Tekelec EAGLE® 5
Integrated Signaling System

Feature Manual - A-Port™

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Table of Contents

List of Figures

List of Tables

1

Introduction

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 ISS (Integrated Signaling System) 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 "NPHLR" for exported number by responding with a MAPSRI 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:

- Chapter 1 Introduction contains general information about the A-Port documentation, the organization of this manual, and how to request technical assistance.

- Chapter 2 Feature Descriptions provides a functional description of the A-Port feature, including network perspectives, assumptions and limitations, a database overview, DSM provisioning and reloading, A-Port user interface, and an audit overview.

- Chapter 3 EAGLE 5 ISS A-Port Commands describes the new or updated commands that support the A-Port feature. It provides sample reports and explanations of appropriate command usage.

- Chapter 4 A-Port Feature Activation describes how to activate the A-Port feature.

- Chapter 5 Maintenance and Measurements describes maintenance and measurements in detail, including EPAP status and alarms, hardware verification messages, TSM emulation mode, A-Port system status reports and commands, code and application data loading, and alarms.

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.

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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.

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• 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

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2

Feature Descriptions

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 Msgs for SCCP Apps

If the MTP Msgs for SCCP Apps feature is turned on, all MTP routed UDT/non-segmented XUDTSCCP messages are routed to TSM cards running the SCCP application. The TSM cards running the SCCP application then perform SCCP decode/verification on MTP routed messages. If the MTP routed messages have CDPAGTI = 0 and the A-Port feature is turned on, then the message is sent for A-Port processing. If the MTP routed messages have CDPA GTI $\neq$ 0, then SRVSEL lookup is performed using the SCCP CDPA information. If the result of the lookup is MNP service, the MTP routed messages are sent to MNP handling. MNP begins A-Port general TCAP/ MAP verification if the message is ANSI TCAP and A-Port feature is turned on.

MNP Circular Route Prevention

The MNP Circular Route Prevention (MNPCRP) feature is an extension of the A-Port feature which helps in cases of 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 MNP CRP feature provides the logic to prevent this scenario. This feature is enabled and turned on using Feature Access Key (FAK) 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 (MO)-Based IS41 SMS NP feature allows wireless operators to route SMS (Short Message Service) messages originating from a mobile subscriber within a Number Portability environment. The MO-Based IS41 SMS NP feature:

- Intercepts SMS messages before they reach the home SMSC (Short Message Service Center)

- Decodes the TCAP/MAP message destination address and performs lookup in RTDB (Real Time Database)

- Modifies the destination address in the TCAP message with DN (dialed number) porting information

- Relays the SMS message to its original destination

The home SMSC uses the DN porting information to determine whether to forward the message to other operators or to process the message for an in-network subscriber.

The MO-Based IS-41 SMS NP feature applies to ANSI TCAP/MAP and ANSI transport (MTP and SCCP) messages.

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 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.

In general, there are two kinds of messages of concern 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, 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 cannot be enabled if any TSM cards running the SCCP application are in the system.

3. The A-Port feature requires 4 GB DSM cards.

4. A-Port is activated or turned on, but not turned off, via a feature access key (FAK).

5. The A-Port, IGM, G-PortMNP, G-Flex C7 Relay, AINPQ, and INP features can run concurrently on an EAGLE 5 ISS node.

6. When A-Port and G-Flex are run on the same node, interactions between the two features must be addressed.

7.   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*.) 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 DSM cards. **Figure 2-1** 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 DSM databases.

NOTE: The EAGLE 5 ISS supports more than one type of hardware card that provides the DSM function. The cards differ in the size of database and the transactions/second rate that they support. In this manual, the term DSM is used to mean any hardware card that supports the DSM function, unless a specific card (such as E5-SM4G) is mentioned. For more information about the hardware cards that support the DSM function, refer to the *Hardware Manual - EAGLE 5 ISS*.

Figure 2-1. MPS/EPAP Platform Architecture
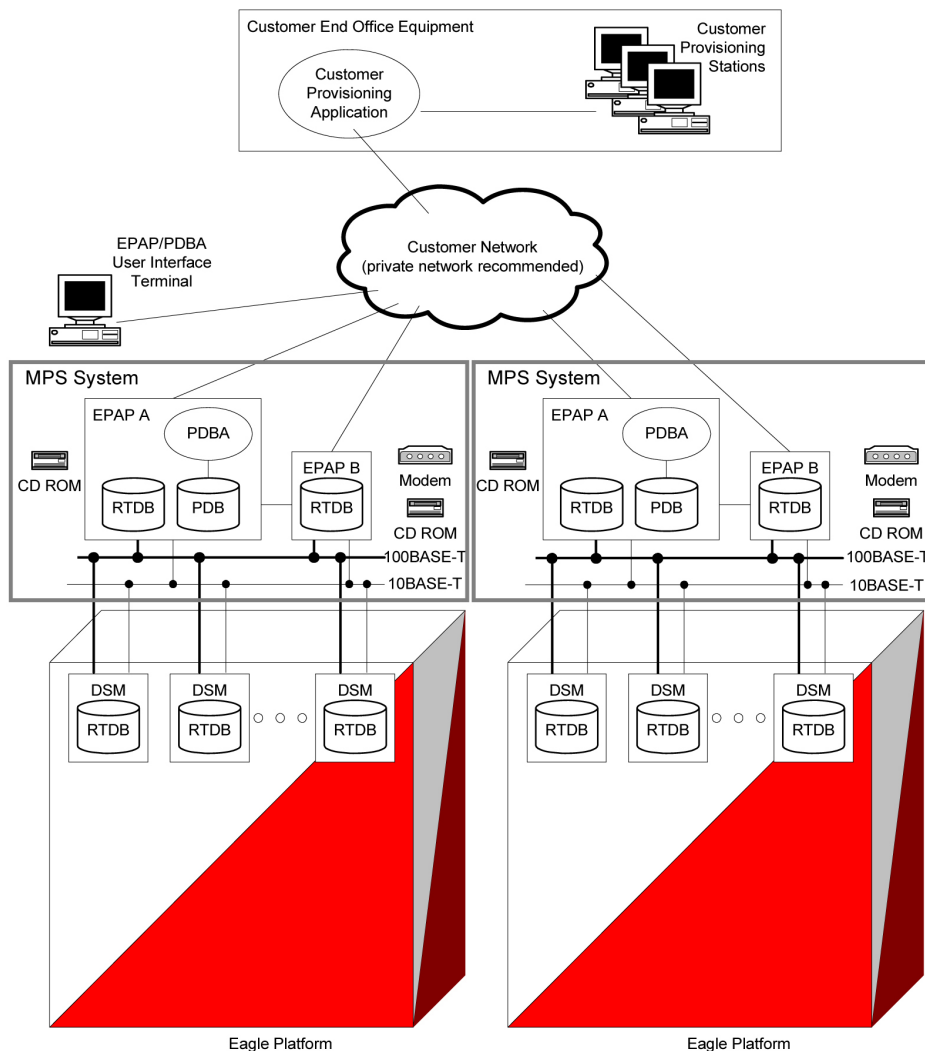
Design Overview and System Layout

Figure 2-1 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, and network hubs. 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 AS system with a total of four Ethernet interfaces: one from each EPAP to the 100Base-T Ethernet and one from each EPAP to the 10Base-T Ethernet.

On the EAGLE 5 ISS platform side, a set of DSM cards, which hold the RTDB database, is part of the STP. Two high-speed Ethernet links connect the DSM cards and the EPAPs. One of the links is a 100BASE-T Ethernet bus, and the other is a 10BASE-T Ethernet bus.

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 DSM 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.

Major modules on the EPAP are the

- DSM provisioning module

- Maintenance module

- RTDB module

- PDB module

The DSM provisioning module is responsible for updating subscriber databases on the EAGLE 5 ISS DSM 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 DSM 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 DSM 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 DSM 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-DSM provisioning task sends database information out on the provisioning link. The DSM 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 DSM 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 DSM 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 DSM 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 DSM cards. The EPAP server must comply with the hardware requirements in the *MPS Hardware Manual*. **Figure 2-1** 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 T1000 Application Server Hardware Manual* for details about the hardware devices and network connections.

Subscriber Data Provisioning

Figure 2-2 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 PDBI (Provisioning Database Interface) between the EPAP and the operator's provisioning system (OPS). Provisioning clients connect to the EPAPs via the Provisioning Database Interface (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 2-2. Subscriber Data Provisioning Architecture (High Level)
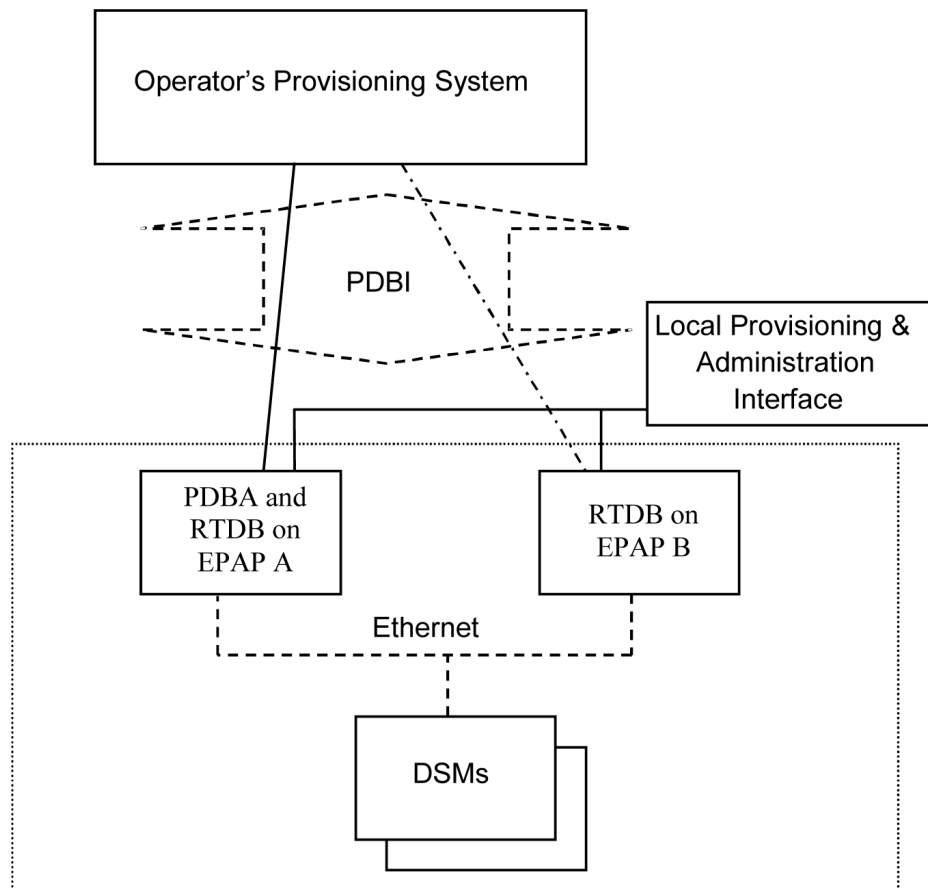
A pair of active/standby EPAP servers provides the interface between the Realtime Database (RTDB) of the EAGLE 5 ISS DSM cards and the OPS. EPAP A is equipped with both the PDB (Provisioning Database) and the RTDB database, and EPAP B has just the RTDB. An EPAP with just the RTDB must be updated by the 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*.

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 DSM cards from an EPAPMPS platform.

An EPAP consists of a combined Provisioning (MySQL) and RTDB database. The Provisioning Database (PDB) responds to requests for updates by the active and standby RTDB databases on both mated EAGLE 5 ISSs. The active EPAPRTDB database is responsible for initiating multi-cast updates of changed database records to the DSM cards after the data has been committed to the EPAP disks. Furthermore, the PDB may accept and commit more database updates while the RTDB databases 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 DSM 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 EPAPRTDB database or to turn the subscriber database audit on or off. For additional information, refer to the *Tekelec T1000 Application Server Hardware Manual* and *EPAP Administration Manual*.

EPAP (EAGLE Provisioning Application Processor)

As shown in **Figure 2-1** , a single MPS system contains two EPAP (EAGLE Provisioning Application Processor) servers. At any given time, only one actively communicates with the DSM boards. 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 DSM 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 DSM card polls the active EPAP RTDB for any new updates. The active EPAP downloads the updates to the DSM for its own resident copy of the RTDB database.

In a mated-pair configuration, there are two mated MPS Systems, as shown in **Figure 2-1** . 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 DSM cards.

Provisioning of the EAGLE 5 ISS's DSM 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 2-3** .

Figure 2-3. Database Administrative Architecture
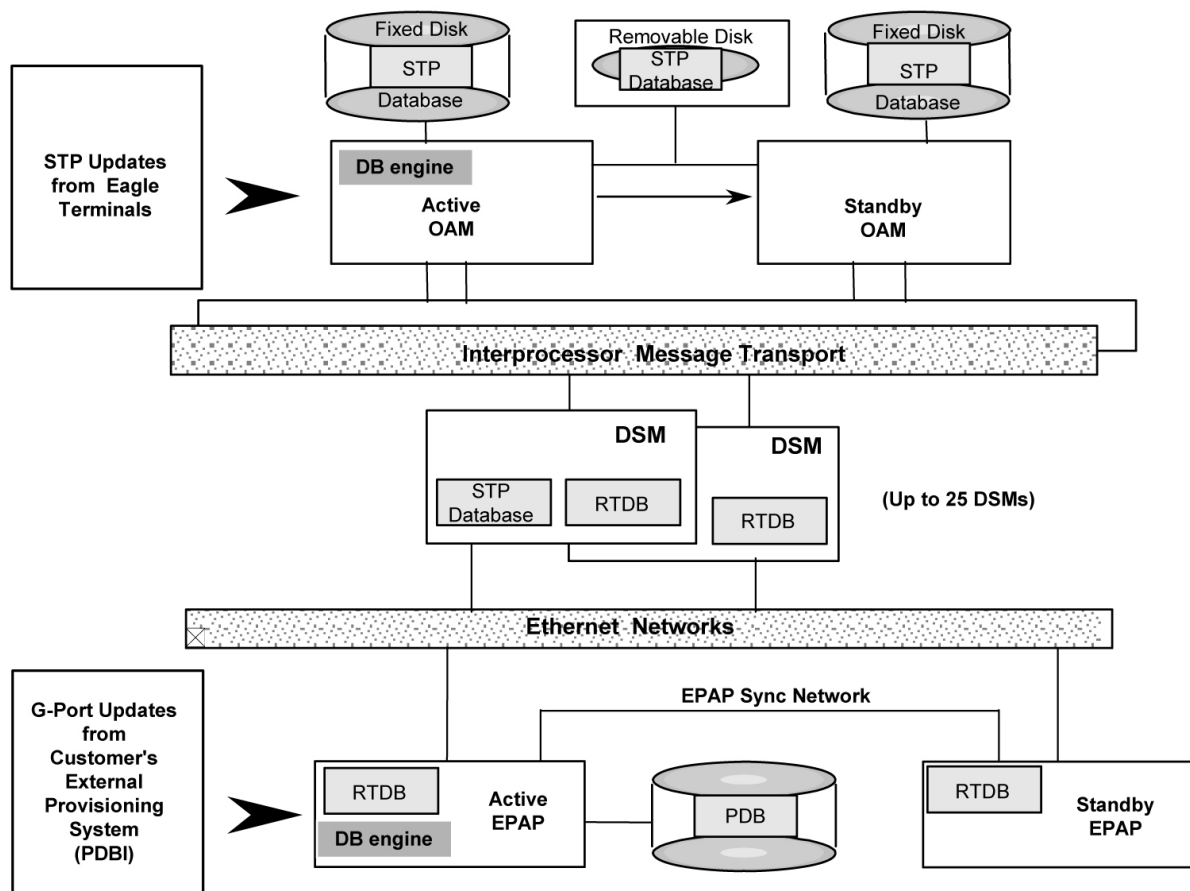
Database Service Module Cards

From 1 to 25 Service Module cards can be provisioned with the A-Port feature enabled. The A-Port feature requires that all Service Module cards contain 4 GB of memory. **Figure 2-3** 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 on the 10BASE-T link.

The extra memory holds a copy of the RTDB. The Service Module Ethernet ports are linked to the EPAP systems to receive the downloaded RTDBs. The Service Module cards run a version of the SCCP software application that has been ported to the VxWorks operating system. To differentiate the DSM-VxWorks-SCCP application from the SCCP that runs on Translation Services Module (TSM) cards, the DSM version is named 'VSCCP'.

Multiple Service Module cards provide a means of load balancing in high-traffic situations. The Service Module database is in a format that facilitates rapid lookups. Each Service Module card contains an identical database. Furthermore, all Service Module A-Port subscriber databases are identical to the RTDB maintained by the EPAPs.

However, the various databases may not be identical at all times for several reasons. First of all, when a DSM card is initialized, it 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. Another condition that can result in databases being out-of-sync occurs when the EPAP receives updates from its provisioning source, but it has not yet sent them 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. In the first case, 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 memory. In this situation, it is desirable to continue processing A-Port transactions, even though the database may not be as up-to-date as it could be.

The other case occurs when a Service Module card is booted. If 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 Communications

Before discussing Service Module 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 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 an 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.

- 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, A-Port uses 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 Provisioning and Reload

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

- EPAP A, Link A (on the main Service Module network, 100BASE-T)

- EPAP A, Link B (on the backup Service Module network, 10BASE-T)

- EPAP B, Link A (on the main Service Module network, 100BASE-T)

- EPAP B, Link B (on the backup Service Module network, 10BASE-T)

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 Service Module 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 according to the Service Module card's current database level.

DSM Reload Model

DSM 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 DSM cards with the current database. The database on the EPAP is large and may be updated constantly. The database sent to the DSM 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 DSM cards from different starting points. Reload begins when the first DSM card requires it. Records are read sequentially from the real-time database from an arbitrary starting point, wrapping back to the beginning. If another DSM card requires reloading at this time, it uses the existing record stream and notifies the DSM provisioning task of the first record it read. This continues until all DSM cards are satisfied.

DSM Database Levels and Reloading

The current database level when the reload started is of special importance during reload. When a DSM 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 DSM card continues to reload until it is completely caught up with the current level of the RTDB. As database records are sent to the DSM 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 DSM card.

The following terminology is used here for the stages of database reload for a given DSM.

- **Stage 1 loading**: The database is being copied record for record from the golden RTDB in the EPAP to the DSM 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 DSM provisioning task.

- **Coherent:** The database is at a whole database level, that is, not currently updating records belonging to a database level.

DSM Reload Requirements

DSM cards may require a complete database reload if there is a reboot or loss of connectivity for a significant amount of time. The EPAP provides a mechanism to quickly load a number of DSM cards with the current database. The RTDB on the EPAP is large and can be updated constantly from the customer's provisioning network.

The upload process is divided into two stages:

1.   Sequentially send the initial database records.

2.   Send any updates missed since the beginning of the first stage.

The DSM reload stream uses a separate RMTP channel from the provisioning and incremental update streams. This allows DSM multicast hardware to filter out the high volume of reload traffic for DSM cards that do not require it.

DSM cards do the following:

•   Detect the need for stage 1 loading and send a status message to the EPAP.

•   Identify the first record DSM was able to read in the above status message if a record stream is already in progress.

•   Handle the record stream regardless of the starting point (that is, records starting with the middle record of the middle table).

•   Expect tables to be sent in a particular order and therefore detect any gap in the record stream.

•   Send a status message if a gap is detected. Stage 1 loading is essentially reset to the last update received.

•   Handle wrapping from the last record from the last table to the first record of the first table of the last update received.

•   Know when they have received all the required records to proceed to stage 2 loading.`

•   Send a status message when stage 1 loading is complete, indicating the database level at the beginning of stage 1.

•   Detect when the master RTDB crosses a memory boundary during stage 1 loading; the card automatically reboots and then auto-inhibits.

DSM Reload Requirements

DSM cards may require a complete database reload if there is a reboot or loss of connectivity for a significant amount of time. The EPAP provides a mechanism to quickly load a number of DSM cards with the current database. The RTDB on the EPAP is large and can be updated constantly from the customer's provisioning network. As the RTDB is sent to the DSM cards, it can possibly miss some updates, making it inconsistent as well as back level.

The upload process is divided into two stages, one that sequentially sends the initial database records and another that sends any updates missed since the beginning of the first stage. The DSM reload stream uses a separate RMTP channel from the provisioning and incremental update streams. This allows DSM multicast hardware to filter out the high volume of reload traffic from DSM cards that do not require it.

DSM cards do the following:

•   Detect the need for stage 1 loading and send a status message to the EPAP.

•   Identify the first record DSM was able to read in the above status message if a record stream is already in progress.

- Handle the record stream regardless of the starting point (that is, accommodate records starting with the middle record of the middle table).

- Expect tables to be sent in a particular order and therefore detect any gap in the record stream.

- Send a status message if a gap is detected. Stage1 loading is essentially reset to the last update received.

- Handle wrapping from the last record from the last table to the first record of the first table.

- Know when they have received all the required records to proceed to stage 2 loading.

- Send a status message when stage 1 loading is complete, indicating the database level at the beginning of stage 1.

- Detect when the master RTDB crosses a memory boundary during stage 1 loading; the card automatically reboots and then auto-inhibits.

EPAP Status and Error Reporting via Maintenance Blocks

The EPAPs forward all status and error messages to the DSM 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 2-4** . (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 2-4** .

Figure 2-4. Customer Provisioning Network
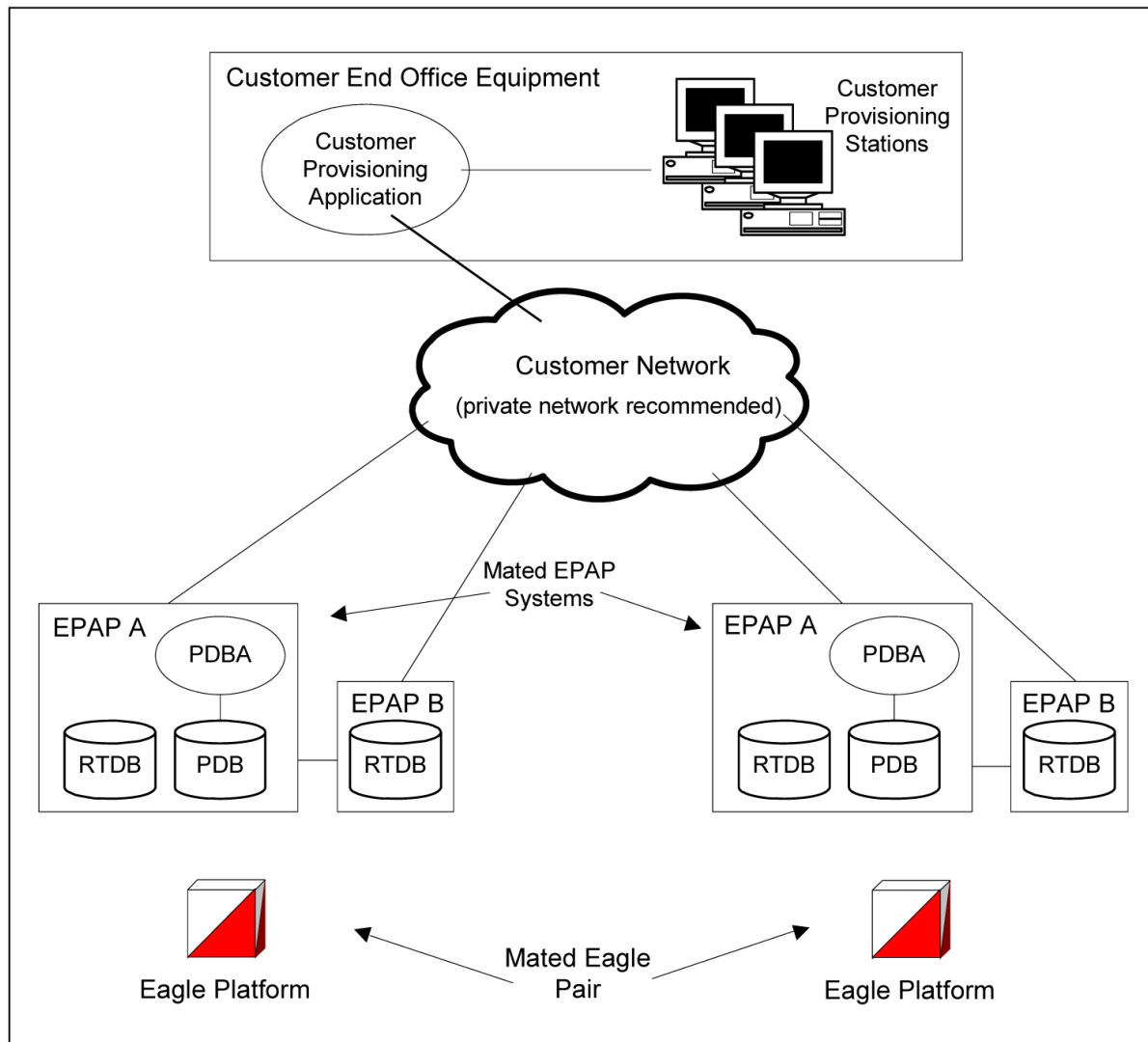
Although a dedicated network is recommended, it is possible that unrelated customer traffic can use the network as well. The determination, either to have a dedicated network or to allow other customer traffic, should be based on available external Ethernet bandwidth and network performance considerations.

EPAP Sync Network

The 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 2-5** .

Figure 2-5. EPAP Sync Network
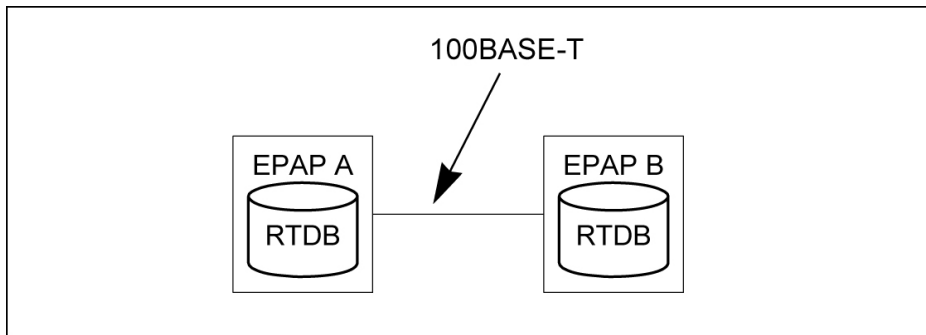
DSM Networks

The DSM card networks are shown in **Figure 2-6** . They carry provisioning data from the active EPAP RTDB to the DSM cards. They also carry reload and maintenance traffic to the DSM cards.

The DSM networks consist of two Ethernet networks: the main DSM network running at 100BASE-T, and the backup DSM network running at 10BASE-T. Both Ethernet networks connect EPAP A and EPAP B with every DSM card on a single EAGLE 5 ISS platform.

Figure 2-6. DSM Card Networks
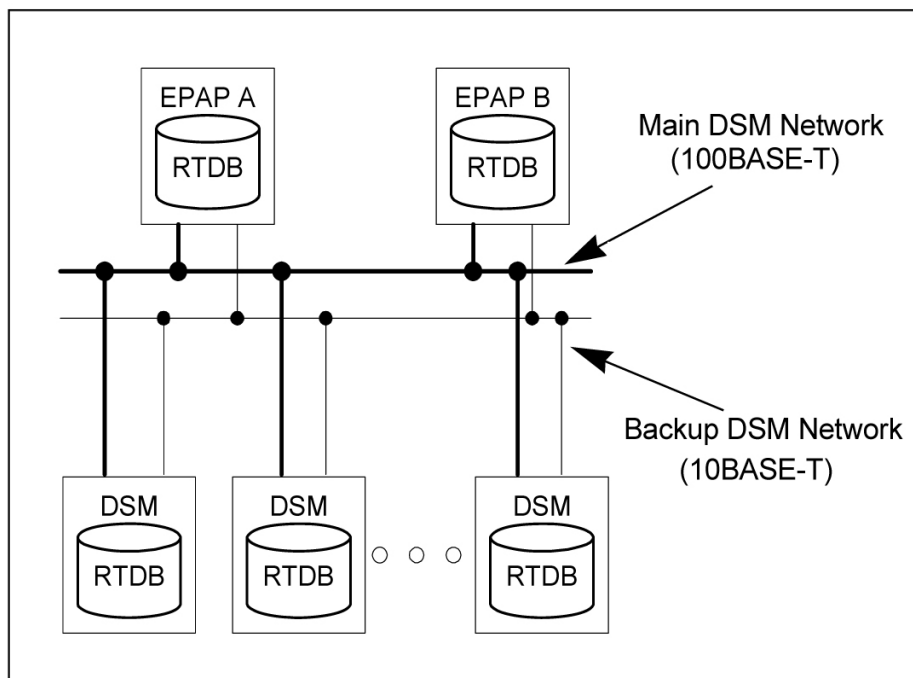
Maintenance information is sent from the active EPAP to an arbitrarily selected DSM card. The selected DSM is known as the primary DSM. Static information is exchanged across this interface at initialization, and dynamic information is exchanged on occasion.

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 1597.)

The third octet is a 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 2-1 summarizes the contents of each octet.

Table 2-1. 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 2-7** .

Figure 2-7. Dial-Up PPP Network
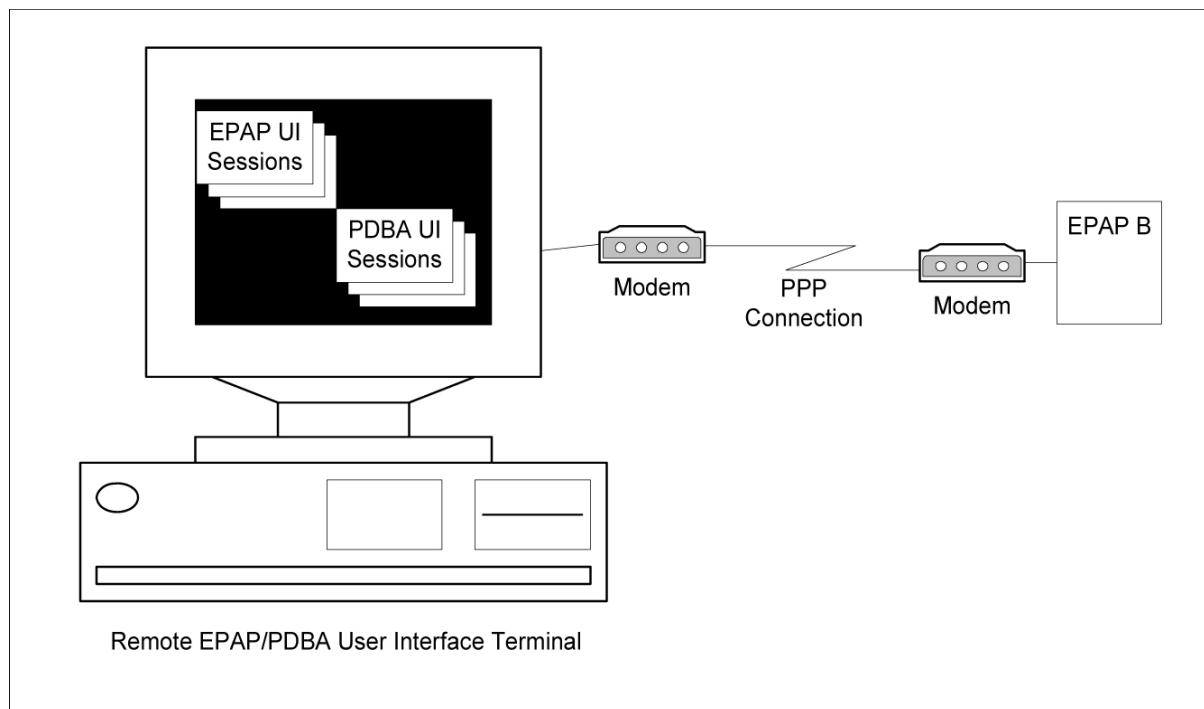
Serviceability Hints

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 SCCPCdPA, 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. GTT currently handles decimal digits only. Thus, if an operator/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, the operator must enter the RN + DN number ranges as DN ranges in the A-Port subscriber database. The only problem with this is that the beginning and ending DNs can only be 15 digits, which may not be enough 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

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

- **DSM Main Board Verification**

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

- **DSM Applique Memory Verification**

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

  > ⚠️ **CAUTION:** **A-Port cannot be enabled if any of the DSM 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.**
  > CAUTION

  — *Local Memory Validation*. When the A-Port feature is first enabled, or any time the A-Port feature is enabled and the DSM card is initializing, VSCCP checks to see if the DSM card has at least 4GB of memory installed.

  — *Real-Time Memory Validation (during card initialization)*. Once communications between the DSM and EPAP have been established, and the DSM has joined the RMTP Tree, the EPAP starts downloading the RTDB to the DSM card. After the DSM 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 DSM card. The DSM card compares the size required to the amount of memory installed, and issues a minor alarm when the database exceeds 80% of the DSM memory. If the database completely fills the DSM memory, a major alarm is issued, the DSM leaves the RMTP tree, and the status of the DSM card changes to IS-ANR/Restricted. The DSM card continues to carry traffic.

- **Actions Taken When Hardware is Determined to be Invalid**

  When the hardware configuration for a DSM card is determined to be invalid for the A-Port application, SCM automatically inhibits loading for that specific DSM card. A major alarm is generated indicating that card loading for that DSM card has failed and has been automatically inhibited, which means it is prevented from reloading. Refer to Chapter 5 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-dsbld`, and the secondary state of the card is set to MEA (Mismatch of Equipment and Attributes).

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

  — The DSM card will not download the EAGLE 5 ISS databases.

— The DSM card will not download the real-time RTDB from the EPAP.

— The DSM 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 DSM 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 DSM cards results in some of the LIMs (Link Interface Module) being denied SCCP services. A threshold must be monitored; if the number of valid DSM 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 CdPAGTAI (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 DSM card basis or on an A-Port system basis.

For more information, refer to Chapter 5 Maintenance and Measurements.

A-Port Loading Mode Support

Loading mode support is not applicable for RTDB updates, since DSM cards use incremental loading from the EPAP. STP Administrative updates are allowed while a DSM 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 ISSGPSM-II cards (General Purpose Service Module II cards) destined for the DSM cards.

Audit Requirements

The A-Port audit does not change EAGLE 5 ISS compliance to STP audit requirements, to whichEAGLE 5 ISS currently adheres. A-Port subscriber database tables residing on the EAGLE 5 ISSTDM 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 DSM cards. The audit mechanisms consist of the following.

- On each DSM 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 DSM cards and the standby EPAP. If the database levels do not match, the standby EPAP or DSM 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 MNPCRP 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 SCCPCdPA 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 RTDB.

- RNIDN (Routing Number, International Directory Number)

- RNNDN (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 MNPCRP is OFF, RN prefix deletion is not attempted. If MNPCRP 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 a RN and Portability Type (PT)≠ **0** (DN is ported or prepaid service), LOCREQ and any IS41 messages are relayed. GTT is applied to any GSM or non-TCAP message .

  For subscriber entries with a Signalling Point (SP), or a RN and PT= **0** (DN not known to be ported), LOCREQ and any IS41 messages are relayed. GTT is applied to any GSM or non-TCAP message.

- Match is Found Without NE

  A data entry in the database is found if a subscriber entry in 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= **1**, **2**, (number ported out) or no PT, the LOCREQ is returned without an NE.

  The LOCREQ is routed via GTT if an entry is found without an NE assigned and PT= **0** or **5** (not known to be ported or migrated to GSM). GTT is applied to any IS41 message if an entry is found without an NE assigned. The EAGLE only modifies 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 database, or the DN is found with non-A-Port data.

  Either the number has never been ported or it is an unknown number. The EAGLE 5 ISS routes the message by normal GTT/MTP routing. The EAGLE 5 ISS only modifies 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 ISSSelf 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 ISSSelf 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 ISSSelf 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.

  Since a DN may be the target of the 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 2-2** summarizes A-Port message processing.

Table 2-2. A-Port Message Processing

NE/ PT	LOCREQ	Any IS41	Any GSM or non-TCAP
RN and PT ≠ 0	ACK (RN from EPAP)	Relay	GTT
SP or (RN and PT= 0)	Relay	Relay	GTT
No NE and PT= 1, 2, or No PT	ACK (no NE)	GTT	GTT
No NE and PT= 1 or 5	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 2-3 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 2-3. 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)
delccprefix	886944000213	1404944000213	Delete country code and add prefix
delcc	886944000213	944000213	Delete country code

DigitAction	Value in Incoming CdPA GTA	Value in Outgoing CdPA GTA	Meaning
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 MNPSCCP 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. In the case when TSM cards running the SCCP application need to be reloaded for some reason, 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 TSM card running the SCCP application 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 TSM cards running the SCCP application 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 though 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 though 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 though 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 2-4 shows the actions taken when the MNP service is offline, a message arrives at the affected node requiring MNP service, and TSM cards running the SCCP application are available.

Table 2-4. 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
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

Result of service selector	DPC	Alternate point code defined and available	GTT to be performed as fall through	Message Handling	Network Management
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 for A-Port

A-Port supports MTP-routed SCCP messages. LOCREQ messages are supported. This feature cannot be turned on unless at least one of the following is turned on:

- A-Port

- IGM

- G-Flex

Use of the "MTP Msgs for SCCP Apps" feature adversely affects the SCCP capacity, as all of these messages are counted under SCCP capacity.

Once this feature is turned on, all SCCP messages are routed to TSM cards running the SCCP application. The TSM card running the SCCP application then performs SCCP decode/verification. If the MTP-routed messages have CdPAGTI = 0 and A-Port is turned on, then the message is sent for A-Port processing. If MNP service is OFFLINE, then MTP routing is performed on the messages.

If the MTP routed messages have CdPA GTI $\neq$ 0, then a service selection (SRVSEL) lookup is performed using the SCCP CdPA information. If the result of the lookup indicates MNP service, then the message is sent to MNP handling. If a service selector is not defined or does not match, or if the service is OFFLINE, then MTP routing is performed on the messages. MNP SCCP Service re-route (see MNP SCCP Service Re-Route Capability) is not performed on MTP-routed messages.

MNP handling checks to see if the TCAP portion of the message is ITU or ANSI. If it is an ITU TCAP message, then normal routing (or G-Flex, if provisioned) is performed on the message. If the message is an ANSI TCAP message, then A-Port general TCAP/MAP verification is performed, if A-Port or IGM is turned on.

SMS Address conversion is not affected by the MTP Msgs for SCCP Apps feature; SMS conversion handles only Registration Notification and SMS Notification messages.

A feature access key (FAK) for part number 893017401 is required to enable the MTP Msgs for SCCP Apps feature.

Figure 2-8 depicts the message control flow for the MTP Msgs for SCCP Apps feature.

Figure 2-8. Message Control Flow
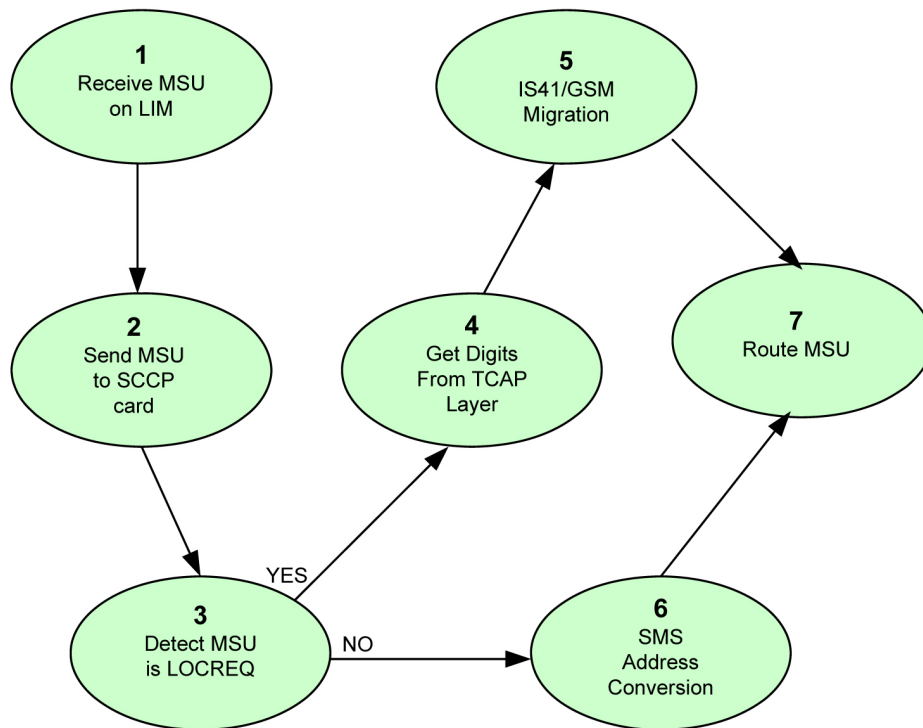
1.   The MSU is received by the EAGLE 5 ISS.

2.   The MSU is sent to the SCCP Function.

3.   The TSM card running the SCCP application examines the MSU and determines if it is a LOCREQ message.

4.   For LOCREQ, the TCAP Digit Parameter contains the digits to apply to Migration. This is a mandatory parameter. The digits are in encoded.

5.   IS41/GSM Migration is applied to the digits to determine if the subscriber is migrated. If so, a LOCREQ Return Result is generated to the OPC. If not, the LOCREQ is routed.

6.   If the message is not a LOCREQ, ITUN-ANSI SMS Address Conversion is applied. SMS Address conversion feature does not have any impact because on this feature because SMS conversion handles only Registration Notification and SMS Notification messages.

7.   The MSU is routed. MTP and SCCP conversion are performed if crossing a network boundary.

MO-Based IS41 SMS NP

The MO-based IS41 SMS NP feature provides network information to the Short Message Service Center (SMSC) for subscribers using the IS41 network. This information allows the SMSC to select a protocol to deliver Short Message Service Delivery Point-to-Point (SMDPP) messages to the called party.

The MO-Based IS41 SMS NP feature:

- Intercepts SMDPP messages after they have undergone Prepaid SMS (PPSMS) and Portability Check for Mobile-Originated SMS (MNPSMS) processing and before they reach the SMSC.

   NOTE: The MO-Based IS41 SMS NP feature does not require the PPSMS or MNPSMS features to be enabled.

- Decodes the TCAP/MAP message destination address and performs lookup in the number portability (NP) database

- Modifies the destination address in the TCAP message with Directory Number (DN) porting information, and

- Relays the message to the SMSC

The SMSC uses the DN porting information to determine whether to forward the message to other operators or to process the message for an in-network subscriber.

The MO-Based IS41 SMS NP feature applies to ANSI TCAP/MAP and ANSI transport (MTP and SCCP) messages.

Options

The MO-Based IS41 SMS NP feature provides configurable options for controlling the processing of SMDPP messages. These options specify the following:

- How to consider SMDPP destination address for processing

- Outbound digit format

- When an RTDB lookup is considered to be successful

- Handling of sub-address field in destination address

Feature Control

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

- A FAK for part number 893-0195-01

- The A-Port feature must be enabled and turned on before this feature can be enabled and 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 MO-Based IS41 SMS NP

The system level options that control the MO-Based IS41 SMS NP feature are stored in the IS41OPTS database table. The MO_Based IS41 SMS NP feature must be enabled before the GSMOPTS table can be provisioned.

The content of the IS41OPTS table is used to help perform number conditioning, response generation, and other feature-specific options. The following table shows the options stored in the IS41OPTS table, their possible values, and the action taken for each value.

Table 2-5. MO-Based IS41 SMS NP Options

IS41OPTS Option	Value	Action in the EAGLE 5 ISS
MOSMSDNFMT	RN	Same as A-Port general action.
	RNDN (default)	
	CCRNDN	
MOSMSTYPE	SP	When the lookup in the NPDB has entitytype=SP, then the lookup is considered successful.
	RN	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.
MOSMSNAI	NAT	The CdPN is treated as National number for lookup in the NPDB. DEFCC will be added to the DN before lookup in the NP database.
	INTL (default)	When SNAI=INTL, no number conditioning is required before lookup in the database.
	UNKNOWN	When this value is set, the NAI is treated as Unknown for the purposes of Number Conditioning
	NAI	The NAI from the SMDPP (short message delivery point to point) message is used for conditioning before lookup in database. - If the NAI is INTL, then NP lookup is performed immediately. - If the NAI is any other value, then the number is considered to be in national format. DEFCC is added before NP lookup is performed.
MOSMSDNNAI	None (default)	This option controls the NAI in the outgoing message. "None" indicates that the NAI is the same as the NAI in the incoming message.
	0–15	The value to be encoded in the outgoing message.

MO-Based IS41 SMS NP Protocol Handling

After the MO-Based IS41 SMS NP feature has been enabled and turned on, it provides the following protocol handling:

- The MO-Based IS41 SMS NP feature traps the SMDPP message and performs RTDB lookup based on the TCAP SMS_Destination_Address parameter. If the entity type is the same as the value of the MOSMSTYPE option in the IS41OPTS table (see **Table 2-5**), then the MO-Based IS41 SMS NP feature modifies the outgoing MO_SMS based on the value of the MOSMSDNFMT option.

- When the outgoing SMDPP is modified, the NAI is based on the value of the MOSMSNAI parameter in the IS41OPTS table.

- The MO-Based IS41 SMS NP feature performs SCCPCDPAGTA lookup against the SMSC list maintained by the STP. If the lookup is not successful, the MSU falls through to GTT handling.

- The number conditioning is based on the value of the MOSMSNAI option:

  — If MOSMSNAI=NAT, then the number is treated like a national number: DEFCC is prepended before performing lookup in the RTDB.

  — If MOSMSNAI=INTL, then the number is treated like an international number: this number is used for lookup in the RTDB.

  — If MOSMSNAI=NAI, then the conditioning is based on the NAI value from the TCAP part.

- For messages handled within this feature, the SCCP CDPA is always used to route the message.

- If the MOSMSTYPE=ALL and MOSMSDNFMT=RN and the RTDB lookup has no entity assigned to the DN, then the message is not modified.

- If the modified SMDPP message SMS_Destination_Address digits are greater than 21, then the digits are not modified and the original message is routed to the SMSC based on SCCPCDPA.

- The MO-Based IS41 SMS NP feature considers a successful RTDB lookup with entity_type=RN and portability-type=0 to be entity_type=SP, if the IS41-GSM Migration feature is enabled. When the IS41-GSM Migration feature is enabled, entity_type=RN, and portability-type=0, the subscriber is considered to be migrated, and therefore is considered to be local (in-network, SP) for the MO-Based IS41 SMS NP feature.

MO-Based IS41 SMS NP Call Flows

This section illustrates the sequence of messages that occur when a mobile operator delivers SMS messages in a number portability environment to:

- A called subscriber who is in the same network as the calling subscriber

- A called subscriber who is in a different network from the calling subscriber

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

Figure 2-9 depicts the message and control flows for a called subscriber who is in the same network as the calling subscriber.

Figure 2-9. MO-Based IS41 SMS NP Call Flow for In-Network Subscriber
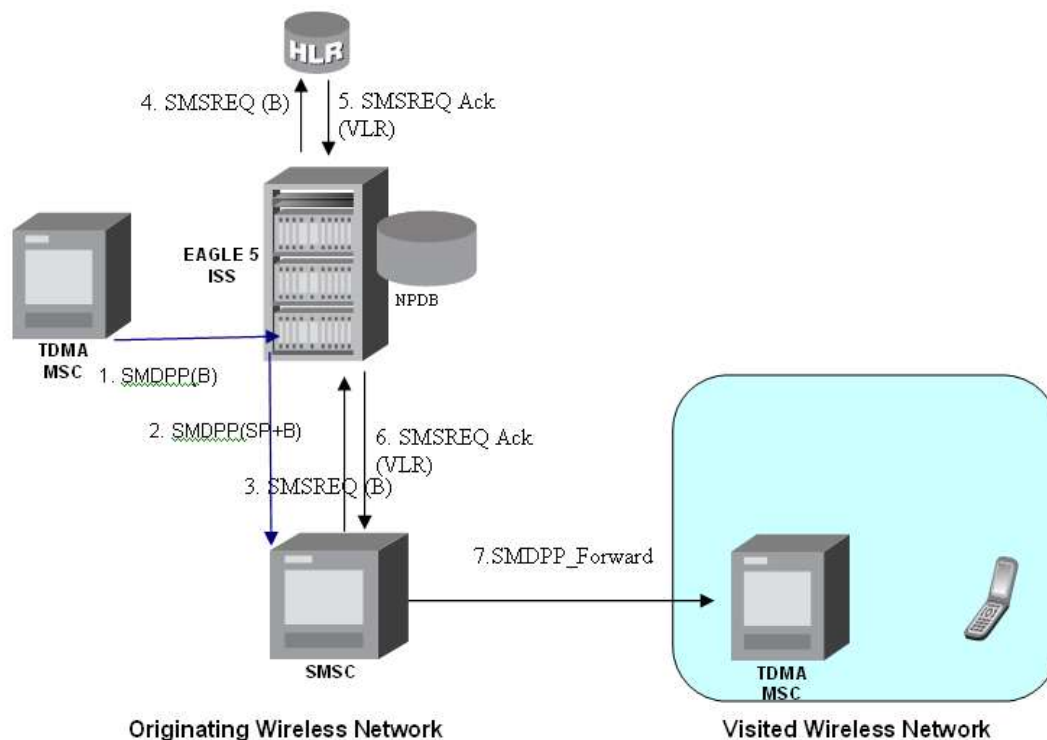
Figure 5 MO-based IS41 SMS NP - Called subscriber is in-network subscriber

Call considerations:

- The TCAP calling party is a wireless IS41 subscriber.

- The TCAP called party is a non-ported or ported-in wireless subscriber that belongs to the same carrier as the TCAP calling party.

- The call type is SMS.

- The SMSC (Short Message Service Center) has to remove the prefix that indicates that the DN (dialed number) is ported in.

- If the called subscriber is ported-in, it must be provisioned individually.

- If the called subscriber is TDMA, the EAGLE IS41-to-GSM NP feature ensures that the message is delivered in the TDMA network.

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

Figure 2-10 depicts the message and control flows for a called subscriber who is in a different network from the calling subscriber.

Figure 2-10. MO-Based IS41 SMS NP Call Flow for Other-Network Subscriber
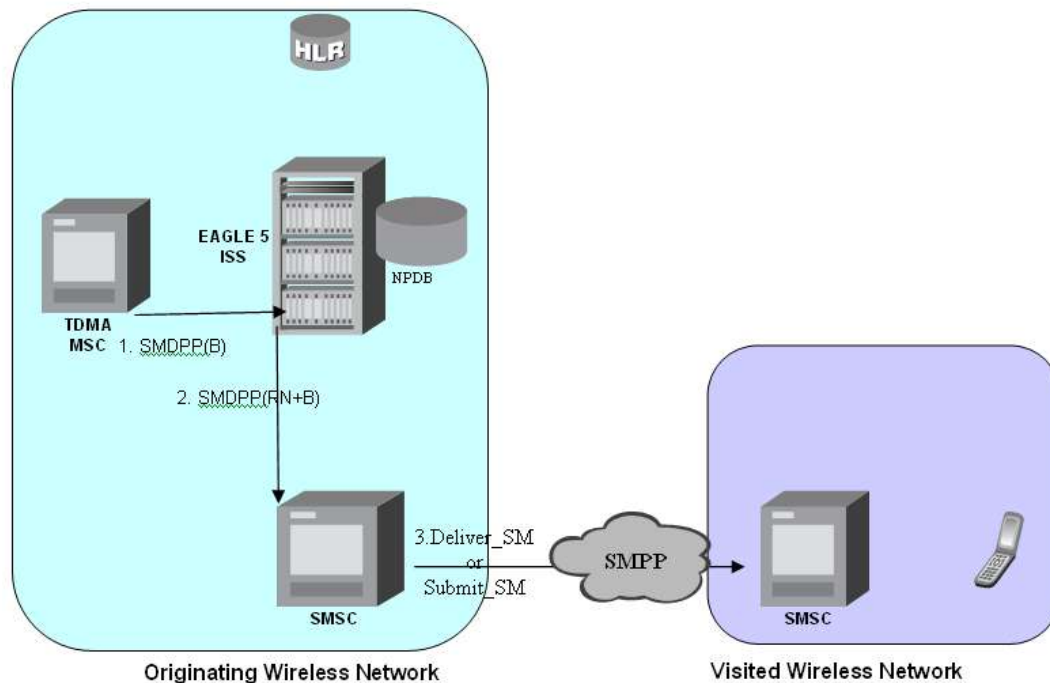
Call considerations:

- The TCAP calling party is a wireless IS41 subscriber.

- The TCAP called party is a non-ported or ported-in 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 remove the prefix that indicates that the DN (dialed number) is ported in. If the called subscriber is ported-out, it must be provisioned individually.

- If the called subscriber is TDMA, the EAGLE IS41-to-GSM NP feature ensures that the message is delivered in the TDMA network.

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.

Hardware Requirements

The MT-Based IS41 SMS NP feature cannot be enabled if TSM cards running the **sccp** application are present in the system. A TSM card that is running the **sccp** application cannot be provisioned after the feature is enabled.

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 IS41OPTS database table. The MT-Based IS41 SMS NP feature must be enabled before the IS41OPTS table can be provisioned.

The content of the IS41OPTS table is used to help perform number conditioning, response generation, and other feature-specific options. **Table 2-6** shows the options stored in the IS41OPTS table, their possible values, and the action taken for each value.

Table 2-6. MT-Based IS41 SMS NP Options

IS41OPTS 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)	**NOTE:**
	CCRNDN	**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.**
	SRFIMSI	SMS_Address is encoded from the "SRFIMSI" parameter from the NPDB entity.
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 (default)	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=IS41OPTS: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 .
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.

IS41OPTS Option	Value	Action in the EAGLE 5 ISS
MTSMSDLTRV	1-5 hex digits	This specifies if delimiter digit(s) need to be 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).
MTSMSCHKSRC	YES (default value is NO)	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. If this option is YES and SCCP CgPA GTA is absent, then the source is assumed to be the Home SMSC. 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.
	NO	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. 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.

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 2-11 depicts the message and control flows for a called subscriber who is in the same network as the calling subscriber.

Figure 2-11. MT-Based IS41 SMS NP Call Flow for In-Network Subscriber
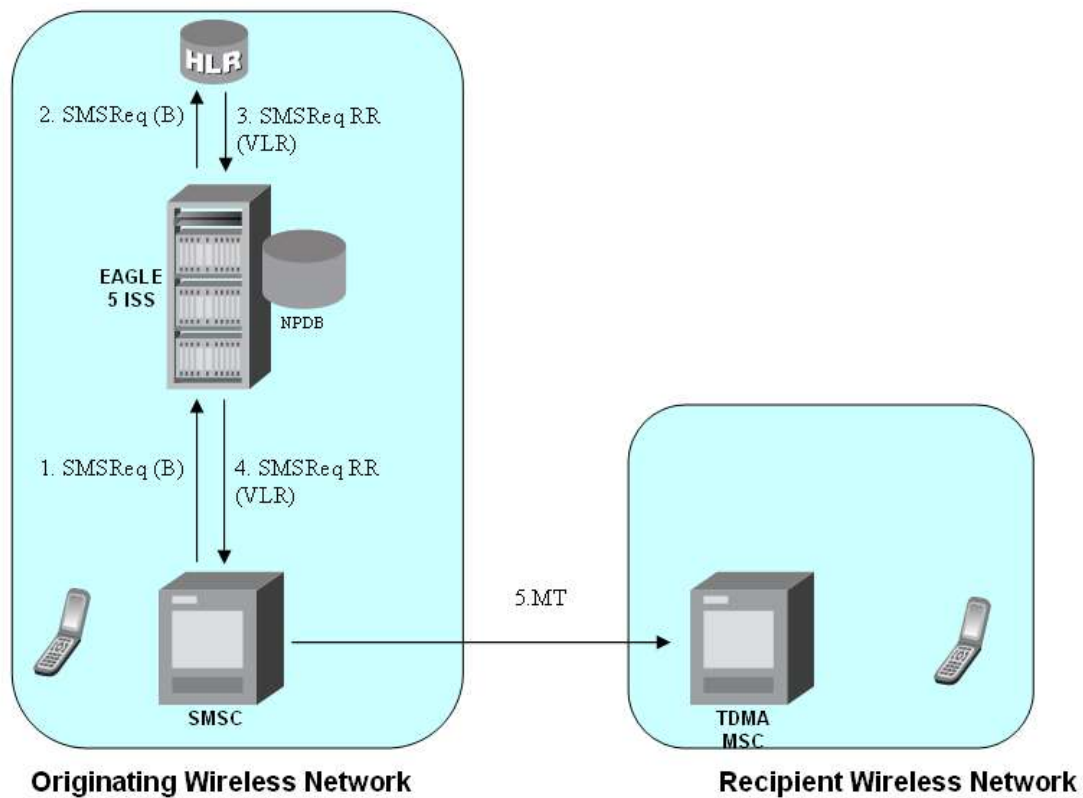
Call considerations:

- The TCAP calling party is a wireless IS41 subscriber.
- The TCAP called party is a non-ported 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 2-12 depicts the message and control flows for a called subscriber who is in a different network from the calling subscriber.

Figure 2-12. MT-Based IS41 SMS NP Call Flow for Other-Network Subscriber
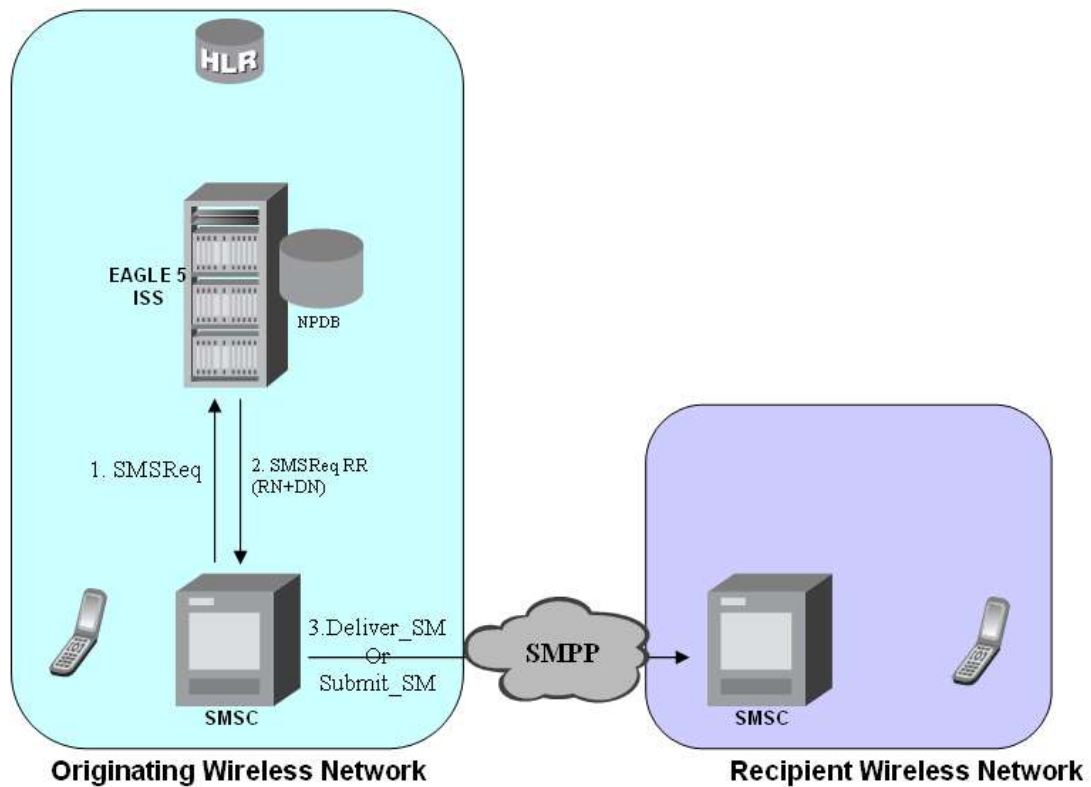
Call considerations:

- 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.

3

EAGLE 5 ISS A-Port Commands

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 DSM 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 3-1** .

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 3-1. 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

EAGLE 5 ISS Commands for A-Port Feature			
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 3-2. 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 RMHRN. 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.
mtplocreqnai	Optional	ccrndn, frmsg, intl, natl, rnidn, rnndn, rnsdn, sub}, none	Message Translation Part LOCREQ Nature of Address Indicator. This parameter defines how Called Party

Parameter	Optional/ Mandatory	Range	Description
			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
rspcdpari	Optional	frmsg, gt, ssn	Response Called Party Routing Indicator. This parameter specifies the value of the Routing Indicator bit to encode the SCCP CdPAGTA of a returned LOCREQ message.
rspcgpanai	Optional	ccrndn, frmsg, intl, natl, rnidn, rnndn, 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	frmsg, 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	frmsg, 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.
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.

Parameter	Optional/ Mandatory	Range	Description
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, frmsg, intl, natl, rnidn, rnndn, 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 36.0.0

    IS41 OPTIONS
    ----------------------
    SMSREQBYPASS    = NO
    LOCREQDN        = TCAP
    IEC             = 0
    NEC             = 00
    RSPCGPARI       = FRMSG
    RSPCGPAPCP      = FRMSG
    RSPCDPARI       = FRMSG
    RSPCDPAPCP      = FRMSG
    RSPCGPANAI      = 0
    RSPCGPANP       = 0
    RSPCGPATT       = 0
    MTPLOCREQNAI    = SUB
    RSPPARM         = DDIGIT
    RSPDIG          = RN
    RSPNON          = 0
    RSPNP           = 0
    RSPMIN          = NOTHOMERN
    MSCMKTID        = 32300
    MSCSWITCH       = 20
    ESNMFG          = 0
    ESNSN           = 0
    RSPDIGTYPE      = 0
    LOCREQRMHRN     = NO
    TCAPSNAI        = SUB
```

The following example shows the output if the MT-Based IS41 SMS NP feature is enabled:
```
tekelecstp 08-01-07 13:11:39 EST  EAGLE 38.0.0

    IS41 OPTIONS
    ----------------------
```

```
SMSREQBYPASS    = NO
LOCREQDN        = TCAP
IEC             = 0
NEC             = 00
RSPCGPARI       = FRMSG
RSPCGPAPCP      = FRMSG
RSPCDPARI       = FRMSG
RSPCDPAPCP      = FRMSG
RSPCGPANAI      = 0
RSPCGPANP       = 0
RSPCGPATT       = 0
MTPLOCREQNAI    = SUB
RSPPARM         = DDIGIT
RSPDIG          = RN
RSPNON          = 0
RSPNP           = 0
RSPMIN          = NOTHOMERN
MSCMKTID        = 32300
MSCSWITCH       = 20
ESNMFG          = 0
ESNSN           = 0
RSPDIGTYPE      = 0
LOCREQRMHRN     = NO
TCAPSNAI        = SUB
MTSMSDNFMT      = RNDN
MTSMSTYPE       = RN
MTSMSPARM       = DIGIT
MTSMSDLTR       = NO
MTSMSDLTRV      = NONE
MTSMSACKN       = ACK
MTSMSESN        = NO
MTSMSSSN        = 6
MTSMSNAKERR     = 5
MTSMSDIGTYPE    = 6
MTSMSCHKSRC     = 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 DSM 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 3-3. `ent-srvsel` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
serv	Mandatory	mnp	DSM service
ssn	Mandatory	0-255, *	Subsystem number

Parameter	Optional/ Mandatory	Range	Description
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, rnidn, rnndn, rnsdn, ccrndn	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 3-4. 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, mnpsms, smsmr, idps, idpr, mnp	New DSM service to be selected
nsnai	Optional	1sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn	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 3-5. 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

Parameter	Optional/ Mandatory	Range	Description
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 3-6. 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
serv	Optional	mnp	DSM service
snai	Optional	1sub, natl, intl, rnidn, rnndn, 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 this 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 the correct hardware is present in the system. These checks include verifying that the GTT bit is on and that no TSM cards running the SCCP application are provisioned. Refer to the *Commands Manual* for details of this command.

The part number 893016601 is used to enable A-Port feature on the EAGLE 5 ISS.

The part number 893019501 is used to enable MO-Based IS41 SMS NP feature on the EAGLE 5 ISS.

The part number 893019901 is used to enable MT-Based IS41 SMS NP feature on the EAGLE 5 ISS

- **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. The A-Port feature cannot be enabled if any TSMs are in the system.

```
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. An example output follows:

```
The following features have been permanently enabled:
    Feature Name            Partnum    Status  Quantity
    IPGWx Signaling TPS     893012805  on          2000
    ISUP Normalization      893000201  on          ----
    Command Class Management 893005801 on          ----
    Prepaid SMS Intercept Ph1 893006701 on         ----
    Intermed GTT Load Sharing 893006901 on         ----
    MNP Circ Route Prevent  893007001  on          ----
    XGTT Table Expansion    893006101  on        400000
    XMAP Table Expansion    893007710  on          3000
    Large System # Links    893005910  on          2000
    Routesets               893006401  on          6000
    EAGLE5 Product          893007101  off         ----
    EAGLE Product           893007201  off         ----
    IP7 Product             893007301  off         ----
    Network Security Enhance 893009101 off         ----
    HC-MIM SLK Capacity     893011801  on            64
    MNP                     893016601  on          ----
    EAGLE OA&M IP Security  893400001  off         ----
    SCCP Conversion         893012001  on          ----

The following features have been temporarily enabled:
Feature Name            Partnum    Status Quantity   Trial Period Left
MNP Circ Route Prevent  893007001 On         ----  20 days 8 hrs 57 mins

The following features have expired temporary keys:
Feature Name            Part Num
OnOffFeatV              893492401
```

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 3-7. 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 *Commands Manual*	Post GTT-translated PC
rc3	Optional	00-99	Relative Cost
pc4, pca4, pci4, pcn4, pcn244	Optional	Refer to *Commands Manual*	Post GTT-translated PC
rc4	Optional	00-99	Relative Cost

- **dlt-sccp-serv: Delete MNPSCCP 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 3-8. 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
        ITUI 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 DSM cards.

The command examples shown illustrate the requirements and provide suggestions for suitable names and output. The commands are described in detail in the *Commands Manual*, where the actual parameter names, valid values, and output for the commands are provided.

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. Refer to the *Commands Manual* for details of these command.

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 are updated to allow both ITU-N and ITU-I true point codes to be defined for the same SSN. Refer to the *Commands Manual* for details of these commands.

rept-stat-sys

This command is used to determine the location of problems in the MNP subsystem. The display shows the number of items that are in service (IS-NR) and the how many are in another state (IS-ANR, OOS-MT, OOS-MT-DSBLD). Refer to the *Commands Manual* for details of this command.

A sample output is:

```
eagle10605 01-07-25 02:32:46 EST  Rel 36.0.0-49.10.0
    MAINTENANCE STATUS REPORT
       Maintenance Baseline established.
       Routing Baseline established.
       SCCP Baseline established.
       ALARMS:     CRIT=  9    MAJR=  10   MINR=  3     INH=   2
       OAM 1113    IS-NR         Active                 INH=   0
       OAM 1115    IS-NR         Standby                INH=   0
       LIM  CARD   IS-NR=  3    Other=       0          INH=   0
       X25  CARD   IS-NR=  0    Other=       0          INH=   0
       SCCP CARD   IS-NR=  1    Other=       0          INH=   0
       GLS  CARD   IS-NR=  0    Other=       0          INH=   0
       SLAN CARD   IS-NR=  0    Other=       0          INH=   0
       EMDC CARD   IS-NR=  2    Other=       0          INH=   0
       MCPM CARD   IS-NR=  2    Other=       0          INH=   0
       IMT         IS-NR=  2    Other=       0
       HMUX        IS-NR=  2    Other=       0          INH=   0
       HIPR        IS-NR=  2    Other=       0          INH=   0
       SLK         IS-NR=  0    Other=       6          INH=   0
       DLK         IS-NR=  0    Other=       0          INH=   0
       LINK SET    IS-NR=  0    Other=       4          INH=   0
       NDC IP LK   IS-NR=  4    Other=       0          INH=   0
```

```
          MCPM IP LK  IS-NR=   2     Other=       0           INH=    0
          SS7 DPC     IS-NR=   0     Other=       6           INH=    0
          X25 DPC     IS-NR=   0     Other=       0           INH=    0
          CLUST DPC   IS-NR=   0     Other=       1           INH=    0
          XLIST DPC   IS-NR=   0     Other=       0
          DPC  SS     Actv =   0     Other=       0
          SEAS SS     IS-NR=   0     Other=       0
          SEAS  X25   IS-NR=   0     Other=       0           INH=    0
          LSMS SS     IS-NR=   0     Other=       0
          LSMS Conn   IS-NR=   0     Other=       0           INH=    0
          NDC SS      IS-NR=   1     Other=       0
          NDC  Q.3    IS-NR=   0     Other=       2           INH=    1
          TERMINAL    IS-NR=   2     Other=      14           INH=    0
          MPS         IS-NR=   2     Other=       0
          EIR SS      IS-NR=   1     Other=       0
```

rept-stat-sccp

The output for the `rept-stat-sccp` command displays the states of and statistics for the DSM cards and the GTT, G-Flex, MNP, INP , and EIR services executing on those cards. This command also displays any cards that are denied SCCP service. When turned on, the A-Port and IGM features share statistics/status with the G-Port feature. If only the G-Port feature is on, the display title is GPORT. If the A-Port or IGM feature are on, with or without the G-Port feature, the display title for the statistic status changes from GPORT to MNP.

The loc parameter displays detailed view of the status of SCCP services provided by a specific DSM card or TSM card running the SCCP application. Fields are omitted if an associated feature is not turned on.

The mode parameter targets the general SCCP traffic performance for both DSM cards and TSM cards running the SCCP application. The report supplies message rates for group ticket voucher (TVG) performance.

SMSREQ NACK is counted as a success for both the Migration and MT-Based IS41 SMS NP features.

Refer to the *Commands Manual* for details of this command.

The following sample output shows the output of the `rept-stat-sccp` command with the G-Flex, G-Port, INP, and A-Port features on. The EIR feature is not enabled, and the ansigflex system option is disabled.

```
tekelecstp 000623 13:34:22 EST  EAGLE5 35.0.0
    SCCP SUBSYSTEM REPORT IS-NR          Active
        SCCP ALARM STATUS = No Alarms
    INPQ SUBSYSTEM REPORT IS-ANR         Restricted  -----
        ASSUMING MATE'S LOAD
        INPQ: SSN STATUS = Allowed    MATE SSN STATUS  = Prohibited
        INPQ ALARM STATUS = No Alarms
    GFLEX SERVICE REPORT IS-ANR       Active
        GFLEX ALARM STATUS = No Alarms
    MNP SERVICE REPORT   IS-ANR       Active
        MNP ALARM STATUS   = No Alarms

    SCCP Cards Configured=4  Cards IS-NR=2
    System TPS Alarm Threshold = 100% Total Capacity
    System Peak SCCP Load = 3000 TPS
    System Total SCCP Capacity = 5000 TPS

    CARD   VERSION     PST         SST        AST     MSU USAGE  CPU USAGE
    --------------------------
    1212   101-001-000  IS-NR       Active     ALMINH     45%        30%
    1301 P 101-001-000  IS-NR       Active     ------     35%        40%
    1305   -----------  OOS-MT      Isolated   ------      0%         0%
    2112   -----------  OOS-MT-DSBLD Manual    ------      0%         0%
    --------------------------
    SCCP Service Average MSU Capacity = 40%    Average CPU Capacity = 35%

    AVERAGE CPU USAGE PER SERVICE:
      GTT   = 15%  GFLEX =  5%  MNP = 10%
      INPMR =  2%  INPQ  =  3%
```

```
TOTAL SERVICE STATISTICS:
                             FAIL    REROUTE\     FORWARD
      SERVICE   SUCCESS  ERRORS  RATIO   WARNINGS     TO GTT    TOTAL
      GTT:         1995      5    0%         -           -      2000
      GFLEX:        500      1    0%         4          10       515
      MNP:          800      0    0%         2           3       805
      INPMR:         50      5    0%         0          15        70
      INPQ:         499      1    0%         -           -       500
Command Completed.
;
```

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 DSM and EPAP is displayed.

Refer to the *Commands Manual* for details of this command.

A sample output of the **rept-stat-mps** command is:

```
Integrat40 00-06-24 10:37:22 EST  Rel 36.0.0-49.10.0

                    VERSION      PST          SST        AST
    EPAP A          027-015-000  IS-NR        Active     -----
        CRITICAL PLATFORM    ALARM DATA = No Alarms
        MAJOR    PLATFORM    ALARM DATA = No Alarms
        MINOR    PLATFORM    ALARM DATA = No Alarms
        CRITICAL APPLICATION ALARM DATA = No Alarms
        MAJOR    APPLICATION ALARM DATA = No Alarms
        MINOR    APPLICATION ALARM DATA = No Alarms
             ALARM STATUS = No Alarms

                    VERSION      PST          SST        AST


  EPAP B            027-015-000

 OOS-MT       Fault

Standby


     CRITICAL PLATFORM    ALARM DATA = No Alarms
        MAJOR    PLATFORM    ALARM DATA = h'0123456789ABCDEF
        MINOR    PLATFORM    ALARM DATA = h'0123456789ABCDEF
        CRITICAL APPLICATION ALARM DATA = No Alarms
        MAJOR    APPLICATION ALARM DATA = h'0123456789ABCDEF
        MINOR    APPLICATION ALARM DATA = No Alarms
             ALARM STATUS = ** 0371  Major Platform Failure(s)

  CARD   PST          SST       EIR STAT
  1106 P IS-NR        Active     ACT
  1201   IS-ANR       Active     SWDL
  1205   OOS-MT-DSBLD Manual    -------
  1302   OOS-MT       Isolated  -------
  1310   IS-ANR       Standby    SWDL

  CARD 1106 ALARM STATUS = No Alarms
    DSM PORT A:      ALARM STATUS       = No Alarms
    DSM PORT B:      ALARM STATUS       = No Alarms

  CARD 1201 ALARM STATUS = No Alarms
    DSM PORT A:      ALARM STATUS       = **  0084 IP Connection Unavailable
    DSM PORT B:      ALARM STATUS       = **  0084 IP Connection Unavailable
  CARD 1205 ALARM STATUS = No Alarms
    DSM PORT A:      ALARM STATUS       = **  0084 IP Connection Unavailable
    DSM PORT B:      ALARM STATUS       = **  0084 IP Connection Unavailable
```

```
       CARD 1302 ALARM STATUS = ** 0013 Card is isolated from the system
         DSM PORT A:      ALARM STATUS      = **  0084 IP Connection Unavailable
         DSM PORT B:      ALARM STATUS      = **  0084 IP Connection Unavailable
       CARD 1310 ALARM STATUS = No Alarms
         DSM PORT A:      ALARM STATUS      = **  0084 IP Connection Unavailable
         DSM PORT B:      ALARM STATUS      = **  0084 IP Connection Unavailable
       Command Completed.
;
```

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. Refer to the *Commands Manual* for details of this command.

rept-meas

This command includes A-Port measurements in the output sent to the EAGLE 5 ISS Terminal. Refer to the *Commands Manual* for details of this command.

rept-stat-meas

This command reports the status of the measurements subsystem including card location and state, alarm level, and subsystem state. Refer to the *Commands Manual* for details of this command.

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.

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

rept-stat-trbl

This command displays a summary the device trouble notifications. The severity of each alarm is indicated in the output report. Refer to the *Commands Manual* for details of this command.

A sample output is:

```
eagle10207 02-08-23 10:09:59 EST  Rel 36.0.0-49.10.0

    SEQN UAM  AL DEVICE     ELEMENT      TROUBLE TEXT
    0001.0013 ** CARD 1201 GLS          Card is isolated from the system
    0002.0013 ** CARD 1211 SS7ANSI      Card is isolated from the system
    0011.0013 ** CARD 1101 SCCP         Card is isolated from the system
    0013.0013 ** CARD 1103 GLS          Card is isolated from the system
    0015.0013 ** CARD 1105 VSCCP        Card is isolated from the system
    0018.0013 ** CARD 1115 OAM          Card is isolated from the system
    0019.0236 ** SLK 1211,B  ls1134     REPT-LKF: not aligned
    0020.0236 ** SLK 1311,A  ls1134567  REPT-LKF: not aligned
    0021.0236 ** SLK 1312,A  ls113456   REPT-LKF: not aligned
    0022.0236 ** SLK 1313,A  ls11345    REPT-LKF: not aligned
    0023.0236 ** SLK 1314,A  ls113467   REPT-LKF: not aligned
    0024.0236 ** SLK 1315,A  ls11234567 REPT-LKF: not aligned
    0025.0236 ** SLK 1316,A  ls11345678 REPT-LKF: not aligned
    0026.0318 ** LSN ls11234567         REPT-LKSTO: link set prohibited
    0027.0318 ** LSN ls11345678         REPT-LKSTO: link set prohibited
    0028.0318 ** LSN ls1134567          REPT-LKSTO: link set prohibited
    0029.0318 ** LSN ls113456           REPT-LKSTO: link set prohibited
    0030.0318 ** LSN ls11345            REPT-LKSTO: link set prohibited
    0035.0318 ** LSN ls113467           REPT-LKSTO: link set prohibited
    0032.0318 ** LSN ls1134             REPT-LKSTO: link set prohibited
    0033.0336 ** SCCP SYSTEM            LIM(s) have been denied SCCP service
    0034.0349 *C SEAS SYSTEM            SEAS unavailable
    0035.0356 *C LSMS SYSTEM            LSMS unavailable
    0036.0455 *C EIR SYSTEM             EIR Subsystem is not available
    0019.0236 *C T1PORT 1301,1          REPT-T1F:FAC-T1   LOS failure
    Command Completed.
;
```

rept-stat-alm

This command includes the alarm totals of the A-Port subsystem and DSM/EPAPIP links. Refer to the *Commands Manual* for details of this command. An example of the command and its output is:

```
rept-stat-alm
Command Accepted - Processing
    eagle10605 99-06-24 23:59:39 EAGLE 35.0.0
    rept-stat-alm
    Command entered at terminal #10.
;

    eagle10605 99-06-24 23:59:39 EAGLE 35.0.0
    ALARM  TRANSFER= RMC
    ALARM  MODE      CRIT= AUDIBLE     MAJR= AUDIBLE     MINR= AUDIBLE
    ALARM  FRAME 1   CRIT=  9          MAJR=  12         MINR=  2
    ALARM  FRAME 2   CRIT=  0          MAJR=  0          MINR=  0
    ALARM  FRAME 3   CRIT=  0          MAJR=  0          MINR=  0
    ALARM  FRAME 4   CRIT=  0          MAJR=  0          MINR=  0
    ALARM  FRAME 5   CRIT=  0          MAJR=  0          MINR=  0
    ALARM  FRAME 6   CRIT=  0          MAJR=  0          MINR=  0
    ALARM  FRAME GPF CRIT=  1          MAJR=  2          MINR=  1
    PERM. INH. ALARMS CRIT= 0          MAJR=  0          MINR=  0
    TEMP. INH. ALARMS CRIT= 0          MAJR=  0          MINR=  0
    ACTIVE ALARMS     CRIT= 10         MAJR=  14         MINR=  3
    TOTAL ALARMS      CRIT= 10         MAJR=  14         MINR=  3
    Command Completed.
;
```

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 DSM network 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. For details about this command, refer to the *Commands Manual*.

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/ACM/DSM/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.

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

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.
NOTE: A TSM card running the SCCP application cannot be provisioned when the MT-Based IS41 SMS NP feature is enabled.

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.

Refer to the *Commands Manual* for details on using these commands.

ent/dlt/rtrv-home-smsc

The ent-home-smsc command is used to enter home Short Message Service Center (SMSC) addresses in the database. An example of the command and its output is:

```
ent-home-smsc : smsc=256489
    rlghncxa03w 04-02-28 08:50:12 EST   EAGLE 31.3.0
    ENT-HOME-SMSC: MASP A - COMPLTD
;
```

The dlt-home-smsc command is used to delete home Short Message Service Center (SMSC) addresses in from the database. An example of the command and its output is:

```
dlt-home-smsc:smsc=552611646
    rlghncxa03w 04-02-28 08:50:12 EST   EAGLE 31.3.0
    DLT-HOME-SMSC: MASP A - COMPLTD
;
```

The rtrv-home-smsc command is used to retrieve HOME SMSC specific addresses currently used to identify SMSCs in the database. An example of the command and its output is:

```
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)

;
```

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

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

The command-handling and scroll area output for these commands include the VSCCPGPL. Refer to the *Commands Manual* for details of these commands.

Here are samples of the reports produced by these commands.

```
chg-gpl:appl=vsccp: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=vsccp: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=vsccp
    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=vsccp
    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=dlk. This allows alarms to be inhibited on the DSM ports. Refer to the *Commands Manual* for details of these commands.

4

A-Port Feature Activation

Introduction

⚠️ CAUTION

CAUTION: For an in-service environment, contact the **Customer Care Center** before continuing to activate A-Port. For an environment that is not yet in-service, you may continue with this procedure.

The A-Port feature cannot be turned on if any of the DSM 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.

This chapter identifies prerequisites for the A-Port feature activation procedure, an overview of the activation steps, and the detailed step descriptions to turn on the A-Port feature. The A-Port feature activation is performed at the EAGLE 5 ISS.

The A-Port features optimizes the use of subscriber numbers and number ranges in a IS-41 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.logical link between any

The A-Port feature and other related features are optional and can be purchased from Tekelec. If you are not sure whether you have purchased a specific feature, contact your Tekelec Sales or Account Representative.

⚠️ CAUTION

CAUTION: After a feature has been turned on with the enable-ctrl-feat command, it cannot be turned off. Because features may overwrite other features or create changes in the database, ensure that you have a license and full technical support from Tekelec before turning on this or any other feature.

> **The A-Port feature requires a DSM card running the VSCCP application. Systems with TSM cards running the SCCP application need to be upgraded to 4 GB DSM cards prior to turning on the A-Port feature.**
>
> **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.**
>
> **Procedures described in the remainder of this section apply to only the A-Port feature and can only be performed if the A-Port feature is enabled.**

The following features are related to the A-Port feature (see 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 (MNPCRP)

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 the 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 4 GB DSM cards need to be installed and TSM cards to be removed are identified.

*   Note installed DSM card locations if any.

*   Note available odd-even card slots for DSM card installation.

*   Note installed TSM card locations.

*   Note adjacent odd-even TSM card slot number positions for DSM card replacement.

> **NOTE: TSM cards use one card slot; DSM cards require two card slots, odd-even.**

> **The A-Port feature cannot be turned on until the TSM cards running the SCCP application are removed from the system.**

• Determine DSM card IP addresses and have them available during the activation procedure.

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

> ⚠️ **CAUTION**
>
> **CAUTION: In an in-service environment and when replacing TSM cards with DSM cards, initialize one DSM card at a time. Verify its return to the IS-NR state before initializing another DSM card. This precaution keeps cards in service and prevents an interruption of SCCP services.**

For in-service systems with TSM cards running SCCP traffic, one DSM card must be installed in an available double-slot odd-even location and provisioned for VSCCP prior to inhibiting the TSM card running the SCCP application. The DSM card running the VSCCP application will take over the SCCP traffic (**alw-card**) after the TSM card running the SCCP application becomes inhibited.

> ⚠️ **CAUTION**
>
> **CAUTION: SCCP traffic redundancy will be lost if inhibiting two TSM cards running the SCCP application at a time with only one DSM card is available in their place. Redundancy will be re-established after the two TSM cards running the SCCP application are replaced with a second DSM card.**

For in-service systems that already have the G-Port, G-Flex and/or INP feature enabled, perform only Step 6 to turn on the A-Port feature. With the G-Port, G-Flex and/or INP feature enabled, the DSM cards already contain the RTDB database.

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

For new systems, GTT, EGTT, and VGTT features may be turned on prior to or immediately following the reboot of all DSM 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 DSM cards in available slots and configure for VSCCP in Step 3 .

• Replace TSM cards configured for SCCP with DSM cards configured for VSCCP and inhibit/remove any remaining TSM cards running the SCCP application in Step 4 through Step 5 .

• Turn on and configure the A-Port feature in Step 6 .

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 <u>Substep a</u>.

    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 *Database Administration Manual - Features*, Removing A Mated Application).

> ⚠ **CAUTION**
>
> **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 <u>Substep a</u> through <u>Substep t</u>.

    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 <u>Substep a</u> to any `pca/pci/pcn` parameter.

> ⚠ **CAUTION**
>
> **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 the EAGLE 5 ISS 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 DSM cards running the VSCCP application and TSM cards running the SCCP application.

> ⚠️
> CAUTION
>
> **CAUTION: When adding DSM cards to an in-service environment, take precautions to not interrupt traffic. Before replacing TSM cards running the SCCP application with DSM cards, first install a DSM card in an available odd-even double-slot prior to removing TSM cards running the SCCP application to make additional room for other DSM cards.**

3.   Install and configure DSM card(s) in available odd-even slots as needed using <u>Substep a</u> through <u>Substep o</u> .

a.   Install DSM cards in available odd-even slots and verify green IMT bus LEDs.

b.   Use **ent-card** command to enter DSM cards running the VSCCP application into the database.

c.   Use **rtrv-card** command to display new DSM cards in the database.

d.   Use **rtrv-ip-lnk** command to display current link parameters associated with the DSM card.

e.   Use **chg-ip-lnk** command to set the IP address port and speed associated with the DSM 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 DSM card information.

l.   Use **alw-card** command to boot DSM card in TSM emulation mode.

m.   Use **rept-stat-card** command to display IS-NR status of DSM card.

n.   Use pass command to test presence of EPAP hosts on network.

o.   Repeat <u>Substep a</u> through <u>Substep n</u> to add all DSM cards (N+1) to be installed in available slots.

4.   Replace TSM card(s) with DSM cards if applicable, and add DSM card(s) to database using <u>Substep a</u> through <u>Substep w</u> .

a.   Use **rtrv-card** command to display TSM cards running the SCCP application in the database.

b.   Use **rept-stat-card** command to display TSM cards running the SCCP application in IS-NR status.

    c.   Use **inh-card** command to inhibit TSM cards running the SCCP application.

    d.   Use **rept-stat-card** command to display OOS-MT-DSBLD status of TSM cards running the SCCP application.

    e.   Use **dlt-card** command to delete TSM cards running the SCCP application from database.

    f.   Use **rtrv-card** command to verify removal of TSM cards running the SCCP application from database.

    g.   Remove first TSM card from shelf.

    h.   Remove second TSM card from shelf.

    i.   Install DSM card in shelf and verify green IMT bus LEDs.

    j.   Use **ent-card** command to enter the DSM card running the VSCCP application into the database.

    k.   Use **rtrv-card** command to display new DSM card running the VSCCP application in the database.

    l.   Use **rtrv-ip-lnk** command to display current link parameters associated with DSM card running the VSCCP application.

    m.   Use **chg-ip-lnk** command to set the IP address port and speed associated with the DSM card running the VSCCP application.

    n.   Use **rtrv-ip-lnk** command to display changed link parameters associated with the DSM card running the VSCCP application.

    o.   Use **alw-card** command to boot DSM card in TSM emulation mode.

    p.   Use **rtrv-ip-host** command to display IP host information in database.

    q.   Use **ent-ip-host** command to add host name and IP address for VSCCP link.

    r.   Use **rtrv-ip-host** command to display changed IP host information in database.

    s.   Use **chg-ip-card** command to set local domain and IP router address if necessary.

    t.   Use **rtrv-ip-card** command to display changed information for the DSM card running the VSCCP application.

    u.   Use **rept-stat-card** command to display IS-NR status of the DSM card running the VSCCP application.

    v.   Use **pass** command to test presence of EPAP hosts on network.

    w.   Repeat Substep a through Substep v to replace all adjacent TSM cards identified in the prerequisites and to be replaced with DSM cards.

5.   Repeat Substep c through Substep g to inhibit any remaining TSM cards running the SCCP application and remove them from database and shelf.

> **NOTE : The A-Port feature cannot be turned on until all TSM cards running the SCCP application are removed from the system.**

⚠ CAUTION

CAUTION: Contact the Customer Care Center at this step for assistance in completing this A-Port activation procedure. Do not proceed without consulting with the Customer Care Center .

6.   Turn on and configure the A-Port feature using steps Substep a through Substep t .

    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 g   through Substep o   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-ported MDNs)**

c.   Use **`enable-ctrl-feat`** command to enable the optional MTPMSGS for SCCP Apps feature, if required.

d.   Use **`chg-ctrl-feat`** command to turn on the optional MTPMSGS for SCCP Apps feature, if required.

e.   Use **`enable-ctrl-feat`** command to enable the optional MO-Based IS41 SMS NP feature, if required.

f.   Use **`chg-ctrl-feat`** command to turn on the optional MO-Based IS41 SMS NP feature, if required.

g.   Use **`chg-stpopts`** command to enter default country code (CC) and default network destination code (NDC) if handling non-international numbers.

h.   Use **`rtrv-stpopts`** command to verify changes of CC and NDC.

i.   Use **`chg-is41opts`** command to change IS41 options.

j.   Use **`rtrv-is41opts`** command to verify changes to IS41 options.

k.   Use the **`ent-homern`** command to enter any Home RNs that are prefixed to DNs for incoming A-Port MR messages.

l.   Use **`rtrv-homern`** command to verify routing number prefixes.

m.   Use the **`rtrv-srvsel`** command to read the service selector combinations.

n.   Use **`ent-srvsel`** command to enter MNP service selectors.

o.   Use **`rtrv-srvsel`** command to verify changes to MNP service selectors.

> ⚠ **CAUTION:**   **When you have an in-service environment and you are replacing TSM cards with DSM cards, initialize one DSM card at a time. Verify its return to IS-NR state before initializing another card. This precaution keeps cards in service and precludes an interruption of SCCP services.**

p.   Use **`init-card:loc=<DSM card`**> command to load RTDB, OAM, GPL, and GTT data to the DSM card running the VSCCP application.

q.   Use **`rept-stat-card`** command to display IS-NR status of the DSM card running the VSCCP application.

r.   Repeat Substep p   and Substep q   to reboot each DSM card

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

s.   Use **`chg-sccp-serv:serv=mnp:state=online`** to set the MNP service to on-line.

t.   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 the *EPAP Administration Manual*.

A-Port Feature Activation Procedure

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

⚠️ 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.**

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 <u>Step 2</u>), the destination point codes (DPCs) (shown in <u>Step 3</u>), and the routes and linksets assigned to the DPCs (shown in <u>Step 4</u>).

    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.

    This is an example of the 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=mnp`.

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

    This is an example of the possible output:

    ```
      tklc1191001 06-05-11 08:02:13 EST  EAGLE5 36.0.0
         DPCA          CLLI       BEI ELEI   ALIASI         ALIASN/N24  DOMAIN
         008-030-008   stpa038a   no  --- ----------    --------------  SS7
         006-010-006   stpc016a   no  --- ----------    --------------  SS7
         042-052-012   tklca4212a2 no ---    4-075-2        4-075-2-aa  SS7
         042-054-012   tklca4212a4 no ---    4-077-2        4-077-2-aa  SS7
         042-056-012   tklca4212a6 no ---    4-079-2        4-079-2-aa  SS7
         255-*-*       mobrncr001a --- --- ----------    --------------  SS7
         255-225-*     mobrncr002a no  no  ----------    --------------  SS7
         225-225-199   mobrrte001a no  ---    7-255-7        7-255-7-aa  SS7

         DPCI          CLLI       BEI ELEI   ALIASA         ALIASN/N24  DOMAIN
         7-030-7       stpa037i   no  --- --------------  --------------  SS7
         7-030-7       ---------- no  --- --------------  --------------  SS7
         5-010-5       stpc015i   no  --- --------------  --------------  SS7
         DPCN24        CLLI       BEI ELEI   ALIASA         ALIASI      DOMAIN
         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.

       This is an example of the 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
```

5.   If the system point code (**pc/pca**) or capability point code (**cpc/cpca**) 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).

6.   If configuring the system point code or capability point code **(pc** or **cpca)** 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. This is an example of the 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 "ANSIPoint Code" section in the *EAGLE 5 ISSDatabase Administration Manual - SS7*. Then continue with <u>Step 7</u>.

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**, **MPCI**, 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 <u>Step 4</u>) and not in the Destination table (see output of the **rtrv-dstn** command in <u>Step 3</u>).

8.   Change PC, CPC, DPC, route, linkset, and LIM card configurations for the HLR database using <u>Step 9</u> through <u>Step 28</u>.

> ⚠ **CAUTION**
>
> **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

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 the EAGLE 5 ISS Commands Manual in the Related Commands section for each of the above `rept-stat` commands.

10. 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.

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

This is an example of the 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
                   s-1-023-4    s-01234
      CPCI
    s-4-056-0
```

```
        CPCN
        s-00456
```

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

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 .

For example, enter one of these commands:

rtrv-dstn:dpci=002-100-002

rtrv-dstn:dpca=002-111-002

This is an example of the possible output **for DPC**s.

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

This is an example of the 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       DOMAIN
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:lst=c

ent-ls:lsn=ls500001:apca=002-112-002:lst=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
   lst
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.

   For example, enter one of these commands:

   rtrv-ls:lsn=ls400001

   rtrv-ls:lsn=ls500001

   For lsn400001, the system returns output similar to the following:

```
                        L3T SLT            GWS GWS GWS
LSN        APC    (SS7) SCRN SET SET BEI LST LNKS ACT MES DIS SLSCI NIS
ls400001   002-200-002  scr1 1   1   yes a   1    off off off ---   off
           CLLI       TFATCABMLQ  MTPRSE  ASL8
           ----------- --          ---     ----
           IPGWAPC MATELSN    IPTPS    LSUSEALM  SLKUSEALM
           no      ---------- ---      ---       ---
                               L2T        L1             PCR  PCR
           LOC    LINK SLC TYPE   SET  BPS    MODE TSET ECM  N1   N2
           1205   a    0   LIMV35 1    56000  --- ---   BASIC --- -----
Link set table is (114 of 1024) 12% full
```

   For lsn500001, the system returns output similar to the following:

```
                        L3T SLT            GWS GWS GWS
LSN        APC    (SS7) SCRN SET SET BEI LST LNKS ACT MES DIS SLSCI NIS
ls500001   002-112-002  scr3 1   1   yes a   1    off off off ---   off
           CLLI       TFATCABMLQ  MTPRSE  ASL8
           ----------- --          ---     ----
           IPGWAPC MATELSN    IPTPS    LSUSEALM  SLKUSEALM
           no      ---------- ---      ---       ---
                               L2T        L1             PCR  PCR
           LOC    LINK SLC TYPE   SET  BPS    MODE TSET ECM  N1   N2
           1205   a    0   LIMV35 1    56000  --- ---   BASIC --- -----
Link set table is (114 of 1024) 12% full
```

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

   For this example, enter these commands:

   ent-card:loc=1105:type=limocu:appl=ccs7itu

   ent-card:loc=1106:type=limocu:appl=ccs7itu

   where:

   loc
Specifies the slot number for the card
   type
Specifies that the card is a LIMOCU 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

    These are examples of the 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
1105   LIMOCU   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   LIMOCU   CCS7ITU  -----------   A    -- -----------   B    --
```

18. 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 26 .

    For example, enter these commands:

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

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

    where:

    loc
    The card location of the LIM that the SS7 signaling link will be assigned to.
    link
    The 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

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

```
RLGHNCXA03W 01-03-07 08:29:03 GMT  EAGLE 36.0.0
ENT-SLK: MASP A - COMPLTD
```

19. Verify the changes using the **rtrv-slk** command, specifying the card location and port of the signaling link entered in Step 18 .

    rtrv-slk:loc=1105:link=a

    rtrv-slk:loc=1106:link=a

    This is an example of the possible output.

```
RLGHNCXA03W 01-03-19 21:16:37 GMT EAGLE 36.0.0
                              L2T        L1              PCR  PCR
LOC   LINK LSN      SLC TYPE  SET  BPS   MODE TSET ECM   N1   N2
1105  A    ls400001 0   LIMOCU 1   56000 --- ---  BASIC ---  -----


RLGHNCXA03W 01-03-19 21:16:37 GMT EAGLE 36.0.0
                              L2T        L1              PCR  PCR
LOC   LINK LSN      SLC TYPE  SET  BPS   MODE TSET ECM   N1   N2
1106  A    ls500001 0   LIMOCU 1   56000 --- ---  BASIC ---  -----
```

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

        For example, enter one of these commands:

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

        ent-rte:dpca=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
```

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

        This is an example of the possible output:

```
rlghncxa03w 01-03-07 11:43:04 GMT  EAGLE 36.0.0
DPCA        ALIASI    ALIASN     CLLI      LSN      RC    APCA
----------- -------   -------    -----     -------- --    -----------
DPC         ALIASN    ALIASA     CLLI      LSN      RC APC
002-100-001 121111    240-111-111 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 idp1     ls400001 10 1-200-2

DPCA        ALIASA    ALIASI     CLLI      LSN      RC APCA
21111       011-222-111 0-001-1    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     ndp1      ls500001 10 11122
```

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

        For this example, enter this command:

        **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
```

23. 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  MPCI          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
```

24. Allow the LIM cards that were entered in by using the **alw-card** command.

For example, enter these commands:

alw-card:loc=1105

alw-card:loc=1106

This message appears:

```
RLGHNCXA03W  01-03-30 21:20:37 GMT EAGLE 36.0.0
Card has been allowed.
```

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

This is an example of the possible output:

```
RLGHNCXA03W 01-03-27 16:43:42 GMT  EAGLE 36.0.0
CARD  VERSION          TYPE  APPL    PST          SST     AST 1101  100-000-00003-000
TSM   SCCP    IS-NR         Active  --- 1102  100-000-00003-000 TSM    SCCP       IS-
NR      Active   --- 1103  100-000-00003-000  ACMENET STPLAN   IS-NR        Active    ---
1104  100-000-00003-000  ACMENET GLS      IS-NR        Active   --- 1105  100-000-00003-000
LIMOCU CCS7ITU  IS-NR        Active   --- 1106  100-000-00003-000  LIMOCU CCS7ITU   IS-
```

```
NR       Active    --- 1113  100-000-00002-000  MCAP    OAM      IS-NR       Active    ---
1114  100-000-00002-000  TDM              IS-NR       Active    --- 1115  100-000-00002-000
MCAP    OAM     IS-NR        Active    --- 1116  100-000-00002-000  TDM              IS-
NR       Active    --- 1117  100-000-00002-000  MDAL             IS-NR       Active    ---
1201  100-000-00003-000  LIMDS0  SS7ANSI  IS-NR       Active    --- 1202  100-000-00002-000
LIMV35  SS7GX25  IS-NR        Active    --- 1203  100-000-00003-000  LIMV35  SS7ANSI  IS-
NR       Active    --- 1204  100-000-00003-000  LIMATM  ATMANSI  IS-NR       Active    ---
1205  100-000-00001-000  DCM     IPLIM    IS-NR       Active    --- 1207  100-000-00001-000
DCM     SS7IPGW  IS-NR        Active    --- 1303  100-000-00001-000  DCM     IPLIM    IS-
NR       Active    --- 1305  100-000-00001-000  DCM     SS7IPGW  IS-NR       Active
---
```

26. Activate the signaling links entered in <u>Step 18</u> 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
```

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

For example, enter these commands:

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  ls400001  ---------- 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  ls500001  ---------- IS-NR      Avail   ----
Command Completed.
```

28. Display the new LIM cards in the database using the **rtrv-card** command.

This is an example of the 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
1101   TSM      SCCP     --------     A    --  --------     B    --
1102   TSM      SCCP     --------     A    --  --------     B    --
1103   ACMENET  STPLAN   --------     A    --  --------     B    --
1104   ACMENET  GLS      --------     A    --  --------     B    --
1105   LIMOCU   CCS7ITU  ls400001     A    00  --------     B    --
1106   LIMOCU   CCS7ITU  ls500001     A    00  --------     B    --
1113   MCAP     OAM1114  TDM
1115   MCAP     OAM
1116   TDM
1117   MDAL
1201   LIMDS0   SS7ANSI  lsn1         A    00  lsn2         B    01
1202   LIMV35   SS7GX25  lsngwy       A    00  --------     B    --
```

```
1203   LIMV35     SS7ANSI    lsn2        A    00   lsn1        B    01
1204   LIMATM     ATMANSI    atmgwy      A    00   --------    B    --
1205   DCM        IPLIM      ipgwy1      A    00   ipgwy3      B    01
1207   DCM        SS7IPGW    ipgwy2      A    00   --------    B    --
1303   DCM        IPLIM      ipgwy1      A    00   ipgwy3      B    01
1305   DCM        SS7IPGW    ipgwy4      A    00   --------    B    --
```

Determine a location where the dual-slot DSM card can be inserted. Also determine adjacent (odd-even slots of TSM cards running the SCCP application for later card replacements. The output shows slots 1107 and 1108 are not occupied.

> ⚠ CAUTION
> **CAUTION: When adding DSM cards to an in-service environment, take precautions to not interrupt traffic. Before replacing TSM cards running the SCCP application with DSM cards, first install a DSM card in an available odd-even double-slot prior to removing TSM cards running the SCCP application to make additional room for other DSM cards.**

29. Install and configure DSM cards as needed in available odd-even slots using Step 30 through Step 44 .

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

30. Install the DSM card in slots 1107 and 1108.

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

a. Open the ejector levers on the DSM 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.

b. 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 DSM card to the MPS.

Refer to the *Installation Manual* for details.

31. Add the DSM card to the database and configure it as a DSM 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 DSM 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
```

32. Verify the DSM card using the **rtrv-card** command with the card location specified.

    For this example, enter this command:

    rtrv-card:loc=1107

    This is an example of the 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   --
    ```

33. Display the current link parameters associated with the DSM card in the database by entering the **rtrv-ip-lnk** command.

    This is an example of the 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
    ```

34. Enter the IP address port and speed associated with the DSM card in the database using the **chg-ip-lnk** command.

    For this example, enter these commands:

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

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

    where:

    loc
    The odd card location of the DSM 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 DSM 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
```

35. Verify the IP address port and speed associated with the DSM card in the database by entering the**rtrv-ip-lnk** command.

This is an example of the 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
```

36. Display the current IP host information in the database by entering the **rtrv-ip-host** command.

This is an example of the 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
```

37. Add the host name and IP address for each DSM link 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 DSM link 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 DSM card and must have a a unique octet identifier for the card's IP address; we recommend numbering the DSM cards sequentially, using values 1 to 25. (This example shows the assignment of the first DSM 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
```

38. 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
```

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

> NOTE: Most A-Port customer private networks do not require setting up a default router for the DSM 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 DSM 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
```

40. Verify the new TCP/IP parameters associated with the DSM card in the database by entering the **rtrv-ip-card** command.

This is an example of the 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
```

41. Boot the DSM card that was added in <u>Step 31</u> in TSM emulation mode by using the **alw-card** command.

For example, enter this command:

alw-card:loc=1107

42. Verify the In-Service Normal (IS-NR) status of the DSM card using the **rept-stat-card** command.

This is an example of the possible output.

```
RLGHNCXA03W 01-03-27 16:43:42 GMT  EAGLE 36.0.0
CARD  VERSION         TYPE    GPL      PST         SST     AST
1101  100-000-00003-000  TSM     SCCP     IS-NR       Active  ---
1102  100-000-00003-000  TSM     SCCP     IS-NR       Active  ---
1103  100-000-00002-000  ACMENET STPLAN   IS-NR       Active  ---
1104  100-000-00003-000  TSM     GLS      IS-NR       Active  ---
1105  100-000-00003-000  LIMOCU  CCS7ITU  IS-NR       Active  ---
1106  100-000-00003-000  LIMOCU  CCS7ITU  IS-NR       Active  ---
1107  100-000-00003-000  DSM     VSCCP    IS-NR       Active  ---
1113  100-000-00002-000  MCAP    OAM      IS-NR       Active  ---
1114  100-000-00002-000  TDM              IS-NR       Active  ---
1115  100-000-00002-000  MCAP    OAM      IS-NR       Active  ---
1116  100-000-00002-000  TDM              IS-NR       Active  ---
```

```
1117  100-000-00002-000  MDAL                IS-NR         Active    ---
1201  100-000-00003-000  LIMDS0   SS7ANSI    IS-NR         Active    ---
1202  100-000-00002-000  LIMV35   SS7GX25    IS-NR         Active    ---
1203  100-000-00003-000  LIMV35   SS7ANSI    IS-NR         Active    ---
1204  100-000-00003-000  LIMATM   ATMANSI    IS-NR         Active    ---
1205  100-000-00001-000  DCM      IPLIM      IS-NR         Active    ---
1207  100-000-00001-000  DCM      SS7IPGW    IS-NR         Active    ---
1303  100-000-00001-000  DCM      IPLIM      IS-NR         Active    ---
1305  100-000-00001-000  DCM      SS7IPGW    IS-NR         Active    --
```

43.   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).

For example, enter the following command:

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 is not successful, verify the the correct connection of the hardware cabling and try again. If the command fails again, contact the Customer Care Center .

44.   Repeat Step 30 through Step 43 to add all DSM cards (N+1) to be installed in available slots.

Go to Step 45 to start replacing TSM cards with DSM cards.

45.   Replace TSM cards with DSM cards if applicable and add DSM cards to the database using Step 46 through Step 68 .

In this procedure, two existing adjacent TSM cards are removed and replaced with a dual-slot DSM card in slots 1101 and 1102.

> **NOTE: When adding DSM cards in an in-service environment, take precautions to not interrupt traffic. Before replacing TSM cards with DSM cards, first install a DSM card in an available dual-slot.**

46.   Determine the cards to be removed from the database by displaying the TSM cards running the SCCP application in the database using the **rtrv-card** command.

This is an example of the 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
1101    TSM       SCCP      --------    A   --  --------    B   --
1102    TSM       SCCP      --------    A   --  --------    B   --
1103    ACMENET   STPLAN    --------    A   --  --------    B   --
1104    ACMENET   GLS       --------    A   --  --------    B   --
1105    LIMOCU    CCS7ITU   ls300001    A   00  --------    B   --
1106    LIMOCU    CCS7ITU   ls400001    A   00  --------    B   --
1107    DSM       VSCCP     ls300001    A   00  --------    B   --
1113    MCAP      OAM
1114    TDM
1115    MCAP      OAM
1116    TDM
1117    MDAL
1201    LIMDS0    SS7ANSI   lsn1        A   00  lsn2        B   01
1202    LIMV35    SS7GX25   lsngwy      A   00  --------    B   --
1203    LIMV35    SS7ANSI   lsn2        A   00  lsn1        B   01
1204    LIMATM    ATMANSI   atmgwy      A   00  --------    B   --
1205    DCM       IPLIM     ipgwy1      A   00  ipgwy3      B   01
1207    DCM       SS7IPGW   ipgwy2      A   00  --------    B   --
1303    DCM       IPLIM     ipgwy1      A   00  ipgwy3      B   01
1305    DCM       SS7IPGW   ipgwy4      A   00  --------    B   --
```

In this procedure, the TSM cards in card locations 1101 and 1102 are removed.

47. Display the TSM cards that are in-service with the **rept-stat-card:stat=nr** command.

For this example, enter the following command:

rept-stat-card:stat=nr

This is an example of the possible output:

```
RLGHNCXA03W 01-03-27 16:43:42 GMT  EAGLE 36.0.0
CARD   VERSION          TYPE    GPL      PST        SST       AST
1101   100-000-00003-000 TSM    SCCP     IS-NR      Active    ---
1102   100-000-00003-000 TSM    SCCP     IS-NR      Active    ---
1103   100-000-00003-000 ACMENET STPLAN  IS-NR      Active    ---
1104   100-000-00003-000 ACMENET GLS     IS-NR      Active    ---
1105   100-000-00003-000 LIMOCU  CCS7ITU IS-NR      Active    ---
1106   100-000-00003-000 LIMOCU  CCS7ITU IS-NR      Active    ---
1107   100-000-00003-000 DSM     VSCCP   IS-NR      Active    ---
1113   100-000-00002-000 MCAP    OAM     IS-NR      Active    ---
1114   100-000-00002-000 TDM             IS-NR      Active    ---
1115   100-000-00002-000 MCAP    OAM     IS-NR      Active    ---
1116   100-000-00002-000 TDM             IS-NR      Active    ---
1117   100-000-00002-000 MDAL            IS-NR      Active    ---
1201   100-000-00003-000 LIMDS0  SS7ANSI IS-NR      Active    ---
1202   100-000-00002-000 LIMV35  SS7GX25 IS-NR      Active    ---
1203   100-000-00003-000 LIMV35  SS7ANSI IS-NR      Active    ---
1204   100-000-00003-000 LIMATM  ATMANSI IS-NR      Active    ---
1205   100-000-00001-000 DCM     IPLIM   IS-NR      Active    ---
1207   100-000-00001-000 DCM     SS7IPGW IS-NR      Active    ---
1303   100-000-00001-000 DCM     IPLIM   IS-NR      Active    ---
1305   100-000-00001-000 DCM     SS7IPGW IS-NR      Active    ---
```

48. Inhibit the TSM cards using the **inh-card** command and specifying the card locations.

inh-card:loc=1101

inh-card:loc=1102

After each command has successfully completed, this message appears:

```
RLGHNCXA03W 01-03-12 09:12:36 GMT  EAGLE 36.0.0
Card has been inhibited.
```

49. Verify that the TSM cards are in the Out-of-Service Maintenance-Disabled (OOS-MT-DSBLD) state with the **rept-stat-card** command.

    This is an example of the possible output:

```
RLGHNCXA03W 01-03-27 16:43:42 GMT  EAGLE 36.0.0
CARD  VERSION          TYPE    GPL      PST           SST        AST
1101  100-000-00003-000 TSM    SCCP     OOS-MT-DSBLD  Isolated   ---
1102  100-000-00003-000 TSM    SCCP     OOS-MT-DSBLD  Isolated   ---
1103  100-000-00002-000 ACMENET STPLAN  IS-NR         Active     ---
1104  100-000-00002-000 ACMENET STPLAN  IS-NR         Active     ---
1105  100-000-00003-000 LIMOCU  CCS7ITU IS-NR         Active     ---
1106  100-000-00003-000 LIMOCU  CCS7ITU IS-NR         Active     ---
1107  100-000-00003-000 DSM     VSCCP    IS-NR         Active     ---
1113  100-000-00002-000 MCAP    OAM      IS-NR         Active     ---
1114  100-000-00002-000 TDM              IS-NR         Active     ---
1115  100-000-00002-000 MCAP    OAM      IS-NR         Active     ---
1116  100-000-00002-000 TDM              IS-NR         Active     ---
1117  100-000-00002-000 MDAL             IS-NR         Active     ---
1201  100-000-00003-000 LIMDS0  SS7ANSI  IS-NR         Active     ---
1202  100-000-00002-000 LIMV35  SS7GX25  IS-NR         Active     ---
1203  100-000-00003-000 LIMV35  SS7ANSI  IS-NR         Active     ---
1204  100-000-00003-000 LIMATM  ATMANSI  IS-NR         Active     ---
1205  100-000-00001-000 DCM     IPLIM    IS-NR         Active     ---
1207  100-000-00001-000 DCM     SS7IPGW  IS-NR         Active     ---
1303  100-000-00001-000 DCM     IPLIM    IS-NR         Active     ---
1305  100-000-00001-000 DCM     SS7IPGW  IS-NR         Active     ---
```

50. Remove the TSM cards from the database using the **dlt-card** command.

    The **dlt-card** command has only one parameter, **loc**, which is the location of the card.

    For this example, enter these commands:

    dlt-card:loc=1101

    dlt-card:loc=1102

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

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

51. Verify that the TSM cards are removed from the database using the **rtrv-card** command and specifying the cards that were removed in .

    For this example, enter these commands:

    rtrv-card:loc=1101

    rtrv-card:loc=1102

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

```
E2144 Cmd Rej: Location invalid for hardware configuration
```

52. Locate the TSM card to be removed from the shelf.

    Because the TSM card fills only one slot and the DSM card requires two slots, the DSM card must be installed in an odd slot that is adjacent to an even slot on its right side. In this procedure, two TSM cards from slots 1101 and 1102 are removed to provide empty slots for one DSM card.

     a.   Push the inject/eject clamps outward from the card faceplate (top clamp in the "UP" position, bottom clamp in the "DOWN" position). Pull the levers away from the shelf until parallel to the floor. Gently pull the card toward you until the card clears the shelf.

**Figure 4-1.** Push Inject/Eject Clamps Outward

     b.   Place the removed card into an electrostatic discharge (ESD) protective container, or place the card in the spare card storage shelf.

53. Repeat Step 52 to remove the second TSM card.

54. Install the DSM card in slots 1101 and 1102.

     a.   Open the ejector levers on the DSM 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.

     b.   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 lock the card in place and ensure a strong connection with the pins on the target shelf backplane.

Figure 4-2. Push in Inject/Eject Clamps
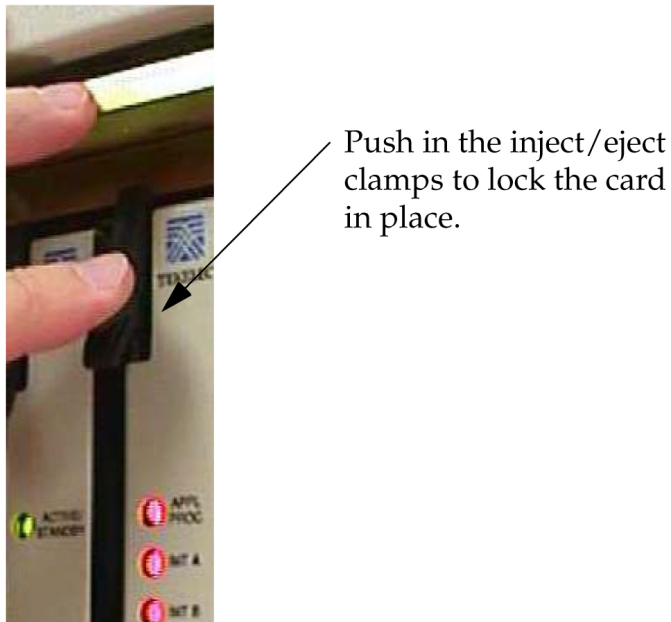
Push in the inject/eject
clamps to lock the card
in place.

      d.   Verify that both IMT bus LEDs are illuminated green.

      e.   Install the cabling required to connect the DSM card to the MPS. Refer to the *EAGLE 5 ISS Installation Manual* for details.

55.   Add the DSM card to the database and assign the VSCCP application using the **ent-card** command.

For this example, enter this command:

ent-card:loc=1101: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 DSM 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
```

56.   Display the new DSM card using the **rtrv-card** command with the card location specified.

For this example, enter this command:

rtrv-card:loc=1101

This is an example of the 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
1101   DSM       VSCCP     --------      A    --  --------       B    --
```

57. Display the current link parameters associated with the DSM card in the database by entering the **rtrv-ip-lnk** command.

This is an example of the possible output:

```
RLGHNCXA03W 01-03-30 21:14:37 GMT EAGLE 36.0.0
LOC  PORT IPADDR          SUBMASK         DUPLEX SPEED MACTYPE AUTO MCAST
1101 A    -----------     -----------     HALF   10    DIX     NO   NO
1101 B    -----------     -----------     HALF   10    DIX     NO   NO
1107 A    -----------     -----------     HALF   10    DIX     NO   NO
1107 B    -----------     -----------     HALF   10    DIX     NO   NO
```

58. Change the link parameters associated with the DSM card in the database using the **chg-ip-lnk** command.

For this example, enter these commands:

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

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

where:

loc
The card location of the DSM 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 DSM 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 unique host number of the machine.

duplex
This is the mode of operation of the interface.

speed
This is interface bandwidth in megabits per second. 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.

After this command has successfully completed, the following message is displayed.

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

59. Verify the new link parameters associated with the DSM card in the database by entering the **rtrv-ip-lnk** command.

The following is an example of the possible output.

```
RLGHNCXA03W 01-03-30 21:14:37 GMT EAGLE 36.0.0
LOC   PORT IPADDR          SUBMASK          DUPLEX SPEED MACTYPE AUTO MCAST
1101  A    192.168.122.2   255.255.255.0    HALF   100   DIX     NO   YES
1101  B    192.168.123.2   255.255.255.0    HALF   10    DIX     NO   YES
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
```

60. Display the current IP host information in the database by entering the `rtrv-ip-host` command.

The following is an example of the 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
192.168.122.1   VSCCP_1107_A
192.168.123.1   VSCCP_1107_B
```

61. Add the host name and IP address for each DSM link using the `ent-ip-host` command.

For example, enter these commands:

`ent-ip-host:host=vsccp_1101_a:ipaddr=192.168.122.2`

`ent-ip-host:host=vsccp_1101_b:ipaddr=192.168.123.2`

where:

host
Specifies the host name. Each DSM link 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 DSM card and must have a a unique octet identifier for the card IP address; numbering the DSM cards sequentially is recommended, using values 1 to 25. This example shows the assignment of the second DSM 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
```

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

This is an example of the possible output:

```
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
192.168.122.2   VSCCP_1101_A  192.168.123.2 VSCCP_1101_B
```

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

> **NOTE: Most A-Port customer private networks do not require setting up a default router for the DSM card. However, if your network configuration does require a default router**

> **to connect the DSM card to the EPAP, then only one default router is assignable to each DSM card. Assign the default router address to each DSM card as shown in this step.**

For this example, enter this command:

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

where:

loc
The card location of the 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 unique host number of the machine.

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
```

64. Verify the local domain and IP router address associated with the DSM card in the database by entering the **rtrv-ip-card** command.

This is an example of the possible output:

```
RLGHNCXA03W 01-03-30 21:21:37 GMT EAGLE 36.0.0
   LOC  1101
      SRCHORDR  LOCAL
      DNSA       -----------
      DNSB       -----------
      DEFROUTER  192.168.122.250
      DOMAIN     NC.TEKELEC.COM
```

65. Boot the DSM card that was inhibited in [Step 48](#) in TSM emulation mode by using the **alw-card** command.

For example, enter this command:

alw-card:loc=1101

This message appears:

```
RLGHNCXA03W  01-03-30 21:20:37 GMT EAGLE 36.0.0
Card has been allowed
```

66. Verify the In-Service Normal (IS-NR) status of the DSM card using the **rept-stat-card** command.

This is an example of the possible output:

```
RLGHNCXA03W 01-03-27 16:43:42 GMT  EAGLE 36.0.0
CARD  VERSION          TYPE    APPL    PST          SST      AST
1101  100-000-00003-000 DSM     VSCCP   IS-NR        Active   ---
1103  100-000-00002-000 ACMENET STPLAN  IS-NR        Active   ---
1104  100-000-00003-000 TSM     GLS     IS-NR        Active   ---
1105  100-000-00003-000 LIMOCU  CCS7ITU IS-NR        Active   ---
1106  100-000-00003-000 LIMOCU  CCS7ITU IS-NR        Active   ---
1107  100-000-00003-000 DSM     VSCCP   IS-NR        Active   ---
1113  100-000-00002-000 MCAP    OAM     IS-NR        Active   ---
1114  100-000-00002-000 TDM             IS-NR        Active   ---
1115  100-000-00002-000 MCAP    OAM     IS-NR        Active   ---
```

```
1116  100-000-00002-000  TDM                IS-NR       Active    ---
1117  100-000-00002-000  MDAL               IS-NR       Active    ---
1201  100-000-00003-000  LIMDS0   SS7ANSI   IS-NR       Active    ---
1202  100-000-00002-000  LIMV35   SS7GX25   IS-NR       Active    ---
1203  100-000-00003-000  LIMV35   SS7ANSI   IS-NR       Active    ---
1204  100-000-00003-000  LIMATM   ATMANSI   IS-NR       Active    ---
1205  100-000-00001-000  DCM      IPLIM     IS-NR       Active    ---
1207  100-000-00001-000  DCM      SS7IPGW   IS-NR       Active    ---
1303  100-000-00001-000  DCM      IPLIM     IS-NR       Active    ---
1305  100-000-00001-000  DCM      SS7IPGW   IS-NR       Active    ---
```

67. 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).

For example, enter the following commands:

pass:loc=1101:cmd="ping 192.168.122.100".

pass:loc=1101:cmd="ping 192.168.122.200".

pass:loc=1101:cmd="ping 192.168.123.100".

pass:loc=1101: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=1101: 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** command with the **ping** parameter is not successful, verify the the correct connection of the hardware cabling and repeat the command. If the command fails again, contact the Customer Care Center .

68. Repeat Step 46 through Step 67 to replace all adjacent TSM cards identified in the prerequisites and to be replaced with DSM cards.

69. Repeat Step 48 through Step 52 to inhibit any remaining TSM cards running the SCCP application and remove them from database and shelf.

> **NOTE: The A-Port feature cannot be turned on until TSM cards running the SCCP application are removed from the system.**

> ⚠️ CAUTION
>
> **CAUTION: At this point in the procedure, contact the Customer Care Center for assistance in completing this A-Port activation procedure. Do not proceed without consulting with the Customer Care Center .**

70. Turn on and configure the A-Port feature using Step 71 through Step 84 .

71. Enter the **enable-ctrl-feat** command to enable the A-Port feature.

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

72. Enter the **chg-ctrl-feat** command to turn on the A-Port feature.

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

73. Enter the **enable-ctrl-feat** command to enable the MTPMSGS for SCCP Apps feature.

    ```
    enable-ctrl-feat:partnum=893017401:fak=<Feature Access Key>
    ```

74. Enter the **chg-ctrl-feat** command to turn on the MTPMSGS for SCCP Apps feature.

    ```
    chg-ctrl-feat:partnum=893017401:status=ON
    ```

75. Change the IS41 system options in the database for the A-Port feature, if desired.

    For example, enter this command:

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

    where:

    rspcgpanai
    Specifies a new NAI value to override the NAI value specified in the SCCPCdPA of a received LOCREQ/
    SMSREQ if the message is to be relayed after database lookup.
    rspcgpanp
    Defines the numbering plan value of the MNP_SRF.
    rspdig
    Specifies the digit encoding format of the LOCREQTCAP Outgoing Called Party parameter on a per
    EAGLE 5 ISS node basis.

    The system returns the following message:

    ```
    rlghncxa03w 00-08-20 09:04:14 GMT EAGLE 36.0.0
    CHG-IS41OPTS: MASP A - COMPLTD
    ```

76. 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
    ```

77. 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
```

78. View the list of service selector combinations using the **rtrv-srvsel** command.

This command retrieves a list of administered service selector combinations.

This is an example of the 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
```

79. 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 DSM services.

For example, enter the following command:

ent-srvsel:gtia=2:tt=1:snp=e164:snai=intl:serv=mnp: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
```

80. 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
```

81. Reload a DSM card using the **init-card** command.

> ⚠️ **CAUTION: When the environment is in-service and TSM cards are being replaced with DSM cards, initialize one DSM card at a time. Verify its return to IS-NR state before initializing another DSM card. This precaution keeps cards in service and precludes an interruption of SCCP services.**
>
> **GTT, EGTT, and VGTT traffic are 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 DSM card to reload.**

For example, enter this command:

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
```

82. Verify its return to IS-NR state with the **rept-stat-card** command.

   (Wait until in-service state is restored.)

   This is an example of the 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   ---
1103  100-000-00002-000  ACMENET STPLAN  IS-NR       Active   ---
1104  100-000-00003-000  TSM     GLS     IS-NR       Active   ---
1105  100-000-00003-000  LIMOCU  CCS7ITU IS-NR       Active   ---
1106  100-000-00003-000  LIMOCU  CCS7ITU IS-NR       Active   ---
1107  100-000-00003-000  DSM     VSCCP   IS-NR       Active   ---
1113  100-000-00002-000  MCAP    OAM     IS-NR       Active   ---
1114  100-000-00002-000  TDM             IS-NR       Active   ---
1115  100-000-00002-000  MCAP    OAM     IS-NR       Active   ---
1116  100-000-00002-000  TDM             IS-NR       Active   ---
1117  100-000-00002-000  MDAL            IS-NR       Active   ---
1201  100-000-00003-000  LIMDS0  SS7ANSI IS-NR       Active   ---
1202  100-000-00002-000  LIMV35  SS7GX25 IS-NR       Active   ---
1203  100-000-00003-000  LIMV35  SS7ANSI IS-NR       Active   ---
1204  100-000-00003-000  LIMATM  ATMANSI IS-NR       Active   ---
1205  100-000-00001-000  DCM     IPLIM   IS-NR       Active   ---
1207  100-000-00001-000  DCM     SS7IPGW IS-NR       Active   ---
1303  100-000-00001-000  DCM     IPLIM   IS-NR       Active   ---
1305  100-000-00001-000  DCM     SS7IPGW IS-NR       Active   ---
```

83. After the **init-card** and the **rept-stat-card** commands show that service is successfully restored, repeat Step 79 and Step 82 for each DSM card in the system.

84. Enter the **chg-sccp-serv:serv=mnp:state=online** command to set the MNP service state online.

85. Confirm that essential activation procedures are successful.

  a.   Use **rept-stat-sccp** to verify all the DSM cards are loaded and are IS-NR (In-Service Normal) status.

  b.   Use **rept-stat-mps** to verify all the DSM cards are connected to the EPAP and are operational.

  c.   Use **rept-stat-db:display=all** to verify database levels are identical for the EPAPPDB and RTDB and the RTDBs on the DSM cards.

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

MO-Based IS41 SMS NP Feature Activation Procedure

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

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

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

The MO-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 MO-Based IS41 SMS NP feature.

   enable-ctrl-feat:partnum=893019501:fak=<Feature Access Key>

4. Enter the the **chg-stpopts** command to set the default country code and, if desired, the default network destination 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:defndc=177

   where:

   defcc
   The default country code.
   defndc
   The default network destination code.

   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-STPOPTS: MASP A - COMPLTD
   ```

5. Verify the new country code and, if changed, network destination code using the **rtrv-stpopts** command.

   This is an example of the possible output:

   ```
   rlghncxa03w 04-04-17 16:02:05 EST  EAGLE 36.0.0
       STP OPTIONS
       --------------------------
   ```

```
MTPT31CTL                 1
MTPLTI                  yes
MTPLTCTDPCQ               3
MTPLTST              10000
MTPXLQ                 500
MTPXLET               0100
MTPXLOT                90%
MTPDPCQ               8000
TFATFRPR              1000
MTPRSI                 yes
MTPRSIT               5000
MTPLPRST               yes
MTPT10ALT            30000
UIMRD                  yes
SLSCNV               perls
CRITALMINH             yes
DISPACTALMS             no
NPCFMTI            2-9-2-1
GSMDFLT               PASS
GSMDECERR             PASS
DEFCC                   49
DEFNDC                 177
DSMAUD                  on
RPTLNPMRSS             yes
RANDSLS                all
GR2878RGLBL             no
RSTRDEV                 on
SECMTPMATE             off
SECMTPSID              off
SECMTPSNM           notify
SECSCCPSCMG         notify
CNVCGDA                yes
CNVCGDI                yes
CNVCGDN                yes
CNVCGDN24              yes
GTCNVDFLT              yes
ANSIGFLEX              yes
HSCLKSRC             RS422
HSCLKLL          LONGHAUL
```

6.   Enter the **rtrv-is4opts** command to view the values of the IS41OPTS table options.

7.   If desired, change the IS41 system options in the database for the MO-Based IS41 SMS NP feature.

   For example, enter this command:

   chg-is41opts:mosmsdnfmt=rn:mosmstype=sp:mosmsnai=nat:mosmsdnnai=7

   where:
   mosmsdnfmt
   Specifies the format of a dialed number.
   mosmstype
   Indicates the entity type for which a database lookup is considered successful.
   mosmsnai
   Indicates how the called party number will be conditioned before lookup in the database.
   mosmsdnnai
   Indicates the value to be encoded in the outgoing message.

   For details about all of the options that can be changed using the **chg-gsmopts** command, see the *Commands Manual*.

8.   Verify the changes using the **rtrv-is41opts** command.

   This command displays all IS41 options from the database.

   This is an example of the possible output:

```
tekelecstp 06-08-15 10:33:44 EST  EAGLE 36.0.0
```

```
        IS41 OPTIONS
        ----------------------
        SMSREQBYPASS    = NO
        LOCREQDN        = TCAP
        IEC             = 0
        NEC             = 00
        RSPCGPARI       = FRMSG
        RSPCGPAPCP      = FRMSG
        RSPCDPARI       = FRMSG
        RSPCDPAPCP      = FRMSG
        RSPCGPANAI      = 7
        RSPCGPANP       = 15
        RSPCGPATT       = 0
        MTPLOCREQNAI    = SUB
        RSPPARM         = DDIGIT
        RSPDIG          = CCRNDN
        RSPNON          = 0
        RSPNP           = 0
        RSPMIN          = NOTHOMERN
        MSCMKTID        = 32300
        MSCSWITCH       = 20
        ESNMFG          = 0
        ESNSN           = 0
        RSPDIGTYPE      = 0
        LOCREQRMHRN     = NO
        TCAPSNAI        = SUB

        MOSMSDNFMT      = RN
        MOSMSTYPE       = SP
        MOSMSNAI        = NAT
        MOSMSDNNAI      = 7
```

9.   Verify that the A-Port feature is turned on using the **rtrv-ctrl-feat** command.
10. If the A-Port feature is not turned on, see Step 74 of the A-Port Feature Activation Procedure before proceeding to Step 11 .
11. Enter the **chg-ctrl-feat** command to turn on the MO-Based IS41 SMS NP feature.

     chg-ctrl-feat:partnum=893019501:status=ON

The MO-Based IS41 SMS NP 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.

     enable-ctrl-feat:partnum=893019901:fak=<Feature Access Key>

4.   Enter the the **chg-stpopts** command to set the default country code and, if desired, the default network destination 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:defndc=177

where:
defcc
The default country code.
defndc
The default network destination code.

5.   Verify the new country code and, if entered, network destination code using the **rtrv-stpopts** command.

6.   Enter the **rtrv-is41opts** command to view the values of the IS41OPTS options.

7.   If desired, change the IS41 system options in the database for the MT-Based IS41 SMS NP feature using the **chg-is41opts** 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-is41opts: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-is41opts** command.

This command displays all IS41 options from the database.

This is an example of the possible output:

```
tekelecstp 08-01-07 13:11:39 EST  EAGLE 38.0.0

    IS41 OPTIONS
    ----------------------
    SMSREQBYPASS    = NO
    LOCREQDN        = TCAP
    IEC             = 0
    NEC             = 00
    RSPCGPARI       = FRMSG
    RSPCGPAPCP      = FRMSG
    RSPCDPARI       = FRMSG
    RSPCDPAPCP      = FRMSG
    RSPCGPANAI      = 0
    RSPCGPANP       = 0
    RSPCGPATT       = 0
    MTPLOCREQNAI    = SUB
    RSPPARM         = DDIGIT
    RSPDIG          = RN
    RSPNON          = 0
    RSPNP           = 0
    RSPMIN          = NOTHOMERN
    MSCMKTID        = 32300
    MSCSWITCH       = 20
    ESNMFG          = 0
    ESNSN           = 0
```

```
RSPDIGTYPE      = 0
LOCREQRMHRN     = NO
TCAPSNAI        = SUB
MTSMSDNFMT      = RNDN
MTSMSTYPE       = RN
MTSMSPARM       = DIGIT
MTSMSDLTR       = NO
MTSMSDLTRV      = NONE
MTSMSACKN       = ACK
MTSMSESN        = NO
MTSMSSSN        = 6
MTSMSNAKERR     = 5
MTSMSDIGTYPE    = 6
MTSMSCHKSRC     = NO
```

9. If the value of IS41OPTS:MTSMSCHKSRC=YES, then provision the Home SMSC Table entries using the **ent-home-smsc** command.

For example, enter this command:

ent-home-smsc:smsc=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 <u>Step 74</u> of the <u>A-Port Feature Activation Procedure</u> before proceeding to <u>Step 13</u>.
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.

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. This feature provides up to 26,400 transactions per second when the maximum number of DSM cards are installed in the EAGLE 5 ISS and one or more EPAP-related features (such as G-Port, G-Flex, A-Port, INP, EIR, Migration) are enabled and turned on.

This feature can be enabled only for DSM cards that are rated at 850 transactions per second (TPS).

⚠️ CAUTION

CAUTION: The increase of the DSM card capacity, 1100 TPS per DSM 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 feature access key is based on the feature's part number and the serial number of the EAGLE 5 ISS, making the feature access key site-specific.

The **enable-ctrl-feat** command enables the 1100 TPS/DSM for ITU NP feature by inputting the feature's access key and the feature's part number with these parameters:

:fak
 The feature access key provided by Tekelec. The feature access key contains 13 alphanumeric characters and is not case sensitive.

:partnum
 The Tekelec-issued part number of the 1100 TPS/DSM for ITU NP feature, 893018001.

After the 1100 TPS/DSM for ITU NP feature has been enabled, the feature must be turned on with the **chg-ctrl-feat** command. The **chg-ctrl-feat** command uses these parameters:

:partnum
 The Tekelec-issued part number of the 1100 TPS/DSM or ITU NP feature, 893019101.

:status=on
 Used to turn the 1100 TPS/DSM for ITU NP feature on.

Activating the 1100 TPS/DSM for ITU NP Feature

Before you start:

The 1100 TPS/DSM for ITU NP feature cannot be enabled with a temporary feature access key.

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

*   The EAGLE 5 ISS does not contain any DSM cards.

*   The LNP feature is enabled.

    The status of the LNP feature is shown with the **rtrv-ctrl-feat** command output.

*   The ANSI G-Flex STP Option is enabled.

    The status of the ANSI G-Flex STP Option is shown in the **rtrv-stpopts** command output.

*   The GTT feature is not turned on.

    The status of the GTT feature is shown in the **rtrv-feat** command output.

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. This can be verified 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 once the EAGLE 5 ISS is on-site, with the **ent-serial-num** command. The **ent-serial-num** command uses these parameters.

:serial
 The serial number assigned to the EAGLE 5 ISS. The serial number is not case sensitive.

:lock
 Specifies whether or not the serial number is locked. This parameter has only one value, yes, which locks the serial number. Once the serial number is locked, it cannot be changed.

NOTE: To enter and lock the EAGLE 5 ISS's serial number, the ent-serial-num command must be entered twice, once to add the correct serial number to the database with the serial parameter, then again with the serial and the lock=yes parameters to lock the serial number. Verify that the serial number

in the database is correct before locking the serial number. The serial number can be found on a label affixed to the control shelf (shelf 1100).

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 achieve this increase in SCCP processing capacity, a maximum of 25 DSM cards must be provisioned and installed in the EAGLE 5 ISS.

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

    The following is an example of the possible output:

    ```
    rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0

    The following features have been permanently enabled:
       Feature Name              Partnum    Status  Quantity
       TPS                       893000110  on      1000
       ISUP Normalization        893000201  on      ----
       Prepaid SMS Intercept Ph1 893006701  on      ----
       MNP Circ Route Prevent    893007001  on      ----
       1100 TPS/DSM for ITU NP   893018001  on      ----

       The following features have been temporarily enabled:
       Feature Name    Partnum    Status  Quantity  Trial Period Left
       TPS             893000140  on      4000      20 days 8 hrs 57 mins

       The following features have expired temporary keys:
       Feature Name              Part Num
       OnOffFeatV                893492401
    ```

2. Based on the output from the previous step, do one of the following:

    *   If the `rtrv-ctrl-feat` output shows that the 1100 TPS/DSM for ITU NP feature is enabled, shown by the entry 1100 TPS/DSM for ITU NP, and its status is **on**, no further action is necessary.

    *   If the feature is enabled, and its status is **off**, skip Step 3 through Step 12 , and go to Step 13 .

    *   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 and LNP features are not enabled, go to Step 3 .

3. Determine whether the G-Flex feature is turned on by entering the `rtrv-ctrl-feat`.

    (If the G-Flex feature is off, then the ANSIGFLEX option is not displayed in the `rtrv-stpopts` output in Step 4 .)

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

    *   If the G-Flex feature is turned off, skip to Step 5 .

    *   If the G-Flex feature is turned on, go to Step 4 .

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 entry **ANSIGFLEX** 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. Skip Step 5 and go 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 entry **GTT** in the **rtrv-feat** output executed in Step 3 .

   - If the GTT feature is turned on, go to Step 6 .

   - If the GTT feature is turned off, perform "Adding an SCCP card" in the *Database Administration Manual - Global Title Translation* manual to turn the GTT feature on and to add the required number of DSM cards to the database. After "Adding an SCCP card" has been performed, go to Step 11 (skip Step 6 through Step 10).

6. Verify the number of DSM cards that are provisioned in the database using the **rept-stat-gpl:gpl=sccphc** command.

   This is an example of the possible output.

```
rlghncxa03w 07-05-01 11:40:26 GMT EAGLE5 37.5.0
GPL     CARD   RUNNING        APPROVED       TRIAL
VSCCCP 1201  126-002-000  126-002-000  126-003-000
VSCCCP 1203  126-002-000  126-002-000  126-003-000
VSCCCP 1207  126-002-000  126-002-000  126-003-000
VSCCCP 1213  126-002-000  126-002-000  126-003-000
VSCCCP 1215  126-002-000  126-002-000  126-003-000
VSCCCP 1305  126-002-000  126-002-000  126-003-000
VSCCCP 1313  126-002-000  126-002-000  126-003-000
VSCCCP 2103  126-002-000  126-002-000  126-003-000
Command Completed
```

7. Based on the output shown in Step 6 , do one of the following:

   - If the required number of DSM cards are provisioned in the database, go to Step 8 .

   - If the required number of DSM cards are not provisioned in the database, perform "Adding an SCCP card" in the *Database Administration Manual - Global Title Translation* to add the required number of DSM cards to the database. After "Adding an SCCP card" has been performed, go to Step 8 .

8. Display the serial number in the database with the **rtrv-serial-num** command.

   This is an example of the possible output.

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0

System serial number = nt00001231

System serial number is not locked
.
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0 Command Completed
```

9. Compare the actual serial number (located on a label affixed to the control shelf, shelf 1100) to the output shown in Step 8 , and do one of the following:

   - If the serial number is correct and locked, go to Step 13 (skip Step 10 through Step 12)

   - If the serial number is correct but not locked, go to Step 12 (skip Step 10 and Step 11).

   - If the serial number is not correct, but is locked, this feature cannot be enabled and the remainder of this procedure cannot be performed. Contact the Customer Care Center to get an incorrect and locked serial number changed.

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

For this example, enter this command.

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

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

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
ENT-SERIAL-NUM: MASP A - COMPLTD
```

11. Verify that the serial number entered into step 7 was entered correctly:

    a. Enter the **`rtrv-serial-num`** command.

        This is an example of the possible output.

        ```
        rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
        System serial number = nt00001231

        System serial number is not locked.

        rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
        Command Completed
        ```

    b. If the serial number was not entered correctly, repeat steps Step 10 and Step 11 and re-enter the correct serial number.

12. Lock the serial number in the database by entering the **`ent-serial-num`** command with the serial number shown in Step 8 (if the serial number shown in Step 8 is correct) or with the serial number shown in Step 10 (if the serial number was changed in Step 10), and with the **`lock=yes`** parameter.

    For this example, enter this command.

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

    When this command has successfully completed, a message similar to the following should appear.

    ```
    rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
    ENT-SERIAL-NUM: MASP A - COMPLTD
    ```

13. Enable the 1100 TPS/DSM for ITU NP feature with the permanent key by entering the **`enable-ctrl-feat`** command.

    For this example, enter this command.

    `enable-ctrl-feat:partnum=893018001:fak=<1100 TPS/DSM for ITU NP feature access key>`

    NOTE: The values for the feature access key (the fak parameter) are provided by Tekelec. If you do not have the feature access key for the 1100 TPS/DSM for ITU NP feature, contact your Tekelec Sales Representative or Account Representative.

    When the **`enable-crtl-feat`** command has successfully completed, a message similar to the following should appear.

    ```
    rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
    ENABLE-CTRL-FEAT: MASP B - COMPLTD
    ```

14. Do one of the following:

    •   If you do not wish to turn the 1100 TPS/DSM for ITU NP feature on, skip this step and go to Step 16 . If you do not turn this feature on, the transaction rate will remain at 850 TPS/DSM.

•   If you do wish 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 used in <u>Step 13</u> and the **status=on** parameter and enter the command again as shown in <u>Step 15</u>.

For this example, enter this command:

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

The following output message appears:

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

15. Re-enter the chg-ctrl-feat command to turn the feature ON.

For example **chg-ctrl-feat:partnum=893018001:status=on**

When this command has successfully completed, a message similar to the following should appear:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
CHG-CTRL-FEAT: MASP B - COMPLTD
```

16. Verify the changes by entering the **rtrv-ctrl-feat** command with the 1100 TPS/DSM for ITU NP feature part number specified in <u>Step 14</u> or <u>Step 15</u>.

rtrv-ctrl-feat:partnum=893018001

The following is an example of the possible output.

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
The following features have been permanently enabled:
 Feature Name            Partnum    Status Quantity
 TPS                     893000110 on     1000
 ISUP Normalization      893000201 on     ----
 Prepaid SMS Intercept Ph1 893006701 on   ----
 MNP Circ Route Prevent  893007001 on     ----
 1100 TPS/DSM for ITU NP 893018001 on     ----

 The following features have been temporarily enabled:
 Feature Name            Partnum Status Quantity Trial Period Left
 TPS                     893000140 on    4000 20 days 8 hrs 57 mins

 The following features have expired temporary keys:
 Feature Name            Part Num
 OnOffFeatV              893492401
```

17. Backup the new changes by entering:

chg-db:action=backup:dest=fixed

These 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.
```

18. If you wish to turn off TPS/DSM for ITU NP feature, enter the **chg-ctrl-feat** command, specifying the 1100 TPS/DSM feature part number used in step <u>Step 14</u> and the **status=off** parameter.

For this example, enter this command.

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

The following output message appears:

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

19. Confirm that you wish to turn off TPS/DSM for ITU NP feature by re-entering the command, as shown below, within 30 seconds:

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

When this command has successfully completed, the following message should appear.

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
CHG-CTRL-FEAT: MASP B - COMPLTD
```

Activating the E5-SM4G Throughput Capacity Feature

This procedure is used to enable and turn on the E5-SM4G Throughput Capacity feature. This feature provides up to 75,000 transactions per second when the maximum number of E5-SM4G cards are installed in the EAGLE 5 ISS and one or more EPAP-related features (such as G-Port, A-Port, G-Flex) are enabled and turned on.

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

The **enable-ctrl-feat** command enables the E5-SM4G Throughput Capacity feature by inputting the feature's access key and the feature's part number with these parameters:

:fak
    The feature access key provided by Tekelec. The feature access key contains 13 alphanumeric characters and is not case sensitive.
:partnum
    The Tekelec-issued part number of the E5-SM4G Throughput Capacity feature, 893019101.

This feature cannot be enabled with a temporary feature access key.

The E5-SM4G Throughput Capacity feature cannot be enabled if:

*   The LNP feature is enabled.

*   The STPLAN feature is turned on.

*   The GTT feature is not turned on.

The E5-SM4G Throughput Capacity feature cannot be enabled unless the EAGLE 5 ISS contains E5-SM4G cards, and E5-SM4G cards cannot be installed in the EAGLE 5 ISS unless HIPR cards are installed in all shelves containing E5-SM4G cards. Enter the **rept-stat-gpl:gpl=hipr** command to verify if HIPR cards are installed in all shelves containing E5-SM4G cards.

The status of the LNP feature is shown with the **rtrv-ctrl-feat** command output.

The status of the GTT is shown in the **rtrv-feat** command output.

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. This can be verified 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 once the EAGLE 5 ISS is on-site, with the **ent-serial-num** command. The **ent-serial-num** command uses these parameters.

:serial

The serial number assigned to the EAGLE 5 ISS. The serial number is not case sensitive.

:lock

Specifies whether or not the serial number is locked. This parameter has only one value, yes, which locks the serial number. Once the serial number is locked, it cannot be changed.

NOTE: To enter and lock the serial number of the EAGLE 5 ISS, the `ent-serial-num` command must be entered twice, first to add the correct serial number to the database with the serial parameter, then again with the serial and the `lock=yes` parameters to lock the serial number. Before locking the serial number, insure that the serial number in the database is correct. The serial number can be found on a label affixed to the control shelf (shelf 1100).

Once the E5-SM4G Throughput Capacity feature has been enabled, the feature must be turned on with the **chg-ctrl-feat** command. The **chg-ctrl-feat** command uses these parameters:

:partnum

The Tekelec-issued part number of the E5-SM4G Throughput Capacity feature, 893019101

:status=on

used to turn the E5-SM4G Throughput Capacity feature on.

This feature increases the processing capacity of SCCP traffic for an EAGLE 5 ISS processing EPAP-based traffic to 75,000 transactions per second. To achieve this increase in SCCP processing capacity, a maximum of 25 E5-SM4G cards must be provisioned and installed in the EAGLE 5 ISS.

1.   Display the status of the E5-SM4G Throughput Capacity feature by entering the **rtrv-ctrl-feat** command.

Possible output of this command follows:
```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
The following features have been permanently enabled:

Feature Name              Partnum    Status  Quantity
IPGWx Signaling TPS       893012814  on       20000
ISUP Normalization        893000201  on       ----
Command Class Management  893005801  on       ----
Intermed GTT Load Sharing 893006901  off      ----
XGTT Table Expansion      893006101  off      ----
XMAP Table Expansion      893007710  on       3000
Large System # Links      893005910  on       2000
Routesets                 893006401  on       6000
HC-MIM SLK Capacity       893012707  on       64

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              Partnum
Zero entries found.
MNP Circ Route Prevent    893007001 On        ----  20 days 8 hrs 57 mins
```

If the **rtrv-ctrl-feat** output shows that the E5-SM4G Throughput Capacity feature is enabled, shown by the entry E5-SM4G Throughput Cap, and its status is on, no further action is necessary.

If the **rtrv-ctrl-feat** output shows that the LNP feature is enabled, this procedure cannot be performed. The E5-SM4G Throughput Capacity feature cannot be enabled if the LNP feature is enabled.

If the feature is enabled, and its status is off, go to <u>Step 9</u> (skip <u>Step 2</u> through <u>Step 8</u>).

If the E5-SM4G Throughput Capacity and LNP features are not enabled, go to <u>Step 2</u> .

2. Enter the `rtrv-feat` command to verify the status of the STPLAN feature.

   To enable the E5-SM4G Throughput Capacity feature, the STPLAN feature cannot be turned on.

   The STPLAN feature is shown by the entry LAN in the `rtrv-feat` output.

   If the STPLAN feature is turned on, this procedure cannot be performed.

   If the STPLAN feature is turned off, go to <u>Step 3</u>

3. Verify that the GTT feature is turned on.

   To enable the E5-SM4G Throughput Capacity feature, the GTT feature must be turned on. The GTT feature is shown by the entry GTT in the rtrv-feat output executed in <u>Step 2</u> . If the GTT feature is turned on, go to <u>Step 4</u> . If the GTT feature is turned off, perform the "Adding an SCCP card" in the *Database Administration Manual* - Global Title Translation in order to:

   • Turn the GTT feature

   • add the required number of E5-SM4G cards to the database

   After the "Adding an SCCP card" step has been performed, go to <u>Step 5</u> (skip <u>Step 4</u>).

4. Verify the number of E5-SM4G cards that are provisioned in the database using the `rept-stat-gpl:gpl=sccphc` command.

   This is an example of the possible output.
   ```
   rlghncxa03w 07-05-01 11:40:26 GMT EAGLE5 37.0.0
   GPL     CARD   RUNNING        APPROVED       TRIAL
   SCCPHC  1201   126-002-000    126-002-000    126-003-000
   SCCPHC  1203   126-002-000    126-002-000    126-003-000
   SCCPHC  1207   126-002-000    126-002-000    126-003-000
   SCCPHC  1213   126-002-000    126-002-000    126-003-000
   SCCPHC  1215   126-002-000    126-002-000    126-003-000
   SCCPHC  1305   126-002-000    126-002-000    126-003-000
   SCCPHC  1313   126-002-000    126-002-000    126-003-000
   SCCPHC  2103   126-002-000    126-002-000    126-003-000
   Command Completed
   ```

   If the required number of E5-SM4G cards are provisioned in the database, go to <u>Step 5</u> .

   If the required number of E5-SM4G cards are not provisioned in the database, perform the "Adding an SCCP card" in the *Database Administration Manual* - Global Title Translation to add the required number of E5-SM4G cards to the database. After the required number of E5-SM4G cards are provisioned in the database, go to <u>Step 5</u> .

5. Verify whether HIPR cards are installed on all the EAGLE 5 ISS shelves containing E5-SM4G cards using the `rept-stat-gpl:gpl=hipr` command.
   ```
   the rept-stat-gpl:gpl=hipr command.
   rlghncxa03w 07-05-01 11:40:26 GMT EAGLE5 37.0.0
   GPL    CARD   RUNNING        APPROVED       TRIAL
   HIPR   1109   126-002-000    126-002-000    126-003-000
   HIPR   1110   126-002-000    126-002-000    126-003-000
   HIPR   1209   126-002-000    126-002-000    126-003-000
   HIPR   1210   126-002-000    126-002-000    126-003-000
   HIPR   1309   126-002-000    126-002-000    126-003-000
   HIPR   1310   126-002-000    126-002-000    126-003-000
   HIPR   2109   126-002-000    126-002-000    126-003-000
   HIPR   2110   126-002-000    126-002-000    126-003-000
   Command Completed
   ```

   If HIPR cards are installed in all shelves containing E5-SM4G cards , go to <u>Step 6</u> .

If HIPR cards are not installed on all shelves containing E5-SM4G cards, refer to the *Installation Manual - EAGLE 5 ISS* and install the HIPR cards on each of the shelves. Once the HIPR cards have been installed, go to Step 6 .

6.   Display the serial number in the database with the `rtrv-serial-num` command.

An example of output from this command follows:
```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
System serial number = nt00001231

System serial number is not locked.

rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
Command Completed
```

If the serial number is correct and locked, go to Step 10 (skip Step 7 , Step 8 , and Step 9). If the serial number is correct but not locked, go to Step 9 (skip Step 7 and Step 8). If the serial number is not correct, but is locked, this feature cannot be enabled and the remainder of this procedure cannot be performed. Contact the Customer Care Center to get an incorrect and locked serial number changed. The serial number can be found on a label affixed to the control shelf (shelf 1100).

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

For this example, enter this command:

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

When this command has successfully completed, the following message appears.
```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
ENT-SERIAL-NUM:  MASP A - COMPLTD
```

8.   Verify that the serial number entered into Step 7 was entered correctly using the `rtrv-serial-num` command.

An example of output from this command follows:
```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
System serial number = nt00001231

System serial number is not locked.

rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
Command Completed
```

If the serial number was not entered correctly, repeat Step 7 and Step 8 and re-enter the correct serial number.

9.   Lock the serial number in the database by entering the `ent-serial-num` command with the serial number shown in Step 6 , if the serial number shown in Step 6 is correct, or with the serial number shown in Step 8 , if the serial number was changed in Step 7 , and with the l`ock=yes` parameter.

For this example, enter this command:

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

When this command has successfully completed, the following message appears:
```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
ENT-SERIAL-NUM:  MASP A - COMPLTD
```

10.   Enable the E5-SM4G Throughput Capacity feature with the permanent key by entering the `enable-ctrl-feat` command.

For this example, enter the following command:

```
enable-ctrl-feat:partnum=893019101:fak=<E5-SM4G Throughput Capacity
feature access key>
```

NOTE: The values for the feature access key (the fak parameter) are provided by Tekelec. If the feature access key for the E5-SM4G Throughput Capacity feature is not known, contact your Tekelec Sales Representative or Account Representative.

When the **enable-crtl-feat** command has successfully completed, this message appears:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
ENABLE-CTRL-FEAT: MASP B - COMPLTD
```

Note: If you do not wish to turn the E5-SM4G Throughput Capacity feature on, go to Step 12 (and skip Step 11) .

11. Turn the E5-SM4G Throughput Capacity feature using the **chg-ctrl-feat** command, specifying the E5-SM4G Throughput Capacity feature part number used in Step 10 and the **status=on** parameter.

For example, enter the following command:

```
chg-ctrl-feat:partnum=893019101:status=on
```

NOTE: Once this feature is turned on, it cannot be turned off.

When this command has successfully completed, the following message appears:
```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
CHG-CTRL-FEAT: MASP B - COMPLTD
```

12. Verify the changes by entering the rtrv-ctrl-feat command with the E5-SM4G Throughput Capacity feature part number specified in Step 10 or Step 11 .

For example, enter the following command:

```
rtrv-ctrl-feat:partnum=893019101
```

An example of output from this command follows:
```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
The following features have been permanently enabled:

Feature Name             Partnum   Status Quantity
E5-SM4G Throughput Cap    893019101   on      ----

The following features have been temporarily enabled:

Feature Name             Partnum    Status  Quantity    Trial Period Left
Zero entries found.
G-Port Circ Route Prevent 893007001 On         ----  20 days 8 hrs 57 mins

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

13. Backup the new changes using the **chg-db:action=backup:dest=fixed** command.

The following messages appear, with the active Maintenance and Administration Subsystem Processor (MASP) appearing first, as shown.
```
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.
```

5

Maintenance and Measurements

Hardware Requirements

The EAGLE 5 ISS may be equipped with from 1 to 25 DSM cards to support A-Port. The A-Port feature requires DSM-based boards to run the VSCCP GPL.

⚠ CAUTION   **CAUTION:**   **A mix of TSM cards running the SCCP application and DSM cards running the VSCCP applaction is not permitted with the A-Port feature enabled; these card types cannot coexist in a system operating the A-Port feature. 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.**

The A-Port feature also requires a T1000-based Multi-Purpose Server (MPS) system.

EPAP Status and Alarms

EPAP has no direct means of accepting user input or displaying output messages on EAGLE 5 ISS terminals, so maintenance, measurements, and status information are routed through a DSM. EPAP sends two types of messages to the DSM: EPAP Maintenance Blocks and DSM Status Requests . Each is discussed in the following sections.

EPAP Maintenance Blocks

The active EPAP generates and sends maintenance blocks to the primary DSM. One maintenance block is sent as soon as the IP link is established between the active EPAP and the primary DSM. 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 so this information 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 so this information 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 DSM. The EPAP must ensure that no more than one maintenance block per second is sent to the primary DSM 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 DSM 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 DSM card, it sends a DSM status request to that DSM card. Since status messages are sent over UDP, the EPAP broadcasts the DSM status request (to all DSM cards) and each DSM 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

DSM cards send a DSM status message to the EPAP when any the following events occur in the DSM card:

- The DSM card is booted

- The DSM card receives a DSM Status Request message from the EPAP

- The DSM card determines that it needs to download the entire database, for example, if the DSM 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 DSM card starts receiving database downloads or database updates. When a DSM 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 DSM card is initialized, it determines the amount of memory present. The EPAP uses the value to determine if the DSM 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 DSM 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](#)

- [DSM Memory Capacity Status Reporting](#)

- [Loading Mode Support Status Reporting](#)

System Status Reporting

The **rept-stat-sys** command supports the DSM cards running the VSCCP application.

The **rept-stat-sccp** command supports the DSM 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.

DSM Memory Capacity Status Reporting

As described in the DSM Status Reporting to the EPAP, the DSM sends a message to the EPAP reporting the amount of memory on the DSM board. The EPAP determines whether the DSM has enough memory to store the RTDB and sends a positive or negative acknowledgement back to the DSM indicating whether or not the DSM has an adequate amount of memory. 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.

When the EPAP sends database updates to the DSM cards, the update messages include a field that contains the new database memory requirements. Each DSM 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 DSM 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 DSM memory.

Loading Mode Support Status Reporting

The OAM application determines whether or not the system is in an unstable loading mode because it knows the state of all LIM, TSM , and DSM 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 DSM card is loading. The DSM 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.

DSM Code Loading

The EAGLE 5 ISSOAM performs code loading of the DSM 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 VSCCP GPL verifies its hardware configuration during initialization to determine if it has the capacity to support the RTDB.

The VSCCP 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 DSM load requests are combined into a single download, reducing the overall download

time. The DSM 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 DSM 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.

A-Port Data Initialization

If the DSM card detects A-Port-capable hardware, the A-Port tables are registered with ADL, specifying a data load function. Any A-Port table data downloaded are stored in memory during loading.

EPAP-DSM Loading Interface

The DSM must convey to the EPAP that it needs to download the RTDB. This occurs when the DSM sends a Full Download Request message to the EPAP.

Loading Mode Support

No more than 16 LIMs can be serviced by each SCCP (or VSCCP) 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.

VSCCP Capacity

An insufficient number of VSCCP cards that are in the is-nr (In Service - Normal) or oos-mt-dsbld (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 VSCCP cards to be inhibited or to have problems that prevent them from operating normally. If enough VSCCP cards are out of service, it may not be possible for the remaining is-nr VSCCP 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-dsbld.

- The number of is-nr and oos-mt-dsbld sccp cards is insufficient to service at least 80% of all provisioned LIMs.

- Insufficient SCCP service occurs when an insufficient number of is-nr VSCCP cards are available to service at least 80% of the number of is-nr LIMs.

- LIM cards are being denied SCCP service and any VSCCP 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.

  When in an unstable loading mode, the EAGLE 5 ISS does not accept STP database updates. When updates are rejected, the reason is given as:

  > E3112 Cmd Rej: Loading Mode unstable due to SCCP service is deficient.

  The **inh-card** and **alw-card** commands can be used to alter SCCP service levels to achieve the 80% threshold. This can be repeated for each card until the system is able to supply SCCP services to at least 80% of the is-nr LIMs. The remaining 20% LIM or supporting VSCCP cards may remain out of service until the stream of database updates ceases. This stream of updates can be temporarily interrupted to allow the remaining 20% of the system to come in service.

  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 DSM aborts the current loading, issues a class 01D7 obit, and reboots. **Figure 5-1** shows an example.

Figure 5-1. 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 5-2** through **Figure 5-8** show the transitions of a DSM 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 Not Enabled, DSM Running in TSM Emulation

In **Figure 5-2**, the A-Port feature is not enabled, and the DSM card can operate in TSM emulation mode, although it does not provide A-Port operation.

Figure 5-2. A-Port Not Enabled, DSM Running in TSM Emulation
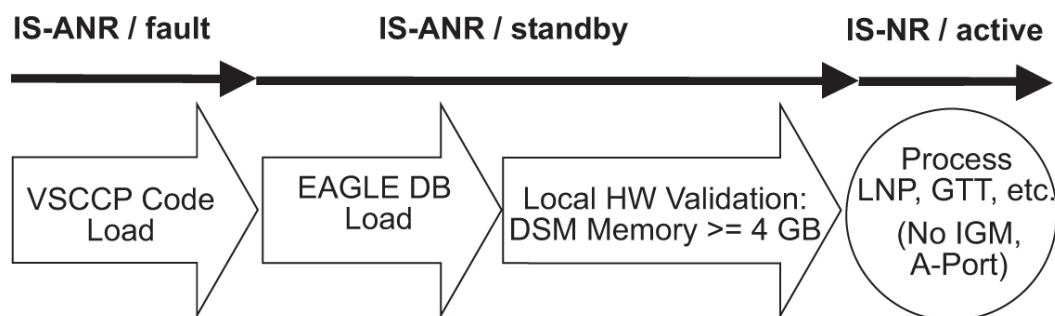
A-Port Enabled, Normal Operating Sequence

In **Figure 5-3** , the A-Port feature is enabled, and the DSM card memory is 4 GB and is connected to the EPAP. A normal DSM card operating sequence occurs, providing A-Port service.

Figure 5-3. A-Port Enabled, Normal Operating Sequence
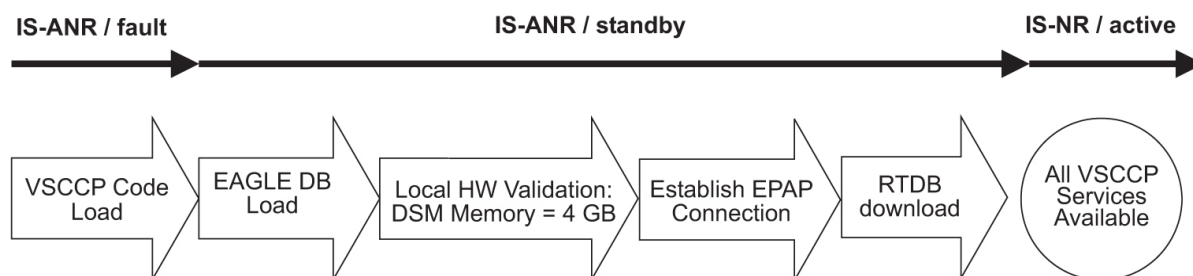
A-Port Enabled, DSM Not Connected to EPAP

In **Figure 5-4** , the A-Port feature is enabled, the DSM card memory is 4 GB, but the DSM card is unable to connect EPAP; thus A-Port cannot begin operation.

Figure 5-4. A-Port Enabled, DSM Not Connected to EPAP
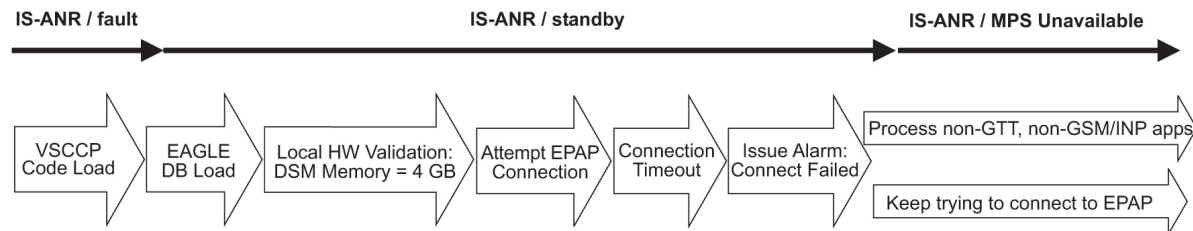
A-Port Enabled, DSM Memory Insufficient for Database

In **Figure 5-5** , the A-Port feature is enabled, the DSM card has the required 4 GB memory and is connected to the EPAP, but the DSM card is too small for the required database; thus A-Port cannot begin operation. 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**.**

Figure 5-5. A-Port Enabled, DSM Memory Insufficient for Database
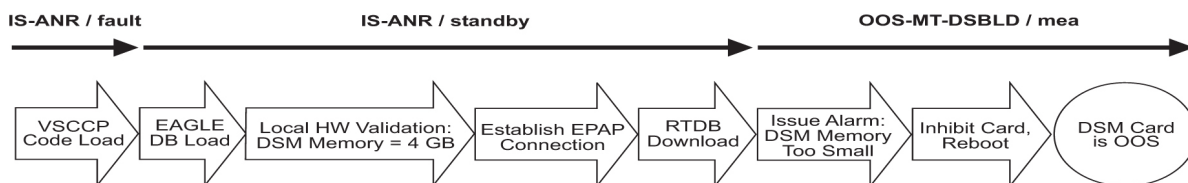
A-Port Enabled, Database Exceeds DSM Memory

In **Figure 5-6** , the A-Port feature is enabled, the DSM card is connected to the EPAP, but the RTDB grows eventually to exceed the capacity of the DSM card memory, despite its memory size of 4 GB. An alarm is issued when the DSM memory becomes full from the RTDB update. The A-Port cannot begin operation. 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**.**

Figure 5-6. A-Port Enabled, Database Exceeds DSM Memory
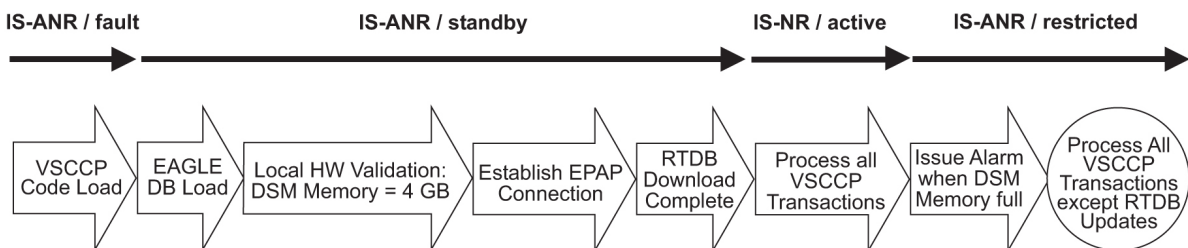
A-Port Not Enabled at First, but then Activated on DSM

In **Figure 5-7** , the A-Port feature is not initially enabled; the DSM card memory is 4 GB, but no EPAP connection; the DSM card is running other applications when the A-Port feature is enabled and turned on. The DSM has sufficient memory to provide A-Port service.

Figure 5-7. A-Port Not Enabled at First, but then Activated on DSM
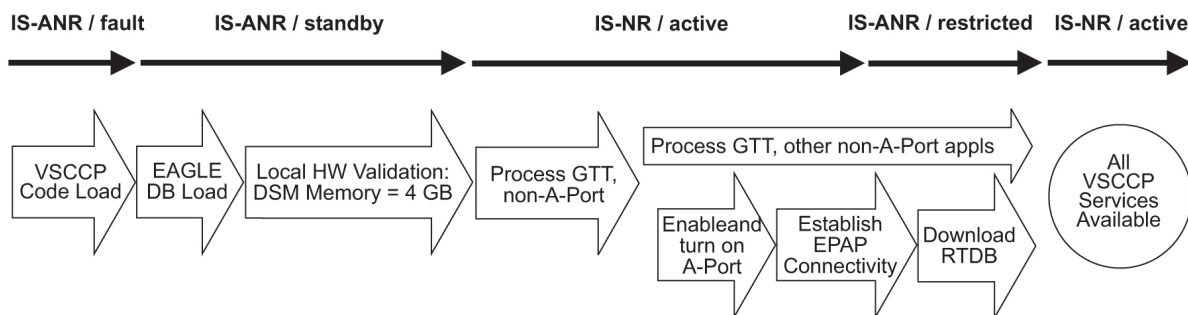
A-Port Activation Unsuccessful Due to Insufficient Database

In **Figure 5-8** , the A-Port feature is not initially enabled; the DSM card memory is 4 GB, but no EPAP connection, and is running other applications when the A-Port feature is turned on. However, the DSM card memory is insufficient for the needed database, and cannot provide A-Port operation. 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**.**

Figure 5-8. A-Port Activation Unsuccessful Due to Insufficient Database
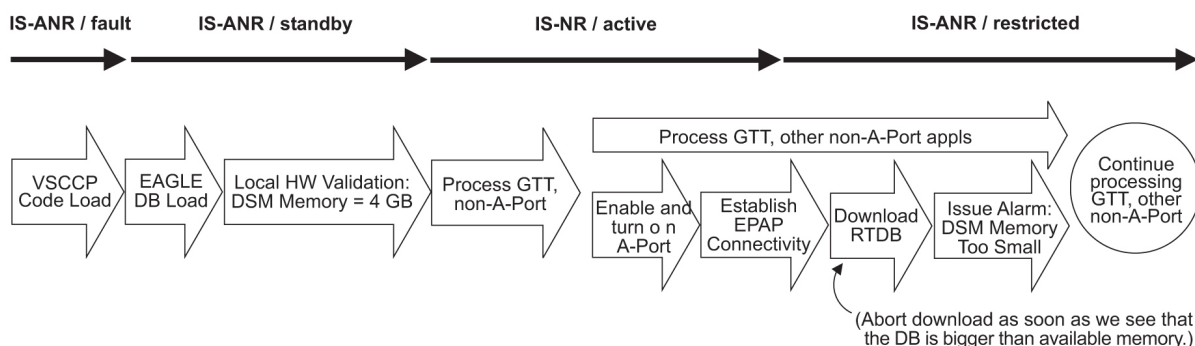
A-Port Alarms

All A-Port related UAMs are output to the Maintenance Output Group. The *Maintenance Manual* contains a complete description of all UAMs. **Table 5-1** contains a listing of UAMs used to support the A-Port feature.

Refer to the *EAGLE 5 ISS Maintenance Manual* for more information and corrective procedures for the EAGLE 5 ISS related alarms. Refer to the *MPS Platform Software and Maintenance Manual* for more information and corrective procedures for the MPS related alarms.

Table 5-1. 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, card(s) abnormal	EAGLE 5 ISS
0330	Major	SCCPTPS Threshold exceeded	EAGLE 5 ISS
0331	Critical	SCCP is not available	EAGLE 5 ISS

UAM	Severity	Message Text	MPS or EAGLE 5 ISS
0335	None	SCCP is removed	EAGLE 5 ISS
0336	Major	LIM(s) have been denied SCCP service	EAGLE 5 ISS
0370	Critical	Critical Platform Failure(s)	MPS
0371	Critical	Critical Application Failure(s)	MPS
0372	Major	Major Platform Failure(s)	MPS
0373	Major	Major Application Failure(s)	MPS
0374	Minor	Minor Platform Failure(s)	MPS
0375	Minor	Minor Application Failure(s)	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	RTDBDatabase 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

DSM-EPAP Link

Two alarms are used to indicate the DSM-to-EPAP link status. Refer to the *Signaling Products Maintenance Manual* for more information and corrective procedures for the following alarms.

- **UAM 0084** - *IP Connection Unavailable*

This message indicates that an IP application socket is out of service due to a IP link down (Ethernet problem) or because the DSM card is not operational.

```
    station1234 00-09-30 16:28:08 EAGLE 36.0.0
**  5676.0084 ** DSM B   1101              IP Connection Unavailable
```

- **UAM 0085** - *IP Connection Available*

This message indicates that a previously broken link between the EPAP and DSM card is now functioning properly.

```
    station1234 00-09-30 16:28:08 EAGLE 36.0.0
    5676.0085    DSM B   1101              IP Connection Available
```

MPS (EPAP) Alarms

The following alarms are output on the EAGLE 5 ISS and include an alarm data string in the output. Refer to the *MPS Platform Software and Maintenance Manual* (except where noted) for more information and corrective procedures for the following MPS related alarms.

- **UAM 0261** - MPS unavailable

This message indicates that the EAGLE 5 ISS is unable to communicate with the MPS or the MPS has an internal failure. Refer to the *Maintenance Manual* for the corrective action procedure.

For example:

```
    station1234 00-09-30 16:28:08 EAGLE 36.0.0
*C  0259.0261 *C MPS   B                  MPS unavailable
```

- **UAM 0370** - Critical Platform Failure (s)

This message indicates the application running in the MPS server has detected a critical platform failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'1xxxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

For example:

```
    station1234 00-09-30 16:28:08 EAGLE 36.0.0
*C  0259.0370 *C MPS   B                  Critical Platform Failure(s)
                ALARM DATA = h'1000000000000008'
```

- **UAM 0371** - Critical Application Failure (s)

This message indicates the application running in the MPS server has detected a critical application failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'2xxxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

For example:

```
    station1234 00-09-30 16:28:08 EAGLE 36.0.0
*C   0259.0371 *C MPS   B                 Critical Application Failure(s)
                ALARM DATA = h'2000000000000001'
```

- **UAM 0372** - Major Platform Failure (s)

This message indicates the application running in the MPS server has detected a major platform failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'3xxxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

For example:

```
    station1234 00-09-30 16:28:08 EAGLE 36.0.0
**  0259.0372 ** MPS   B              Major Platform Failure(s)
              ALARM DATA = h'3000000000000002'
```

- **UAM 0373** - Major Application Failure (s)

This message indicates the application running in the MPS server has detected a major application failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'4xxxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

For example:

```
    station1234 00-09-30 16:28:08 EAGLE 36.0.0
**   0259.0373 ** MPS   B              Major Application Failure(s)
              ALARM DATA = h'4000000000000008'
```

- **UAM 0374** - Minor Platform Failure (s)

This message indicates the application running in the MPS server has detected a minor platform failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'5xxxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

For example:

```
    station1234 00-09-30 16:28:08 EAGLE 36.0.0
*   0259.0374 * MPS   B              Minor Platform Failure(s)
              ALARM DATA = h'5000000000000004'
```

- **UAM 0375** - Minor Application Failure (s)

This message indicates the application running in the MPS server has detected a minor application failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'6xxxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

For example:

```
    station1234 00-09-30 16:28:08 EAGLE 36.0.0
*   0259.0375 * MPS   B              Minor Application Failure(s)
              ALARM DATA = h'6000000000000001'
```

Card Related MPS Alarms

The following alarms are output on the EAGLE 5 ISS. Refer to the *Signaling Products Maintenance Manual* for more information and corrective procedures for the following card related MPS alarms.

- **UAM 0013** - Card is isolated from system

This indicates a card has become isolated and is unable to communicate to other cards in the system. This could be caused by a defective card, a power failure occurred on the card, or the system software has ordered a reset.

This also appears when the card has been manually reset by a command.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0013 ** CARD 1101 SCCP        Card is isolated from the system
                ASSY SN:  102199815a1234
```

- **UAM 0099** - Incompatible HW for provisioned slot

This indicates a DCM or DSM card does not have an extended memory. This card is automatically inhibited.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0099 ** CARD 1101 VSCCP  Incompatible hardware for provisioned slot
                ASSY SN:  102199815a1234
```

- **UAM 0422** - Insufficient extended memory

At least one TSM card running the SCCP application does not have enough memory for the A-Port application. Loading of the SCCP card is automatically inhibited.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0422 ** CARD 1108  SCCP       Insufficient extended memory
```

- **UAM 0423** - Card reload attempted

Card loading is no longer inhibited. The once inhibited card is now attempting to load.

For example:

```
station1234 00-04-30 16:28:08 EAGLE 36.0.0
0012.0423    CARD 1108  SCCP       Card reload attempted
```

- **UAM 0441** - Incorrect main board - CPU

A DSM card does not have the required hardware configuration for the A-Port application.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0441 ** CARD 1108  VSCCP       Incorrect MBD - CPU
```

- **UAM 0442** - Insufficient RTDB database capacity

At least one DSM card does not have at least 4Gb of memory or does not have enough capacity for the RTDB. Loading of the DSM card is automatically inhibited.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
*C  0012.0442 *C CARD 1108  VSCCP        RTDB database capacity is 95% full
```

- **UAM 0443** - RTDB database is corrupted

A RTDB database is corrupt. The calculated checksum did not match the checksum value stored for one or more records.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0443 **  CARD 1108  VSCCP      RTDB database is corrupted
```

- **UAM 0444** - RTDB database is inconsistent

  The real time database of one or more DSM cards is not identical to the current real time database on the active EPAP fixed disks.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
*   0012.0444 *  CARD 1108  VSCCP      RTDB database is inconsistent
```

- **UAM 0445** - RTDB database has been corrected

  This message indicates that a problem with the RTDB has been corrected.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
0012.0445    CARD 1108  VSCCP      RTDB database has been corrected
```

- **UAM 0446** - RTDBDatabase capacity is 80% full

  This message is displayed when a DSM card detects that its daughterboard memory is at least 80% full.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
**   0012.0446 **  CARD 1108  VSCCP      RTDB Database capacity is 80% full
```

- **UAM 0447** - RTDB Database capacity alarm cleared

  This message indicates that a problem with the RTDB memory has been corrected.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
0012.0447    CARD 1108  VSCCP      RTDB database capacity alarm cleared
```

- **UAM 0448** - RTDB database is incoherent

  This message indicates that the RTDB database download is in-process.

  Example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
*   0012.0448 *  CARD 1108  VSCCP      RTDB database is incoherent
```

- **UAM 0449** - RTDB resynchronization in progress

  This message indicates that the MPS database resynchronization is in-process.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0449 **  CARD 1108  VSCCP      RTDB resynchronization in progress
```

• **UAM 0451** - RTDB reload is required

The RTDB database on the DSM card needs to be reloaded because the resynch log does not contain all of the required updates.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0451 ** CARD 1108  VSCCP      RTDB reload is required
```

A-Port Subsystem Alarms

The following alarms are output on the EAGLE 5 ISS for the A-Port subsystem.

• **UAM 0526** - Service is available

A problem with the specified SCCP service has been corrected. All TSM cards running the SCCP application are IS-NR and have a service status of Active.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
    0056.0526   MNP SERVICE        Service is available
```

• **UAM 0527** - Service abnormal

One or more of the cards providing the specified SCCP service do not have a service status of Active.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
*   0056.0527 *  MNP SERVICE        Service abnormal
```

• **UAM 0528** - Service is not available

The A-Port service is not available. No IS-NRSCCP cards are associated the A-Port service. No TSM cards running the SCCP application and providing the A-Port service have a service status of Active.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
*C  0056.0528 *C MNP SERVICE        Service is not available
```

• **UAM 0529** - Service is disabled

The A-Port service has been manually disabled with the chg-sccp-serv command. All IS-NR cards providing the A-Port have service status of Offline.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
*C  0056.0529 *C MNP SERVICE        Service is disabled
```

• **UAM 0530** - Service is removed

The A-PortSCCP service is not equipped. No TSM cards running the SCCP application are configured with the A-Port service.

For example:

```
station1234 00-04-30 16:28:08 EAGLE 36.0.0
0056.0530    MNP SERVICE         Service is removed
```

A-Port UIMs

The EAGLE 5 ISS Maintenance Manual contains a complete description of all UIM text and formats. If A-Port is provisioned, then the following UIMs (**Table 5-2**) are used.

Table 5-2. 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 CGPATT in the GTTTT 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	LOCREQ rcvd - 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
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 `chg-stpopts :defcc=xxx`	application subsystem

UIM	Text	Description	Action	Output Group (UI Output Direction)
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 **chg-stpopts :defndc=xx xxx**	application subsystem
1246	Invalid length of conditioned digits	Invalid length of condition- ed 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 MAPMSISDN parameter	No digits found in MAPMSISDN parameter	Specify valid digits in the MSISDN	application subsystem
1295	Translation PC is EAGLE's	PC translation is invalid because it is one of EAGLE 5 ISS's PCs	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.	gtt
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 determine the error and the originating node or the requested outbound digit formatting option should be modified to correct the encoding error.	application subsystem

A-Port Related Measurements

Refer to the *Maintenance Manual* for for detailed measurement usage information.

OAM Based Measurements

A-Port measurements are available via the FTA (File Transfer Area) feature and not directly via EAGLE 5 ISS terminals. The File Transfer Area feature supports the transfer of file data between an EAGLE 5 ISS and a remote computer. It provides the capability to download files from the EAGLE 5 ISS via a data communications link. The data communications link is accessed through a dial-up modem using one of the EAGLE 5 ISS's RS-232 I/O ports. The link is illustrated in **Figure 2-7** ""Dial-Up PPP Network .

See the *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, Migration, A-Port, and G-PORT measurements data. The interface to the customer's network supports the FTP transfer of Measurements reports to an FTP server. Following collection, scheduled reports are automatically generated and transferred to the customer's FTP server via 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 5-3 lists the Peg counts (of MSUs - Message Signalling Units) supported *per-system* by the A-Port feature.

Table 5-3. 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 will include 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 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.**	System	Peg count
GPSRRCV	Number of call-related SRI messagesreceived	System	Peg count
GPSRGTT	Number of call-related SRI messages that fell through to GTT	System	Peg count
GPSRREP	Number of call-related SRI messages that received A-Port service	System	Peg count
GPSRERR	Number of call-related messages that cause errors and SRI Negative ACK	System	Peg count
IS41LRERR	Number of IS-41 Location Request - Error response messages sent.	System	Peg count
IS41LRMRCV	Number of IS-41 Location Requestmessages received.	System	Peg count
IS41LRRTRN	Number of IS-41 Location Request - Return Result messages sent	System	Peg count

Table 5-4 lists the Peg counts (of MSUs - Message Signalling Units) supported *per-SSP* by the A-Port feature.

Table 5-4. 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
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 repsonses. **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 5-5 lists the Peg counts (of MSUs - Message Signalling Units) supported for both *per-system* and *per-SSP* by the A-Port feature.

Table 5-5. 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
GPNOCL	Number of non-call-related messages relayed by G-Port	System, Point Code	Peg count
GPNOCLGT	Number of non-call-related messages that fell through to GTT	System, Point Code	Peg count

Measurement Reports

Measurements are available with these report commands. Refer to the *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

ACM   Address Complete Message

                 Application Communications Module

ADL   Application Data Loader

AINPQ   ANSI-41 INP Query

ANSI   American National Standards Institute

A-Port   ANSI-41 Mobile Number Portability

AS   Application Server

C

CC   Connection Confirmed

                 Country Code

CCS7ITU   The generic program load and application for the ITU SS7 signaling links that is used with card types `limds0, limch, limocu, limv35, lime1, and limt1`.

CdPA   Called Party Address

Circular Route Prevention   A G-Port MNP feature that detects instances of circular routing caused by incorrect information in one or more of the network number portability databases. If a circular route has been detected, a message will be generated by the EAGLE 5 ISS and returned to the originator.

CLLI   Common Language Location Identifier

CPC   Capability Point Code

CPU   Central Processing Unit

CSR   Customer Service Request

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

                 Daughter Board

                 Documentation Bulletin

DCB   Device Control Block

DCM   Database Communication Module

                 The DCM provides IP connectivity for applications. Connection to a host is achieved through an ethernet LAN using the TCP/IP protocol.

DEFCC   Default Country Code

Destination	The node to which the signaling link traffic is routed. This destination is identified by a point code, either a full point code or a cluster point 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
	The point code of the signaling point to which the MSU is routed. This point code can be adjacent to the EAGLE 5 ISS, but does not have to be.
DSM	Database Service Module.

E

EGTT	Enhanced Global Title Translation
EIR	Equipment Identity Register
Enhanced Global Title Translation	A feature that is designed for the signaling connection control part (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.
EPAP	EAGLE Provisioning Application Processor
ESD	Electro-Static Discharge
ESN	Electronic Serial Number
ETSI	European Technical Standards Institute

F

FAK	Feature Access Key.
FTA	File Transfer Area.
FTP	Feature Test Plan
	File Transfer Protocol.

G

GB	Gigabyte — 1,073,741,824 bytes
G-Flex	GSM Flexible numbering
	A feature that allows the operator to flexibly assign individual subscribers to HLRs and route signaling messages, based on subscriber numbering, accordingly.
GPL	Generic Program Load
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
GPSM-II	General Purpose Service Module
GSM	Global System for Mobile Communications
GT	Global Title Routing Indicator
GTA	Global Title Address
GTAI	Global Title Address Information
GTI	Global Title Indicator
GTT	Global Title Translation.

GUI	Graphical User Interface

H

HLR	Home Location Register
HOMERN	Home Network Routing Number Prefix
HRN	Home Routing Number
HW	Hardware

I

ID	Identity, identifier
IEC	Inter-Exchange Carrier
	International Escape Code
IGM	IS41 GSM Migration
IMSI	International Mobile Station 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
INAP	Intelligent Network Application Protocol
INP	INAP-based Number Portability
	Intelligent Network (IN) Portability
IP	Intelligent Peripheral
	Internet Protocol
IP^7	Tekelec's Internet Protocol to SS7 Interface
IS-41	Interim Standard 41, same as and interchangeable with ANSI-41.
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
Link	Signaling Link
LNP	Local Number Portability
LOCREQ	Location Request Message

M

MAP	Mated Application Part
	Mobile Application Part
MASP	Maintenance and Administration Subsystem Processor
Mated Application	The point codes and subsystem numbers of the service databases that messages are routed to for global title translation.
MCPM	Measurement Collection and Polling Module
MDN	Mobile Dialed Number
	Mobile Directory Number
MEA	Memory Extension Applique
	Mismatch of Equipment and Attributes
MIM	Multi-Channel Interface Module
MIN	Mobile Identification Number
MNP	Mobile Number Portability
MO	Magneto Optical
	Managed Object
	Mobile Originated
MP	Measurement Platform
MPS	Multi-Purpose Server
MR	Message Relay
MRN	Message Reference Number
	Mated Relay Node
MSISDN	Mobile Station International Subscriber Directory Number
	The MSISDN is the number dialed by someone trying to reach the subscriber.
MSRN	Mobile Station Roaming Number
MSU	Message Signaling Unit
MT	Mobile Terminated
MTP	Message Transfer Part
	Module Test Plan
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
NC	Network Cluster
	Network Code
NDC	Network destination code
	Network Data Collection
NE	Network Element
NEC	National Escape Code
NP	Number Plan
	Numbering Plan
	Number Portability

O

OAM	Operations, Administration, and Maintenance
OOS-MT	Out of Service - Maintenance
OPC	Originating Point Code
OPS	Operator Provisioning System

P

PC	Point Code.
PDB	Provisioning Database
PDBA	Provisioning Database Application
PDBI	Provisioning Database Interface
PPP	Point-to-Point Protocol
PPSMS	Prepaid Short Message Service
PPSMS	Prepaid Short Message Service Intercept
PT	Portability Type

R

RC	Relative Cost
	Restriction Criteria
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
RMTP	Reliable Multicast Transport Protocol
RN	Routing Number
RNIDN	Routing Number - International DN
RNNDN	Routing Number - National DN
RNSDN	Routing Number - Subscriber DN
Route	A path to another signaling point.
RS	Requirement Specification
RTDB	DSM Real-time database

S

SAT	Supervisory Audio Tone
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	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.
SMS	Short Message Service
SMSC	Short Message Service Center
SMSREQ	SMS Request Message
SNAI	Service Nature of Address Indicator
SP	Service Provider
	Signaling Point
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	Signaling Relay Function
SRI	Send Routing Information
	Send_Route_Information Message
SS	Subsystem
SS7	Signaling System #7
SSN	SS7 Subsystem Number
	Subsystem Number
SSP	Subsystem Prohibited network management message.
	Subsystem Prohibited SCCP (SCMG) management message. (CER)
	Service Switching Point (SS7 Network)
STP	Signal Transfer Point

T

TCAP	Transaction Capabilities Application Part
TCP	Transfer-Cluster-Prohibited
	Transfer Control Protocol
	Transmission Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TDM	Terminal Disk Module.
	Time Division Multiplexing.
TFA	TransFer Allowed (Msg)
TFP	TransFer Prohibited (Msg)
TPS	Transactions Per Second
	A method of measuring how quickly a network can transmit and receive data. Capacities listed with "TPS" units involve the maximum of the receive rate and the transmit rate, and the worst-case assumption is that the transmit and receive rates are the same. Under the TU model, transaction units per second are calculated with the total transaction unit value and the advertised card capacity.
TSM	Translation Services Module
TT	Translation Type.

TVG   Group Ticket Voucher

U

UAM   Unsolicited Alarm Message.
UDP   User Datagram Protocol
UDT   Unit Data Transfer
UDTS   Unit Data Transfer Service
UI   User Interface
UIM   Unsolicited Information Message

V

VGTT   Variable Length GTT

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 DSM 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 DSM card is present, the VSCCP GPL processes normal GTT traffic.

X

XUDT   Extended Unit Data
                      Extended User Data

Index