
rspdigtype	Optional	0-255	Response digit type. This parameter specifies DigitType value to encode the TCAP Outgoing Called Party parameter.

Parameter	Optional/ Mandatory	Range	Description
rspmin	Optional	homern, nothomern, tendelhomern, tenhomern, tenzero	Response LOCREQ min parameter encoding. This parameter specifies how the digits of the LOCREQ MIN parameter are to be encoded.
rspnon	Optional	0-255, none	MSRN nature of number. This parameter specifies the Nature of Number value of the TCAP Outgoing Called Party parameter.
rspnp	Optional	0-15, none	MSRN numbering plan. This parameter specifies the Numbering Plan values of the TCAP Outgoing Called Party parameter.
rspparm	Optional	ddigit, rtdigit, tlist	Response parameter. This parameter specifies which TCAP LOCREQ parameter (TCAP Outgoing Called Party) will encode the RN and/or DN information.
smsreqbypass	Optional	yes, no	This parameter specifies whether a received SMSREQ that passes the MNP Service Selector (serv=mnp parameter is specified) will be subject to A-Port message processing.
tcapsnai	Optional	ccrndn, frmmsg, intl, natl, rnidn, rrndn, rnsdn, sub}, none	This parameter specifies how Called Party, obtained from the TCAP layer of a received LOCREQ message shall be interpreted, either based on the Nature of Number encoded in the TCAP Digits[Dialed] parameter, or based on the selection specified by the mtplocreqnai parameter.

- **rtrv-is41opts: Retrieve IS41 Options Command** – The `rtrv-is41opts` command displays the IS41 option indicators maintained in the IS41OPTS table.

The following IS41 options are displayed.

```
rtrv-is41opts

tekelecstp 06-08-15 10:33:44 EST EAGLE 39.0.0

IS41 OPTIONS
-----
SMSREQBYPASS      = NO
LOCREQDN          = SCCP
IEC               = NONE
NEC               = NONE
RSPCGPARI         = FRMSG
RSPCGPAPCP        = FRMSG
RSPCDPARI         = FRMSG
RSPCDPAPCP        = OFF
RSPCGPANAI        = NONE
RSPCGPANP         = NONE
RSPCGPATT         = NONE
```

```

MTPLOCREQNAI = FRMSG
RSPPARAM     = TLIST
RSPDIG       = RNDN
RSPNON       = NONE
RSPNP        = 2
RSPMIN       = HOMERN
MSCMKTID     = 0
MSCSWITCH    = 0
ESNMFG       = 0
ESNSN        = 0
RSPDIGTYPE   = 6
LOCREQRMHRN = NO
TCAPSNAI     = FRMSG
MTPLOCREQLEN = 15
;
    
```

EAGLE 5 ISS IS41 SMS Options Commands

The IS41 SMS options (`is41smsopts`) commands change and display SMS options in the EAGLE 5 ISS database for the MT-based IS41 SMS NP feature. The following sections describe the two variations: `chg-is41smsopts` and `rtrv-is41smsopts`. For details about these commands, refer to *Commands Manual*.

chg-is41smsopts

Change IS41 SMS Options Command - The `chg-is41smsopts` command changes the IS41 SMS system options in the database. This command updates the IS41SMSOPTS table. The default parameters are always overwritten when specified.

```

Command: chg-is41smsopts          Class = DATABASE
    
```

Table 11: chg-is41smsopts Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
mtsmsackn	Optional	ack, nack	MT-based SMS acknowledgement
mtsmschsrc	Optional	yes, no	MT-based SMS check source
mtsmsdigtype	Optional	0-255	MT-based SMS digit type
mtsmsdltr	Optional	no, prern, postrn	MT-based SMS delimiter
mtsmsdltrv	Optional	1-5 digits	MT-based SMS delimiter value
mtsmsdnfmt	Optional	rn, rndn, ccrndn, dn, srfimsi	MT-based SMS DN format
mtsmsesn	Optional	no, yes	MT-based SMS electronic serial number
mtsmsnakerr	Optional	0-255	MT-based SMS negative acknowledgement error
mtsmsparm	Optional	digit, pcsn	MT-based SMS parameter
mtsmsssn	Optional	2-255	MT-based SMS subsystem number

Parameter	Optional/ Mandatory	Range	Description
mtsmstype	Optional	sp, rn, sprn, all, nonsp	MT-based SMS type

The following command examples set the IS41 SMS options when the MT-based IS41 SMS NP feature is enabled.

- `chg-is41smsopts:mtsmsdnfmt=dn:mtsmstype=sp`
- `chg-is41smsopts:mtsmsdltr=no:mtsmsparm=digit`
- `chg-is41smsopts:mtsmsn=2:mtsmsnakerr=55:mtsmsdigtype=25`

rtrv-is41smsopts

Retrieve IS41 SMS Options Command - The `rtrv-is41smsopts` command displays all IS41 SMS options from the database.

The following IS41 SMS options are displayed if the MT-based IS41 SMS NP feature is enabled.

```
tekelecstp 08-04-08 19:38:30 EST EAGLE 39.0.0
IS41 SMS OPTIONS
-----
MTSMSDNFMT      = RNDN
MTSMSTYPE       = RN
MTSMSPARM       = DIGIT
MTSMSDLTR       = NO
MTSMSDLTRV      = NONE
MTSMSACKN       = ACK
MTSMSESN        = NO
MTSMSSSN        = 6
MTSMSNAKERR     = 5
MTSMSDIGTYPE    = 6
MTSMSSCHKSRC    = NO
;
```

EAGLE 5 ISS A-Port Service Selector Commands

The A-Port service selector (`srvsel`) commands are used to provision, remove, change, and report on the applicable service selectors required to change a service entry for Service Module card services. These commands provide flexibility when provisioning the type of messages that require A-Port processing. Four variants of the service selector commands are described in the following sections: `ent-srvsel`, `chg-srvsel`, `dlt-srvsel`, and `rtrv-srvsel`. For further details on the EAGLE 5 ISS service selector commands, such as command rules and output format, refer to the *Commands Manual*.

- **ent-srvsel: Enter A-Port Service Selectors Command**

The `ent-srvsel` command specifies that the applicable A-Port service selectors indicating A-Port processing are required. The A-Port feature must be enabled before entering this command. The available parameters are:

Table 12: ent-srvsel Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
serv	Mandatory	mnp	Service Module card service
ssn	Mandatory	0-255, *	Subsystem number
tt	Mandatory	0-255	Translation Type
nai	Optional	1sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	1e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	Optional	0-15	Numbering Plan Value
snai	Optional	1sub, natl, intl, rmidn, rmdn, rnsdn, ccndn	Service Nature of Address Indicator
snp	Optional	1e164, e212, e214	Service Numbering Plan

- **chg-srvsel: Change A-Port Service Selector Command**

The `chg-srvsel` command specifies the applicable A-Port selectors required to change an existing A-Port selector entry. The available parameters are:

Table 13: chg-srvsel Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
ssn	Mandatory	0-255, *	Subsystem number
tt	Mandatory	0-255	Translation Type
nai	Optional	1sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	1e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	Optional	0-15	Numbering Plan Value
nserv	Mandatory	eir, gflex, gport, inpq, inpmr, smsmr, idps, idpr, mnp	New Service Module card service to be selected

Parameter	Optional/ Mandatory	Range	Description
nsnai	Optional	1sub, natl, intl, rnsdn, rnsdn, rnsdn, rnsdn, rnsdn, rnsdn	New Service Nature of Address Indicator
nsnp	Optional	1e164, e212, e214	New Service Numbering Plan

- **dlt-srvsel: Delete A-Port Service Selector Command**

The `dlt-srvsel` command deletes a A-Port service selector. The available parameters are:

Table 14: dlt-srvsel Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
tt	Mandatory	0-255	Translation Type
ssn	Mandatory	0-255, *	Subsystem number
nai	Optional	1sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	1e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	Optional	0-15	Numbering Plan Value

- **rtrv-srvsel: Retrieve A-Port Service Selector Command**

The `rtrv-srvsel` command displays a list of administered A-Port service selector combinations. All output is sorted first by service, then by global title domain (ANSI first, followed by ITU), GTI, translation type, numbering plan, and by the nature of address indicator. The output can be filtered by specifying any optional parameter. The available parameters are:

Table 15: rtrv-srvsel Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Optional	2, 4	Global Title Indicator
nai	Optional	sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	Optional	0-15	Numbering Plan Value

Parameter	Optional/ Mandatory	Range	Description
serv	Optional	mnp	Service Module card service
snai	Optional	1sub, natl, intl, rnidn, rnmndn, rnsdn, ccrndn	Service Nature of Address Indicator
snp	Optional	1e164, e212, e214	Service Numbering Plan
ssn	Mandatory	0-255, *	Subsystem number
tt	Optional	0-255	Translation Type

EAGLE 5 ISS Feature Key Control Commands

These commands are used to enable, update, view, and control the A-Port feature. A Feature Access Key is used to turn the A-Port feature on. This feature must be purchased to have access to the Feature Access Key, which must be used when enabling these features.

No temporary key is associated with the A-Port feature. After the feature is on, it cannot be turned off. Two steps are needed to turn on the A-Port feature. The first step is to enable the feature. The second step is to set the status to **on**.

Additional verifications are performed to ensure that the correct hardware is present in the system. Refer to *Commands Manual* for details of this command.

- **enable-ctrl-feat: Enable Control Feature Command**

The `enable-ctrl-feat` command is used for the permanent enabling of the A-Port feature. An example of the command using the A-Port part number follows:

```
enable-ctrl-feat:partnum=893016601:fak=<Feature Access Key>
```

- **chg-ctrl-feat: Change Control Feature Command**

The `chg-ctrl-feat` command is used to activate the A-Port feature. This command requires the A-Port feature to be enabled as a prerequisite.

```
chg-ctrl-feat:partnum=893016601:status=on
```

- **rtrv-ctrl-feat: Retrieve Control Feature Command**

The `rtrv-ctrl-feat` command is used display the status of the features (on/off) and to show the trial period remaining if temporarily enabled.

EAGLE 5 ISS MNP SCCP Service Commands

The `sccp-serv` commands allow for services to be taken online and offline, and their processing load to be shifted to other designated nodes. These commands also support the assignment of PCs to PC groups used for MNP re-route assignment. Three variants of these commands are described in the following sections:

- `chg-sccp-serv`
- `dlt-sccp-serv`
- `rtrv-sccp-serv`

Entries using the **chg-sccp-serv** command are provisioned in the SCCP-SERV table, and are shown by the **rtrv-sccp-serv** command output. This reduces the maximum number of entries that the MRN table can contain by the number of entries shown in the **rtrv-sccp-serv** command output. For more information on provisioning MRN tables, refer to the *Database Administration Manual - Global Title Translations* manual.

For further details on the EAGLE 5 ISS MNP SCCP service commands, such as command rules and output format, refer to the *Commands Manual*.

- **chg-sccp-serv: Change MNPSCCP Service Command**

The **chg-sccp-serv** command is used to add point codes to an existing service group or to change the Relative Cost (RC) of existing point codes in a group. SCCP Service groups are organized by service (G-Flex, G-Port, MNP) and point code network type (ANSI, ITU-I, Spare ITU-I, ITU-N, Spare ITU-N, or ITUN-24). Up to seven PCs may be in a network type grouping for service re-route load sharing. This command allows for additions/modifications of up to 4 PCs at one time. The point code parameters support the Spare Point Code subtype prefix **s-** for ITU-I and ITU-N point codes. The available parameters are:

Table 16: chg-sccp-serv Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
serv	Mandatory	gport, gflex, mnp	Service
state	Optional	offline, online	Status
gtt	Optional	no, yes	Global Title Translation
pc1, pca1, pci1, pcn1, pcn241	Optional	Refer to Commands Manual	Post GTT-translated PC
rc1	Optional	00-99	Relative Cost
pc2, pca2, pci2, pcn2, pcn242	Optional	Refer to Commands Manual	Post GTT-translated PC
rc2	Optional	00-99	Relative Cost
pc3, pca3, pci3, pcn3, pcn243	Optional	Refer to <i>Commands Manual</i>	Post GTT-translated PC
rc3	Optional	00-99	Relative Cost
pc4, pca4, pci4, pcn4, pcn244	Optional	Refer to <i>Commands Manual</i>	Post GTT-translated PC
rc4	Optional	00-99	Relative Cost

- **dlt-sccp-serv: Delete MNP SCCP Service Command**

The **dlt-sccp-serv** command is used to remove entries from the SCCP Service table. A single command may either remove a PC from a group or remove the entire group. The available parameters are:

Table 17: dlt-sccp-serv Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
serv	Mandatory	gport, gflex, mnp	Service
pc1, pca1, pci1, pcn1, pcn241	Optional	Refer to Commands Manual	Post GTT-translated PC
pc2, pca2, pci2, pcn2, pcn242	Optional	Refer to Commands Manual	Post GTT-translated PC
pc3, pca3, pci3, pcn3, pcn243	Optional	Refer to Commands Manual	Post GTT-translated PC
pc4, pca4, pci4, pcn4, pcn244	Optional	Refer to Commands Manual	Post GTT-translated PC
all	Optional	No, Yes	Yes will delete the entire group

- **rtrv-sccp-serv: Retrieve MNP SCCP Service Command**

The `rtrv-sccp-serv` command is used to display the SCCP Service application relationship information maintained by the EAGLE 5 ISS. Point Codes are grouped by service. The sample output that follows indicates that the MNP service is online, and ANSI and ITU-I point codes are in the service set.

```
tekelecstp 05-12-20 08:51:53 EST 36.0.0-55.43.0
rtrv-sccp-serv
Command entered at terminal #4.
-----
Service      : GFLEX
State       : Offline
GTT Option  : Yes
-----
Service      : MNP
State       : Online
GTT Option  : Yes
-----
ANSI PC      RC
001-001-001 10
002-002-002 20
003-003-003 30
004-004-004 40
ITU-I PC     RC
2-002-2     10
3-003-3     10
;
```

Maintenance and Measurements User Interface Commands

This section provides a description of the user interface for maintenance and measurements for the A-Port feature. The commands that follow allow provisioning, operations, and maintenance activities for Service Module cards.

Refer to *Commands Manual* for details of these commands.

Commands described include:

- *chg-sid / dlt-sid*
- *ent-map / dlt-map*
- *rept-stat-sys*
- *rept-stat-sccp*
- *rept-stat-mps*
- *rept-ftp-meas*
- *rept-meas*
- *rept-stat-meas*
- *rtrv-measopts / chg-measopts*
- *rept-stat-trbl*
- *rept-stat-alm*
- *chg-db*
- *rept-stat-db*
- *inh-card / alw-card*
- *ent-card / rtrv-card / dlt-card*
- *ent/dlt/rtrv-home-smsc*
- *chg-gpl / act-gpl / rtrv-gpl / rept-stat-gpl / copy-gpl*
- *inh-alm / unhb-alm*

chg-sid / dlt-sid

These commands are used to change and report on the self-identification of the EAGLE 5 ISS. The self-identification identifies the EAGLE 5 ISS to other signaling points in the network. The CPC type `mnp` is used for A-Port.

ent-map / dlt-map

These commands are used to provision, remove, change, and report on the mate point code and subsystem number and its attributes. A mate point code defines an adjacent signaling point, which is considered the mated signal transfer point (STP) to the EAGLE 5 ISS.

These commands allow both ITU-N and ITU-I true point codes to be defined for the same SSN.

rept-stat-sys

This command is used to determine the location of problems in the MNP subsystem. The output shows the number of items that are In Service - Normal (IS-NR) and the how many are in another state (IS-ANR, OOS-MT, OOS-MT-DSBLD).

rept-stat-sccp

This command displays the status of the Service Module cards (DSM, E5-SM4G) and the services executing on the cards: ANSI-41 Mobile Number Portability (A-Port), ATI Number Portability Query

(ATINPQ), Equipment Identity Register (EIR), Global Title Translation (GTT), GSM Flexible Numbering (G-Flex), GSM Mobile Number Portability (G-Port), INAP-based Number Portability (INP), Info Analyzed Relay (IAR), IS41 GSM Migration (IGM), ITU TCAP LRN Query (LRNQT), Local Number Portability (LNP), MO-based GSM SMS NP, MO-based IS41 SMS NP, MO SMS B-Party Routing, MO SMS IS41-to-GSM Migration, Prepaid IDP Query Relay (IDP Relay), Prepaid Short Message Service Intercept (PPSMS), and Voice Mail Router (V-Flex). This command also displays any cards that are denied SCCP service.

If the MO-based GSM SMS NP, MO-based IS41 SMS NP, MO SMS B-Party Routing, MO SMS IS41-to-GSM Migration, Portability Check for Mobile Originated SMS (MNP SMS), or Prepaid Short Message Service Intercept (PPSMS) feature is turned on, the display title for the statistic status is *SMSMR*. If G-Port is turned on, with or without PPSMS, the display title for the statistic status is *GPORT*. If A-Port or IGM is turned on, with or without G-Port and PPSMS, the display title for the statistic status is *MNP*.

rept-stat-mps

This command is used to display the overall status of the application running on the MPS (Multi-Purpose Server). If the G-Port, G-Flex, A-Port, or Migration feature is turned on, the status of the Service Module card and EPAP is displayed.

rept-ftp-meas

This command provides on-demand measurements reporting capabilities. This command initiates generation and FTP transfer of a measurements report from the Measurement Collection and Polling Module (MCPM) to the FTP server. The `enttype=np` supports A-Port measurements. The combination of this enttype and a report type determines which on-demand A-Port report is generated. Only two report types are accepted in conjunction with enttype=eir: MTCH and MTCD. The A-Port enttype is only valid with the A-Port feature enabled.

rept-meas

This command includes A-Port measurements in the output sent to the EAGLE 5 ISS Terminal.

rept-stat-meas

This command reports the status of the measurements subsystem including card location and state, alarm level, and subsystem state.

rtrv-measopts / chg-measopts

The `chg-measopts` command provides the user with the capability to enable and disable measurement options related to the Measurements Platform. Use this command for the following functions:

- Enable the Measurements Platform collection function
- Turn on or turn off the 15 Minute Measurements collection function
- Enable or disable the automatic generation and FTP transfer of scheduled measurements reports to the FTP server
- Turn on or off the CLLI-based file name option for measurements reports files

The `rtrv-measopts` command displays the current state of the Measurements Platform options.

rept-stat-trbl

This command displays a summary the device trouble notifications. The severity of each alarm is indicated in the output report.

rept-stat-alm

This command includes the alarm totals of the A-Port subsystem and Service Module/EPAPIP links.

chg-db

The `chg-db` commands copies the EAGLE 5 ISS TDM-resident A-Port database tables during database backup, restore, and repair.

rept-stat-db

This command displays the status information for the EAGLE 5 ISS databases. This status information includes the level information for each Service Module card, and for the active and standby EPAP databases. The command reports database exception status such as corrupted, incoherent, or inconsistent, as well as providing the birthdates and levels. The command output is enhanced to show the status of the PDB and RTDB databases if the A-Port feature is activated.

inh-card / alw-card

The `inh-card` command is used to change the state of the card from in-service normal (IS-NR) to Out-of-Service Maintenance-Disabled (OOS-MT-DSBLD). A craftsperson can then test the DCM/LIM/Service Module card/GPSM-II/MIM card or physically remove it from the shelf.

The `alw-card` command is used to change the card from OOS-MT-DSBLD (out-of-service maintenance-disabled) to IS-NR (in-service normal) if the loading is successful.

ent-card / rtrv-card / dlt-card

The `ent-card` command is used to add a card to the database. The card type and application specifies the function assigned to the card. This command verifies that if the A-Port feature is turned on, the Generic Program Load (GPL) being provisioned is a VSCCP GPL; if it is, an error is displayed and the `ent-card` command is rejected.

The `rtrv-card` command is used to display the information about a card. This command displays the card type, the application the card is running, the linkset name, the signaling links, and the signaling link codes.

The `dlt-card` command is used to remove a card entry from the system database.

ent/dlt/rtrv-home-smsc

The `ent-home-smsc` command is used to enter home Short Message Service Center (SMSC) addresses in the database.

The `dlt-home-smsc` command is used to delete home Short Message Service Center (SMSC) addresses in from the database.

The `rtrv-home-smsc` command is used to retrieve HOME SMSC specific addresses currently used to identify SMSCs in the database.

chg-gpl / act-gpl / rtrv-gpl / rept-stat-gpl / copy-gpl

The command-handling and scroll area output for these commands include the VSCCP GPL.

These are samples of the reports produced by the commands.

```

chg-gpl:appl=vscpp:ver=101-3-0
  Command entered at terminal #3.
;
  tekelecstp 99-10-24 06:54:39 EAGLE 35.0.0
  VSCCP upload to 1114 completed
  VSCCP upload to 1116 completed
;

act-gpl:appl=vscpp:ver=101-3-0
  Command entered at terminal #3.
;
  tekelecstp 99-10-24 06:54:39 EAGLE 35.0.0
  VSCCP activate on 1114 completed
  VSCCP activate on 1116 completed
;

rtrv-gpl:appl=vscpp
  Command entered at terminal #3.
;
  tekelecstp 99-10-04 07:01:08 EAGLE 35.0.0
  GPL Auditing ON
  APPL  CARD  RELEASE      APPROVED      TRIAL      REMOVE TRIAL
  VSCCP 1114  101-001-000  101-003-000  101-001-000 101-003-000
  VSCCP 1116  101-001-000  101-003-000  101-003-000 -----
;

rept-stat-gpl:appl=vscpp
  Command entered at terminal #3.
;
  tekelecstp 99-10-04 12:55:50 EAGLE 35.0.0
  APPL  CARD      RUNNING      APPROVED      TRIAL
  VSCCP 1205      101-003-000 ALM    101-003-000  101-003-000
  VSCCP 1211      101-001-000 ALM+   101-003-000  -----
  Command Completed.
;

```

inh-alm / unhb-alm

These commands allow both Port A and Port B to be specified for the dev=d1k. This allows alarms to be inhibited on the DSM ports.

Feature Activation

Topics:

- *Introduction.....68*
- *Prerequisites.....69*
- *Feature Activation Overview.....70*
- *A-Port Feature Activation Procedure.....73*
- *MT-Based IS41 SMS NP Feature Activation Procedure.....91*
- *Activating the 1100 TPS/DSM for ITU NP Feature93*
- *Activating the E5-SM4G Throughput Capacity Feature.....98*
- *Adding a Service Module Card.....101*
- *MTP Msgs for SCCP Apps Activation Procedure.....103*

This chapter describes the prerequisites, considerations, and steps to activate the A-Port feature. This chapter also includes feature activation procedures for the following features:

- MT-Based IS41 SMS NP
- 1100 TPS/DSM for ITU NP
- E5-SM4G Throughput Capacity
- MTP Msgs for SCCP Apps

Introduction

This chapter identifies prerequisites for the A-Port feature activation procedure, an overview of the A-Port feature activation steps, and the feature activation procedures for these features:

- A-Port
- MT-Based IS41 SMS NP
- 1100 TPS/DSM for ITU NP
- E5-SM4G Throughput Capacity
- MTP Msgs for SCCP Apps

These feature activation procedures are performed at the EAGLE 5 ISS.

The A-Port feature and other related features are optional and are purchased from Tekelec. Contact your Tekelec Sales or Account Representative to determine whether you have purchased a specific feature or for additional information.

The A-Port features optimizes the use of subscriber numbers and number ranges in an IS41 Mobile Network by providing a Mobile Directory Number (MDN) and any International Mobile Station Identifier (IMSI). This feature allows subscribers to be moved easily from one Home Location Register (HLR) to another. The A-Port feature applies to ITU-N ANSI networks.

The following features are related to the A-Port feature. Contact your Tekelec Sales or Account Representative for additional information:

- Global Title Translation (GTT)
- Enhanced Global Title Translation (EGTT)
- Variable-Length Global Title Translation (VGTT)
- Mobile Number Portability Circular Route Prevention (MNPCR)



CAUTION:

For an in-service environment, contact the [Customer Care Center](#) before performing the A-Port feature activation procedure. For an environment that is not in-service, continue with the feature activation procedure.

The A-Port feature cannot be turned on if any of the Service Module cards have less than 4 GB of memory installed. Refer to *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information about the dimensioning rules and database capacity requirements. The A-Port feature requires a Service Module card running the VSCCP application prior to turning on the A-Port feature.

After a permanently-on feature has been turned on with the `enable-ctrl-feat` command, the feature cannot be turned off. Because this feature may affect other features or system databases, confirm that a feature license and technical support from Tekelec are available before turning on this feature. Contact your Tekelec Sales or Account Representative to verify whether the feature has been purchased.

Summary of Feature Activation

This table summarizes the attributes for the features activated in this chapter.

Table 18: Feature Activation Summary

Feature Name	Part Number	Temporary FAK Available?	Permanently On?
ANSI-41 Mobile Number Portability (A-Port)	893016601	No	Yes
MNP Circular Route Prevention	893007001	Yes	No
MTP Msgs for SCCP Apps	893017401	No	No
MT-Based IS41 SMS NP	893019901	No	Yes
1100 TPS/DSM for ITU NP	893018001	No	No
E5-SM4G Throughput Capacity	893019101 893019102	No	Yes

Prerequisites

The A-Port feature activation assumes that at least one of the following features is provisioned.

- Global Title Translation (GTT)
- Enhanced Global Title Translation (EGTT)
- Variable-Length Global Title Translation (VGTT)

Refer to *Database Administration Manual - Features* for provisioning procedures.

The A-Port feature activation assumes that the EPAP software is already configured; refer to *EPAP Administration Manual*, EPAP Software Configuration.

The NT serial number (`ent-serial-num`) must be entered and locked before A-Port can be enabled and turned-on.

The A-Port feature activation assumes that Service Module cards with 4 GB need to be installed.

- Note installed Service Module card locations if any.
- Note available odd-even card slots for Service Module card installation.
- Determine Service Module card IP addresses and have them available during the activation procedure.

For in-service systems, schedule Service Module card replacement in a maintenance window that allows the reboot of Service Module cards (`init-card:loc=<Service Module card location>`) one at a time.

**CAUTION:**

In an in-service environment, initialize one Service Module card at a time. Verify its return to the IS-NR state before initializing another Service Module card. This precaution keeps cards in service and prevents an interruption of SCCP services.

For in-service systems that already have another EPAP-related feature enabled, perform only [Step 4](#) to turn on the A-Port feature. With another EPAP-related feature feature enabled, the Service Module cards already contain the Real Time Database (RTDB).

For new systems, Service Module cards may be rebooted all at one time using the `init-card:appl=vsccp` command.

For new systems, the GTT, EGTT, or VGTT feature must be turned on prior to the reboot of all Service Module cards.

Feature Activation Overview

This section provides an overview of the A-Port feature activation procedure. The procedure is described in detail in [A-Port Feature Activation Procedure](#).

The feature activation consists of these sections:

- Configure system for HLR destinations in [Step 1](#) and [Step 2](#).
These steps configure the system to be able to communicate with the HLR database system. This route may already be configured. Perform these steps to verify that you have entered all HLR destinations for A-Port and make configuration changes as needed.
 - Install Service Module cards in available slots and configure for VSCCP in [Step 3](#).
 - Turn on and configure the A-Port feature in [Step 4](#).
1. Display and note current system settings for point codes (PCs) and capability point codes (CPCs), destination point codes (DPCs), routes, and linksets using [Substep a](#) through [Substep f](#).
 - a) Use `rtrv-sid` command to display current PCs and CPCs.
 - b) Use `rtrv-dstn` command to display current DPCs.
 - c) Use `rtrv-rte` command to display current route configurations.
 - d) Identify PCs and CPCs. Determine new PC and CPC to be entered in [Substep a](#).
 - e) Use `rtrv-stpopts` command to display PC or CPC format if ITU-N network.
 - f) Use `rtrv-map` command to display PCs of mated applications in database. Remove system PC from table, if necessary. Refer to the "Removing a Mated Application" procedure in *Database Administration Manual - Global Title Translation*.

**CAUTION:**

Changing a point code of a system requires a system reboot using the `init-sys` command to fully implement the changes. The `init-sys` command causes a complete system reload and should be used only in an environment that is not in

service. Using this command ensures that the updated self identification information is loaded onto all cards, but does interrupt service.

2. Change PC, CPC, DPC, route, linkset, and LIM card configurations for the HLR database using *Substep a* through *Substep t*.
 - a) Use `chg-sid` command to configure PC and CPC by network type.
 - b) Use `init-sys` command to initialize system if changes were made in *Substep a* to any `pca/pci/pcn` parameter.

**CAUTION:**

The `init-sys` command causes a complete system reload and should be used only in an environment that is not in-service. Using this command ensures the updated self identification information is loaded onto all cards, but does interrupt service.

When the `init-sys` command executes, the system does not retain the manually initiated state (for example, OOS-MT-DSBLD) for the signaling link, card, or terminal. After the command executes, the system attempts to bring all provisioned links, cards, and terminals on-line, including those that were previously out of service. After the system is again on-line, manually return each device to its previous state. Print or electronically capture the output of the `rept-stat-slk`, `rept-stat-card`, and `rept-stat-trm` commands for reference prior to issuing the command. To restore a device to its previous state, issue the appropriate inhibit/deactivate command listed in *Commands Manual*. in the Related Commands section for each of the above `rept-stat` commands.

- c) Use `rtrv-sid` command to display new PC and CPC.
- d) Use `ent-dstn` command to enter DPC for HLR destinations.
- e) Use `rtrv-dstn` command to display new HLRDPC.
- f) Use `ent-ls` command to enter linkset and assign DPC for HLR destinations.
- g) Use `rtrv-ls` command to display new linkset and assigned DPC for HLR destinations.
- h) Use `ent-card` command to enter LIM cards into the database.
- i) Use `rtrv-card` command to display new LIM cards in the database.
- j) Use `ent-slk` command to assign signaling links to LIM cards.
- k) Use `rtrv-slk` command to display new signaling links assigned to LIM card(s).
- l) Use `ent-rte` command to assign route to new DPC.
- m) Use `rtrv-rte` command to display route assigned to new DPC.
- n) Use `ent-map` command to enter mated application into database.
- o) Use `rtrv-map` command to display new mated application in database.
- p) Use `alw-card` command to allow LIM cards.
- q) Use `rept-stat-card` command to display status of new LIM cards in database.
- r) Use `act-slk` command to activate new signaling links for LIM cards.
- s) Use `rept-stat-slk` command to display IS-NR status of signaling links.
- t) Use `rtrv-card` command to confirm the new LIM cards and identify Service Module cards running the VSCCP application.



CAUTION: When adding Service Module cards to an in-service environment, take precautions to not interrupt traffic.

3. Install and configure Service Module card(s) in available odd-even slots as needed using *Substep a* through *Substep o*.
 - a) Install Service Module cards in available odd-even slots and verify green IMT bus LEDs.
 - b) Use `ent-card` command to enter Service Module cards running the VSCCP application into the database.
 - c) Use `rtrv-card` command to display new Service Module cards in the database.
 - d) Use `rtrv-ip-lnk` command to display current link parameters associated with the Service Module card.
 - e) Use `chg-ip-lnk` command to set the IP address port and speed associated with the Service Module card.
 - f) Use `rtrv-ip-lnk` command to display changed link parameters.
 - g) Use `rtrv-ip-host` command to display current IP host information in database.
 - h) Use `ent-ip-host` command to add host name and IP address for each VSCCP link.
 - i) Use `rtrv-ip-host` command to display changed IP host information.
 - j) Use `chg-ip-card` command to set local domain and IP router address if necessary.
 - k) Use `rtrv-ip-card` command to display changed Service Module card information.
 - l) Use `alw-card` command to boot Service Module card.
 - m) Use `rept-stat-card` command to display IS-NR status of Service Module card.
 - n) Use `pass` command to test presence of EPAP hosts on network.
 - o) Repeat *Substep a* through *Substep n* to add all Service Module cards (N+1) to be installed in available slots.



CAUTION: Contact *Customer Care Center* for technical assistance before performing the next step to activate the A-Port feature. Do not proceed before consulting *Customer Care Center*.

4. Turn on and configure the A-Port feature using steps *Substep a* through *Substep r*.
 - a) Use `enable-ctrl-feat` command to enable the A-Port feature.
 - b) Use `chg-ctrl-feat` command to turn on the A-Port feature.

Note:

Substep e through *Substep m* describe the commands that administer the A-Port protocol flow to support:

 - A-Port LOCREQ (Ported-out MDNs)
 - A-Port LOCREQ (Foreign MDNs not known to be ported)
 - A-Port Message Relay (Ported-in, non-porting MDNs)
 - c) Use `enable-ctrl-feat` command to enable the optional MTP MSGS for SCCP Apps feature, if required.
 - d) Use `chg-ctrl-feat` command to turn on the optional MTP MSGS for SCCP Apps feature, if required.
 - e) Use `chg-stpopts` command to enter default country code (CC) and default network destination code (NDC) if handling non-international numbers.

- f) Use `rtrv-stpopts` command to verify changes of CC and NDC.
- g) Use `chg-is41opts` command to change IS41 options.
- h) Use `rtrv-is41opts` command to verify changes to IS41 options.
- i) Use the `ent-homern` command to enter any Home RNs that are prefixed to DNs for incoming A-Port MR messages.
- j) Use `rtrv-homern` command to verify routing number prefixes.
- k) Use the `rtrv-srvsel` command to read the service selector combinations.
- l) Use `ent-srvsel` command to enter MNP service selectors.
- m) Use `rtrv-srvsel` command to verify changes to MNP service selectors.
- n) Use `init-card:loc= <Service Module card>` command to load RTDB, OAM, GPL, and GTT data to the Service Module card running the VSCCP application.
- o) Use `rept-stat-card` command to display IS-NR status of the Service Module card running the VSCCP application.
- p) Repeat *Substep n* and *Substep o* to reboot each Service Module card

Note:

After the A-Port feature is turned on, boot the Service Module cards with the `init-card:loc=<Service Module card location>` command.

- q) Use `chg-sccp-serv:serv=mnps:state=online` to set the MNP service to on-line.
- r) Confirm success of activation procedure with `rept-stat-sccp`, `rept-stat-mps`, and `rept-stat-db:display=all` commands.

EPAP can now administer A-Port entity objects and A-Port subscribers. For the details about performing these actions, refer to *EPAP Administration Manual*.

A-Port Feature Activation Procedure

Refer to *Commands Manual* for details about the commands used in this procedure.

**CAUTION:**

Refer to *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements.

1. Before changing a true point code (PC) and adding a capability point code (CPC) for the A-Port feature, display the current values of the self-identification configuration (shown in *Step 2*), the destination point codes (DPCs) (shown in *Step 3*), and the routes and linksets assigned to the DPCs (shown in *Step 4*).

The A-Port feature applies to ITU-N and ANSI networks.

2. Display the current self identification of the system (PC and CPC) using the `rtrv-sid` command.
Example of possible output:

```
tklc1081301 06-10-05 11:43:02 EST EAGLE5 36.0.0
PCA          PCI          PCN          CLLI          PCTYPE
006-010-006  5-010-5      5-010-5-aa  tklc1081301  ANSI
CPCA (MNP)
006-012-000
CPCI (MNP)
```

```
5-012-0
CPCN (MNP)
5-012-0-aa          5-012-0-ms
CPCN24 (MNP)
006-012-000
```

This example retrieved all capability point codes with `cpctype=mnmp`.

3. Display the current destination point codes in the Destination Table (`dpc/dpca`) using the `rtrv-dstn` command.

Example of possible output:

```
tk1c1191001 09-08-24 08:02:13 EST EAGLE 40.1.0
DPCA          CLLI          BEI  ELEI  ALIASI          ALIASN/N24  DMN
008-030-008  stpa038a  no  ---  -----  -----  SS7
006-010-006  stpc016a  no  ---  -----  -----  SS7
042-052-012  tk1ca4212a2 no  ---  4-075-2  4-075-2-aa  SS7
042-054-012  tk1ca4212a4 no  ---  4-077-2  4-077-2-aa  SS7
042-056-012  tk1ca4212a6 no  ---  4-079-2  4-079-2-aa  SS7
255-*-*      mobrncr001a ---  ---  -----  -----  SS7
255-225-*    mobrncr002a no  no  -----  -----  SS7
225-225-199  mobrnte001a no  ---  7-255-7  7-255-7-aa  SS7

DPCI          CLLI          BEI  ELEI  ALIASA          ALIASN/N24  DMN
7-030-7      stpa037i  no  ---  -----  -----  SS7
7-030-7      -----  no  ---  -----  -----  SS7
5-010-5      stpc015i  no  ---  -----  -----  SS7
DPCN24       CLLI          BEI  ELEI  ALIASA          ALIASI        DMN
008-030-008  stpa038c  no  ---  -----  -----  SS7
006-010-006  stpc016c  no  ---  -----  -----  SS7
006-090-006  stpd096c  no  ---  -----  -----  SS7
006-132-002  sc3a040i00 no  ---  -----  -----  SS7
DESTINATION ENTRIES ALLOCATED: 6000
FULL DPC(s): 664
EXCEPTION DPC(s): 5272
NETWORK DPC(s): 1
CLUSTER DPC(s): 1
TOTAL DPC(s): 5938
CAPACITY (% FULL): 99%
ALIASES ALLOCATED: 12000
ALIASES USED: 1185
CAPACITY (% FULL): 10%
X-LIST ENTRIES ALLOCATED: 500
```

The example shows a truncated display of all provisioned destinations.

4. Display the current route configuration using the `rtrv-rte` command.

Example of possible output:

```
rlghncxa03w 01-03-07 11:43:04 GMT EAGLE 36.0.0
DPCA          ALIASI          ALIASN          CLLI  LSN          RC  APCA
-----  -----  -----  -----  -----  ---  -----
DPCI          ALIASN          ALIASA          CLLI  LSN          RC  APCI
2-100-1      121111  -----  idp1  ls100001  10  1-234-5
              ls100002  10  1-234-6
              ls100003  20  1-234-7
              ls100004  30  1-234-1
              ls100005  40  1-234-2
              ls100006  50  1-234-3
DPCN          ALIASA          ALIASI          CLLI  LSN          RC  APCN
21111      -----  0-001-1  ndp1  ls200001  10  11111
              ls200002  10  11112
              ls200003  20  11113
              ls200004  30  11114
```

```
ls200005 40 11115
ls200006 50 11116
```

- If the system point code (pc/pcsa) or capability point code (cpc/cpcs) to be configured in this procedure is shown in [Step 2](#), [Step 3](#), or [Step 4](#), choose another point code to configure with this procedure ([Step 9](#)).
- If configuring the system point code or capability point code (pc or pcsa) of an ANSI network, view the current value of the ANSI point code format.

Otherwise go to [Step 7](#). Enter the `rtrv-stpopts` command and specify the point code format option `npcfmti`. The `npcfmti` option identifies how the point code is entered into the database and how it is displayed in any outputs. The value is shown in the `NPCFMTI` field.

Example of possible output:

```
rlghncxa03w 01-03-17 16:02:05 GMT EAGLE 36.0.0
STP OPTIONS
-----
MTPT31CTL          1
MTPLTI             yes
MTPLTCTDPCQ       3
MTPLTST           10000
MTPXLQ            500
MTPXLET           0100
MTPXLOT           90%
MTPDPCQ           1750
TFATFRPR          1000
MTPRSI            yes
MTPRSIT           5000
MTPLPRST          yes
MTPT10ALT         30000
SLSCNV            perlS
UIMRD             yes
CRITALMINH        no
DISPACTALMS       no
NPCFMTI           4-4-4-2
DEFCC             49
DEFNDC            177
DSMAUD            on
```

To change the format of the ANSI point code, go to the “ANSI Point Code” section in *EAGLE 5 ISS Database Administration Manual - SS7*. Then continue with [Step 7](#).

- Display the mated applications in the database using the `rtrv-map` command.

These are examples of possible output:

```
rlghncxa03w 04-01-07 11:43:04 EST EAGLE 36.0.0
MAP TABLE IS 1 % FULL (1 of 3000)
PCA          SSN RC MPCA          SSN MATERC MULT SRM MRC GRP NAME SSO
002-002-002 10 10                                YES YES ----- ON
                                002-002-003 20 10 SHR YES YES ----- ON
```

- If the system point code is shown in the `rtrv-map` command output (in the PCA, PCI, PCN, MPCA, MPC I, or MPCN fields), remove the system point code from the mated application table. Refer to procedure “Removing a Mated Application” in the *EAGLE 5 ISS Database Administration Manual - Features*.
- If the system point code or capability point code is a destination point code of a route, select a point code that is not the destination point code of a route (see output of the `rtrv-rte`

command in [Step 4](#)) and not in the Destination table (see output of the `rtrv-dstn` command in [Step 3](#)).

8. Change PC, CPC, DPC, route, linkset, and LIM card configurations for the HLR database using [Step 9](#) through [Step 29](#).

**CAUTION:**

Changing a system point code requires a system reboot using the `init-sys` command to fully implement the changes. The `init-sys` command causes a complete system reload and should be used only in an environment that is not in service. Using this command ensures the updated self identification information is loaded onto all cards but does interrupt service.

9. Configure the system point code (`pc/pca`) and capability point code (`cpc/cpca`) by network type using the `chg-sid` command.

For example, enter one of these commands:

```
chg-sid:pc=002-002-002:pca=003-002-002
```

```
chg-sid:cpc=10-20-30:cpca=20-20-30
```

where:

pc/pca

The point code used to uniquely identify the system.

cpc/cpca

The point code used by the SS7 protocol to identify a group of functionally related EAGLE 5 ISSs in the signaling network to which the EAGLE 5 ISS belongs.

After successful completion of this command, the system returns the following output:

```
rlghncxa03w 01-03-07 00:57:31 GMT EAGLE 36.0.0
CHG-SID: MASP A - COMPLTD
```

When any of the `pc/pca` parameters have changed, the system needs to be reinitialized. The following caution message is displayed:

```
CAUTION: SYSTEM SITE ID HAS BEEN CHANGED, MANUAL RE-INITIALIZATION IS NEEDED
```

**CAUTION:**

The `init-sys` command causes a complete system reload and should be used only in an environment that is not in service. Using this command ensures the updated self identification information is loaded onto all cards, but does interrupt service.

When the `init-sys` command executes, the system does not retain the manually initiated state (for example, OOS-MT-DSBLD) for the signaling link, card, or terminal. After the command executes, the system attempts to bring all provisioned links, cards, and terminals on line, including those that were previously out of service. Each device will need to be manually put back into its previous state after the system is back on line. Print or electronically capture the output of the `rept-stat-slk`, `rept-stat-card`, and `rept-stat-trm` commands for reference prior to issuing the `init-sys` command. To restore a device to its previous state, issue the appropriate inhibit/deactivate command listed in *Command Manual* in the Related Commands section for each of the above `rept-stat` commands.

- Reinitialize the system by entering the `init-sys` command if changes were made in [Step 9](#) to any `pc/pca` parameter.

Note:

The `init-sys` command must be entered twice within 30 seconds for the system to re-initialize. If the `init-sys` command is not executed twice within 30 seconds, the attempt to re-initialize the system is aborted.

When the `init-sys` command is first entered, this message should appear.

```
rlghncxa03w 01-03-07 00:57:31 GMT EAGLE 36.0.0
CAUTION: This command causes a complete system reload, and
will result in traffic loss.
Re-enter command within 30 seconds to confirm.
```

When the `init-sys` command is re-entered within the 30 second time limit, this message should appear.

```
rlghncxa03w 01-03-07 00:57:31 GMT EAGLE 36.0.0
Init System command issued at terminal #3
```

From the time that the `init-sys` command is accepted, approximately two minutes must elapse before [Step 11](#) (logging into the system) can be performed. If the terminal is in the VT-100/VT-320 mode, the terminal display will be refreshed with non-zero alarm counts. During this two-minute interval, an intermediate screen refresh occurs, which is caused by the role of the MASP (Maintenance and Administration Subsystem Processor) change from active to standby and from standby to active. This screen refresh is typically a partial refresh and the alarm indicators are set to zero.

If logged into the system in the KSR (Keyboard Send/Receive) mode, the message 'UAM 0009, MASP became active' is the only response indicating a successful login to the system. UAM 0009 could be issued twice due to a possible transient MASP role change (switching from active to standby). Following the execution of the `init-sys` command, the MASP that was active before the `init-sys` command was entered will be the active MASP again when the system has finished reinitializing.

- Verify the SID changes using the `rtrv-sid` command.

Example of possible output:

```
tekelecstp 04-06-14 15:18:11 EST EAGLE 36.0.0
  PCA          PCI          PCN          CLLI          PCTYPE
  003-002-002  1-023-4      01234        tekelecstp    ANSI
          CPCI
          s-4-056-0
          CPCN
          s-00456
          s-1-023-4      s-01234
```

- Enter a destination point code for the location in the Destination table by network type using the `ent-dstn` command.

For example, enter one of these commands:

```
ent-dstn:dpc=002-100-002
```

```
ent-dstn:dpca=002-111-002
```

where:

dpci/dpcn

The destination point code being added to the database

The system returns this message:

```
rlghncxa03w 01-03-17 15:35:05 GMT EAGLE 36.0.0
Destination table is (40 of 4000) 1% full
ENT-DSTN: MASP A - COMPLTD
```

13. Verify the changes using the `rtrv-dstn` command and specifying the DPC that was entered in [Step 12](#).

For example, enter one of these commands:

```
rtrv-dstn:dpci=002-100-002
```

```
rtrv-dstn:dpcn=002-111-002
```

Example of a possible output for DPCs.

```
rtrv-dstn:dpc=002-100-002
RLGHNCXA03W 01-03-30 21:16:37 GMT EAGLE 36.0.0
DPC          CLLI          BEI  ELEI  ALIASA          ALIASN          DMN
002-100-002  -----          no  ---  -----          002-111-002    SS7
              SPC          NCAI
              -----          no
Destination table is (20 of 2000) 1% full
```

Example of a possible output for DPCAs.

```
rtrv-dstn:dpcn=002-111-002
RLGHNCXA03W 01-03-30 21:16:37 GMT EAGLE 36.0.0
DPCA          CLLI          BEI  ELEI  ALIASA          ALIASI          DMN
002-111-002  -----          no  ---  -----          002-100-002    SS7
              SPC          NCAI
              -----          no
Destination table is (20 of 2000) 1% full
```

14. Enter a linkset with the `ent-ls` command, and assign it to the destination point code by network type.

For example, enter one of these commands:

```
ent-ls:lsn=ls400001:apc=002-200-002:lsc=c
```

```
ent-ls:lsn=ls500001:apca=002-112-002:lsc=c
```

where:

lsn

The name of the linkset

apc/apca

Adjacent point code – the point code identifying the node that is next to the system

lsc

The linkset type of the specified linkset

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-17 16:23:21 GMT EAGLE 36.0.0
Link set table is ( 114 of 1024) 12% full
ENT-LS: MASP A - COMPLTD
```

15. Verify the changes using the `rtrv-ls` command and specifying the linkset name.

Command examples:

```
rtrv-ls:lsn=ls400001
rtrv-ls:lsn=ls500001
```

16. Add the LIM cards to the database using the `ent-card` command.

For this example, enter these commands:

```
ent-card:loc=1105:type=limt1:appl=ccs7itu
ent-card:loc=1106:type=limt1:appl=ccs7itu
```

where:

loc

Specifies the slot number for the card

type

Specifies that the card is a LIMT1 card

appl

Specifies that the application is CCS7ITU

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-12 09:12:36 GMT EAGLE 36.0.0
ENT-CARD: MASP A - COMPLTD
```

17. Verify the changes using the `rtrv-card` command with the card location specified.

For this example, enter these commands:

```
rtrv-card:loc=1105
rtrv-card:loc=1106
```

Examples of possible outputs:

```
RLGHNCXA03W 01-03-30 09:12:36 GMT EAGLE 36.0.0
CARD  TYPE      APPL      LSET NAME      LINK SLC LSET NAME      LINK SLC
1105  LIMT1      CCS7ITU  -----      A   --  -----      B   --

RLGHNCXA03W 01-03-30 09:12:36 GMT EAGLE 36.0.0
CARD  TYPE      APPL      LSET NAME      LINK SLC LSET NAME      LINK SLC
1106  LIMT1      CCS7ITU  -----      A   --  -----      B   --
```

18. Enter the T1 interface using the `ent-t1` command.

Command examples:

```
ent-t1:loc=1105:t1port=1
ent-t1:loc=1106:t1port=1
```

where:

loc

Card location or slot as stenciled on the shelf of the system

t1port

T1 card port number

19. Assign signaling links to the LIM cards using the `ent-slk` command.

Signaling links are the only elements in the database directly supported by a hardware device. When a link is added to a linkset, the link remains in the state OOS-MT-DSBLD (Out Of Service Maintenance Disabled) until it is activated; see [Step 27](#).

For example, enter these commands:

```
ent-slk:loc=1105:link=a:lsn=ls400001:slc=0:l2tset=1:t1port=1:ts=1
```

```
ent-slk:loc=1106:link=a:lsn=ls500001:slc=0:l2tset=1:t1port=1:ts=1
```

where:

loc

Card location of the LIM to which the SS7 signaling link will be assigned

link

Signaling link ID assigned on the card specified in the `loc` parameter

lsn

The name of the linkset that will contain the signaling link.

slc

The signaling link code. The `slc` must be unique within the linkset. It must be the same at both the system location and the distant node

l2tset

The level 2 timer set table. A signaling link may be assigned to any of the twenty tables

t1port

Port for the T1 interface on the T1 card to which the signaling link and timeslot are being assigned

ts

T1 timeslot for the assigned signaling link

20. Verify the changes using the `rtrv-slk` command, specifying the card location and port of the signaling link entered in [Step 19](#).

```
rtrv-slk:loc=1105:link=a
```

```
rtrv-slk:loc=1106:link=a
```

21. Add a route for the new DPC by network type using the `ent-rte` command.

Command examples:

```
ent-rte:dpc=002-100-002:lsn=ls400001:rc=10
```

```
ent-rte:dpc=002-111-002:lsn=ls500001:rc=10
```

where:

dpc/dpca

Destination point code of the node that the traffic is bound for

lsn

The name of the linkset that will carry the traffic bound for the node specified by the destination point code.

rc

The relative cost (priority) for this route.

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-07 08:28:30 GMT EAGLE 36.0.0
ENT-RTE: MASP A - COMPLTD
```

22. Verify the changes using the `rtrv-rte` command and specifying the destination point code of the route.

Example of possible output:

```
rlghncxa03w 01-03-07 11:43:04 GMT EAGLE 36.0.0
DPCA          ALIASI          ALIASN/N24      RTX  CLLI
                LSN                RC    APCA
-----
DPCN          ALIASN          ALIASI          RTX  CLLI
                LSN                RC    APCN
002-100-001  121111          240-111-111    NO   idp1
                ls100001          10   1-234-5
                ls100002          10   1-234-6
                ls100003          20   1-234-7
                ls100004          30   1-234-1
                ls100005          40   1-234-2
                ls100006          50   1-234-3
002-100-002  121111          240-111-111    NO   idp1
                ls400001          10   1-200-2

DPCA          ALIASA          ALIASI          RTX  CLLI
                LSN                RC    APCA
21111          011-222-111     0-001-1         NO   ndp1
                ls200001          10   11111
                ls200002          10   11112
                ls200003          20   11113
                ls200004          30   11114
                ls200005          40   11115
                ls200006          50   11116
21112          011-222-111     0-001-1         NO   ndp1
                ls500001          10   11122
```

23. Add a mated application to the database by network type using the `ent-map` command.

Command example:

```
ent-map:pci=2-100-1:ssn=12:rc=20:mpci=3-200-1:mssn=50 :materc=99:grp=grp03
```

```
ent-map:pcn=11112:ssn=12:rc=10:mpcn=11114:mssn=250:materc=99 :grp=grp07
```

where:

pci/pcn

The point code of the primary signaling point that is to receive the message.

ssn

Subsystem number – the subsystem address of the primary point code that is to receive the message.

rc

The relative cost

mpc/mpca/mpci/mpcn

The point code of the backup signaling point that is to receive the message.

mssn

Mate subsystem number – the subsystem address of the backup point code that is to receive the message.

materc

Mate relative cost.

grp

The name of the concerned signaling point code group that contains the point codes that should be notified of the subsystem status. This parameter applies to both RPCs/SSNs.

When each of these commands have successfully completed, this message should appear.

```
RLGHNCXA03W 01-03-07 00:28:31 GMT EAGLE 36.0.0
ENT-MAP: MASP A - COMPLTD
```

24. Verify the changes using the `rtrv-map` command.

These are examples of possible output.

```
rlghncxa03w 01-03-07 11:43:04 GMT EAGLE 36.0.0
PCN          SSN  RC  MPCN          MSSN MATERC SRM  MRC  GRP  NAME
11111        5   20 12347          250    99  ---  ---  GRP07
11112        12  0  12347          250    99  ---  ---  GRP07
rlghncxa03w 01-03-07 11:43:04 GMT EAGLE 36.0.0
PCI          SSN  RC  MPCN          MSSN MATERC SRM  MRC  GRP  NAME
1-100-1      5   0  3-200-1       250    99  ---  ---  GRP03
2-100-1      12  20 3-200-1       50     99  ---  ---  GRP03
```

25. Allow the LIM cards that were entered in [Step 16](#) by using the `alw-card` command.

For example, enter these commands:

```
alw-card:loc=1105
```

```
alw-card:loc=1106
```

26. Verify the In-Service Normal (IS-NR) status of the cards using the `rept-stat-card` command.

Example of possible output:

```
RLGHNCXA03W 01-03-27 16:43:42 GMT EAGLE 36.0.0

CARD  VERSION          TYPE      APPL      PST          SST          AST
1105  100-000-00003-000  LIMT1    CCS7ITU   IS-NR        Active       ---
1106  100-000-00003-000  LIMT1    CCS7ITU   IS-NR        Active       ---
```

27. Activate the signaling links entered in [Step 19](#) using the `act-slk` command.

For example, enter these commands:

```
act-slk:loc=1105:port=a
```

```
act-slk:loc=1106:port=a
```

The link changes its state from OOS-MT-DSBLD (out-of-service maintenance-disabled) to IS-NR (In-Service Normal).

The output confirms the activation.

```
RLGHNCXA03W 01-03-07 11:11:28 GMT EAGLE 36.0.0
Activate Link message sent to card
```

28. Verify the In-Service Normal (IS-NR) status of the signaling link using the `rept-stat-slk` command.

Command examples:

```
rept-stat-slk:loc=1105
```

```
rept-stat-slk:loc=1106
```

This message should appear:

```
RLGHNCXA03W 01-03-30 21:16:37 GMT EAGLE 36.0.0

SLK      LSN      CLLI      PST      SST      AST
1105,A   1s400001  -----  IS-NR    Avail    ----
Command Completed.

RLGHNCXA03W 01-03-30 21:16:37 GMT EAGLE 36.0.0

SLK      LSN      CLLI      PST      SST      AST
1106,A   1s500001  -----  IS-NR    Avail    ----
Command Completed.
```

29. Display the new LIM cards in the database using the `rtrv-card` command.

Example of possible output:

```
RLGHNCXA03W 01-03-15 16:34:56 GMT EAGLE 36.0.0
CARD  TYPE      APPL      LSET NAME      LINK SLC  LSET NAME      LINK SLC
1105  LIMT1     CCS7ITU   1s400001       A    00  -----  B    --
1106  LIMT1     CCS7ITU   1s500001       A    00  -----  B    --
```

30. Determine a location where the dual-slot Service Module card can be inserted. Install and configure Service Module cards as needed in available odd-even slots using [Step 31](#) through [Step 45](#).

For the example, install a Service Module card in slots 1107 and 1108.



CAUTION

CAUTION:

When adding Service Module cards to an in-service environment, take precautions to not interrupt traffic.

31. Install the Service Module card in slots 1107 and 1108.

The Service Module card requires two slots and must be installed in an odd slot with an adjacent empty even slot on its right side.

- Open the ejector levers on the Service Module card. Carefully align the card edges with the top and bottom card guides. Push the card along the length of the card guides until the rear connectors on the card engage the mating connectors on the target shelf backplane.
- Press the left edge of the card faceplate using constant pressure until the card progress ceases.



WARNING

warning: Do not impact the faceplate to mate the connectors. Any impact to the card faceplate can damage the faceplate, the pins, or the connectors.

- c) Push in the top and bottom inject/eject clamps to locks the card in place and ensures a strong connection with the pins on the target shelf backplane.
- d) Verify that both IMT bus LEDs are illuminated green.
- e) Install the cabling required to connect the Service Module card to the MPS.

Refer to the *Installation - EAGLE 5 ISS* manual for details.

32. Add the Service Module card to the database and configure it as a Service Module card running the VSCCP application using the `ent-card` command.

For this example, enter this command.

```
ent-card:loc=1107:type=dsm:appl=vsccp
```

where:

loc

Specifies the slot number for the card. The slot number must be an odd number.

type

Specifies that the card is a Service Module card.

appl

Specifies that the application is VSCCP.

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-12 09:12:36 GMT EAGLE 36.0.0
ENT-CARD: MASP A - COMPLTD
```

33. Verify the Service Module card using the `rtrv-card` command with the card location specified.

For this example, enter this command:

```
rtrv-card:loc=1107
```

Example of possible output:

```
RLGHNCXA03W 01-03-30 09:12:36 GMT EAGLE 36.0.0
CARD  TYPE      APPL      LSET NAME      LINK  SLC  LSET NAME      LINK  SLC
1107  DSM          VSCCP      -----          A    --  -----          B    --
```

34. Display the current link parameters associated with the Service Module card in the database by entering the `rtrv-ip-lnk` command.

Example of possible output:

```
RLGHNCXA03W 01-03-30 21:14:37 GMT EAGLE 36.0.0
LOC   PORT  IPADDR      SUBMASK      DUPLEX  SPEED  MACTYPE  AUTO  MCAST
1107  A     -----     -----     HALF   10     DIX      NO    NO
1107  B     -----     -----     HALF   10     DIX      NO    NO
```

35. Enter the IP address port and speed associated with the Service Module card in the database using the `chg-ip-lnk` command.

where:loc -

For this example, enter these commands:

```
chg-ip-lnk:loc=1107:port=a:duplex=half:ipaddr=192.168.122.1
:mactype=dix:speed=100:mcast=yes:submask=255.255.255.0
```

```
chg-ip-lnk:loc=1107:port=b:duplex=half:ipaddr=192.168.123.1
:mactype=dix:speed=10:mcast=yes:submask=255.255.255.0
```

where:

loc

The odd card location of the Service Module card within the EAGLE 5 ISS.

port

The port ID. The port parameter of the `chg-ip-lnk` command specifies the physical interface of the Service Module card.

ipaddr

IP address assigned to the port. This is a TCP/IP address expressed in standard "dot notation." IP addresses consist of the system network number and the machine's unique host number.

duplex

This is the mode of operation of the interface.

speed

This is interface bandwidth in megabits per second (Mbps). The speed is either 100 Mbps for main DSM network or 10 Mbps for backup DSM network.

mactype

This is the Media Access Control Type of the interface. Specify *dix* for the Digital/Inter/Xerox de facto standard for the Ethernet.

mcast

This is the Multicast Control of the interface.

submask

The subnet mask of the IP interface, in the form of an IP address with a restricted range of values.

When this command has successfully completed, the following message appears:

```
RLGHNCXA03W 01-03-30 21:18:37 GMT EAGLE 36.0.0
CHG-IP-LNK: MASP A - COMPLTD
```

36. Verify the IP address port and speed associated with the Service Module card in the database by entering the `trv-ip-lnk` command.

Example of possible output:

```
RLGHNCXA03W 01-03-30 21:14:37 GMT EAGLE 36.0.0
LOC  PORT  IPADDR      SUBMASK      DUPLEX  SPEED  MACTYPE  AUTO  MCAST
1107 A    192.168.122.1 255.255.255.0 HALF    100    DIX      NO    YES
1107 B    192.168.123.1 255.255.255.0 HALF    10     DIX      NO    YES
```

37. Display the current IP host information in the database by entering the `trv-ip-host` command.

Example of possible output:

```
RLGHNCXA03W 01-03-30 21:17:37 GMT EAGLE 36.0.0
IPADDR      HOST
192.1.1.32  KC_HLR2
```

```
192.1.1.50      DN_MSC1
192.1.1.52      DN_MSC2
```

38. Add the host name and IP address for each Service Module card using the `ent-ip-host` command.

For example, enter these commands:

```
ent-ip-host:host=vsccp_1107_a:ipaddr=192.168.122.1
ent-ip-host:host=vsccp_1107_b:ipaddr=192.168.123.1
```

where:

host

Specifies the host name. Each Service Module card must be specified separately.

ipaddr

Specifies the IP network address for each EPAP. The first three octets of the IP address must be the same as MPS A and B ports, respectively. The fourth octet identifies the Service Module card and must have a unique octet identifier for the card IP address. Sequential numbering of the Service Module cards using values 1 to 25 is recommended. This example shows the assignment of the first Service Module card.

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-30 21:18:37 GMT EAGLE 36.0.0
ENT-IP-HOST: MASP A - COMPLTD
```

39. Verify the new IP host information in the database by entering the `rtrv-ip-host` command.

```
RLGHNCXA03W 01-03-30 21:19:37 GMT EAGLE 36.0.0
IPADDR      HOST
192.1.1.32   KC_HLR2
192.1.1.50   DN_MSC1
192.1.1.52   DN_MSC2
192.168.122.1 VSCCP_1107_A
192.168.123.1 VSCCP_1107_B
```

40. If the network configuration does require a default router to connect the Service Module card to the EPAP, then only one default router is assignable to each Service Module card. Assign the default router address to each Service Module card by entering a local domain and IP router address for the Service Module card using the `chg-ip-card` command.

Note: Most A-Port customer private networks do not require setting up a default router for the Service Module card.

For this example, enter this command:

```
chg-ip-card:loc=1107:domain=nc.tekelec.com :defrouter=192.168.122.250
```

where:

loc

The odd card location of the Service Module card within the EAGLE 5 ISS.

domain

The domain name of domain server.

defrouter

Default router address. The IP address for default router. This is a TCP/IP address expressed in standard *dot notation*. IP addresses consist of the system network number and the unique host number.

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-30 21:20:37 GMT EAGLE 36.0.0
CHG-IP-CARD: MASP A - COMPLTD
```

41. Verify the new TCP/IP parameters associated with the Service Module card in the database by entering the `rtrv-ip-card` command.

Example of possible output:

```
RLGHNCXA03W 01-03-30 21:21:37 GMT EAGLE 36.0.0
LOC 1107
SRCHORDR LOCAL
DNSA -----
DNSB -----
DEFROUTER 192.168.122.250
DOMAIN NC.TEKELEC.COM
```

42. Boot the Service Module card that was added in [Step 32](#) using the `alw-card` command.

Command example:

```
alw-card:loc=1107
```

43. Verify the In-Service Normal (IS-NR) status of the Service Module card using the `rept-stat-card` command.

Example of the possible output.

```
RLGHNCXA03W 09-08-24 16:43:42 GMT EAGLE 40.1.0
CARD VERSION TYPE APPL PST SST AST
1107 100-000-00003-000 DSM VSCCP IS-NR Active ---
```

44. Test the presence of the EPAP hosts on the network using the `pass` command with the *ping* parameter.

This command is invoked with a destination (either a hostname or IP address).

Command example:

```
pass:loc=1107:cmd="ping 192.168.122.100".
pass:loc=1107:cmd="ping 192.168.122.200".
pass:loc=1107:cmd="ping 192.168.123.100".
pass:loc=1107:cmd="ping 192.168.123.200".
```

After successful completion of each command, the system returns output similar to the following:

```
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
pass:loc=1107:cmd="ping 192.168.122.100"
Command entered at terminal #1.
;
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
PASS: Command sent to card
;
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
```

```

PING command in progress
;
rlghncxa03w 00-06-27 08:30:46 GMT EAGLE 36.0.0
PING 192.168.122.100: 56 data bytes
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=0.time=5. ms
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=1.time=0. ms
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=2.time=0. ms
----192.168.100.3 PING Statistics----
3 packets transmitted, 3 packets received, 0% packet loss
round-trip (ms) min/avg/max = 0/1/5
PING command complete

```

If the pass commands with the *ping* parameter are not successful, verify the the correct connection of the hardware cabling and repeat the pass commands. If the command fails again, contact the [Customer Care Center](#).

45. Repeat [Step 31](#) through [Step 44](#) to add all Service Module cards (N+1) to be installed in available slots.
46. Contact the [Customer Care Center](#) for assistance in completing this A-Port activation procedure. Do not proceed without consulting with the [Customer Care Center](#). The A-Port feature is enabled and turned on using [Step 47](#) through [Step 60](#).
47. Enter the `enable-ctrl-feat` command to enable the A-Port feature.
`enable-ctrl-feat:partnum=893016601:fak=<Feature Access Key>`
48. Enter the `chg-ctrl-feat` command to turn on the A-Port feature.
`chg-ctrl-feat:partnum=893016601:status=ON`
49. Enter the `enable-ctrl-feat` command to enable the MTPMSGS for SCCP Apps feature.
`enable-ctrl-feat:partnum=893017401:fak=<Feature Access Key>`
50. Enter the `chg-ctrl-feat` command to turn on the MTPMSGS for SCCP Apps feature.
`chg-ctrl-feat:partnum=893017401:status=ON`
51. Change the IS41 system options in the database for the A-Port feature, if desired.

Command example:

```
chg-is41opts:rspcgpanai=7:rspcgpanp=15:rspdig=ccrndn
```

where:

rspcgpanai

specifies a nature of address (NAI) that will encode the SCCP CgPA GTA of a LOCREQ response message.

rspcgpanp

specifies the numbering plan (NP) that will encode the SCCP CgPA GTA of a LOCREQ response message.

rspdig

specifies the digit encoding format of the TCAP Outgoing Called Party parameter for a LOCREQ response message.

52. Add routing number prefixes for the operating network using the `ent-homern` command.
 Use this command to enter any Home RNs that are prefixed to DNs for incoming A-Port messages.
 Use this command to enter up to 100 routing number prefixes for the operating network into the HOMERN table.

For example, enter this command:

```
ent-homern:rn=34
```

where:

rn

The home routing number prefix. The range is 1 to 15 hex digits (0-F).

When this command has successfully completed, this message appears:

```
RLGHNCXA03W 01-03-07 00:28:31 GMT EAGLE 36.0.0
HOMERN table is (1 of 100) 1% full
ENT-HOMERN: MASP A - COMPLTD
```

53. Verify the changes using the `rtrv-homern` command.

This command retrieves a list of routing number prefixes that belong to the operating network.

Here is an example of the possible output.

```
rlghncxa03w 01-03-28 00:29:31 GMT EAGLE 36.0.0.0
RN
-----
216780909087654
76345098
c10234567
c222
cabade
abc
abc123
HOMERN table is (6 of 100) 6% full
```

54. View the list of service selector combinations using the `rtrv-srvsel` command.

This command retrieves a list of administered service selector combinations.

Example of possible output:

```
rlghncxa03w 00-06-20 09:09:14 GMT EAGLE 36.0.0
GTII TT NP NAI NPV NAIV SSN SNP SNAI SERV
4 1 e214 intl --- --- 3 --- --- gport
```

55. Use the `ent-srvsel` command to enter the A-Port service selectors by network type.

This command assigns applicable service selectors required to specify the service entry for Service Module services.

For example, enter the following command:

```
ent-srvsel:gtia=2:tt=1:snp=e164:snai=intl:serv=mrp:nai=intl:np=e164:ssn=9
```

where:

gtia

Specifies the global title translation indicator (2 = ANSI, ITU; 4 = ITU)

tt

Specifies the translation type.

snp

Defines the service numbering plan (e164, e212, or e214).

snai

Specifies the international Service Nature of Address Indicator.

serv

Specifies the service feature. This must be set to mnp for A-Port.

nai

Specifies the nature of address indicator.

np

Specifies the numbering plan.

ssn

Defines the subsystem number.

The system returns the following message:

```
rlghncxa03w 01-03-07 00:28:31 GMT EAGLE 36.0.0
Service Selector table is (114 of 1024) 11% full
ENT-SRVSEL: MASP A - COMPLTD
```

56. Verify the changes using the `rtrv-srvsel` command.

This command retrieves a list of administered service selector combinations. Avoid lengthy output by filtering the list using various parameter combinations. The selector table can have over 1,000 entries.

For example, enter this command:

```
rtrv-srvsel:gtai=2
```

After successful completion of this command, the system returns output similar to the following:

GTAI	TT	NP	NAI	NPV	NAIV	SNP	SNAI	SERV
2	0	e164	intl	---	---	e164	intl	mnp
2	1	e164	intl	---	---	e164	intl	mnp

57. Reload a Service Module card using the `init-card` command.

**CAUTION:**

When the environment is in-service, initialize one Service Module card at a time. Verify its return to IS-NR state before initializing another Service Module card. This precaution keeps cards in service and avoid an interruption of SCCP services.

GTT, EGTT, and VGTT traffic is routed based on the global titles in the OAM database while G-Flex, A-Port, and INP traffic is routed based on the global title in the RTDB. Rebooting a DSM card running the VSCCP application causes both the OAM and RTDB databases on the Service Module card to reload.

Command example:

```
init-card:loc=1101
```

The system returns the following message:

```
rlghncxa03w 01-03-07 00:28:31 GMT EAGLE 36.0.0
Command entered at terminal #3.
Init Card command issued to card 1101
```

58. Verify the Service Module card returns to the IS-NR state with the `rept-stat-card` command.

Wait until In-Service-Normal (IS-NR) state is restored before continuing.

Example of a possible output:

```
RLGHNCXA03W 01-03-07 00:30:42 GMT EAGLE 36.0.0
CARD  VERSION                TYPE    APPL    PST      SST      AST
1101  100-000-00003-000    DSM     VSCCP   IS-NR    Active   --
```

59. After the `init-card` and the `rept-stat-card` commands show that service is successfully restored, repeat [Step 57](#) and [Step 58](#) for each Service Module card in the system.

60. Enter the `chg-sccp-serv` command to set the MNP service to the online state.

Command example:

```
chg-sccp-serv:serv=mdp:state=online
```

61. Confirm that essential activation procedures are successful.

- a) Use `rept-stat-sccp` to verify that all Service Module cards are loaded and are IS-NR (In-Service Normal) status.
- b) Use `rept-stat-mps` to verify that all Service Module cards are connected to the EPAP and are operational.
- c) Use `rept-stat-db:display=all` to verify database levels are identical for the EPAP PDB and RTDB, and the RTDBs on the Service Module cards.

The A-Port feature is now enabled, turned on, and operating in the system.

MT-Based IS41 SMS NP Feature Activation Procedure

This procedure is used to activate the MT-Based IS41 SMS NP feature.

Before this feature can be enabled, the A-Port feature must be enabled.

Before the MT-Based IS41 SMS NP feature can be turned on, the A-Port Feature must be turned on.

The MT-Based IS41 SMS NP feature can be enabled before the A-Port feature is turned on.

For details about the commands used in this procedure, see the *Commands Manual*.

1. Verify that the A-Port feature is enabled using the `rtrv-ctrl-feat` command.
2. If the A-Port feature is not enabled, enable it using [A-Port Feature Activation Procedure](#) before proceeding to [Step 3](#).
3. Enter the `enable-ctrl-feat` command to enable the MT-Based IS41 SMS NP feature.
4. Enter the `chg-stpopts` command to set the default country code to convert the nature of address indicator (NAI) of MDNs to the international format (`nai=intl`).

The parameters in this command are used for number conditioning.

For example, enter this command:

```
chg-stpopts:defcc=49
```

where:

defcc

The default country code.

5. Verify the new country code using the `rtrv-stpopts` command.
6. Enter the `rtrv-is41smsopts` command to view the values of the IS41SMSOPTS options.
7. If desired, change the IS41 SMS options in the database for the MT-Based IS41 SMS NP feature using the `chg-is41smsopts` command.

Note: MTSMSDLTRV must be set to a value other than NONE before MTSMSDLTR can be set to either PRERN or POSTRN. Details about the parameters that can be changed using this command can be found in the *Commands Manual*.

For example, enter this command:

```
chg-is41smsopts:mtsmsdnfmt=rn:mtsmstype=rn
```

where:

mtsmsdnfmt

Specifies the format of the SMS_Address parameter of the SMSREQ ACK response.

mtsmstype

Indicates the entity type for which a database lookup is considered successful.

8. Verify the changes using the `rtrv-is41smsopts` command.
This command displays all IS41 SMS options from the database.

This is an example of the possible output:

```
tekelecstp 08-04-08 19:38:30 EST EAGLE 39.0.0
```

```
IS41 OPTIONS
-----
MTSMSDNFMT      = RNDN
MTSMSTYPE       = RN
MTSMSPPARM      = DIGIT
MTSMSDLTR       = NO
MTSMSDLTRV      = NONE
MTSMSACKN       = ACK
MTSMSSESN       = NO
MTSMSSSN        = 6
MTSMSNAKERR     = 5
MTSMSDIGTYPE    = 6
MTSMSCHKSRC     = NO
```

9. If the value of IS41SMSOPTS:MTSMSCHKSRC=YES, then provision the Home SMSC Table entries using the `ent-home-smsc` command.

For example, enter this command:

```
ent-home-smsc:smc=552611646
```

10. Verify the SMSC table contents using the `rtrv-home-smsc` command.
This command retrieves the HOME SMSC specific addresses currently used to identify Short Message Service Centers in the database.

This is an example of the possible output:

```
rtrv-home-smsc
```

```
rlghncxa03w 03-03-28 08:50:12 EST EAGLE 31.3.0
SMSC ADDRESS
```

```

13214564894498
55231465465434
5465455655656456

HOME SMSC ADDRESS TABLE IS 1 % FULL (3 of 500)

```

11. Verify that the A-Port feature is turned on using the `rtrv-ctrl-feat` command.
12. If the A-Port feature is not turned on, see [Step 50](#) of the [A-Port Feature Activation Procedure](#) before proceeding to [Step 13](#).
13. Enter the `chg-ctrl-feat` command to turn on the MT-Based IS41 SMS NP feature.
`chg-ctrl-feat:partnum=893019901:status=ON`

The MT-Based IS41 SMS NP feature is now enabled, turned on, and operating in the system.

Activating the 1100 TPS/DSM for ITU NP Feature

This procedure is used to enable and turn on the 1100 TPS/DSM for ITU NP feature.

The 1100 TPS/DSM for ITU NP feature increases the processing capacity of SCCP traffic for an EAGLE 5 ISS processing EPAP-based traffic to 26,400 transactions per second. To provide this increase in SCCP processing capacity, the maximum of 25 Service Module cards must be provisioned and installed in the EAGLE 5 ISS, and one or more EPAP-related features enabled and turned on. This feature can be enabled only for Service Module cards that are rated at 850 transactions per second (TPS).

Note: The increased capacity to 1100 TPS per Service Module card assumes incoming traffic consists of at least 30% of GTT routed traffic that does not require EPAP-based lookup. If more than 70% of incoming traffic requires EPAP-based lookup, Group Ticket Voucher (TVG) may shutdown and overall TVG capacity of 1100 for the card may not be met.

The 1100 TPS/DSM for ITU NP feature cannot be enabled if:

- The EAGLE 5 ISS does not contain any Service Module cards.
- The LNP feature is enabled.
- The ANSI G-Flex STP Option is enabled.
- The GTT feature is not turned on.

The feature access key for the 1100 TPS/DSM for ITU NP feature is provided by Tekelec. Contact your Tekelec Sales Representative or Account Representative before beginning the feature activation procedure if you do not have the feature access key for this feature. Based on the feature part number and the serial number of the EAGLE 5 ISS, the feature access key is site-specific. The feature access key contains thirteen alphanumeric characters and is not case sensitive. The 1100 TPS/DSM for ITU NP feature cannot be enabled with a temporary feature access key.

The `enable-ctrl-feat` command requires that the database contain a valid serial number for the EAGLE 5 ISS, and that this serial number is locked. Verify with the `rtrv-serial-num` command. The EAGLE 5 ISS is shipped with a serial number in the database, but the serial number is not locked. The serial number can be changed, if necessary, and locked after the EAGLE 5 ISS is on-site with the `ent-serial-num` command.

Note: To enter and lock the serial number of the EAGLE 5 ISS, the `ent-serial-num` command must be entered twice. The first entry of the `ent-serial-num` command adds the correct serial number

to the database with the `serial` parameter. The second entry of the `ent-serial-num` command with the `serial` and `lock=yes` parameters locks the serial number. Verify that the serial number in the database is correct before locking the serial number. The serial number is on a label attached to the control shelf (shelf 1100).

Refer to *Commands Manual* for detailed descriptions of all commands used in this procedure.

1. Display the status of the 1100 TPS/DSM for ITU NP feature by entering the `rtrv-ctrl-feat` command.

Example of a possible output:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0

The following features have been permanently enabled:
Feature Name          Partnum    Status    Quantity
HC-MIM SLK Capacity  893012707  on        64
Prepaid SMS Intercept Ph1 893006701  on        ----
1100 TPS/DSM for ITU NP 893018001  on        ----

The following features have been temporarily enabled:
Feature Name          Partnum    Status    Quantity    Trial Period Left
MNP Circ Route Prevent 893000140  On        ----        20 days 8 hrs 57 mins

The following features have expired temporary keys:
Feature Name          Part Num
OnOffFeatV
```

2. Based on the output in [Step 1](#), perform one of the following:
 - If the `rtrv-ctrl-feat` output shows that the LNP feature is enabled, this procedure cannot be performed. The 1100 TPS/DSM for ITU NP feature cannot be enabled if the LNP feature is enabled.
 - If the 1100 TPS/DSM for ITU NP entry of the `rtrv-ctrl-feat` output shows that the 1100 TPS/DSM for ITU NP feature is enabled and the feature status is on, no further action is necessary.
 - If the feature is enabled and the feature status is off, go to [Step 13](#).
 - If the 1100 TPS/DSM for ITU NP and LNP features are not enabled, continue to [Step 3](#).
3. Determine whether the G-Flex feature is turned on by entering the `rtrv-ctrl-feat`.

The status of the G-Flex feature is shown by the G-Flex entry in the `rtrv-ctrl-feat` output.

 - If the G-Flex feature is on, continue to [Step 4](#).
 - If the G-Flex feature is off, go to [Step 5](#).
4. Verify that the ANSI G-Flex option is not enabled or turned on by entering the `rtrv-stpopts` command.

The 1100 TPS/DSM ITU NP feature cannot be enabled if the ANSI G-Flex option is turned on.

The ANSI G-Flex option is shown by the ANSIGFLEX entry in the `rtrv-stpopts` output. If the ANSIGFLEX entry is displayed in the `rtrv-stpopts` output, both the G-Flex and the GTT features are turned on.

 - If the ANSIGFLEX value is *yes* in the `rtrv-stpopts` output, the ANSI G-Flex option is enabled and the remainder of this procedure cannot be performed.

- If the ANSIGFLEX value is *no* in the `rtrv-stpopts` output, the ANSI G-Flex option is not enabled. Proceed to [Step 6](#).
5. Determine whether the GTT feature is turned on by examining the output of the `rtrv-feat` command.

The 1100 TPS/DSM ITU NP feature cannot be enabled unless the GTT feature is turned on. The GTT feature is shown by the GTT entry in the `rtrv-feat` output in [Step 3](#).

- If the GTT feature is turned on, continue to [Step 6](#).
 - If the GTT feature is turned off, perform "Adding a Service Module" in *Database Administration Manual - Global Title Translation* to turn on the GTT feature and to add the required number of Service Module cards to the database. After "Adding a Service Module" has been performed, go to [Step 11](#).
6. Verify the number of Service Module cards provisioned in the database using the `rtrv-card:appl=vsccp` command:

Example of a possible output:

```
tk1c1110501 07-04-12 17:28:02 EST EAGLE5 37.0.0
CARD   VERSION      TYPE      GPL      PST      SST      AST
1111   128-015-000    DSM      SCCPHC   IS-NR    Active   -----
1101   128-015-000    DSM      VSCCP    IS-NR    Active   -----
Command Completed.
```

7. Based on the output shown in [Step 6](#), perform one of the following:
 - If the required number of Service Module cards is provisioned in the database, continue to [Step 8](#).
 - If the required number of Service Module cards is not provisioned in the database, perform "Adding a Service Module" in *Database Administration Manual - Global Title Translation* to add the required number of Service Module cards to the database. After "Adding a Service Module" has been performed, continue with [Step 8](#).
8. Display the serial number in the database with the `rtrv-serial-num` command.

Example of a possible output:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
System serial number = nt00000123
System serial number is not locked
.
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
Command Completed
```

9. Compare the serial number located on a label affixed to the control shelf (shelf 1100) to the output shown in [Step 8](#), then perform one of the following:
 - If the serial number is not correct and is locked, this feature cannot be enabled and the remainder of this procedure cannot be performed. Contact [Customer Care Center](#) to change an incorrect and locked serial number.
 - If the serial number is not correct and is not locked, continue to [Step 10](#).
 - If the serial number is correct but is not locked, go to [Step 12](#).
 - If the serial number is correct and is locked, go to [Step 13](#).

10. Enter the correct serial number into the database using the `ent-serial-num` command with the `serial` parameter.

Command example:

```
ent-serial-num:serial=<EAGLE 5 ISS serial number>
```

After the command has completed successfully, this message is displayed:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
ENT-SERIAL-NUM: MASP A - COMPLTD
```

11. Verify with the `rtrv-serial-num` command that the serial number entered in [Step 10](#) was entered correctly. If the serial number was not entered correctly, repeat [Step 10](#) and enter the correct serial number.

Example of a possible output:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
System serial number = nt00000123

System serial number is not locked.

rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
Command Completed
```

12. Lock the serial number in the database by entering the `ent-serial-num` command with the correct serial number as shown in [Step 11](#) and with the `lock=yes` parameter value.

Command example:

```
ent-serial-num:serial=<EAGLE 5 ISS serial number>:lock=yes
```

After the command has completed successfully, this message is displayed:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
ENT-SERIAL-NUM: MASP A - COMPLTD
```

13. Enable the 1100 TPS/DSM for ITU NP feature with the feature access key using the `enable-ctrl-feat` command.

Command example:

```
enable-ctrl-feat:partnum=893018001:fak=<feature access key>
```

Note: The feature access key for the 1100 TPS/DSM for ITU NP feature is provided by Tekelec. Contact your Tekelec Sales Representative or Account Representative if you do not have the feature access key for this feature. This feature cannot be enabled with a temporary feature access key.

After the command has completed successfully, this message is displayed:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
ENABLE-CTRL-FEAT: MASP B - COMPLTD
```

14. Perform on of the following:

- To turn on the 1100 TPS/DSM for ITU NP feature, go to [Step 15](#).
- To not turn on the 1100 TPS/DSM for ITU NP feature, go to [Step 17](#). The transaction rate will remain at 850 TPS per Service Module card.

15. To turn on the 1100 TPS/DSM for ITU NP feature, enter the `chg-ctrl-feat` command, specifying the 1100 TPS/DSM for ITU NP feature part number and the `status=on` parameter value.

Command example:

```
chg-ctrl-feat:partnum=893018001:status=on
```

This message is displayed:

```
CAUTION: Rated TPS for this feature supports an engineered GTT
traffic mix of no more than 70 percent EPAP-based traffic.
Re-enter the command within 30 seconds to confirm change.
```



CAUTION

CAUTION: If the EPAP-based traffic is higher than 70% of all traffic on the EAGLE 5 ISS, the Service Module card performance may not reach 1100 TPS per Service Module card.

16. Re-enter the `chg-ctrl-feat` command to turn on the feature.

Command example:

```
chg-ctrl-feat:partnum=893018001:status=on
```

After the command has completed successfully, this message is displayed:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
CHG-CTRL-FEAT: MASP B - COMPLTD
```

17. Verify the changes by entering the `rtrv-ctrl-feat` command with the 1100 TPS/DSM for ITU NP feature part number.

Command example:

```
rtrv-ctrl-feat:partnum=893018001
```

Example of a possible output:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
The following features have been permanently enabled:
Feature Name          Partnum      Status      Quantity
1100 TPS/DSM for ITU NP 893018001  on         ----

The following features have been temporarily enabled:
Feature Name          Partnum      Status      Quantity Trial Period Left
Zero entries found.

The following features have expired temporary keys:
Feature Name          Part Num
Zero entries found.
```

18. Back up the new database changes with the `chg-db` command:

Command example:

```
chg-db:action=backup:dest=fixed
```

These messages are displayed. The active Maintenance and Administration Subsystem Processor (MASP) is displayed first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete. BACKUP
(FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

To turn off the 1100 TPS/DSM for ITU NP feature, enter the `chg-ctrl-feat` command, specifying the 1100 TPS/DSM feature part number and the `status=off` parameter value.

```
chg-ctrl-feat:partnum=893018001:status=off
```

This message is displayed:

```
CAUTION: This command decreases the total TPS of the SCCP system from 1100 to 850
TPS for each DSM card.
```

Confirm that you wish to turn off the 1100 TPS/DSM for ITU NP feature by re-entering the command within 30 seconds.

```
chg-ctrl-feat:partnum=893018001:status=off
```

This message is displayed:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
CHG-CTRL-FEAT: MASP B - COMPLTD
```

Activating the E5-SM4G Throughput Capacity Feature

The E5-SM4G Throughput Capacity feature quantities are used to increase the processing capacity of the E5-SM4G card and of system SCCP traffic for an EAGLE 5 ISS that contains E5-SM4G cards only (no DSM cards). The achievable TPS maximums are shown in [Table 19: Maximum E5-SM4G Card and System TPS Capacity](#).

Table 19: Maximum E5-SM4G Card and System TPS Capacity

Feature Quantity Part Number	Maximum TPS Capacity per E5-SM4G Card	Maximum System TPS Capacity
893019101 - Feature Quantity 5000	3125	<ul style="list-style-type: none"> 75,000 TPS with one or more EPAP-related features and 24+1 cards
	5000	<ul style="list-style-type: none"> 150,000 TPS with no EPAP-related or ELAP-related feature traffic and 31+1 cards 120,000 TPS with G-Flex and the ANSIGFLEX STP option and 24+1 cards 40,000 TPS with ELAP and 8+1 cards
893019102 - Feature Quantity 6800	6800	<ul style="list-style-type: none"> 210,800 TPS with no EPAP-related or ELAP-related feature traffic and 31+1 cards 163,200 TPS with one or more EPAP-related features and 24+1 cards 54,400 TPS with ELAP and 8+1 cards

An E5-SM4G Throughput Capacity quantity feature must be enabled using an E5-SM4G Throughput Capacity feature part number (893019101 or 893019102) and a feature access key.

The feature access key is based on the feature part number and the serial number of the EAGLE 5 ISS, making the feature access key site-specific.

Note: The E5-SM4G Throughput Capacity quantity feature must be purchased to receive the feature access key used to enable the feature. Contact your Tekelec Sales Representative or Account Representative before beginning this procedure if you have purchased the E5-SM4G Throughput Capacity quantity feature, but do not have the feature access key. A temporary feature access key is not available for this feature.

After an E5-SM4G Throughput Capacity feature is enabled and turned on, the E5-SM4G Throughput Capacity feature cannot be turned off. When the E5-SM4G Throughput Capacity feature is enabled, it is permanently enabled. The E5-SM4G Throughput Capacity feature cannot be temporarily enabled.

System Prerequisites

Before any feature that is described in this manual can be enabled, the prerequisites listed in [Table 20: System Prerequisites](#) are required in the system.

Table 20: System Prerequisites

Prerequisite	Verification and Provisioning
<p>For new installations, the system serial number must be verified and locked. The system is shipped with an unlocked serial number. The serial number can be changed if necessary and must be locked after the system is on-site.</p> <p>For systems that are being upgraded, the serial number has already been verified and locked.</p>	<p>Enter the <code>rtrv-serial-num</code> command to display the serial number and its lock status.</p> <p>Verify that the displayed serial number is correct for the system. The serial number is shown on a label affixed to the control shelf (shelf 1100).</p> <p>If no serial number is displayed, or if the displayed serial number is not locked, refer to the <code>ent-serial-number</code> command description in the <i>Commands Manual</i> for instructions to enter and lock the serial number.</p>
<p>Service Module cards (DSM cards, E5-SM4G cards, or a mixture of both) must be equipped.</p> <p>Some features require only E5-SM4G cards and cannot use DSM cards. See the specific feature prerequisites in this section.</p> <p>Some features require only E5-SM4G cards and cannot use DSM cards. See the specific feature prerequisites in this section.</p> <p>Note: Refer to the <i>Dimensioning Guide for EPAP Advanced DB Features Technical Reference</i> for information on the dimensioning rules and the database capacity requirements for EPAP-related features.</p>	<p>Enter the <code>rept-stat-card:appl=vsccp</code> command to list the Service Module cards in the system.</p>
<p>The GTT feature must on in the system.</p>	<p>Enter the <code>rtrv-feat</code> command.</p> <p>If the GTT feature is on, the <code>gtt=on</code> entry appears in the output.</p>

Prerequisite	Verification and Provisioning
	If the gtt=off entry appears in the output, use the procedures in the <i>Database Administration Manual – Global Title Translation</i> to turn on the GTT feature.

E5-SM4G Throughput Capacity Feature Prerequisite

Before the E5-SM4G Throughput Capacity feature can be enabled, the prerequisite shown in [Table 21: E5-SM4G Throughput Capacity Feature Prerequisite](#) is required in the system.

Table 21: E5-SM4G Throughput Capacity Feature Prerequisite

Prerequisite	Verification and Provisioning
E5-SM4G cards running the VSCCP application must be equipped. The required number of cards depends on the desired total system TPS to be achieved by the cards. See Table 19: Maximum E5-SM4G Card and System TPS Capacity .	Enter the <code>rept-stat-gpl:gpl=sccphc</code> command to list the E5-SM4G cards in the system. If the number of cards is not sufficient, use the procedure in Adding a Service Module Card to add E5-SM4G cards.

The following procedure explains how to enable an E5-SM4G Throughput Capacity quantity feature.

Note: After a quantity feature has been enabled, a feature for a higher quantity can be enabled; a feature for a lower quantity cannot be enabled. Quantity features are automatically turned on when they are enabled.

1. Display the status of the features that are controlled by feature access keys. Enter the `rtrv-ctrl-feat` command.

```
rlghncxa03w 09-07-29 16:40:40 EST EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum  Status  Quantity
HC-MIM SLK Capacity  893012707  on      64
E5-SM4G Throughput Cap  893019101  on      5000
;
```

- If the `rtrv-ctrl-feat` output shows that the correct E5-SM4G Throughput Capacity quantity feature is enabled and its status is on, no further action is necessary.
 - If no E5-SM4G Throughput Capacity feature quantity is enabled or a higher quantity needs to be enabled, continue with step [Step 2](#).
2. Enable the E5-SM4G Throughput Capacity quantity feature by entering the `enable-ctrl-feat` command with the correct part number and FAK for the desired quantity.
 3. Verify the status of the E5-SM4G Throughput Capacity quantity feature by entering the `rtrv-ctrl-feat` command with the feature part number that was just enabled (893033501 or 893019102).

```
rtrv-ctrl-feat:partnum=893019102
rlghncxa03w 09-08-29 16:40:40 EST EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum  Status  Quantity
HC-MIM SLK Capacity  893012707  on      64
```

```
E5-SM4G Throughput Cap      893019102 on          6800
;
```

Adding a Service Module Card

This procedure uses the `ent-card` command to add Service Module cards to the database, to support GTT-related features and EPAP-related features.



CAUTION

CAUTION: Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements.

A Service Module card can be inserted only in an odd/even numbered pair of empty card slots of an EAGLE 5 ISS shelf. Slots 09 and 10 of each shelf contain an HMUX card, a HIPR card, or a HIPR2 card. A Service Module card cannot be inserted in slots 09 and 10. A Service Module card occupies two card slots, so the even-numbered card slot to the right of the odd-numbered slot where the Service Module card has been inserted must be empty. The Service Module card is connected to the network through the odd-numbered card slot connector.

Note: Service Module cards can be inserted in the control shelf, but only in slots 01, 03, 05, 07, and 11.

Table 22: Service Module Card Locations

Location of the Service Module	Empty Card Location	Location of the Service Module	Empty Card Location
Slot 01	Slot 02	Slot 11	Slot 12
Slot 03	Slot 04	Slot 13	Slot 14
Slot 05	Slot 06	Slot 15	Slot 16
Slot 07	Slot 08	Slot 17	Slot 18

The shelf to which the card is to be added must already be provisioned in the database. This can be verified with the `rtv-shlf` command. If the shelf is not in the database, refer to the procedure for adding a shelf in the *Database Administration Manual – System Management*.

The card cannot be added to the database if the specified card location already has a card assigned to it.

The system can contain a maximum of 25 Service Module cards for EPAP-based features.

Note: This manual contains brief descriptions of the commands that are used in these procedures to configure EPAP-based features. Refer to the *Commands Manual* for complete descriptions of the commands that are used in this procedure. The complete descriptions include all valid parameter values and output examples.

1. Verify that the GTT feature is on. Enter the `rtrv-feat` command.

If the GTT feature is on, the `GTT = on` field appears in the command output.

Note: The `rtrv-feat` command output contains other fields that are not used by this procedure. To see all the fields displayed by the `rtrv-feat` command, refer to the `rtrv-feat` command description in the *Commands Manual*.

- If the GTT feature is on, shown by the entry `GTT = on` in the `rtrv-feat` command output, continue with [Step 2](#).
 - If the GTT feature is off, shown by the entry `GTT = off` in the `rtrv-feat` command output, use the procedures in the *Database Administration Manual - GTT* to turn on the GTT feature. Then continue with [Step 2](#).
2. Display the cards in the system, by entering the `rtrv-card` command. Odd-even pairs of card locations that do not contain cards (are not listed in the output or are not HMUX or HIPR card locations) could be used for Service Module cards.

```

rlghncxa03w 08-03-15 16:34:56 EST EAGLE 39.2.0
CARD      TYPE      APPL      LSET NAME      LINK SLC LSET NAME      LINK SLC
1201     LIMDS0     SS7ANSI     LS1              A    0    LS1              B    --
1102     DSM        VSCCP      -----         A    --  -----         B    --
1113     GPSM      OAM
1114     TDM-A
1115     GPSM      OAM
1116     TDM-B
1117     MDAL
;

```

3. If an E5-SM4G card is being added, verify that card locations 09 and 10 contain HIPR cards or HIPR2 cards in the shelf where the E5-SM4G card will be installed.

Enter the `rept-stat-gpl:gpl=hipr` command and the `rept-stat-gpl:gpl=hipr2` command to list the installed HIPR cards and HIPR2 cards in the system.

- If the shelf contains HIPR cards or HIPR2 cards, continue with [Step 4](#).
- If the shelf does not contain HIPR cards or HIPR2 cards, refer to the *Installation Manual - EAGLE 5 ISS* to install HIPR cards or HIPR2 cards in the shelf. Continue with [Step 4](#).

Note: Cards should be distributed throughout the system for proper power distribution. Refer to the *Installation Manual - EAGLE 5 ISS* for the shelf power distribution.

4. Verify that the Service Module card has been physically installed into the proper location.



CAUTION

CAUTION: If the version of the BPDCM GPL on the Service Module card does not match the BPDCM GPL version in the database when the Service Module card is inserted into the card slot, UAM 0002 is generated indicating that these GPL versions do not match. If UAM 0002 has been generated, perform the alarm clearing procedure for UAM 0002 in the *Unsolicited Alarm and Information Messages* manual before proceeding with this procedure.

5. Add the Service Module card to the database, using the `ent-card` command.
`ent-card:loc=1301:type=dsm:appl=vscpp`
6. Verify the temperature threshold settings for an E5-SM4G card by performing the “Changing the High-Capacity Card Temperature Alarm Thresholds” procedure in the *Database Administration Manual - SS7*.

- Verify the changes by entering the `rtrv-card` command with the card location specified.

```
rtrv-card:loc=1102
```

```
rlghncxa03w 08-03-15 16:34:56 EST EAGLE 39.2.0
CARD   TYPE      APPL      LSET NAME      LINK SLC LSET NAME      LINK SLC
1301   DSM         VSCCP     -----      A   --  -----      B
;
```

- Back up the database changes, by entering the following command.

```
chg-db:action=backup:dest=fixed
```

The following messages should appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

- Repeat this procedure for each Service Module card that needs to be added to the system.

MTP Msgs for SCCP Apps Activation Procedure

This procedure is used to enable and turn on the MTP Msgs for SCCP Apps (MTPR) feature in the EAGLE 5 ISS.

- Before the MTP Msgs for SCCP Apps feature can be enabled, at least one of these features must be turned on:
 - A-Port
 - G-Flex
 - IS41 GSM Migration (IGM)
 - MO-Based IS41 SMS NP
 - MO SMS IS41-to-GSM Migration
 - MO SMS B-Party Routing
 - MO SMS ASD
 - MO SMS GRN
- The MTP Msgs for SCCP Apps feature is optional and must be purchased from Tekelec. The feature must be purchased to receive the Feature Access Key (FAK) that is required to enable the feature. Contact your Tekelec Sales Representative or Account Representative to determine whether the MTP Msgs for SCCP Apps feature has been purchased and for additional information.

The MTP Msgs for SCCP Apps feature is enabled using part number 893017401 and the Feature Access Key (FAK). The MTP Msgs for SCCP Apps feature cannot be disabled after it is enabled and cannot be enabled with a temporary FAK. After the MTP Msgs for SCCP Apps feature is enabled and turned on, the feature can be turned off.

The MTP Msgs for SCCP Apps feature must be enabled and turned on (status set to *on*) before MTPR processing will occur.

For details about the commands used in this procedure, see *Commands Manual*.

- Display the status of the features that are controlled with Feature Access Keys (FAKs).

Command example:

```
rtrv-ctrl-feat
```

The output shows the enabled features and the on/off status for each enabled feature in the EAGLE 5 ISS. If the MTP Msgs for SCCP Apps entry appears in the `rtrv-ctrl-feat` output with status = on, this procedure does not need to be performed. If the MTP Msgs for SCCP Apps entry appears in the `rtrv-ctrl-feat` output with status = off, go to [Step 4](#) to turn on the MTP Msgs for SCCP Apps feature. To enable and turn on the MTP Msgs for SCCP Apps feature, continue to [Step 2](#).

2. Enable the MTP Msgs for SCCP Apps feature.

Command example:

```
enable-ctrl-feat:partnum=893017401:fak=<Feature Access Key>
```

3. Verify that the MTP Msgs for SCCP Apps feature is enabled.

Command example:

```
rtrv-ctrl-feat
```

```
rlghncxa03w 09-06-29 16:40:40 EST EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name          Partnum  Status  Quantity
HC-MIM SLK Capacity   893012707  on      64
MO-based IS41SMS NP    893019501  on      ----
MTP Msgs for SCCP Apps 893017401  off     ----
;
```

MTP Msgs for SCCP processing will not occur until the feature is enabled and turned on.

4. Turn on the MTP Msgs for SCCP feature.

Command example:

```
chg-ctrl-feat:partnum=893017401:status=on
```

5. Verify that the MTP Msgs for SCCP feature is enabled and turned on.

Command example:

```
rtrv-ctrl-feat
```

```
rlghncxa03w 09-06-29 16:43:40 EST EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name          Partnum  Status  Quantity
HC-MIM SLK Capacity   893012707  on      64
MO-based IS41SMS NP    893019501  on      ----
MTP Msgs for SCCP Apps 893017401  on      ----
;
```

MTP Msgs for SCCP processing can occur after the feature is enabled and turned on.

6. Back up the database changes.

The active Maintenance and Administration Subsystem Processor (MASP) is listed first in the output.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

The MTP Msgs for SCCP (MTPR) feature is now enabled, turned on, and operating in the system. The feature can be turned off using the `chg-ctrl-feat` command, but cannot be disabled.

Chapter 5

Maintenance and Measurements

Topics:

- *Hardware Requirements.....106*
- *EPAP Status and Alarms.....106*
- *A-Port System Status Reports.....107*
- *Code and Application Data Loading.....108*
- *A-Port Alarms.....114*
- *A-Port UIMs.....116*
- *A-Port Related Measurements.....119*

This chapter describes the maintenance and measurements information available from the EAGLE 5 ISS for the A-Port feature. The information includes status, alarms (UAMs), information messages (UIMs), and reports from the Measurements Platform.

Hardware Requirements

The EAGLE 5 ISS may be equipped with from 1 to 25 Service Module cards to support A-Port. The A-Port feature requires Service Module cards to run the VSCCP application. Refer to *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements.

The A-Port feature also requires a T1000-based Multi-Purpose Server (MPS) system.

EPAP Status and Alarms

Because EPAP has no direct means of accepting user input or displaying output messages on EAGLE 5 ISS terminals, maintenance, measurements, and status information are routed through a Service Module card. EPAP sends two types of messages to the Service Module card: *EPAP Maintenance Blocks* and *DSM Status Requests*. Each message type is discussed in the following sections.

EPAP Maintenance Blocks

The active EPAP generates and sends maintenance blocks to the primary Service Module card. One maintenance block is sent as soon as the IP link is established between the active EPAP and the primary Service Module card. Additional maintenance blocks are sent whenever the EPAP needs to report any change in status or error conditions. The information returned in maintenance blocks is included in the output of the `rept-stat-mps` and `rept-stat-sccp` commands.

The EPAP sends maintenance blocks that contain at least the following information:

- Status of EPAP 'A' - actual states are active, standby, and down (inoperative). Maintenance blocks include a field for this information so that it can be forwarded to the EPAP A Device Control Block (DCB), where it is available for the output of the `rept-stat-mps` command.
- Status of EPAP 'B' - actual states are active, standby, and down (inoperative). Maintenance blocks include a field for this information so that it can be forwarded to the EPAP B DCB, where it is available for the output of the `rept-stat-mps` command.
- Identification of Active EPAP - a field to identify the active EPAP.
- Congestion Indicator - an indicator showing provisioning link congestion. The link between the EPAPs and the external source of provisioning data can become congested in high-provisioning traffic situations. When this occurs and subsequently as the congestion clears, the EPAP sends maintenance blocks to the Service Module card. The EPAP must ensure that no more than one maintenance block per second is sent to the primary Service Module card if the only reason is to report a change in congestion status.
- Alarm Conditions - an error code field. If the EPAP needs to report an alarm condition, it puts an appropriate UAM identifier in this field.
- Current MPS Database Size - a field indicating the current RTDB size. The Service Module card uses this information to calculate the percentage of memory utilized by the RTDB.

DSM Status Requests

When the EPAP needs to know the status of a Service Module card, it sends a DSM status request to that Service Module card. Because status messages are sent over UDP, the EPAP broadcasts the DSM status request (to all Service Module cards) and each Service Module card returns its status to the EPAP.

DSM Status Reporting to the EPAP

The sections that follow describe the DSM status reporting for the EPAP.

DSM Status Messages – When Sent

Service Module cards send a DSM status message to the EPAP when any the following events occur in the Service Module card:

- The Service Module card is booted.
- The Service Module card receives a DSM Status Request message from the EPAP
- The Service Module card determines that it needs to download the entire database, for example, if the Service Module card determines that the RTDB needs to be downloaded (for instance, if the database is totally corrupted), or if a craftsperson requests that the database be reloaded.
- The Service Module card starts receiving database downloads or database updates. When a Service Module card starts downloading the RTDB or accepting database updates, it sends a DSM Status Message informing the EPAP of the first record received. This helps the EPAP keep track of downloads in progress.

DSM Status Messages Fields

The DSM Status Message provides the following information to the EPAP:

- **DSM Memory Size.** When the Service Module card is initialized, it determines the amount of memory present. The EPAP uses the value to determine if the Service Module card has enough memory to hold the RTDB.

Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.

- **Load Mode Status.** This indicator indicates whether or not 80% of the IS-NR (In-Service Normal) LIMs have access to SCCP services.

A-Port System Status Reports

Status reporting described here includes the following:

- [System Status Reporting](#)
- [A-Port Status Reporting](#)
- [Service Module Card Memory Capacity Status Reporting](#)
- [Loading Mode Support Status Reporting](#)

System Status Reporting

The `rept-stat-sys` command supports the Service Module cards running the VSCCP application.

The `rept-stat-sccp` command supports the Service Module cards running the VSCCP application and reports A-Port statistics.

A-Port Status Reporting

The `rept-stat-mps` command supports A-Port system reporting concentrated on reporting the status of the A-Port provisioning system. See "[Maintenance and Measurements User Interface Commands](#)", for details. A-Port statistics are placed in the `rept-stat-sccp` command as described in [System Status Reporting](#).

Service Module Card Memory Capacity Status Reporting

As described in the [DSM Status Reporting to the EPAP](#), the Service Module card sends a message to the EPAP reporting the amount of memory on the Service Module card. The EPAP determines whether the Service Module card has enough memory to store the RTDB and sends a positive or negative acknowledgement back to the Service Module card indicating whether or not the Service Module card has an adequate amount of memory. Refer to [Dimensioning Guide for EPAP Advanced DB Features Technical Reference](#) for important information on the dimensioning rules and the Service Module card database capacity requirements.

When the EPAP sends database updates to the Service Module cards, the update messages include a field that contains the new database memory requirements. Each Service Module cards monitors the database size requirements, and issues a minor alarm if the size of the database exceeds 80% of its memory. If a database increases to the point that there is insufficient Service Module card memory, a major alarm is issued.

The `rept-stat-mps:loc=xxxx` command shows the amount of memory used by the RTDB as a percent of available Service Module card memory.

Loading Mode Support Status Reporting

The OAM application determines whether the system is in an unstable loading mode because it knows the state of all LIM and Service Module cards in the system. When the loading mode is unstable, the `rept-stat-sys` command reports the existence of the unstable loading mode and the specific conditions that caused it. Refer to [Loading Mode Support](#) for details.

Code and Application Data Loading

In general, administrative updates can occur while a Service Module card is loading. The Service Module card should also remain in an in-transition state if the STP portion of the database has completed loading and is waiting for the RTDB to download.

Service Module Code Loading

The EAGLE 5 ISS OAM performs code loading of the Service Module card.

EPAP Application Data Loading

The A-Port feature requires that new TDM-resident data tables be loaded in addition to those currently supported by EAGLE 5 ISS. The GPL and data loading support this additional table loading while maintaining support for loading the existing EAGLE 5 ISS tables.

In order to support both RTDB and EAGLE 5 ISS data loading, the Service Module card GPL verifies its hardware configuration during initialization to determine if it has the capacity to support the RTDB.

The Service Module card GPL application data loader registers all tables for loading, independent of the A-Port feature provisioning and main board / applique hardware configuration. As a result, load requests are always identical. During loading, multiple Service Module card load requests are combined into a single download, reducing the overall download time. The Service Module card stores or discards RTDB table data based on whether or not it has RTDB-capable hardware for features like G-Port, G-Flex, INP, and EIR.

The OAM, on the other hand, downloads or sets memory boundaries for the A-Port options, HOMERN, and service selector tables only if the A-Port feature is provisioned. When the A-Port feature is not provisioned, the OAM does not attempt to read these tables from disk. Instead, empty tables (i.e., tables without entries) are downloaded. All other tables requested for loading are read from disk and downloaded routinely.

Non A-Port Data Initialization

If the Service Module card's hardware configuration cannot support the RTDB, the A-Port tables are marked as absent during Service Management System initialization. Memory is not reserved for the A-Port table data. A-Port tables are registered with the application data loader (ADL), specifying a data discard function. A-Port table data is discarded during loading by the ADL discard function, rather than storing it in memory.

EPAP-Service Module Card Loading Interface

The Service Module card must convey to the EPAP that it needs to download the RTDB. This occurs when the Service Module card sends a Full Download Request message to the EPAP.

Loading Mode Support

No more than 16 LIMs can be serviced by each Service Module card.

80% Threshold of Support

Loading mode is based on the ability of the system to provide SCCP service to at least 80% of the LIMs.

Service Module Card Capacity

An insufficient number of Service Module cards that are in the is-nr (In Service - Normal) or oos-mt-dsbl (Out of Service - Maintenance Disabled) relative to 80% of the number of provisioned LIMs is called a "failure to provide adequate SCCP capacity."

Insufficient SCCP Service

It is also possible for LIMs or Service Module cards to be inhibited or to have problems that prevent them from operating normally. If enough Service Module cards are out of service, it may not be possible for the remaining is-nr Service Module cards to service at least 80% of the number of is-nr LIMs. This

is called “insufficient SCCP service.” When this occurs, some of the LIMs are denied SCCP service. It is possible to inhibit LIMs to bring the ratio back to 16:1 (or better).

Conditions That Create an Unstable Loading Mode

The current system implementation interrupts and aborts card loading upon execution of an STP database `chg` command. Loading mode support denies the execution of EAGLE 5 ISS database `chg` commands when the system is in an unstable loading mode. An unstable loading mode exists when any of the following conditions are true:

- The system's maintenance baseline has not been established.
- Less than 80% of the number of LIMs provisioned are `is-nr` or `oos-mt-dsbl`.
- The number of `is-nr` and `oos-mt-dsbl` Service Module cards running the VSCCP application is insufficient to service at least 80% of all provisioned LIMs.
- Insufficient SCCP service occurs when an insufficient number of `is-nr` Service Module cards are available to service at least 80% of the number of `is-nr` LIMs.
- LIM cards are being denied SCCP service and any Service Module cards are in an abnormal state (`oos-mt` or `is-anr`).

Effects of System in an Unstable Loading Mode

- No affect on RTDB downloads or updates.

Unstable loading mode has no impact on RTDB downloads or the stream of RTDB updates.

- `rept-stat-sys` reports unstable loading mode.

When the loading mode is unstable, the `rept-stat-sys` command response reports the existence of the unstable loading mode and the specific trigger that caused it.

- No STP database updates allowed.

Once an STP database has been loaded, that database can be updated (as long as the system is not in an unstable loading mode). However, if an STP update arrives during STP database loading, the Service Module card aborts the current loading, issues a class 01D7 obit, and reboots. [Figure 10: Obit Message for Abort of Card Loading](#) shows an example.

Figure 10: Obit Message for Abort of Card Loading

```

tekelecstp 97-04-08 12:29:04 EAGLE 35.0.0
-----
Card 1317  Module RADB_MGR.C  Line  337  Class 01d7
Card 1317  Module RADB_MGR.C  Line  337  Class 01d7
Register Dump :
    EFL=00000246      CS =0058      EIP=0000808d      SS =0060
    EAX=000a6ff3      ECX=000a0005      EDX=00000000      EBX=000a6fa0
    ESP=00108828      EBP=0010882c      ESI=001f1e10      EDI=00000000
    DS =0060          ES =0060          FS =0060          GS =0060

Stack Dump :
[SP+1E]=001f      [SP+16]=0000      [SP+0E]=000a      [SP+06]=0010
[SP+1C]=1e10      [SP+14]=0004      [SP+0C]=6fa0      [SP+04]=8850
[SP+1A]=0010      [SP+12]=001f      [SP+0A]=0004      [SP+02]=0001
[SP+18]=886c      [SP+10]=4928      [SP+08]=7ec3      [SP+00]=504b

User Data Dump :

14 02 fa ed 01 01 1d 01 5a 01 00      .....Z...

Report Date:97-04-08  Time:12:29:04

```

Using the force Option

Use the force option to force the execution of commands that would put the system in unstable loading mode. If executing the `ent-card` or `inh-card` commands would cause the system to enter an unstable loading mode, use the force option on the command.

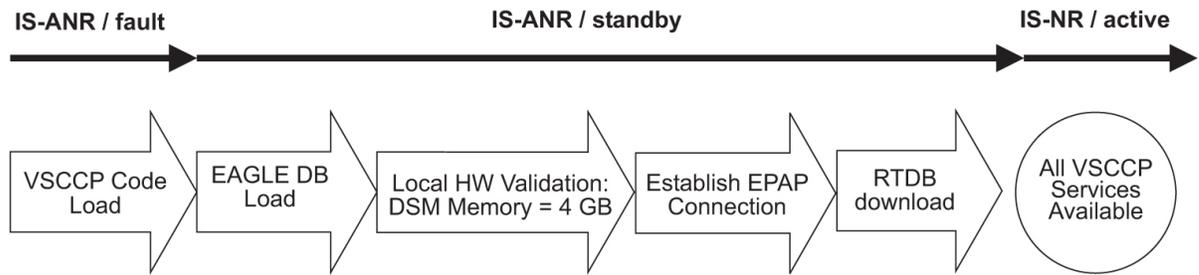
State Transitions during Start-Up

Figures [Figure 11: A-Port Enabled, Normal Operating Sequence](#) through [Figure 16: A-Port Activation Unsuccessful Due to Insufficient Database](#) show the transitions of a Service Module card when booting, loading code and data, and running various VSCCP services. These figures do not illustrate every possible situation, but they include the most common scenarios involving the A-Port feature.

A-Port Enabled, Normal Operating Sequence

In [Figure 11: A-Port Enabled, Normal Operating Sequence](#), the A-Port feature is enabled, and the Service Module card memory is 4 GB and is connected to the EPAP. A normal Service Module card operating sequence occurs, providing A-Port service.

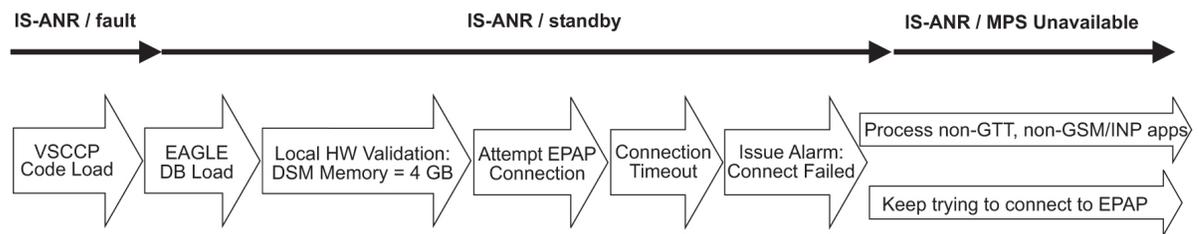
Figure 11: A-Port Enabled, Normal Operating Sequence



A-Port Enabled, Service Module card Not Connected to EPAP

In *Figure 12: A-Port Enabled, Service Module Card Not Connected to EPAP*, the A-Port feature is enabled, the Service Module card memory is 4 GB, but the Service Module card is unable to connect EPAP; thus A-Port cannot begin operation.

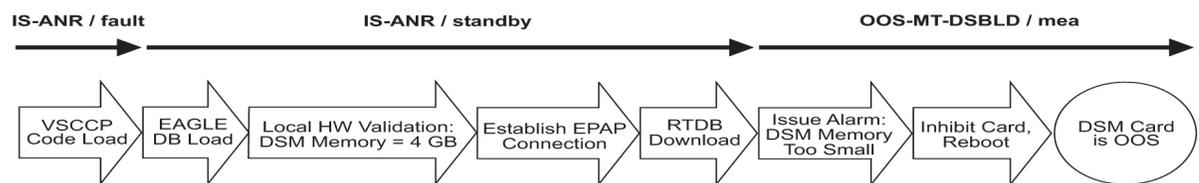
Figure 12: A-Port Enabled, Service Module Card Not Connected to EPAP



A-Port Enabled, Service Module Card Memory Insufficient for Database

In *Figure 13: A-Port Enabled, Service Module card Memory Insufficient for Database*, the A-Port feature is enabled, the Service Module card has the required 4 GB memory and is connected to the EPAP, but the Service Module card is too small for the required database; thus A-Port cannot begin operation. Refer to *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.

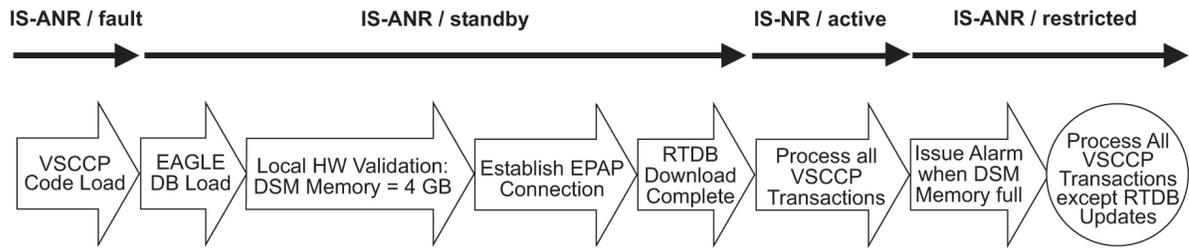
Figure 13: A-Port Enabled, Service Module card Memory Insufficient for Database



A-Port Enabled, Database Exceeds Service Module Card Memory

In *Figure 14: A-Port Enabled, Database Exceeds Service Module Card Memory*, the A-Port feature is enabled, the Service Module card is connected to the EPAP, but the RTDB grows eventually to exceed the capacity of the Service Module card memory, despite its memory size of 4 GB. An alarm is issued when the Service Module card memory becomes full from the RTDB update. The A-Port cannot begin operation. Refer to *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.

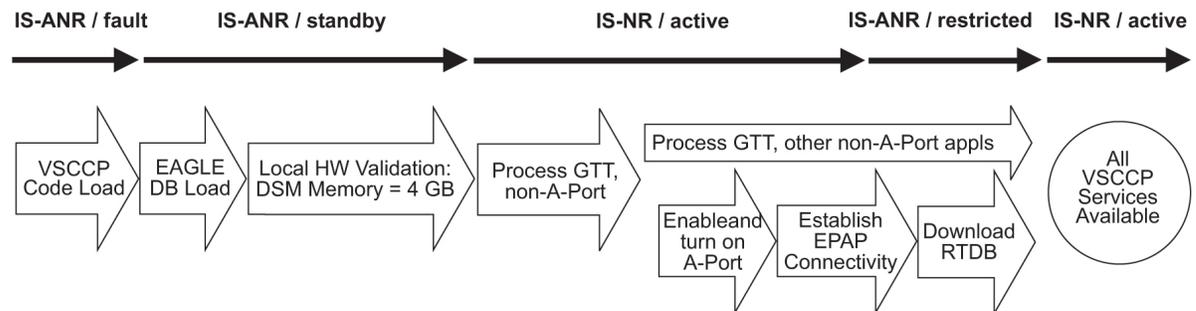
Figure 14: A-Port Enabled, Database Exceeds Service Module Card Memory



A-Port Not Enabled at First, but then Activated on Service Module Card

In *Figure 15: A-Port Not Enabled at First, but then Activated on Service Module Card*, the A-Port feature is not initially enabled; the Service Module card memory is 4 GB, but no EPAP connection; the Service Module card is running other applications when the A-Port feature is enabled and turned on. The Service Module card has sufficient memory to provide A-Port service.

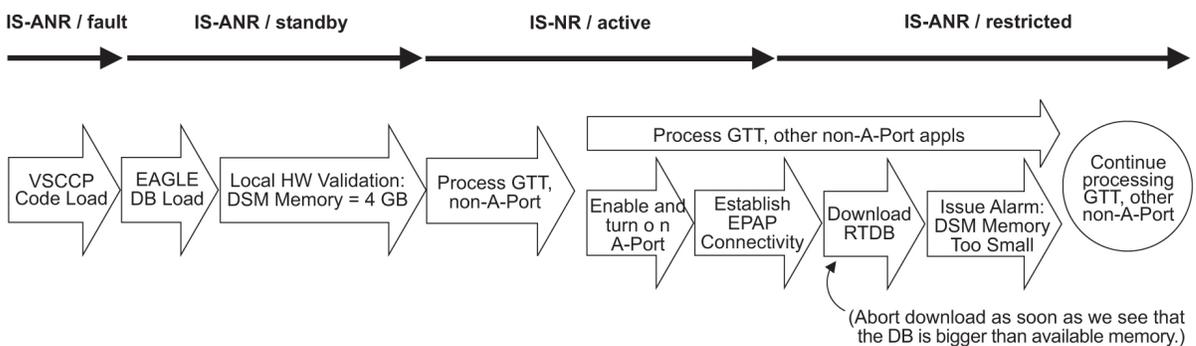
Figure 15: A-Port Not Enabled at First, but then Activated on Service Module Card



A-Port Activation Unsuccessful Due to Insufficient Database

In *Figure 16: A-Port Activation Unsuccessful Due to Insufficient Database*, the A-Port feature is not initially enabled; the Service Module card memory is 4 GB, but no EPAP connection, and is running other applications when the A-Port feature is turned on. However, the Service Module card memory is insufficient for the needed database, and cannot provide A-Port operation. Refer to *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.

Figure 16: A-Port Activation Unsuccessful Due to Insufficient Database



A-Port Alarms

All A-Port related UAMs are output to the Maintenance Output Group. EAGLE 5 ISS *Unsolicited Alarm and Information Messages Manual* contains a complete description of all UAMs. [Table 23: A-Port Related UAMs](#) is a list of UAMs used to support the A-Port feature.

Refer to *Unsolicited Alarm and Information Messages Manual* for more information and corrective procedures for the EAGLE 5 ISS related alarms. Refer to *MPS Platform Software and Maintenance Manual* for more information and corrective procedures for the MPS related alarms.

Table 23: A-Port Related UAMs

UAM	Severity	Message Text	MPS or EAGLE 5 ISS
0013	Major	Card is isolated from system	EAGLE 5 ISS
0084	Major	IP Connection Unavailable	EAGLE 5 ISS
0085	None	IP Connection Available	EAGLE 5 ISS
0099	Major	Incompatible HW for provisioned slot	EAGLE 5 ISS
0250	None	MPS available	MPS
0261	Critical	MPS unavailable	MPS
0328	None	SCCP is available	EAGLE 5 ISS
0329	None	SCCP capacity normal, cards abnormal	EAGLE 5 ISS
0330	Major	SCCP TPS Threshold exceeded	EAGLE 5 ISS
0331	Critical	SCCP is not available	EAGLE 5 ISS
0335	None	SCCP is removed	EAGLE 5 ISS
0336	Major	LIMs have been denied SCCP service	EAGLE 5 ISS
0370	Critical	Critical Platform Failures	MPS
0371	Critical	Critical Application Failures	MPS
0372	Major	Major Platform Failures	MPS

UAM	Severity	Message Text	MPS or EAGLE 5 ISS
0373	Major	Major Application Failures	MPS
0374	Minor	Minor Platform Failures	MPS
0375	Minor	Minor Application Failures	MPS
0422	Major	Insufficient extended memory	EAGLE 5 ISS
0423	None	Card reload attempted	EAGLE 5 ISS
0441	Major	Incorrect MBD - CPU	EAGLE 5 ISS
0442	Critical	RTDB database capacity is 95% full	EAGLE 5 ISS
0443	Major	RTDB database is corrupted	EAGLE 5 ISS
0444	Minor	RTDB database is inconsistent	EAGLE 5 ISS
0445	None	RTDB database has been corrected	EAGLE 5 ISS
0446	Major	RTDB database capacity is 80% full	EAGLE 5 ISS
0447	None	RTDB database capacity alarm cleared	EAGLE 5 ISS
0448	Minor	RTDB database is incoherent	EAGLE 5 ISS
0449	Major	RTDB resynchronization in progress	EAGLE 5 ISS
0451	Major	RTDB reload is required	EAGLE 5 ISS
0526	None	Service is available	EAGLE 5 ISS
0527	Minor	Service abnormal	EAGLE 5 ISS
0528	Critical	Service is not available	EAGLE 5 ISS
0529	Critical	Service is disabled	EAGLE 5 ISS
0530	None	Service is removed	EAGLE 5 ISS

A-Port UIMs

EAGLE 5 ISS *Unsolicited Alarm and Information Messages Manual* contains a complete description of all UIM text and formats. [Table 24: A-Port UIMs](#) is a list of UIMs used to support the A-Port feature.

Table 24: A-Port UIMs

UIM	Text	Description	Action	Output Group (UI Output Direction)
1035	SCCP rsp did not route - invalid GTI	The SCCP response did not route due to an invalid GTI	Use a valid GTI in the CGPA part of the query	gtt
1036	SCCP rsp did not route - invalid TT	The SCCP response did not route due to an invalid TT	Provision the CGPA TT in the GTT TT table	gtt
1037	SCCP rsp did not route - bad Xlation	The SCCP response did not route due to a bad translation	Provision the CGPAGTA address in the GTT database	gtt
1038	SCCP rsp did not route - SSP not True PC	The SCCP response did not route due to SSP is not true point code	Use the true point code in the CGPA point code or OPC of the query	gtt
1039	SCCP rsp did not route - bad Selectors	The SCCP response did not route due to invalid selectors	Provision the CGPAGTI, TT, NP, and NAI in the EGTT selector table	gtt
1130	IS412GSM not provisioned	The IS-41 to GSM Migration prefix specified by the IS412GSM parameter is not provisioned on this system.	The IS412GSM prefix must be specified in the GSMOPTS table.	gtt
1131	Invalid digits in IS41MAP Digits parms	The EAGLE 5 ISS encountered an error in decoding the digits parameter in the LocationRequest message.	Correct the digits parameter	gtt

UIM	Text	Description	Action	Output Group (UI Output Direction)
1169	SCCP rcvd inv TCAP portion	This indicates that SCCP discarded a message because the TCAP provided in the called party address is invalid in the EAGLE 5 ISS.	No action is necessary.	application subsystem
1227	SCCP did not route - DPC not in MAP tbl	This message indicates that SCCP did not route a message because the destination point code was not in the mated application (MAP) table. The message was discarded.	If the DPC indicated in the message should not be routed to, no further action is necessary.	gtt
1230	SCCP did not route - SS not in MAP tbl	This message indicates that SCCP did not route a message because the destination subsystem was not in the Mated Application (MAP) table. The message was discarded.	No action is necessary.	gtt
1242	Conv to intl num - Dflt CC not found	Conversion to international number failed because default CC was not found	Define the default CC with <code>chg-stpopts :defcc=xxx</code>	application subsystem
1243	Conv to intl num - Dflt NC not found	Conversion to international number failed because default NC was not found	Define the default NDC with <code>chg-stpopts :defndc=xxxxxx</code>	application subsystem
1246	Invalid length of conditioned digits	Invalid length of conditioned digits (length of conditioned international number is less than 5 or greater than 15)	Use an international number with length in the acceptable range	application subsystem
1256	MNP Circular Route Detected	This message indicates the network has incorrect number portability data for a subscriber.	Verify and update number portability data.	application subsystem
1294	Invalid digits in MAP MSISDN parameter	No digits found in MAPMSISDN parameter	Specify valid digits in the MSISDN	application subsystem

UIM	Text	Description	Action	Output Group (UI Output Direction)
1295	Translation PC is EAGLE	PC translation is invalid because it is PC of EAGLE 5 ISS	Change the point code	application subsystem
1296	Translation PC type is ANSI	PC translation is invalid because it is an ANSI point code	Change the point code	application subsystem
1297	Invalid length of prefix/suffix digits	Attempted digit action of prefixing entity ID is invalid because combined length of entity ID and GT digits was greater than 21 digits	Change the attempted digit action or decrease the length of the entity ID and/or GT digits	application subsystem
1341	SRI rcvd - GSM2IS41 not provisioned	MIGRPFX=SINGLE and GSM2IS41 prefix is NONE. The GSM to IS-41 Migration prefix is not provisioned on this system.	The GSM2IS41 prefix must be specified in the GSMOPTS table.	ggt
1374	SMS NP destination address decode failed	An error was detected during decode of SMS message destination address.	The message should be analyzed to determine the error, and the originating node should be contacted to send corrected message.	application subsystem
1375	SMS NP failed to modify TCAP message	The formatted outbound digit string length generated by SMS NP for encoding the TCAP message exceeded system limits.	The message and outbound digits formatting options should be analyzed to determine the error and the originating node or the requested outbound digit formatting option should be modified to correct the encoding error.	application subsystem
1376	SMS NP outbound digits leng exceed limit	During processing of SMS message, the formatted outbound digit string length exceeded limit for number of digits.	The message and the digit format provisioning should be analyzed to	application subsystem

UIM	Text	Description	Action	Output Group (UI Output Direction)
			determine the error and the originating node or the requested outbound digit formatting option should be modified to correct the encoding error.	

A-Port Related Measurements

Refer to *EAGLE 5 ISS Measurements* for detailed measurement usage information.

OAM Based Measurements

A-Port measurements are available via the File Transfer Area (FTA) feature and not directly by EAGLE 5 ISS terminals. The File Transfer Area feature supports the transfer of file data between an EAGLE 5 ISS and a remote computer. The feature provides the capability to download files from the EAGLE 5 ISS using a data communications link. The data communications link is accessed through a dial-up modem using one of the EAGLE 5 ISS RS-232 I/O ports. The link is illustrated in [Figure 7: Dial-Up PPP Network](#).

Refer to *Commands Manual* for details about using FTA commands, which are:

- Activate File Transfer: `act-file-trns`
- Copy to or from Transfer Area: `copy-fta`
- Delete Entry from File Transfer Area: `dlt-fta`
- Display File Transfer Area: `disp-fta-dir`

Measurements Platform

The Measurements Platform (MP) is required for an EAGLE 5 ISS with more than 700 links. It provides a dedicated processor for collecting and reporting EAGLE 5 ISS, LNP, INP, G-FLEX, EIR, IS41 GSM Migration (IGM), A-Port, and G-PORT measurements data. The interface to the customer network supports the FTP transfer of measurements reports to an FTP server. After collection of the measurements reports, scheduled reports are automatically generated and transferred to the customer FTP server using the FTP interface.

Note:

Existing FTP file server reports are overwritten by subsequent requests that produce the identical file name.

Reports can be scheduled or printed on-demand. Scheduled and on-demand reports are accessible by the following administrative commands:

- `chg-measopts` - Used to enable or disable the automatic generation and FTP transfer of scheduled measurement reports to the FTP server.
- `rept-stat-meas` - Reports the status of the measurements subsystem including card location and state, Alarm level, and Subsystem State.
- `rept-ftp-meas` - Manually initiates generation and FTP transfer of a measurements report from the MCPM to the FTP server.
- `rtrv-measopts` - Generates a user interface display showing the enabled/disabled status of all FTP scheduled reports.

Table 25: Pegs for Per System A-Port Measurements lists the Peg counts of MSUs (Message Signalling Units) supported per-system by the A-Port feature.

Table 25: Pegs for Per System A-Port Measurements

Event Name	Description	Type	Unit
APSMSREL	Number of SMS Request messages relayed	System	Peg count
APSMRQREP	Number of SMSREQ messages received that result in SMSREQ ACK or SMSREQ NACK responses Note: This count includes any SMSREQ NACKs generated by the Migration feature.	System	Peg count
APSMRQERR	Number of SMSREQ messages received that resulted in error. Note: This count is applicable only when the incoming message is SMSREQ . The peg count is incremented only when the MT-Based IS-41 SMS NP feature is turned on. If the IGM feature is also turned on and the IGM feature handles the message resulting in an error, this peg count will be incremented.	System	Peg count
IS41LRERR	Number of IS-41 Location Request - Error response messages sent.	System	Peg count
IS41LRMRCV	Number of IS-41 Location Request messages received.	System	Peg count
IS41LRRTRN	Number of IS-41 Location Request - Return Result messages sent	System	Peg count

Table 26: Pegs for Per SSP A-Port Measurements lists the Peg counts of MSUs (Message Signalling Units) supported per-SSP by the A-Port feature.

Table 26: Pegs for Per SSP A-Port Measurements

Event Name	Description	Type	Unit
APLRACK	Number of call related LOCREQ messages acknowledged.	Point Code	Peg count
APLRRLY	Number of call related LOCREQ messages relayed	Point Code	Peg count

Event Name	Description	Type	Unit
APNOCL	Number of non-call non-LOCREQ related messages relayed	Point Code	Peg count
APNOCLGT	Number of non-call non-LOCREQ related messages that fell through to GTT	Point Code	Peg count
APSMRQREP	Number of SMSREQ messages received from a specific SSP that resulted in SMSREQ ACK or SMSREQ NACK responses. Note: This count will include any SMSREQ NACKs generated by the IGM feature.	Point Code	Peg count
APSMRQERR	Number of SMSREQ messages received from a specific SSP that resulted in error. Note: This count is only applicable when the incoming message is SMSREQ . The peg count is incremented only when the MT-Based IS-41 SMS NP feature is turned on. If the IGM feature is also turned on and the IGM feature handles the message resulting in an error, this peg count will be incremented.	Point Code	Peg count
GPSRACK	Number of call-related SRI responses	Point Code	Peg count
GPSRRLY	Number of call-related SRI messages relayed	Point Code	Peg count

Table 27: Pegs for Per System and Per SSP A-Port Measurements lists the Peg counts of MSUs (Message Signalling Units) supported for both per-system and per-SSP by the A-Port feature.

Table 27: Pegs for Per System and Per SSP A-Port Measurements

Event Name	Description	Type	Unit
APSMSRCV	Number of SMS Request messages received	System, Point Code	Peg count
MNPCRCD	Number of times Circular Route is detected	System, Point Code	Peg count

Measurement Reports

Measurements are available with these report commands. Refer to *Commands Manual* for detailed usage information.

The commands are specified as follows, where *xxx* is a three-letter abbreviation for a day of the week (MON, TUE, WED, THU, FRI, SAT, or SUN) and *yy* is an hour of the day:

- OAM Daily: `rept-meas:type=mtcd:enttype=np`
- OAM hourly: `rept-meas:type=mtch:enttype=np`
- MP daily: `rept-ftp-meas:type=mtcd:enttype=np`
- MP hourly: `rept-ftp-meas:type=mtch:enttype=np`

Glossary

A

ACK	Data Acknowledgement
ADL	Application Data Loader
AINPQ	ANSI-41 INP Query
alarm	An indicator in the <code>rept-stat-gpl</code> and <code>rtrv-gpl</code> command outputs to show that the entry in these command outputs is in an alarm condition and further action may be necessary to relieve the alarm condition.
ANSI	American National Standards Institute An organization that administers and coordinates the U.S. voluntary standardization and conformity assessment system. ANSI develops and publishes standards. ANSI is a non-commercial, non-government organization which is funded by more than 1000 corporations, professional bodies, and enterprises.
ANSI-41 Mobile Number Portability	A feature that enables IS-41 subscribers to change their service provider while retaining the same Mobile Dialed Number (MDN).
A-Port	ANSI-41 Mobile Number Portability
AS	Application Server

A

A logical entity serving a specific Routing Key. An example of an Application Server is a virtual switch element handling all call processing for a unique range of PSTN trunks, identified by an SS7 DPC/OPC/CIC_range. Another example is a virtual database element, handling all HLR transactions for a particular SS7 DPC/OPC/SCCP_SSN combination. The AS contains a set of one or more unique Application Server Processes, of which one or more normally is actively processing traffic.

Application Simulator

Test tool that can simulate applications and/or SMSCs.

ATINPQ

ATI Number Portability Query
(Name of the local subsystem)

C

CC

Country Code

CCS7ITU

The application for the ITU SS7 signaling links that is used with card types `limds0`, `limch`, `lime1`, and `limt1`.

CdPA

Called Party Address

The portion of the MSU that contains the additional addressing information of the destination of the MSU. Gateway screening uses this additional information to determine if MSUs that contain the DPC in the routing label and the subsystem number in the called party address portion of the MSU are allowed in the network where the EAGLE 5 ISS is located.

C

Circular Route Prevention

See CRP.

CLLI

Common Language Location Identifier

The CLLI uniquely identifies the STP in terms of its physical location. It is usually comprised of a combination of identifiers for the STP's city (or locality), state (or province), building, and traffic unit identity.

The format of the CLLI is:

The first four characters identify the city, town, or locality.

The first character of the CLLI must be an alphabetical character.

The fifth and sixth characters identify state or province.

The seventh and eighth characters identify the building.

The last three characters identify the traffic unit.

CPC

Capability Point Code

A capability point code used by the SS7 protocol to identify a group of functionally related STPs in the signaling network.

D

Database

All data that can be administered by the user, including cards, destination point codes, gateway screening tables, global title translation tables, links, LNP services, LNP service providers, location routing numbers, routes, shelves, subsystem applications, and 10 digit telephone numbers.

DB

Database

D

	Daughter Board
	Documentation Bulletin
DCB	Device Control Block
DEFCC	Default Country Code
DN	Directory number A DN can refer to any mobile or wireline subscriber number, and can include MSISDN, MDN, MIN, or the wireline Dialed Number.
DPC	Destination Point Code DPC refers to the scheme in SS7 signaling to identify the receiving signaling point. In the SS7 network, the point codes are numeric addresses which uniquely identify each signaling point. This point code can be adjacent to the EAGLE 5 ISS, but does not have to be.
DSM	Database Service Module. The DSM provides large capacity SCCP/database functionality. The DSM is an application card that supports network specific functions such as EAGLE Provisioning Application Processor (EPAP), Global System for Mobile Communications (GSM), EAGLE Local Number Portability (ELAP), and interface to Local Service Management System (LSMS).

E

EGTT	Enhanced Global Title Translation A feature that is designed for the signaling connection control part
------	---

E

(SCCP) of the SS7 protocol. The EAGLE 5 ISS uses this feature to determine to which service database to send the query message when a Message Signaling Unit (MSU) enters the system.

EIR

Equipment Identity Register

A network entity used in GSM networks, as defined in the 3GPP Specifications for mobile networks. The entity stores lists of International Mobile Equipment Identity (IMEI) numbers, which correspond to physical handsets (not subscribers). Use of the EIR can prevent the use of stolen handsets because the network operator can enter the IMEI of these handsets into a 'blacklist' and prevent them from being registered on the network, thus making them useless.

Enhanced Global Title Translation

See EGTT.

EPAP

EAGLE Provisioning Application Processor

ESN

Electronic Serial Number

ETSI

European Technical Standards Institute

F**FAK**

Feature Access Key

The feature access key allows the user to enable a controlled feature in the system by entering either a permanent feature access key or a temporary feature access key. The feature access key is supplied by Tekelec.

F

FTA File Transfer Area

A special area that exists on each OAM hard disk, used as a staging area to copy files to and from the EAGLE 5 ISS using the Kermit file-transfer protocol.

FTP File Transfer Protocol

A client-server protocol that allows a user on one computer to transfer files to and from another computer over a TCP/IP network.

G

GB Gigabyte — 1,073,741,824 bytes

G-Flex GSM Flexible numbering

A feature that allows the operator to flexibly assign individual subscribers across multiple HLRs and route signaling messages, based on subscriber numbering, accordingly.

GPL Generic Program Load

Software that allows the various features in the system to work. GPLs and applications are not the same software.

G-Port GSM Mobile Number Portability

A feature that provides mobile subscribers the ability to change the GSM subscription network within a portability cluster, while retaining their original MSISDN(s).

GPSM General Purpose Service Module

GSM Global System for Mobile Communications

G

GT	Global Title Routing Indicator
GTA	Global Title Address
GTAI	Global Title Address Information
GTI	Global Title Indicator
GTT	Global Title Translation A feature of the signaling connection control part (SCCP) of the SS7 protocol that the EAGLE 5 ISS uses to determine which service database to send the query message when an MSU enters the EAGLE 5 ISS and more information is needed to route the MSU. These service databases also verify calling card numbers and credit card numbers. The service databases are identified in the SS7 network by a point code and a subsystem number.
GUI	Graphical User Interface The term given to that set of items and facilities which provide the user with a graphic means for manipulating screen data rather than being limited to character based commands.

H

HLR	Home Location Register
HOMERN	Home Network Routing Number Prefix
HRN	Home Routing Number

I

I

IAR	IAM Reject
ID	Identity, identifier
IEC	International Escape Code
IGM	IS41 GSM Migration
IMSI	International Mobile Subscriber Identity
IMT	Inter-Module-Transport The communication software that operates the inter-module-transport bus on all cards except the LIMATM, DCM, DSM, and HMUX.
IN	Intelligent Network A network design that provides an open platform for developing, providing and managing services.
INAP	Intelligent Network Application Protocol
INP	INAP-based Number Portability Tekelec's INP can be deployed as a stand-alone or an integrated signal transfer point/number portability solution. With Tekelec's stand-alone NP server, no network reconfiguration is required to implement number portability. The NP server delivers a much greater signaling capability than the conventional SCP-based approach. Intelligent Network (IN) Portability

I

IP	Internet Protocol IP specifies the format of packets, also called datagrams, and the addressing scheme. The network layer for the TCP/IP protocol suite widely used on Ethernet networks, defined in STD 5, RFC 791. IP is a connectionless, best-effort packet switching protocol. It provides packet routing, fragmentation and re-assembly through the data link layer.
IS41 GSM Migration	A feature that adds GSM IS-41 migration functions to the existing IS-41 to GSM feature. This enhancement provides flexibility in the encoding and decoding of parameters of LOCREQ messages and responses to number migration from one mobile protocol to another.
IS-ANR	In Service - Abnormal The entity is in service but only able to perform a limited subset of its normal service functions.
IS-NR	In Service - Normal
ISS	Integrated Signaling System
ITU	International Telecommunications Union
K	
KSR	Keyboard Send/Receive Mode
L	
LIM	Link Interface Module

L

Provides access to remote SS7, IP and other network elements, such as a Signaling Control Point (SCP) through a variety of signaling interfaces (DS0, MPL, E1/T1 MIM, LIM-ATM, E1-ATM, IPLIMx, IPGWx). The LIMs consist of a main assembly and possibly, an interface appliqué board. These appliqués provide level one and some level two functionality on SS7 signaling links.

Link

Signaling Link

Signaling Link

Carries signaling within a Link Set using a specific Association. A Link can belong to only one Link Set and one Association. There is generally one Link per Association in a Link Set.

LNP

Local Number Portability

LOCREQ

Location Request Message

A TDMA/CDMA MSC query to an HLR for retrieving subscription/location information about a subscriber to terminate a voice call.

M

MAP

Mobile Application Part

MASP

Maintenance and Administration Subsystem Processor

The Maintenance and Administration Subsystem Processor (MASP) function is a logical pairing of the GPSM-II card and the TDM card. The GPSM-II card is connected to the TDM card by means of an

M

Extended Bus Interface (EBI) local bus.

The MDAL card contains the removable cartridge drive and alarm logic. There is only one MDAL card in the Maintenance and Administration Subsystem (MAS) and it is shared between the two MASPs.

MCPM

Measurement Collection and Polling Module

The Measurement Collection and Polling Module (MCPM) provides comma delimited core STP measurement data to a remote server for processing. The MCPM is an EDSM with 2 GB of memory running the MCP application.

MDN

Mobile Dialed Number

Mobile Directory Number

MEA

Memory Extension Applique

Mismatch of Equipment and Attributes

MIN

Mobile Identification Number

MNP

Mobile Number Portability

MP

Measurement Platform

Message Processor

The role of the Message Processor is to provide the application messaging protocol interfaces and processing. However, these servers also have OAM&P components. All Message Processors replicate

M

from their Signaling OAM's database and generate faults to a Fault Management System.

MPS

Multi-Purpose Server

The Multi-Purpose Server provides database/reload functionality and a variety of high capacity/high speed offboard database functions for applications. The MPS resides in the General Purpose Frame.

MR

Message Relay

MRN

Message Reference Number

An unsolicited numbered message (alarm or information) that is displayed in response to an alarm condition detected by the system or in response to an event that has occurred in the system.

Mated Relay Node

A mated relay node (MRN) group is provisioned in the database to identify the nodes that the traffic is load shared with, and the type of routing, either dominant, load sharing, or combined dominant/load sharing.

MSISDN

Mobile Station International
Subscriber Directory Number

The MSISDN is the network specific subscriber number of a mobile communications subscriber. This is normally the phone number that is used to reach the subscriber.

MSRN

Mobile Station Roaming Number

M

MSU

Message Signaling Unit

The SS7 message that is sent between signaling points in the SS7 network with the necessary information to get the message to its destination and allow the signaling points in the network to set up either a voice or data connection between themselves. The message contains the following information:

- The forward and backward sequence numbers assigned to the message which indicate the position of the message in the traffic stream in relation to the other messages.
- The length indicator which indicates the number of bytes the message contains.
- The type of message and the priority of the message in the signaling information octet of the message.
- The routing information for the message, shown in the routing label of the message, with the identification of the node that sent message (originating point code), the identification of the node receiving the message (destination point code), and the signaling link selector which the EAGLE 5 ISS uses to pick which link set and signaling link to use to route the message.

MT

Mobile Terminated

All transmissions that reach the mobile station and are accepted by it, such as calls or short messages.

MTP

The levels 1, 2, and 3 of the SS7 protocol that control all the functions

M

necessary to route an SS7 MSU through the network.

MTP Msgs for SCCP Apps

A feature that supports MTP-routed SCCP messages for the ANSI-41 Mobile Number Portability feature and the IS41 GSM Migration feature. The feature supports both LOCREQ and SMSREQ messages.

N

NAI

Nature of Address Indicator

Standard method of identifying users who request access to a network.

NC

Network Cluster

Network Code

NDC

Network destination code

NE

Network Element

An independent and identifiable piece of equipment closely associated with at least one processor, and within a single location.

Network Entity

NEC

National Escape Code

NP

Number Plan

O

OAM

Operations, Administration, and Maintenance

The generic load program (application) that operates the

O

Maintenance and Administration Subsystem which controls the operation of the EAGLE 5 ISS.

OOS-MT

Out of Service - Maintenance

The entity is out of service and is not available to perform its normal service function. The maintenance system is actively working to restore the entity to service.

OPC

Originating Point Code

OPS

Operator Provisioning System

own-network

Belonging to or assigned to this operator.

P

PC

Point Code

The identifier of a signaling point or service control point in a network. The format of the point code can be one of the following types:

- ANSI point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**).
- Non-ANSI domestic point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**).
- Cluster point codes in the format network indicator-network cluster-* or network indicator-*-*.
- ITU international point codes in the format **zone-area-id**.
- ITU national point codes in the format of a 5-digit number (**nnnnn**), or 2, 3, or 4 numbers

P

(members) separated by dashes (**m1-m2-m3-m4**) as defined by the Flexible Point Code system option. A group code is required (**m1-m2-m3-m4-gc**) when the ITUDUPPC feature is turned on.

- 24-bit ITU national point codes in the format main signaling area-subsignaling area-service point (**msa-ssa-sp**).

The EAGLE 5 ISS LNP uses only the ANSI point codes and Non-ANSI domestic point codes.

PDB

Provisioning Database

PDBA

Provisioning Database Application

There are two Provisioning Database Applications (PDBAs), one in EPAP A on each EAGLE 5 ISS. They follow an Active/Standby model. These processes are responsible for updating and maintaining the Provisioning Database (PDB).

PDBI

Provisioning Database Interface

The interface consists of the definition of provisioning messages only. The customer must write a client application that uses the PDBI request/response messages to communicate with the PDBA.

PPP

Point-to-Point Protocol

PPSMS

Prepaid Short Message Service

Prepaid Short Message Service Intercept

P

Prepaid IDP Query Relay A feature (IDP Relay) that provides a mechanism to insure correct charging for calls from prepaid subscribers in a portability environment.

PT Portability Type

R

RC Relative Cost

Restricted The network management state of a route, link set, or signaling link that is not operating properly and cannot carry all of its traffic. This condition only allows the highest priority messages to sent to the database entity first, and if space allows, followed by the other traffic. Traffic that cannot be sent on the restricted database entity must be rerouted or the traffic is discarded.

RFC Request for Comment
RFCs are standards-track documents, which are official specifications of the Internet protocol suite defined by the Internet Engineering Task Force (IETF) and its steering group the IESG.

RMTP Reliable Multicast Transport Protocol

RN Routing Number

RNIDN Routing Number - International DN

RNNDN Routing Number - National DN

R

RNSDN	Routing Number - Subscriber DN
Route	A signaling path from an LSP to an RSP using a specified Link Set
RTDB	Real Time Database

S

SCCP	Signaling Connection Control Part
SCM	System Configuration Manager System Configuration Matrix.
Self Point Code	The True, Secondary, or Capability Point Code of the EAGLE.
Service Nature of Address Indicator	See SNAI.
SMS	Short Message Service
SMSC	Short Message Service Center
SMSREQ	SMS Request Message
SNAI	Service Nature of Address Indicator An internal G-Port parameter that allows a user to specify how to interpret the signaling connection control part (SCCP) called party address (CdPA) GTA of a LOCREQ/SMSREQ message.
SN	Services Node
SP	Signaling Point

S

A set of signaling equipment represented by a unique point code within an SS7 domain.

Spare Point Code

The EAGLE ITU International/National Spare Point Code feature allows a network operator to use the same Point Codes across two networks (either ITU-I or ITU-N). The feature also enables National and National Spare traffic to be routed over the same linkset. The EAGLE uses the MSU Network Indicator (NI) to differentiate the same point code of one network from the other. In accordance with the SS7 standard, unique Network Indicator values are defined for Point Code types ITU-I, ITU-N, ITU-I Spare, and ITU-N Spare.

SRF

Service Resource Function

Provide resources to a call, such as announcements, voice prompting, and voice recognition. An example of a SRF is a Voice Recognition Unit (VRU).

SRI

Send_Route_Information Message

SS

Subsystem

SSN

Subsystem Number

The subsystem number of a given point code. The subsystem number identifies the SCP application that should receive the message, or the subsystem number of the destination point code to be assigned to the LNP subsystem of the EAGLE 5 ISS.

A value of the routing indicator portion of the global title translation

S

data commands indicating that no further global title translation is required for the specified entry.

SSP Subsystem Prohibited network management message.
Subsystem Prohibited SCCP (SCMG) management message. (CER)

STP Signal Transfer Point
STPs are ultra-reliable, high speed packet switches at the heart of SS7 networks, which terminate all link types except F-links. STPs are nearly always deployed in mated pairs for reliability reasons. Their primary functions are to provide access to SS7 networks and to provide routing of signaling messages within and among signaling networks.

T

TCAP Transaction Capabilities Application Part

TCP Transfer Control Protocol

TCP/IP Transmission Control Protocol/Internet Protocol

TDM Terminal Disk Module
Time Division Multiplexing

TFA TransFer Allowed (Msg)

TFP TransFer Prohibited (Msg)
A procedure included in the signaling route management (functionality) used to inform a

T

signaling point of the unavailability of a signaling route.

TT

Translation Type.

Resides in the Called Party Address (CdPA) field of the MSU and determines which service database is to receive query messages. The translation type indicates which Global Title Translation table determines the routing to a particular service database.

U

UAM

Unsolicited Alarm Message.

UDP

User Datagram Protocol

UDT

Unitdata Transfer

UDTS

Unitdata Transfer Service

An error response to a UDT message.

UI

User Interface

UIM

Unsolicited Information Message

V

V-Flex

Voicemail Flexible Routing

An advanced database application based on the industry proven EAGLE 5 ISS. Deployed as a local subsystem on the EAGLE platform, V-Flex centralizes voicemail routing.

VGTT

Variable Length GTT

V

A feature that provides the ability to provision global title entries of varying lengths to a single translation type or GTT set. Users are able to assign global title entries of up to 10 different lengths to a single translation type or GTT set.

VSCCP

VxWorks Signaling Connection Control Part

The application used by the Service Module card to support the G-Flex, G-Port, INP, AINPQ, EIR, A-Port, IGM, V-Flex, and LNP features. If the G-Flex, G-Port, INP, AINPQ, EIR, A-Port, IGM, V-Flex, or LNP feature is not turned on, and a Service Module card is present, the VSCCP GPL processes normal GTT traffic.

X

XUDT

Extended User Data

XUDTS

Extended Unitdata Service message

An error response to an XUDT message.