Tekelec EAGLE® 5 Integrated Signaling System

Feature Manual - G-Port

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Patents

This product is covered by one or more of the following U.S. and foreign patents:
U.S. Patent Numbers:
5,732,213; 5,953,404; 6,115,746; 6,167,129; 6,324,183; 6,327,350; 6,456,845; 6,606,379; 6,639,981; 6,647,113; 6,662,017; 6,735,441; 6,745,041; 6,765,990; 6,795,546; 6,819,932; 6,836,477; 6,839,423; 6,885,872; 6,901,262; 6,914,973; 6,940,866; 6,944,184; 6,954,526;6,954,794; 6,959,076; 6,965,592; 6,967,956; 6,968,048; 6,970,542; 6,987,781; 6,987,849; 6,990,089; 6,990,347; 6,993,038; 7,002,988; 7,020,707; 7,031,340; 7,035,239; 7,035,387; 7,043,000; 7,043,001; 7,043,002; 7,046,667; 7,050,456; 7,050,562; 7,054,422; 7,068,773; 7,072,678; 7,075,331; 7,079,524; 7,088,728; 7,092,505; 7,108,468; 7,110,780; 7,113,581; 7,113,781; 7,117,411; 7,123,710; 7,127,057; 7,133,420; 7,136,477; 7,139,388; 7,145,875; 7,146,181; 7,155,206; 7,155,243; 7,155,505; 7,155,512; 7,181,194; 7,190,702; 7,190,772; 7,190,959; 7,197,036; 7,206,394; 7,215,748; 7,219,264; 7,222,192; 7,227,927; 7,231,024; 7,242,695; 7,254,391; 7,260,086; 7,260,207; 7,283,969; 7,286,516; 7,286,647; 7,286,839; 7,295,579; 7,299,050; 7,301,910; 7,304,957; 7,318,091; 7,319,857; 7,327,670
Foreign Patent Numbers:
EP1062792; EP1308054; EP1247378; EP1303994; EP1252788; EP1161819; EP1177660; EP1169829; EP1135905; EP1364520; EP1192758; EP1240772; EP1173969; CA2352246

Ordering Information

Your Tekelec Sales Representative can provide you with information about how to order additional discs.

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Chapter 1

Introduction

Topics:

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

Overview

This manual provides an overview of the GSM Mobile Number Portability (G-Port) feature of the EAGLE 5 ISS (Integrated Signaling System). The G-Port feature implements Mobile Number Portability for GSM networks according to ETSI GSM 03.66. In response to governmental mandates for telecommunication networks, this feature focuses on service provider number portability on GSM networks.

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

The G-Port feature allows subscribers to be moved easily from one Home Location Register (HLR) to another. The G-Port feature applies to ITU-I (international) and ITU-N (national) networks.

Scope and Audience

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

Manual Organization

This document is organized into the following chapters:

- *Introduction* on page 1 contains general information about the G-Port documentation, the organization of this manual, and how to request technical assistance.
- *Feature Description* on page 9 provides a description of the G-Port feature and related features, including network perspectives, assumptions and limitations, database overview, DSM provisioning and reloading, and G-Port protocol.
- *Commands* on page 67 describes the commands that support the G-Port and related features
- *Feature Activation* on page 85 describes how to activate the G-Port feature and related features.
- *Maintenance and Measurements* on page 117 describes maintenance and measurements in detail, including EPAP status and alarms, hardware verification messages, G-Port system status reports and commands, code and application data loading, and alarms.

Documentation Admonishments

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

Table 1: Admonishments

	**DANGER**: (This icon and text indicate the possibility of *personal injury*.)
	**WARNING**: (This icon and text indicate the possibility of *equipment damage*.)
	**CAUTION**: (This icon and text indicate the possibility of *service interruption*.)

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The Tekelec Customer Care Center is your initial point of contact for all product support needs. A representative takes your call or email, creates a Customer Service Request (CSR) and directs your requests to the Tekelec Technical Assistance Center (TAC). Each CSR includes an individual tracking number. Together with TAC Engineers, the representative will help you resolve your request.

The Customer Care Center is available 24 hours a day, 7 days a week, 365 days a year, and is linked to TAC Engineers around the globe.

Tekelec TAC Engineers are available to provide solutions to your technical questions and issues 7 days a week, 24 hours a day. After a CSR is issued, the TAC Engineer determines the classification of the trouble. If a critical problem exists, emergency procedures are initiated. If the problem is not critical, normal support procedures apply. A primary Technical Engineer is assigned to work on the CSR and provide a solution to the problem. The CSR is closed when the problem is resolved.

Tekelec Technical Assistance Centers are located around the globe in the following locations:

Tekelec - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

  Phone:

  1-888-FOR-TKLC or 1-888-367-8552 (toll-free, within continental USA and Canada)

1-919-460-2150 (outside continental USA and Canada)

TAC Regional Support Office Hours:

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- **Central and Latin America (CALA)**

  Phone:

  USA access code +1-800-658-5454, then 1-888-FOR-TKLC or 1-888-367-8552 (toll-free)

  TAC Regional Support Office Hours (except Brazil):

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  - **Brazil**

    Phone:

    0-800-891-4341 (toll-free)

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  - **Columbia**

    Phone:

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  - **Dominican Republic**

    Phone:

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

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

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

Related Publications

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

Documentation Availability, Packaging, and Updates

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

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

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

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

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

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

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

Locate Product Documentation on the Customer Support Site

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

1. Log into the Tekelec **new** Customer Support site at *support.tekelec.com*.

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

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

Chapter 2

Feature Description

Topics:

This chapter describes the G-Port feature and related features which include:

- MT-Based GSM SMS NP
- MT-Based GSM MMS NP
- G-Port SRI Query for Prepaid
- GSM MAP SRI Redirect to Serving HLR

Introduction

Throughout the world, an increasing number of governments are mandating that telecommunications network operators support service provider number portability. These mandates are intended to promote competition among service providers and apply to both wireline and mobile phone networks. The GSM Mobile Number Portability (G-Port) feature is focused on service provider portability in GSM (Global System for Mobile Communications) networks.

Service provider portability allows a consumer to change service providers while retaining the same phone number. While consumers benefit from number portability, the implementation can present challenges for network operators. G-Port minimizes the challenges for GSM network operators, while enabling them to efficiently meet their regulatory obligations.

G-Port implements Mobile Number Portability for GSM networks according to the ETSI GSM 03.66 standard. The focus is on service provider portability among GSM networks in a defined portability cluster, usually a country. With service provider portability, subscribers can change operators while retaining their MSISDNs (Mobile Station international ISDN number). The MSISDN is the number dialed by a caller trying to reach the subscriber. The IMSI (International Mobile Station Identifier) number is not portable. The IMSI identifies the SIM (Subscriber Identity Module) card, which modularly plugs into the GSM handset.

The G-Port feature is based on the EAGLE 5 ISS platform, and is deployed in a node that is also performing the STP function. G-Port uses the Real Time Database (RTDB) to derive the portability status of subscribers.

MNP Circular Route Prevention

The MNP Circular Route Prevention (MNPCRP) feature, as an extension of the G-Port feature, 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. In this case, network A routes the call to network B, based on its portability data, but network B routes the call back to network A, based on its incorrect data. The result is a circular route. The MNPCRP feature provides logic to prevent the circular routing from occurring.

DigitAction Expansion

The DigitAction Expansion feature provides more flexibility to formulate the SCCP Called Party Address - Global Title Address (GTA) field of the MAP messages relayed by G-Port. Without DigitAction Expansion, G-Port supports four options (none, insert, prefix, and replace) to overwrite the SCCP CdPA GTA field. With DigitAction Expansion, four additional options (delcc, delccprefix, spare1, and spare2) are included to overwrite the SCCP CdPA GTA field.

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.

G-Port SCCP Service Re-Route

The G-Port SCCP Service Re-Route feature is used when the G-Port subscriber database is incoherent with MPS data and the GTT data is valid. The G-Port SCCP Service Re-Route feature provides the capability to re-route the traffic from the EAGLE 5 ISS to other G-Port subscriber database nodes and inform the originating nodes to re-route the G-Port service related traffic to other G-Port service nodes.

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

Multiple Country Code

The Multiple Country Code (MULTCC) feature supports up to 10 MULTCCs for customers having one MNP node servicing several countries, or areas with differing country codes. The MULTCCs are not used for conditioning of non-International numbers to International format for database lookup. The MULTCCs are used for the construction of the Mobile Station Roaming Number (MSRN) parameter in the case of a Send Routing Information acknowledgement (SRI-ack) response from G-Port, and in certain cases for the formulation of the SCCP CdPA. The DEFCC parameter in STPOPTS is used for conditioning of numbers to International format when necessary, and also for constructing the MSRN and SCCP CdPA parameters in addition to a MULTCC list. The MULTCC list is optional. If no values are provisioned, G-Port uses the DEFCC to process messages. If values are provisioned, G-Port automatically utilizes both the DEFCC and the MULTCC to process messages. The chg-gsmopts command along with the MULTCC and NMULTCC parameters are used to provision Multiple Country Code list entries.

MSISDN Truncation Support for G-Port

The MSISDN Truncation Support for G-Port feature is an optional feature that allows an operator to specify a certain number of digits to be deleted from the beginning of the National MSISDN (MSISDN without Country Code) prior to formulating the MSRN parameter of the SRI-ack response. This feature only changes the behavior of the encoding of the MAP MSRN parameter in a SRI-ack formulated by the EAGLE 5 ISS. It does not affect the encoding of any other parameters or any other messages processed by G-Port. The International MSISDN is 12 digits long, and the RN is 5 digits long. So when the RN is added to form the MSRN parameter, it will exceed 15 digits in length. Some carriers require MSISDN digits to be truncated when formulating MSRN parameter of SRI-ack response in G-Port in order to maintain max 15 digits length. This feature works in conjunction with the MULTCC Support feature. The DefCC and MULTCC table are used to determine which digits are the CC and which digits are the National MSISDN. If a match is not found on the leading digits of the International MSISDN, then the truncation is not performed, and standard G-Port processing is followed. The `chg-gsmopts` command along with the MISDNTRUNC parameter is used to set-up the MSISDN Truncation Support feature.

Mobile-Originated Based GSM SMS Number Portability

The MO-Based GSM SMS NP feature provides network information to the Short Message Service Center (SMSC) for subscribers using the GSM network. This information allows the SMSC to select a protocol to deliver SMS messages to the called party. For more information about the MO-Based GSM SMS NP feature, refer to *Feature Manual - MO SMS*.

Mobile-Terminated Based GSM SMS Number Portability

The Mobile Terminated (MT)-Based GSM 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 GSM SMS NP feature is not enabled and turned on, then messages are processed by the G-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 query the HLR in real time for delivering the call to the subscriber. The G-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 SRI_SM. 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 SRI_SM messages destined to the HLR and replies with routing information for out-of-network destination subscribers.

The MT-Based GSM SMS NP feature intercepts SRI_SM messages and replies with routing information for out-of-network destination subscribers using the following process:

1. An SRI_SM message from the SMSC is intercepted by the Eagle 5 ISS before the message reaches the home location register (HLR).
2. The message destination address (SCCP Called Party GTA), is extracted, the digits are conditioned, and lookup is performed in the Real Time Database (RTDB).
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 SRI_SM message is relayed to the HLR according to the options set for normal G-Port processing.

The feature provides configurable options for controlling processing of SRI_SM messages and the content of the response:

- Selecting the SMSC response message type and digit format
- Specifying when an RTDB lookup is considered to be successful
- Specifying the format of digits encoded in the response message.

Mobile-Terminated Based GSM MMS Number Portability

The MT-Based GSM MMS NP feature provides routing information to the Multimedia Message Service Center (MMSC) for subscribers using the GSM network. This information can be used by the MMSC to route the MMS messages to the called party.

Note: The MT-Based GSM MMS NP feature can be used only in conjunction with the MT-Based GSM SMS NP feature.

The MT-Based GSM MMS NP feature intercepts SRI_SM messages and replies with routing information for out-of-network destination subscribers using the following process:

1. An SRI_SM message from the MMSC is intercepted by the Eagle 5 ISS before the message reaches the home location register (HLR).
2. The message destination address (SCCP Called Party GTA), is extracted, the digits are conditioned, and lookup is performed in the RTDB.
3. If the destination address/subscribers belongs to a foreign network, then a reply message is sent to the MMSC with routing information. If the destination address/subscribers belongs to

a local network, then the SRI_SM message is relayed to the HLR according to the options set for normal G-Port processing.

The feature provides the following configurable options for controlling processing of SRI_SM messages and the content of the response:

- Selecting the MMSC response message type and digit format
- Specifying when an RTDB lookup is considered to be successful
- Specifying the format of digits encoded in the response message.

Routing Options

The ETSI standards for SRF-based MNP define two routing options, direct routing and indirect routing. G-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.

Dialed Number Lengths

Number lengths vary between countries and may even vary within a country. As a result, the G-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. This length is based on the maximum length for MSISDN numbers as defined in the ETSI GSM 03.03 standard.

SRF vs INAP Mobile Number Portability

The ETSI standards are defined so that GSM carriers can choose to implement either Signaling Relay Function (SRF)-based (using MAP protocol) MNP or IN-based (using INAP protocol) MNP. G-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 intercepting existing MAP messages to check for ported numbers. For call-related messages, G-Port acts as an NP HLR" in the case where the number has been exported, by responding to the switch with a MAP SRI ack message. For calls to imported numbers and non-call related messages, G-Port performs message relay.

G-Port SRI Query for Prepaid

The G-Port SRI Query for Prepaid feature allows the EAGLE 5 ISS to provide portability information to a Service Control Point (SCP) database. This information enables the database to determine the network used by a called subscriber. The G-Port SRI Query for Prepaid feature enables the following Message Signal Unit (MSU) values to be provisioned in the EAGLE 5 ISS GSERV table:

- translation type (TT)—The TT of the called party (CdPA)
- originating point code (OPC)—The OPC from the message transfer part (MTP) layer
- global title address (GTA)—The GTA of the calling party (CgPA)

These values are used to determine whether an SRI should receive G-Port SRI Query for Prepaid service or normal G-Port SRI service.

If the G-Port SRI Query for Prepaid feature is enabled and turned on, incoming SRI TT, OPC, and GTA values are compared against the values in the GSERV table. If no match is found, or if no values are provisioned in the GSERV table, normal G-Port SRI processing is performed on the message. If a match is found for one or more of the values, the message is treated as a Prepaid Query. The G-Port SRI Query for Prepaid feature affects only SRI messages. All other messages, including SRI-SM and SRI-GPRS messages, are processed by normal G-Port service, even if the values in those messages match values in the GSERV table.

After an SRI message is identified as requiring G-Port SRI Query for Prepaid service, the EAGLE 5 ISS performs a Mobile Number Portability (MNP) database lookup on the Mobile Station Integrated Services Digital Number (MSISDN). The results of the lookup are returned to the SCP that originated the query.

A TCAP/MAP error specifically related to a decoding error in the SRI MSISDN parameter causes an "Unsupported/Unexpected Data Value" MAP error. All other TCAP/MAP errors cause the message to be relayed to a Home Location Register (HLR), which then returns the appropriate MAP error based on the status of the subscriber (e.g. Unknown, Barred, etc.)

The message relay is based on information in the Real Time Database (RTDB). SCCP level errors cause the return on a UDTS message to the Prepaid SCP.

This feature requires a Feature Access Key and cannot be turned off after it is turned on.

GSM MAP SRI Redirect to Serving HLR

The GSM MAP SRI Redirect to Serving HLR feature provides the capability to resolve the incompatibility introduced by the proprietary implementation of the GSM MAP SRI message. This feature is an extension to the G-Port protocol. The GSM MAP SRI Redirect to Serving HLR feature is compatible with other G-Port enhancement features.

Additional Subscriber Data Support

The G-Port feature is enhanced to support new Mobile Station Routing Number (MSRN) formatting options that use Additional Subscriber Data (ASD). ASD information is inserted into the outgoing SRI ack messages. If the GSMOPTS:MSRNDIG digit formatting option specifies the use of ASD information and a successful database lookup returns ASD, then the ASD is encoded into the outgoing message and the existing behavior for encoding messages for G-Port is followed.

G-Port Considerations

- G-Port can be turned on, but cannot be turned off.
- The G-Port, A-Port, IGM, G-Flex C7 Relay, INP, and AINPQ features can run concurrently on an EAGLE 5 ISS node.
- When G-Port and G-Flex run on the same node, interactions between the two features must be addressed.
- G-Port and North American LNP are mutually exclusive on an EAGLE 5 ISS node.
- G-Port SCCP Service Re-Route Capability is not supported for the Prepaid Short Message Service Intercept feature.
- When A-Port or IGM run concurrently with G-Port on the same EAGLE 5 ISS node, the service name is changed from GPORT to MNP (`serv=mnp` in `chg-sccp-serv`).
- G-Port, A-Port, or IGM must be turned on before the MNP Circular Route Prevention feature can be turned on.

MPS/EPAP Platform

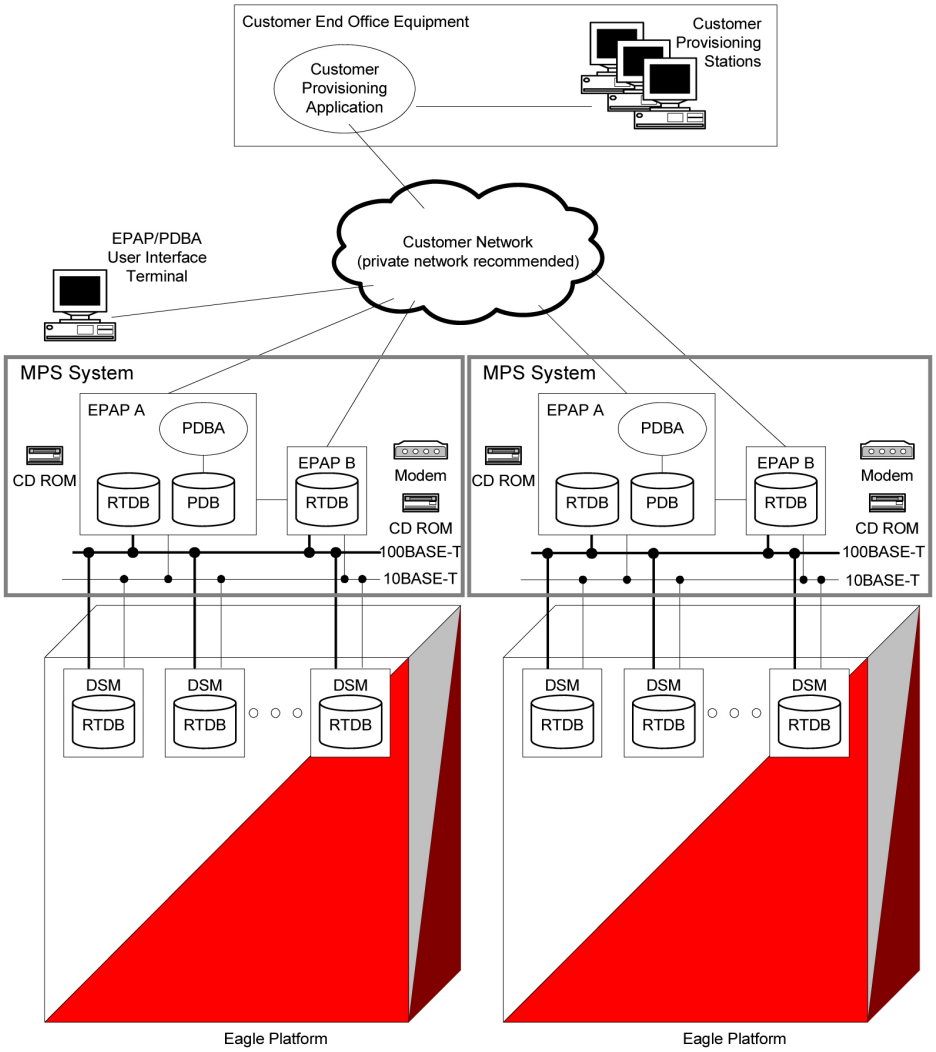
Tekelec provides the MPS (Multi-Purpose Server) platform as a subsystem of the EAGLE 5 ISS. The MPS provides support for the AINPQ, A-Port, EIR , G-Flex, G-Port, IGM, and INP features.

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 Service Module cards. *Figure 1: MPS/EPAP Platform Architecture* on page 15 shows the overall system architecture, providing a graphic overview of MPS/EPAP platform from customer provisioning through the MPS subsystem to the EAGLE 5 ISS Service Module card databases.

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

Figure 1: MPS/EPAP Platform Architecture



Design Overview and System Layout

Figure 1: MPS/EPAP Platform Architecture on page 15 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 Service Module cards, which hold the RTDB database, is part of the STP. Two high-speed Ethernet links connect the Service Module cards and the EPAPs. One of the links is a 100BASE-T Ethernet bus, and the other is 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 Service Module cards. The two Ethernet links are part of the DSM network.

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

The major modules on the EPAP are:

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

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

Functional Overview

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

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

EPAP/PDBA Overview

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

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

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

The EPAP platform performs the following:

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

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

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

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

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

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

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

Each EPAP server maintains a copy of the Real Time Database (RTDB) in order to provision the EAGLE 5 ISS Service Module cards. The EPAP server must comply with the hardware requirements in the *MPS Hardware Manual*. *Figure 1: MPS/EPAP Platform Architecture* on page 15 illustrates the EPAP architecture contained in the MPS subsystem.

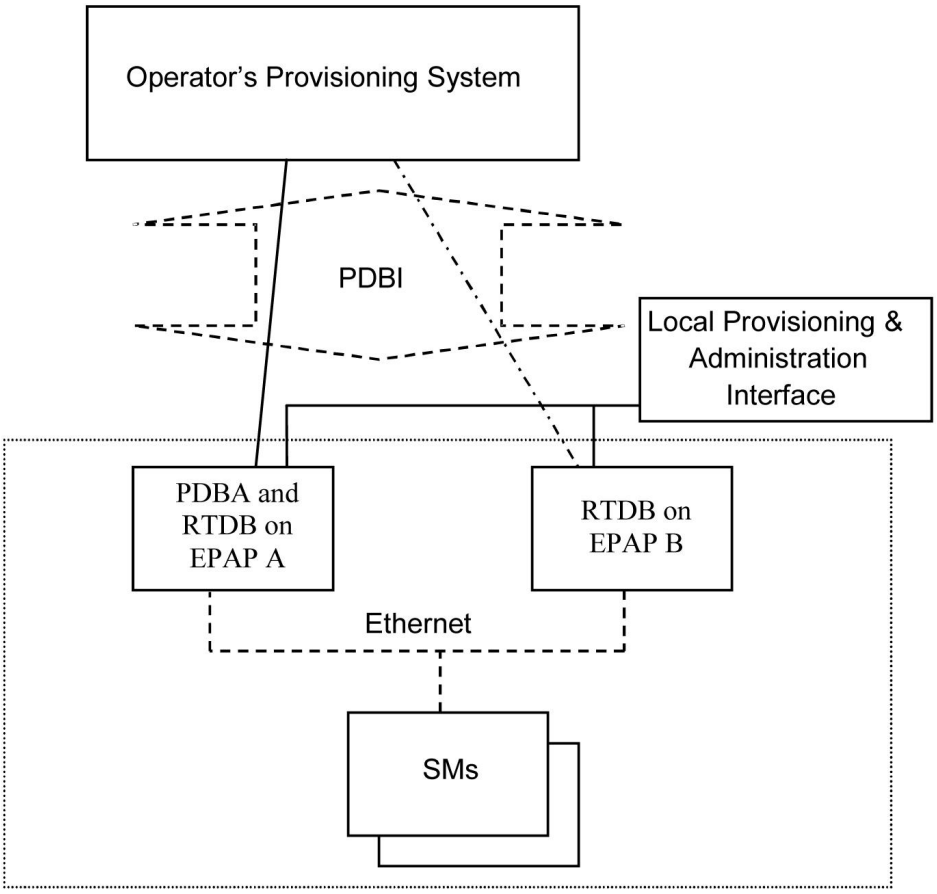
Each EPAP has a dedicated optical media drive. One EPAP per EAGLE 5 ISS platform has a modem capable of supporting remote diagnostics, configuration, and maintenance. These remote operations are performed through EPAP login sessions and are accessible across the customer network as well as through a 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: Subscriber Data Provisioning Architecture (High Level) on page 19 shows the current high-level view of the subscriber data provisioning architecture. Only those parts of the EAGLE 5 ISS platform that are relevant to subscriber data provisioning are shown. This section defines requirements for the Provisioning Database Interface (PDBI) between the EPAP and the operator's provisioning system (OPS). Provisioning clients connect to the EPAPs via the PDBI. This interface contains commands that allow all of the provisioning and retrieving of subscription data. The

PDBI is used for real-time provisioning of subscriber and network entity data only. Refer to the *Provisioning Database Interface Manual* for more details.

Figure 2: Subscriber Data Provisioning Architecture (High Level)



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

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

Distributed Administrative Architecture

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

In general, EAGLE 5 ISS database updates are sent via an EAGLE 5 ISS terminal across an RS232 serial port to the active OAM (Operation Administration and Maintenance). The active OAM commits the update to TDM fixed disk and then sends the update control information to the standby OAM and to the rest of the network cards. When all databases are updated, the active OAM responds with a *Command Completed* indication to the user terminal. EAGLE 5 ISS database updates are generally considered to be EAGLE 5 ISS link, linkset, route, destination, mated application, gateway screening, and global title types of information.

Databases requiring high update and retrieval rates, (compared to the rates provided by the OAM) are not administered via EAGLE 5 ISS terminals. These databases, such as the EPAP RTDB, are populated using redundant Ethernet connections to Service Module cards from an EPAP MPS platform.

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

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

The EPAP architecture contains a local provisioning terminal and a modem for remote access, as well as other functions. A backup device can be used to back up or restore the provisioning database. The local provisioning terminal is used to manually repair the standby EPAP RTDB or to turn the subscriber database audit on or off. For additional information, refer to the *Tekelec T1000 Application Server Hardware Manual* and *EPAP Administration Manual*.

EPAP (EAGLE Provisioning Application Processor)

As shown in *Figure 1: MPS/EPAP Platform Architecture* on page 15, a single MPS system contains two EPAP (EAGLE Provisioning Application Processor) servers. At any given time, only one actively communicates with the Service Module cards. The other EPAP server is in standby mode. In addition, two MPS systems can be deployed in a mated-pair configuration.

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

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

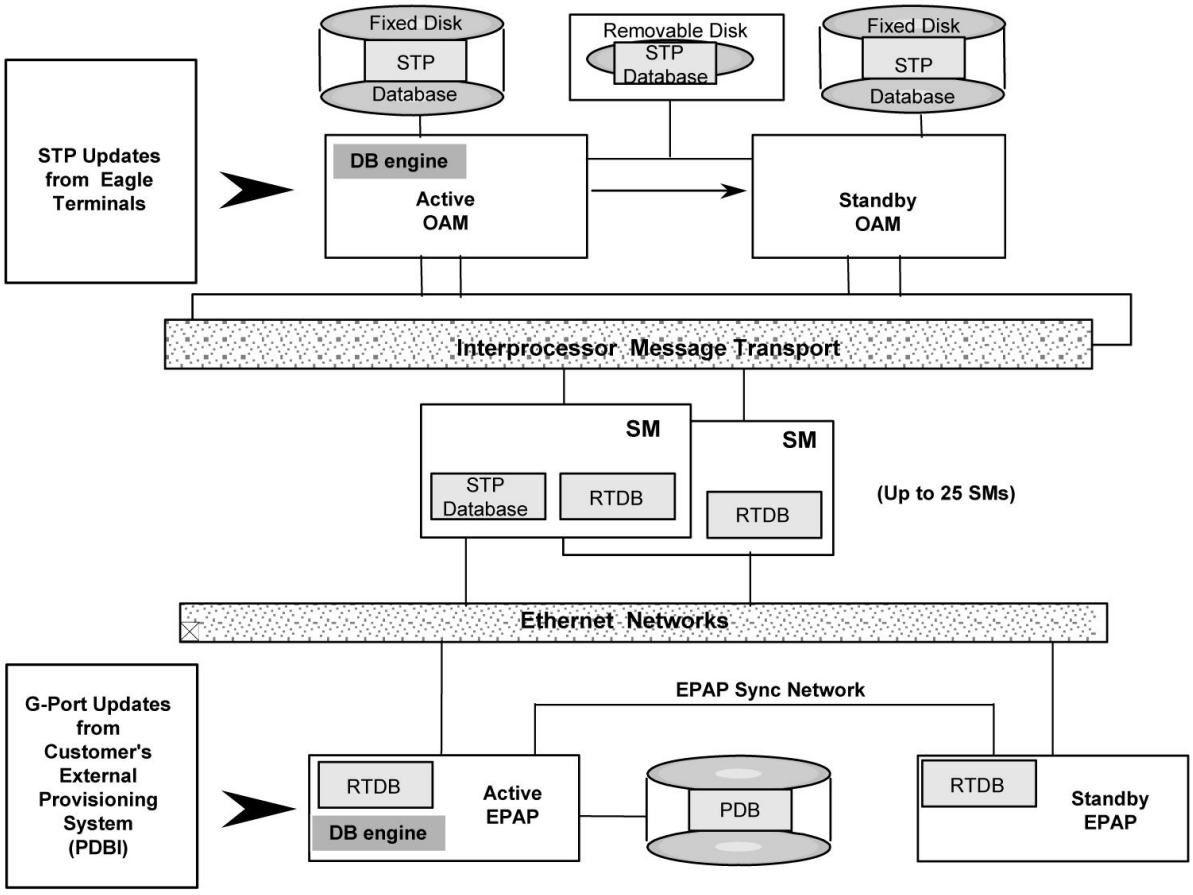
Both the active and standby EPAPs maintain copies of the RTDB. Periodically, the Service Module card polls the active EPAP RTDB for any new updates. The active EPAP downloads the updates to the Service Module for its own resident copy of the RTDB.

In a mated-pair configuration, there are two mated MPS Systems, as shown in *Figure 1: MPS/EPAP Platform Architecture* on page 15. The PDB on the active EPAP automatically updates the PDB on the mate platform. The PDB on the mate platform then updates its EPAP RTDBs, which in turn update the RTDBs on the associated Service Module cards.

Provisioning of the EAGLE 5 ISS's Service Module cards is performed through two interfaces, using two different sets of commands. Provisioning is accomplished by the STP updates from EAGLE 5 ISS terminals and by updates from the customer's external provisioning system. This

system of dual provisioning is illustrated in *Figure 3: Database Administrative Architecture* on page 21.

Figure 3: Database Administrative Architecture



Service Module Cards

From 1 to 25 Service Module cards can be provisioned with one or more EPAP-related features enabled. EPAP-related features require that all Service Module cards contain 4 GB of memory. *Figure 3: Database Administrative Architecture* on page 21 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 Service Module cards run the VSCCP software application.

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

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

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

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

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

Overview of EPAP to Service Module Card Communications

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

- UDP - sending Service Module card status messages

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

- IP - reporting EPAP maintenance data

  The Service Module cards create 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 card.

- IP Multicast - downloading GSM database

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

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

Service Module Card Provisioning and Reload

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

- EPAP A, Link A (on the main DSM network, 100BASE-T)
- EPAP A, Link B (on the backup DSM network, 10BASE-T)
- EPAP B, Link A (on the main DSM network, 100BASE-T)
- EPAP B, Link B (on the backup DSM 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 tables coherent between updates.

The Service Module cards do the following:

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

Service Module Card Reload Model

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

EPAP Continuous Reload

It is important to understand how the EPAP handles reloading of multiple Service Module cards from different starting points. Reload begins when the first Service Module card requires it. Records are read sequentially from the Real Time Database (RTDB) from an arbitrary starting point, wrapping back to the beginning. If another Service Module card requires reloading at this time, it uses the existing record stream and notifies the Service Module card provisioning task of the first record it read. This continues until all Service Module cards are satisfied.

Service Module Card Database Levels and Reloading

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

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

- **Stage 1 loading**: The database is being copied record for record from the golden RTDB in the EPAP to the Service Module card RTDB. The database is incoherent during stage 1 loading.

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

EPAP Status and Error Reporting via Maintenance Blocks

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

Network Connections

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

- *Customer Provisioning Network* on page 24
- *EPAP Sync Network* on page 25
- *DSM Networks* on page 26
- *Dial-Up PPP Network* on page 27

The following discussion is an overview of these private networks. It expands on the networks in the architecture diagram shown in *Figure 4: Customer Provisioning Network* on page 24. (For details about configuring these networks, refer to the EPAP *Administration Manual*.)

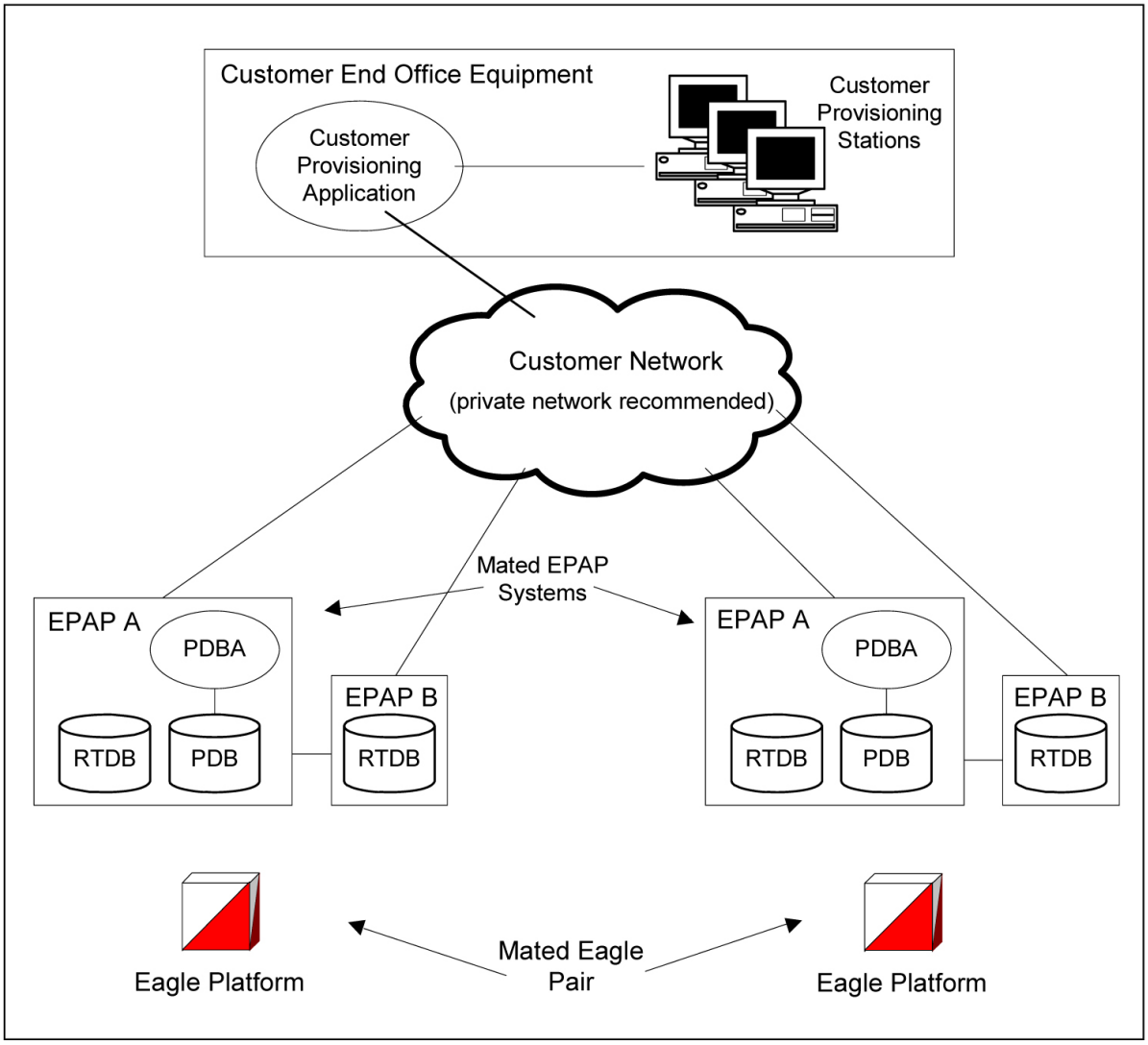
Customer Provisioning Network

The customer network carries the following traffic:

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

A typical customer network is shown in *Figure 4: Customer Provisioning Network* on page 24.

Figure 4: Customer Provisioning Network

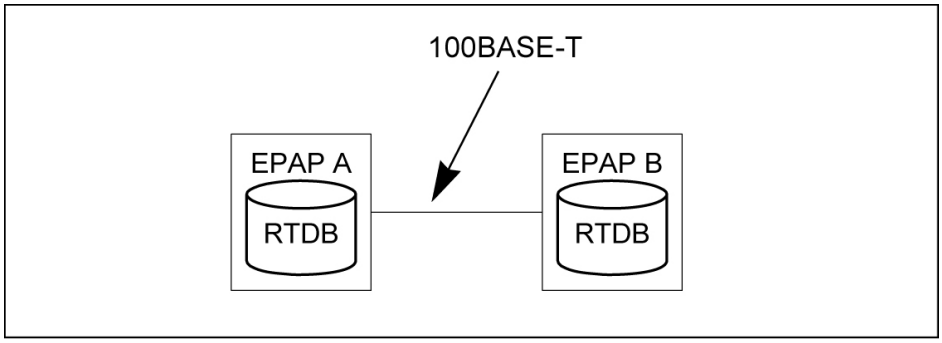


Although a dedicated network is recommended, it is possible that unrelated customer traffic can use the network as well. The determination, either to have a dedicated network or to allow other customer traffic, should be based on available external Ethernet bandwidth and network performance considerations.

EPAP Sync Network

The EPAP sync network carries RTDB and maintenance application traffic between active and standby EPAP servers on an MPS system. It synchronizes the contents of the RTDBs of both EPAP A and B. The EPAP Sync network is a single Ethernet connection between EPAP A and EPAP B running at 100BASE-T, as shown in *Figure 5: EPAP Sync Network* on page 25.

Figure 5: EPAP Sync Network

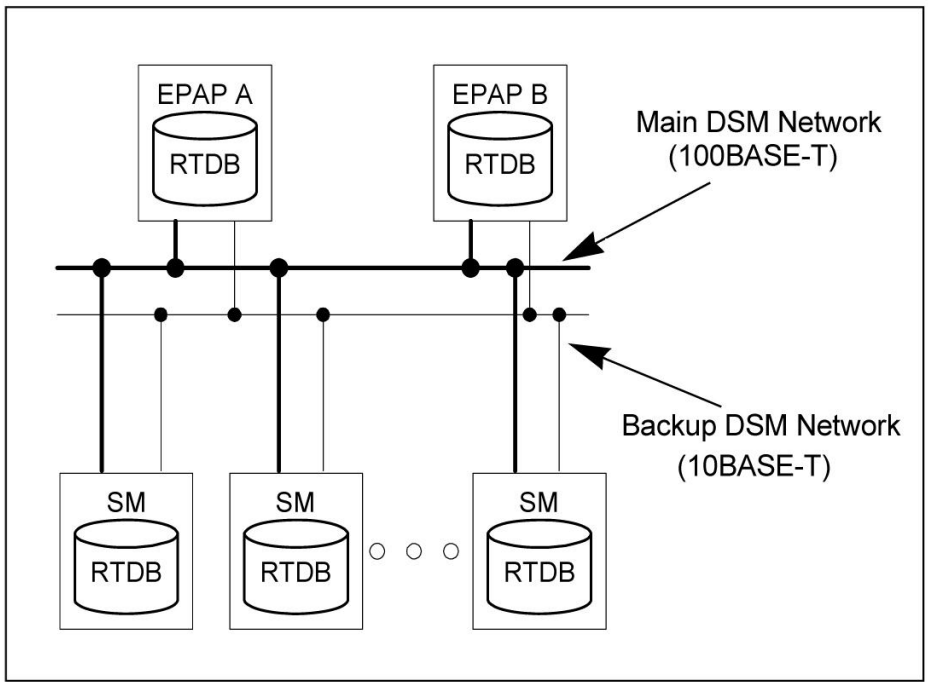


DSM Networks

The DSM networks are shown in *Figure 6: DSM Networks* on page 26. They carry provisioning data from the active EPAP RTDB to the Service Module cards. They also carry reload and maintenance traffic to the Service Module cards.

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

Figure 6: DSM Networks



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

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

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

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

The fourth octet of the address is specified as follows:

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

Table 2: EPAP IP Addresses in the DSM Network on page 27 summarizes the contents of each octet.

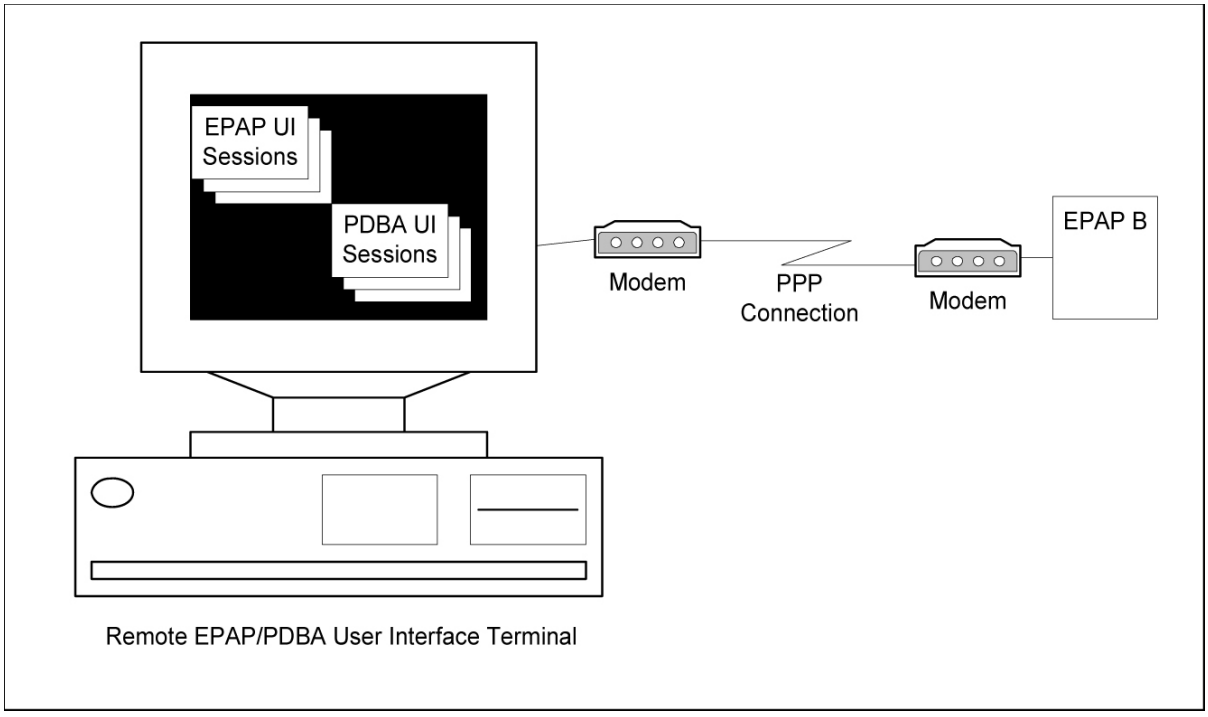
Table 2: EPAP IP Addresses in the DSM Network

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

Dial-Up PPP Network

The dial-up PPP network allows multiple user-interface sessions to be established with the EPAP. The network connects a remote EPAP/PDBA user interface terminal with the EPAP in the EAGLE 5 ISS's MPS subsystem. The dial-up PPP network is illustrated in *Figure 7: Dial-Up PPP Network* on page 27.

Figure 7: Dial-Up PPP Network



Serviceability Hints

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

- *Mated Application Considerations* on page 28
- *Entity Point Codes and Routes* on page 28

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.

Network Perspectives

GSM Mobile Number Portability (G-Port) provides the capability for a mobile subscriber to change the GSM subscription network within a portability cluster while retaining the original MSISDNs. Because the IMSI is not ported, the recipient network of the porting process issues a new IMSI for the ported subscriber.

In a Public Land Mobile Network (PLMN) that supports G-Port, SCCP messages that are sent to an HLR can be relayed by either:

- An MNP-SRF
- An EAGLE 5 ISS with G-Port depending on the type of message (call-related or non-call-related) and on the porting status of the called subscriber.

For call-related messages, MNP-SRF either generates an SRI_ACK response with the routing number if the number is ported, or relays the message to an appropriate HLR if the number is not ported.

For non-call related messages, MNP-SRF can modify the SCCP called party address and route the message to the HLR of the recipient network or to the subscription network.

Figure 8: G-Port Node in GSM Network on page 29 shows the location of the G-Port in a GSM network. Note the basic functions G-Port performs:

- G-Port performs a query/response for call-related SRI messages when the number is ported-out, not known to be ported, or not identified to be ported.
- G-Port performs a message relay function for non-call-related messages and for call-related messages when the number is non-ported or ported-in.

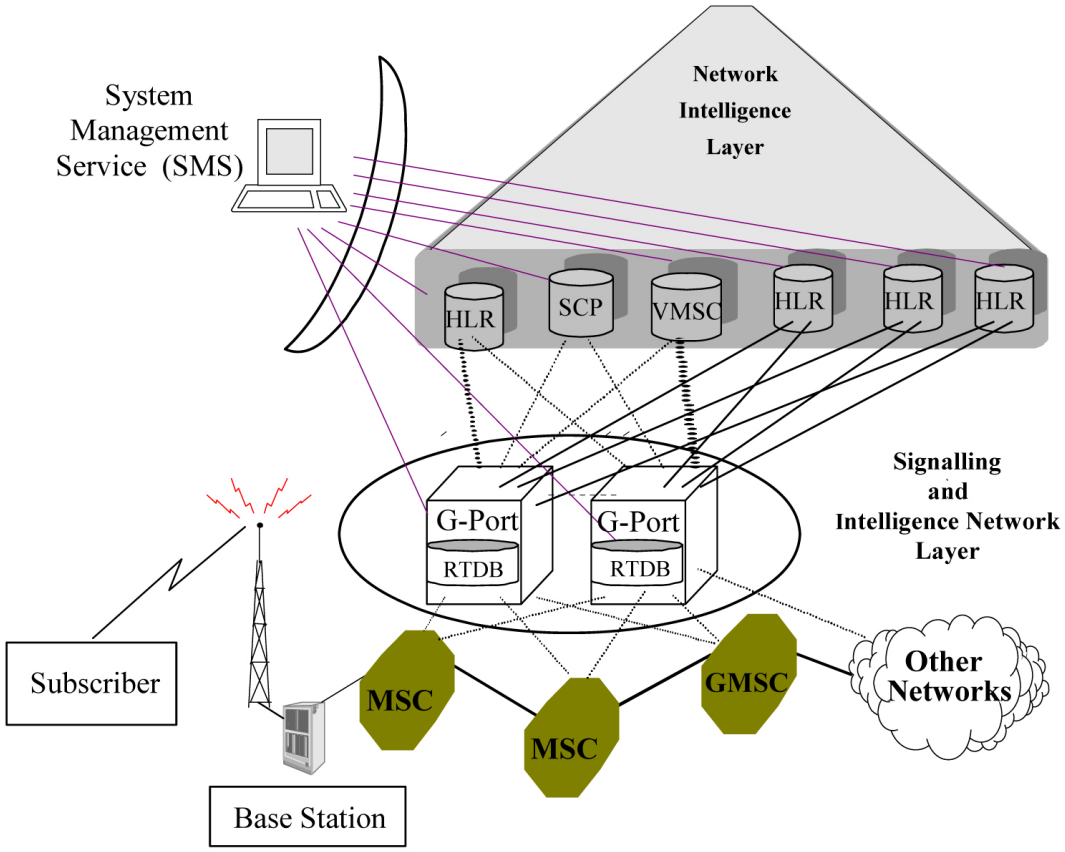
G-Port performs the following actions based on the message received and number status:

- If the message received is call-related SRI (not-SOR) and the number is ported-out, not known to be ported, or not identified to be ported, G-Port sends the SRI ack to the MSC with the Routing Number information in the MAP portion of the message.
- If the number is ported-out and the message received is non-call related (non-SRI), G-Port performs a message relay function and forwards the translated message based on the Routing Number information.
- If the number is non-ported or ported-in, G-Port performs an HLR translation and forwards the translated message to the HLR.

An additional user option allows configuration of G-Port to modify the above processing as follows:

- If the number is not found in the RTDB (individual or range), then G-Port returns a negative acknowledgement in response to an SRI.

Figure 8: G-Port Node in GSM Network



G-Port Considerations

The following items must be considered before installing and operating the G-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 G-Port Message Relay messages with E.164 numbers in the SCCP CdPA, it is assumed that no truncation occurred if and when the routing number was prepended and that SCCP CdPA has the full DN of the subscriber.
4. G-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 G-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, and the DN used for processing will be only 14 digits (21 total digits less 7 RN digits).
6. With the Hex Digit Support for GTT feature enabled and turned on, Message Signaling Units (MSUs) containing either decimal or hexadecimal digits in the Called Party Address (CdPA) are processed. Unless the Hex Digit Support for GTT feature is enabled and turned on, GTT processes decimal digits only.

   If the Hex Digit Support for GTT feature is not enabled and not turned on and an operator or country is using hexadecimal digits *A* through *F* in RNs and the operator is providing GTT to messages that have RN prefixes other than its own prefixes, then the operator must enter the

RN + DN number ranges as DN ranges in the RTDB. The beginning and ending DNs can be only 15 digits, which may not be sufficient for an RN + DN.

7. In this document, Mobile Number Portability (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 already inside the cluster can port. Any individual G-Port node is required to support only an MNP within such a portability cluster.
8. The EAGLE 5 ISS examines the TCAP portion of the MAP message to determine the message type. Although GSM 03.66 defines a new translation type for SRI-MNP messages, G-Port does not rely upon the use of this TT.
9. The routing number found in the 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.
10. No MAP overload procedures, as defined in GSM 09.02, need to be supported by G-Port.
11. All non-call related messages affected by MNP contain the MSISDN number in the SCCP CdPA. In the case of the SRI message, G-Port may get the number from the MAP level.
12. TCAP operation codes uniquely distinguish MAP SRI messages and do not change from one phase (or version) of MAP to another.
13. PCs 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.
14. The parameters of the SRI ack message generated by G-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”, G-Port generates an SRI ack contains IMSI, MSRN, MSISDN, and NPS parameters, despite the MSISDN and NPS parameters not being defined for phase 1 or 2.
15. If SRFIMSI is not provisioned with an RN entity and an incoming message is an SRI message, G-Port sets IMSI parameter as one of these options:
    a. If a CCNDC>MCCMNC match in GSMOPTS is found, then the MCCMNC is encoded.
    b. If DefMCC is provisioned in GSMOPTS, then DefMCC is encoded.
    c. Zero digits are encoded.
16. G-Port uses the MTP route for the SRI ack response, even when the final GTT is performed on the response.
17. When the concatenated number (RN + MSISDN) option is selected for encoding the Routing Info (MSRN) in SRI ack, G-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 G-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 G-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 G-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 G-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 G-Port. In this case, a UIM is issued, and the message falls through to GTT.

Maintenance

Validation of Hardware Configuration

Service Module card loading verifies the validity of the hardware configuration for the Service Module cards. Hardware verification includes the following.

- **Service Module Card Main Board Verification**

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

  Note: The system does not allow the feature to be turned on if the hardware configuration is invalid.

- During initialization, the VSCCP application determines the main board type. The SCCP maintenance block is the mechanism used to relay the main board information to OAM. This requires that the application software be loaded to the Service Module card and then the main board information received in the SCCP maintenance block must be verified. If the main board is determined to be invalid for the application, loading of the Service Module card is automatically inhibited.
- **Service Module Card Applique Memory Verification**

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

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

- ***Local Memory Validation*** . When the feature is enabled and the Service Module card is initializing, VSCCP checks whether the Service Module card has at least 4GB of memory installed.

- *Real-Time Memory Validation (during card initialization)*. After communications between the Service Module card and EPAP have been established, and the Service Module card has joined the RMTP Tree, the EPAP starts downloading the RTDB to the Service Module card. After the Service Module card has downloaded the RTDB, it continues to receive database updates as necessary. The EPAP includes the size of the current RTDB in all records sent to the Service Module card. The Service Module card compares the size required to the amount of memory installed, and issues a minor alarm once the database exceeds 80% of the Service Module card memory. If the database completely fills the Service Module card memory, a major alarm is issued, the Service Module card leaves the RMTP tree, and the status of the Service Module card changes to IS-ANR/Restricted. The Service Module card continues to carry traffic.

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

  When the hardware configuration for a Service Module card is determined to be invalid for the application, SCM automatically inhibits loading for that specific Service Module card. A major alarm is generated indicating that card loading for that Service Module card has failed and has been automatically inhibited (that is, prevented from reloading again). Refer to *G-Port Related Alarms* on page 126 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 actions apply to a Service Module card determined to be invalid:

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

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

- **Unstable Loading Mode**

  At some point, having a number of invalid Service Module cards results in some of the LIMs (Link Interface Module) being denied SCCP services. The threshold is monitored; if the number of valid Service Module cards is insufficient to provide service to at least 80% of the IS-NR LIMs, the system is said to be in an unstable loading mode. For additional reasons an EAGLE 5 ISS might be in an unstable loading mode, refer to *Loading Mode Support* on page 122.

Maintenance Commands

The following commands are used for G-Port maintenance.

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

For more information, refer to *Maintenance and Measurements* on page 117.

G-Port *Loading Mode Support*

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

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

Audit Requirements

The G-Port audit does not change EAGLE 5 ISS compliance to STP audit requirements. G-Port subscriber database tables residing on the EAGLE 5 ISS TDM fixed disks are audited by the existing STP audit, which verifies tables on the EAGLE 5 ISS active and standby TDMs. Additional audit mechanisms for G-Port tables residing on the EPAP platform that are downloaded to the Service Module cards are:

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

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

G-Port Protocol

Main Functions

G-Port and MNPCRP provide the following main functions:

Message Discrimination

Because G-Port provides translation of ported numbers, it provides a method to identify which messages should receive G-Port vs. GTT. This task of identification is provided via a service selector table where the user can define G-Port service for a combination of selectors. If a selector match is not found then, G-Port falls through to GTT.

RN Prefix Deletion - SCCP

The decoded SCCP CdPA digits can have a RN concatenated with the MSISDN number in two forms:

- RN + DN
- CC+RN+DN

When the SNAI is either RNIDN, RNNDN, or RNLDN, G-Port compares the decoded MSISDN number with the list of provisioned home RN prefixes defined in the RTDB. If a match is found, G-Port removes the RN digits from the number.

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

When the SNAI is CCRNDN, G-Port first compares the CC to the DEFCC/MULTCC list:

- If CC is not equal to the DEFCC/MULTCC, then no prefix deletion is performed and G-Port processing continues.
- If CC=DEFCC/MULTCC then, G-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 G-Port strips off the RN digits from the number. If no match is found, the no-prefix deletion is performed and G-Port processing continues.

RN Prefix Deletion - TCAP

The decoded MAPMSISDN digits can have a RN concatenated with the MSISDN number in two forms:

- RN + DN
- CC+RN+DN

The MAP NAI 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 MSISDNs. If the MAPNAI indicates International, then a check is performed for the DEFCC/MULTCC prefix on the MSISDN. If DEFCC/MULTCC is detected, then HomeRN deletion is attempted using the CC+RN+DN format. All other MSISDNs will use the RN+DN format. G-Port compares the decoded MSISDN number with the list of provisioned home RN prefixes defined in the RTDB. If a match is found, the G-Port strips off the RN digits from the number.

Number conditioning (if required) is performed after deleting the RN.

If CC+RN+DN search is performed, G-Port compare the digits after CC with the list of provisioned home RN prefixes defined in the RTDB. If a match is found, G-Port strips off the RN digits from the number. If no match is found, then no prefix deletion is performed and G-Port processing continues.

Number Conditioning

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

When G-Port is required to be performed on a message and the number is not international (that is, the NAI of MSISDN number is “National (Significant) Number” or “Subscriber Number”, or the SNAI is NATL or SUB or RNNDN or RNLDN), the National/Local to International number is triggered.

For a National (Significant) Number, the received CdPA/MAP MSISDN digits are prepended with the default country code; for a Subscriber number, the CdPA/MAP MSISDN digits are prepended with the default country code and the default network code.

Database Lookup

G-Port performs an RTDB lookup using the MSISDN in international format. RTDB individual subscriber records have precedence over subscriber range records. If the MSISDN does not represent an individual subscriber in the RTDB, then the subscriber range records are searched. If the MSISDN is not represent by an individual subscriber record or by a subscriber range record in the RTDB, then the RTDB lookup fails.

If the first RTDB lookup fails but the MSISDN contains an even number of digits, ends with zero, and does not include a method for determining the exact number of digits (for example, an odd/even indicator), the G-Port repeats the RTDB lookup using the MSISDN without the last digit.

If both RTDB lookup attempts fail, then G-Port does not process the message further, the message is passed to GTT to be routed out of the EAGLE 5 ISS.

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 networks, message processing call disposition is based on which applications are turned on. *Table 3: G-Port Database Lookup* on page 37 shows call dispositions for the following configurations:

G-Port Only (*Table 3: G-Port Database Lookup* on page 37)

G-Port and IGM (*Table 4: IGM and G-Port Message Processing* on page 38)

The following notations apply to *Table 3: G-Port Database Lookup* on page 37 and *Table 4: IGM and G-Port Message Processing* on page 38:

PT = Portability Type for the DN values:

0 – Not known to be ported

1 – Own number ported out

2 – Foreign number ported to foreign network

3 – Prepaid1, Prepaid Short Message Service Intercept (PPSMS) subscriber on server #1

4 – Prepaid2, PPSMS subscriber on server #2

5 – IS41 GSM migrated subscriber with only GSM handset active

6 – Prepaid3, PPSMS subscriber on server #3

through

35– Prepaid32, PPSMS subscriber on server #32

36 - Not identified to be ported

255 - No portablity type

RN = Routing Number

SOR = Support for Optimal Routing

SRI = Send Routing Information

SP = Signaling Point

NE = Network Entity

Table 3: G-Port Database Lookup on page 37 summarizes the actions taken based on the database result.

Table 3: G-Port Database Lookup

Message Type	MSISDN Found	Entity Result	MNPCRP on and HomeRN deleted from DN	Action
SRI	Yes	RN	No	SRI ack using RN prefix. If Portability Type = 0, 1, 2, 36, or *no status* is present with MSISDN, NPS will be encoded. For Portability Type = 36, NPS will have a value of 0.
SRI	Yes	RN	Yes	Issue UIM 1256 and fall through to GTT
SRI	Yes	SP	N/A	Forward SRI message to the destination using SP data
SRI	Yes	None	No	**Portability Type result is 0, 1, 2, or *no status*.** SRI ack using MSISDN. Portability Type = 36 will map to NPS=0 in response. Portability Type = 0, 1, or 2 will have the values of 0, 1, or 2.
SRI	Yes	None	No	**Portability Type result is 3 or 4.** Fall through and perform GTT
SRI	Yes	None	Yes	Issue UIM 1256 and fall through to GTT
SRI	No	N/A	N/A	Fall through and perform GTT
Non-SRI or SRI-SOR	Yes	RN	No	Forward the message to the next node using RN data
Non-SRI or SRI-SOR	Yes	RN	Yes	Issue UIM 1256 and fall through to GTT
Non-SRI or SRI-SOR	Yes	SP	N/A	Forward the message to the next node using SP data
Non-SRI or SRI-SOR	Yes	None	No	Fall through and perform GTT
Non-SRI or SRI-SOR	Yes	None	Yes	Issue UIM 1256 and fall through to GTT

Message Type	MSISDN Found	Entity Result	MNPCRP on and HomeRN deleted from DN	Action
Non-SRI or SRI-SOR	No	N/A	N/A	Fall through and perform GTT

Table 4: IGM and G-Port Message Processing

NE/PT	SRI	SRI_SM	Other GSM
RN and PT = 0	MIGRPFX = single: ACK (use GSM2IS41 prefix) MIGRPFX = multiple: ACK (RN from EPAP)	SRI_SM_ACK with Return Error Component	Relay
RN and PT≠ 0	ACK (RN from EPAP)	Relay	Relay
SP and PT = 5	Relay	Relay	Relay
SP and PT ≠ 5	Relay	Relay	Relay
No NE and PT = 5	GTT	GTT	GTT
No NE PT= 0, 1, 2, or No PT	ACK (no NE)	GTT	GTT
No DN entry found	GTT	GTT	GTT

Database lookup results in the following:

1. Fall through to 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. 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. Refer to *Table 5: DigitAction Applications* on page 39 for examples of

DigitAction Expansion on the SCCP CdPA GTA of an outgoing message when the Entity ID = 1404 and the default country code = 886...

Table 5: DigitAction Applications

DigitAction	Value in Incoming CdPA GTA	Value in Outgoing CdPA GTA	Meaning
none	886944000213	886944000213	No change to the Called Party GTA (default)
prefix	886944000213	1404886944000213	Prefix Called Party GTA with the entity id
replace	886944000213	1404	Replace Called Party GTA with the entity id
insert	886944000213	8861404944000213	Insert entity id after country code. (CC + Entity Id + NDC + SN)
delccprefix	886944000213	1404944000213	Delete country code and add prefix
delcc	886944000213	944000213	Delete country code
spare1	886944000213	treated as none	No change to the Called Party GTA (default)
spare2	886944000213	treated as none	No change to the Called Party GTA (default)

Returning Acknowledgement

The following encoding rules are followed when a SRI ack is returned:

1. When a SRI ack is returned, the EAGLE 5 ISS follows the SRI ack encoding rules along with the following enhancements for added flexibility:
2. Allow users to specify which SRI parameter (the TCAP MSRN parameter) encodes the RN (and/or DN) information
3. Allow users to specify the value to encode the Nature of Address field of the TCAP MSRN parameter;
4. Allow users to specify the value to encode the Numbering Plan field of the TCAP MSRN parameter;

Determination of MAP Phase

The phase or version of the MAP protocol is determined from the ACN.

If ACN received is found to be from SRI (in the form: map-ac-locInforetrieval(s) version xx, such as '04000010005xx'), the last byte ('xx') of the ACN determines the version/phase of the MAP, as shown in *Table 6: MAP Phase Determination* on page 40. (If the ACN does not match the one defined in ETSI GSM 03.18, the MAP version/phase is assumed to from the `defmapvr` parameter of GSMOPTS specification.)

Table 6: MAP Phase Determination

Last Byte in ACN	MAP Phase
00	Specified by `defmapvr` parameter of a GSMOPTS command
01	Phase 1
02	Phase 2
03	Phase 2+
Greater than 3	Specified by `defmapvr` parameter of a GSMOPTS command

G-Port Message Handling

G-Port performs message handling in the following steps.

1. The message arrives at the EAGLE 5 ISS *route-on-gt*. The EAGLE 5 ISS decodes the SCCP portion and uses the data to perform the G-Port selection based on the CdPA GT fields other than the ES and GTAI. The result of the selection provides a service indicator. The service indicator is G-Port if it is determined that MNP-SRF is required. If a G-Port selector does not match the incoming GT fields, the message is passed on for GTT selection.
2. If step #1 indicates that MNP SRF is required and the message is not a UDTS generated by the EAGLE 5 ISS, then the EAGLE 5 ISS performs SSN-based discrimination. If the message is a UDTS generated by the EAGLE 5 ISS, then regular GTT is performed on the message.
3. MNP-SRF first decodes the Operation Code of the MAP message to distinguish the SRI message from the rest. If the Operation Code is SRI and the OR Interrogation indicator is absent, and the GSMOPTS parameter SRIDN=TCAP, the MSISDN parameter is decoded from the MAP message. If the GSMOPTS parameter SRIDN=SCCP, or the message is not SRI, the digits available in the CdPA GTAI are used for database lookup.
4. The decoded DN is conditioned to an international number before performing the database lookup. The conditioning performed depends on whether the digits are obtained from TCAP or MAP part of the message.
   - If the digits are from the SCCP part, the number conditioning is based on SNAI value. First, RN prefix deletion is performed, and conversion to an international number, based on its value. Conversion to international format is based on DEFCC and DEFNDC, as required. If the incoming number is CCRNDN, DEFCC and MULTCC are used to determine the Best Match CC to locate the RN digits for RN prefix deletion

- If the digits are from the MAP part, the number conditioning is based on NAI of MSISDN parameter. Prefix deletion is performed if MNPCRP is on. The number is converted to an international number, if necessary. Conversion to international format is based on DEFCC and DEFNDC, as required. If the incoming number is international, DEFCC and MULTCC are used to determine if the format is CCRNDN or RNIDN. If a Best Match CC is located, then it is used to locate the RN digits for RN prefix deletion.

5. The database lookup is performed in two parts:
   - The exception or individual number database is searched for a match. If the match is found, the data associated with this entry is considered.
   - If the conditioned number is absent in the exception database, the number range database is searched. If the match is found, the data associated with this range entry is considered. If the search is unsuccessful, the result is no match.
6. If the number is found and a RN prefix is present for this entry, the following is performed:
   - If the message is SRI, and MNPCRP is off, or if MNPCRP is on and a HomeRN was not present in the incoming DN (a HomeRN was not deleted from the SCCP CdPA/MAP MSISDN), then G-Port generates a SRI ack response with the RN prefix in the Routing Number parameter.
   - If the message is non-SRI, and MNPCRP is on, or if MNPCRP is on and a HomeRN was not present in the incoming DN a HomeRN was not deleted from the SCCP CdPA), then G-Port uses the translation data for the number to alter the CdPA digits and route the message to the destination.
   - If the message is SRI or non-SRI, and MNPCRP is on, and a HomeRN was present in the incoming DN (a HomeRN was deleted from the SCCP CdPA/MAP MSISDN), then G-Port generates UIM #1256, and the message shall fall through to GTT. In most network implementations, since the message contains RN+DN, this should cause a GTT failure, which will result in the EAGLE 5 ISS sending a UDTS to the originator if the Return Message on Error flag was set in the incoming UDT.
7. If the number is found and a SP entity is present for this entry, G-Port uses the SP translation data as the number to route the message to the destination. This is true whether or not MNPCRP feature is on.
8. If the number is found and neither SP nor RN data is associated with it (this is a direct routing case with number not known to be ported or not identified to be ported), the following occurs:
   - If the message is SRI, and MNPCRP is off, or if MNPCRP is on and no HomeRN is present in the incoming DN (a HomeRN was not deleted from the SCCP CdPA/MAP MSISDN), and if the portability type associated with the DN entry is other than 3 through 35 (including "no status"), then G-Port generates a SRI ack response with the MSISDN in the Routing Number parameter. If the message is SRI, and MNPCRP is off, or if MNPCRP is on and no HomeRN was present in the incoming DN (a HomeRN was not deleted from the SCCP CdPA/MAP MSISDN), and the portability type associated with the DN entry is either 3 through 35, then the SRI falls through to GTT (no SRI ack response is generated).
   - If the message is non-SRI, and MNPCRP is off, or if MNPCRP is on and no HomeRN is present in the incoming DN (a HomeRN was not deleted from the SCCP CdPA), then the message falls through to GTT.
   - If the message is SRI or non-SRI, and MNPCRP is on, and a HomeRN was present in the incoming DN (a HomeRN was deleted from the SCCPCdPA/MAP MSISDN), then G-Port

generates UIM #1256, and the message falls through to GTT. In most network implementations, since the message contains RN+DN, this should cause a GTT failure, which results in the EAGLE 5 ISS sending a UDTS to the originator if the Return Message on Error flag was set in the incoming UDT.

9. If the number is not found in the database, then the GSMOPTS:SRIDNNOTFOUND option is queried.
10. If the GSMOPTS:SRIDNNOTFOUND option is set to SRINACK, then a negative acknowledgement is generated in response to the message.
11. If the GSMOPTS:SRIDNNOTFOUND option is set to GTT, then GTT is performed on the message.

G-Port Call Flows

This section contains several illustrative sample call flows: G-Port supports all call flows identified in GSM 03.66 other than noted exceptions. This section contains a mix of call flows using both indirect and direct routing.

These call flows, including calls to imported or non-ported numbers, show one possible scenario regarding how messages are routed in the network and where various stages of GTT are performed. G-Port may perform intermediate or final GTT depending on the message received and provisioned data.

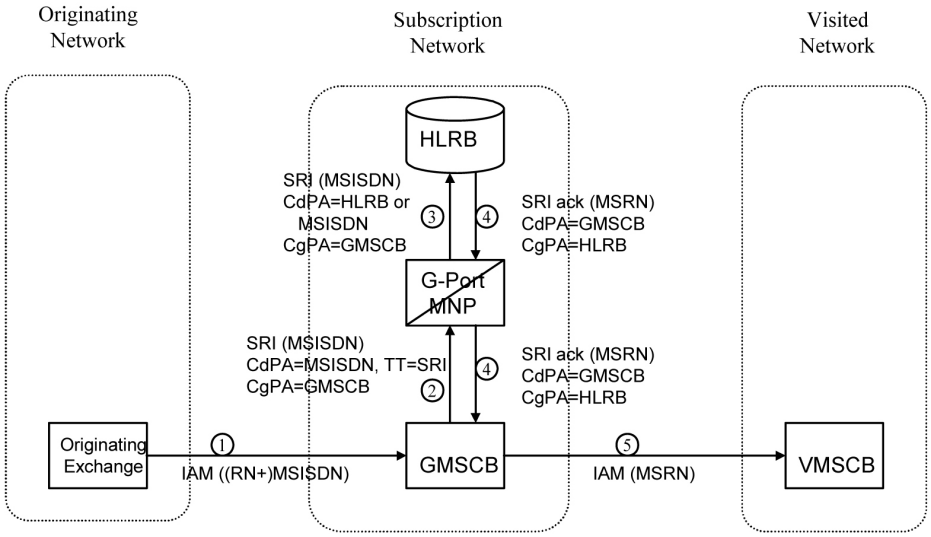
Several call flows refer to non-call related messages. Examples of non-call related messages are SRI for Short Message Service and SRI for Optimal Routing.

In all G-Port call flows, the MSISDN used for the database search is converted to an international number, if necessary, prior to the database search.

Mobile Terminated Call to Non-Ported or Imported Number (Indirect Routing)

The first call flow example is for a mobile terminated call to a non-ported or imported number by indirect routing. Refer to *Figure 9: Mobile Terminated Call by Indirect Routing* on page 42.

Figure 9: Mobile Terminated Call by Indirect Routing

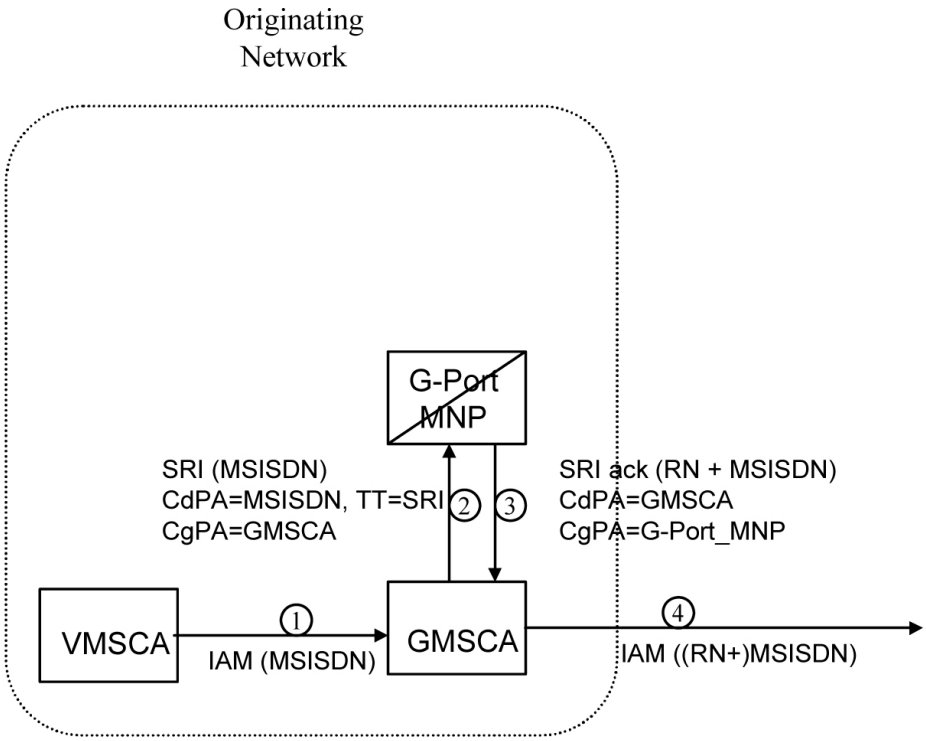


1. The originating exchange sends an IAM message to GMSCB in the subscription network. When the number is imported, the original number range owner network has already performed a database lookup and determined the new subscription network (Routing Number). As shown in the figure, this could be sent in the IAM along with the MSISDN.
2. GMSCB sends an SRI request to the MNP-SRF. This request may or may not contain the new TT = SRI. Global title information triggers G-Port processing. The MNP-SRF determines the message is an SRI and uses the MSISDN from the MAP message to search the database. A match is found with no Routing Number and an HLR GT address for HLRB, or no match is found and falls through to GTT, producing a routing to HLRB. Alternatively and not illustrated in the figure, GTT could route to another node, possibly in a different network.
3. The message is routed to HLRB.
4. HLRB responds to GMSCB with an SRI ack. This message can be GT routed through the STP or MTP routed.
5. GMSCB sends an IAM with the roaming number to the visited network.

Mobile Originated/Terminated Call to an Exported Number (Direct Routing)

This call flow example is for a call that is mobile originated or terminated to an exported number by direct routing. Refer to *Figure 10: Call to an Exported Number by Direct Routing* on page 43.

Figure 10: Call to an Exported Number by Direct Routing



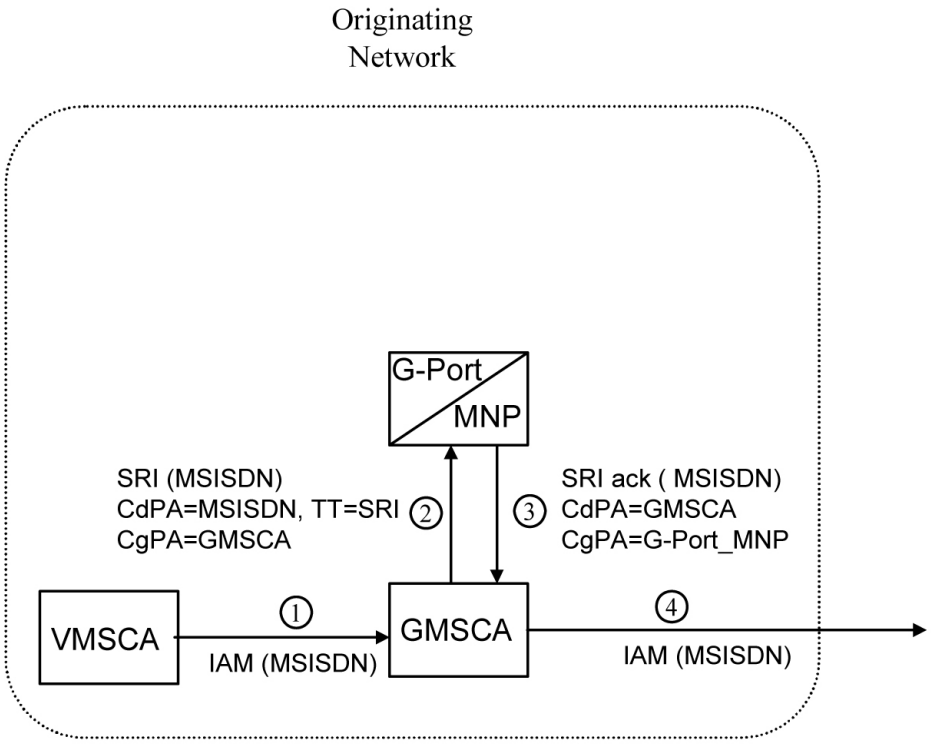
This call flow assumes the originating network is not the subscription network. If indirect routing were used in this example, the originating network would first route the call to the number range owner network, according to pre-portability rules, where the MNP-SRF and NPDB are accessed to locate the Routing Number.

1. When the call is originated, VMSCA sends an IAM message to GMSCA.
2. GMSCA sends an SRI request to the MNP-SRF. This may or may not contain the new TT = SRI. Global title information triggers G-Port processing. The MNP-SRF determines the message is an SRI and uses the MSISDN from the MAP message to search the database. A match is found with the Routing Number field populated.
3. The MNP-SRF responds to GMSCA with an SRI ack containing the Routing Number prefixed to the MSISDN number as the Roaming Number.
4. GMSCA sends an IAM with the roaming number to the subscription network. The Routing Number is used by GMSCA and possibly by transit exchanges to route the call to the subscription network.

MO/MT Call to a Number Not Known to be Ported (Direct Routing)

This call flow example is for a call that is mobile originated (MO) or mobile terminated (MT) to a foreign number that is not known to be ported by direct routing. Refer to *Figure 11: MO/MT Call to Number Not Known to be Ported (Direct Routing)* on page 44.

Figure 11: MO/MT Call to Number Not Known to be Ported (Direct Routing)



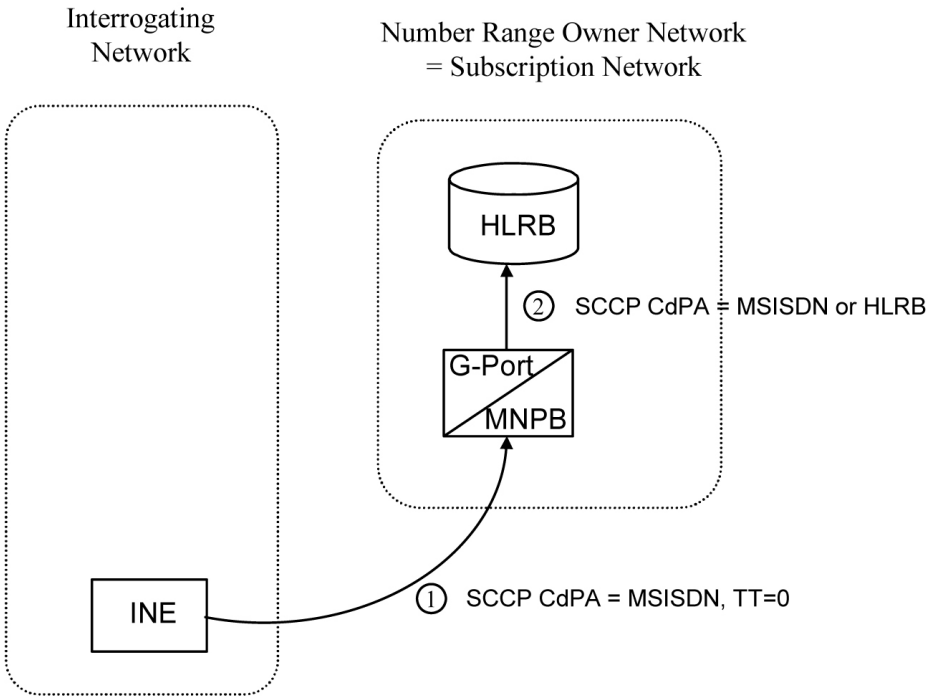
This call flow assumes the originating network is not the subscription network.

1. When the call is originated, VMSCA sends an IAM message to GMSCA.
2. GMSCA sends an SRI request to the MNP-SRF. This request may or may not contain the new TT = SRI. Global title information triggers G-Port processing. The MNP-SRF determines the message is an SRI and uses the MSISDN from the MAP message to search the database. A match is found, but the Routing Number and HLR Address fields are not populated.
3. The MNP-SRF responds to GMSCA with an SRI ack containing the MSISDN number.
4. GMSCA sends an IAM with the roaming number to the subscription network.

Non-Call Related Message for Non-Ported Number (Indirect Routing)

This call flow example is for a non-call related message for a non-ported number by indirect routing. Refer to *Figure 12: Non-Call Related Message for Non-Ported Number* on page 45.

Figure 12: Non-Call Related Message for Non-Ported Number

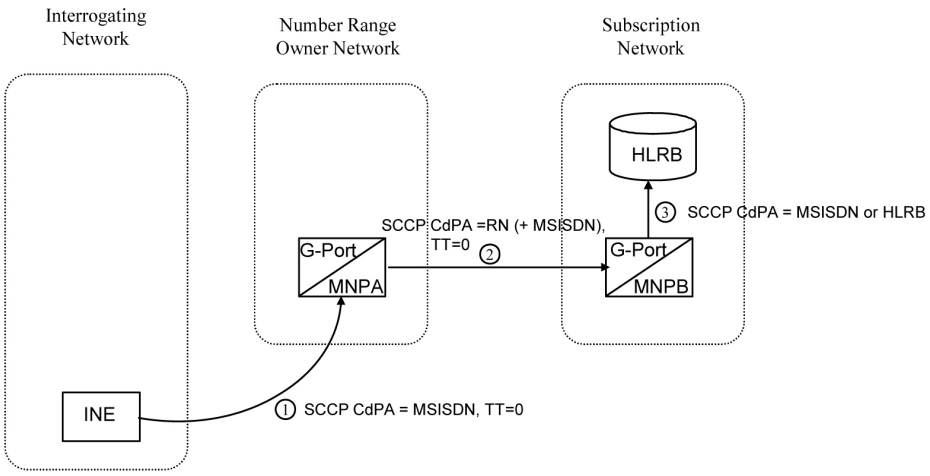


1. The Interrogating Network Entity (INE) sends the non-call related message to MNP-SRFB in the number range owner network. The SCCP CdPA contains the MSISDN number of the subscriber and the TT. The TT may be either 0 as shown in the figure, or another value depending upon the service, such as TT=17 for CCBS service.
2. Global title information triggers G-Port processing. MNP-SRFB determines the message is non-call related (i.e. not an SRI that doesn't require Optimal Routing) and uses the MSISDN from the SCCP CdPA to search the database. No match is found, so MNP-SRFB uses GTT to locate the GT address associated with the MSISDN to route the message to HLRB.

Non-Call Related Message for Ported Number (Indirect Routing)

This call flow example is for a non-call related message for a ported number by indirect routing. Refer to *Figure 13: Non-Call Related Message for Ported Number* on page 46.

Figure 13: Non-Call Related Message for Ported Number

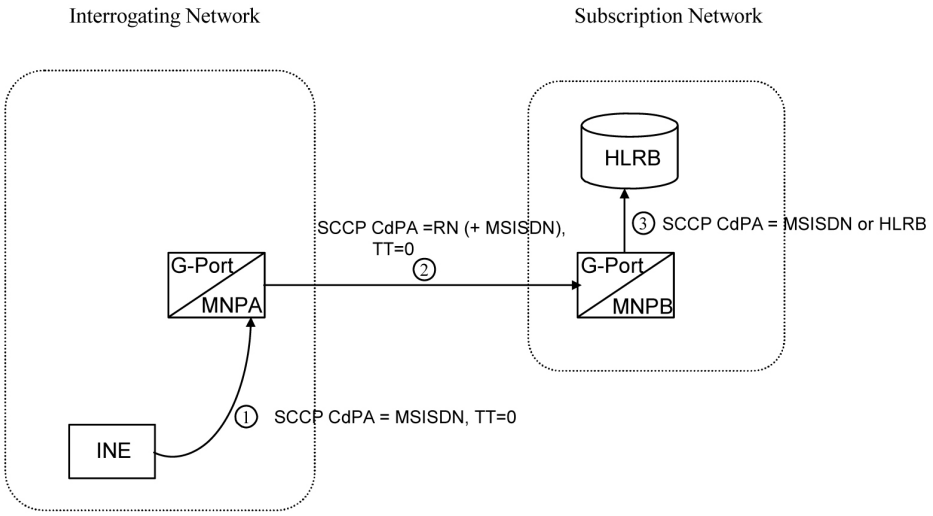


1. The Interrogating Network Entity (INE) sends a non-call related message to MNP-SRFA in the number range owner network. The SCCPCdPA contains the MSISDN number of the subscriber and the TT. The TT may be either 0 as shown in the figure, or another value depending upon the service, such as TT=17 for CCBS service.
2. Global title information triggers G-Port processing. MNP-SRFA determines the message is one requiring message relay (that is, not an SRI that doesn't require Optimal Routing) and uses the MSISDN from the SCCPCdPA to search the database. A match is found, and MNP-SRFA uses the Message Relay GT address associated with the match to route the message to the subscription network.
3. MNP-SRFB receives the message and determines the message is one requiring message relay (that is, not an SRI that does not require Optimal Routing). It checks if the SCCPCdPA begins with a Prefixed RN. If it does, it removes the prefix. In either case, it uses the MSISDN from the SCCPCdPA to search the database. A match is found, and MNP-SRFB uses the HLRGT address associated with the match to route the message to HLRB.

Non-Call Related Message for Ported or Non-Ported Number (Direct Routing)

This call flow example is for a non-call related message for either a ported or non-ported number by direct routing. Refer to *Figure 14: Non-Call Related Message for Any Number* on page 47.

Figure 14: Non-Call Related Message for Any Number



This call flow assumes the originating network is not the subscription network.

1. The Interrogating Network Entity (INE) sends the non-call related message to MNP-SRFA in the interrogating network. The SCCP CdPA contains the MSISDN number of the subscriber and the TT. The TT may be either 0 as shown in the figure, or another value depending upon the service, such as TT=17 for CCBS service.
2. Global title information triggers G-Port processing. MNP-SRFA determines the message is one requiring message relay (that is, not an SRI that doesn't require Optimal Routing) and uses the MSISDN from the SCCP CdPA to search the database.
   - If a match is found (ported case), MNP-SRFA uses the Message Relay GT address associated with the match to route the message to the subscription network.
   - If a match is not found (non-ported case), MNP-SRFA uses GTT to route the message to MNP-SRFB.
3. MNP-SRFB receives the message and determines the message requires message relay (that is, not an SRI that does not require Optimal Routing). It checks to see if the SCCP CdPA begins with a Prefixed RN. If so, it removes the prefix. In either case, it uses the MSISDN from the SCCP CdPA to search the database.
   - If a match is found (imported case), MNP-SRFB uses the HLR GT address associated with the match to route the message to HLRB.
   - If a match is not found, MNP-SRFB uses GTT to route the message to HLRB.

G-Port SCCP Service Re-Route Capability

This feature is designed to handle and control re-routing of G-Port traffic from an affected node to alternate nodes within an operators network. This feature is an optional feature and doesn't affect the normal G-Port functionality. This feature consists to the following main functions:

- *Service State* on page 49

- *MNP Re-Routing* on page 49
- *MNP Capability Point Codes* on page 49

G-Port SCCP Service Re-Route Capability is not supported for the Prepaid SMS Intercept feature. G-Port SCCP Service Re-Route Capability is supported for the IS-41 to GSM Migration feature.

Service State

Service state is part of the G-Port SCCP Service Re-Route Capability. Service state is used to indicate the current state of G-Port, either ONLINE or OFFLINE . Service state also gives the user the option to mark G-Port as OFFLINE or ONLINE based on the current behavior. If a G-Port problem is identified, G-Port can be marked OFFLINE to initiate the re-routing procedure. This feature also provides the option to mark G-Port OFFLINE to perform a controlled re-routing during this 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. G-Port re-routing is activated by marking G-Port OFFLINE . When G-Port is OFFLINE and alternate PCs are provisioned, any messages destined for G-Port are re-routed to the available alternate PCs that are defined for G-Port. 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 G-Port will fall through to GTT as part of the re-routing procedure.

Re-Routing is applied to all G-Port messages (based on SRVSEL). There is no distinction of 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 also supported for G-Port. The use of MNP capability point code aids the adjacent nodes in knowing about G-Port outages. When G-Port is brought down though administrative commands, all traffic destined to this G-Port node will generate a Transfer Prohibited (TFP) message to the adjacent node about the G-Port CPC. The TFP response to the adjacent node causes the traffic originating nodes to stop sending G-Port traffic to this node. All G-Port traffic coming into this node is sent to the alternate G-Port 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 G-Port service is OFFLINE. The originator would not be aware of the outage.

Once G-Port 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 G-Port traffic to the original G-Port node.

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

When the G-Port feature is turned on and the G-Port service state is set to offline, the user can change the service to online at any point. After the feature is turned online, G-Port starts processing messages if at least one Service Module card is IS-NR.

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

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

G-Port 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 G-Port re-route. When the G-Port service is OFFLINE , G-Port messages fall though to GTT based on the GTT option. This option is set to YES by default.

G-Port SCCP Service Re-Route Capability Summary

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

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

Option 1

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

```
chg-sccp-serv:serv=gport:pci1=1-1-1:rc1=10:pci2=2-2-2:rc2=10:pc
i3=3-3-3:rc3=10:pci4=4-4-4:rc4=10
```

```
chg-sccp-serv:serv=gport:pci1=5-5-5:rc1=10:pci2=6-6-6:rc2=10:pc
i3=7-7-7:rc3=10:pci4=8-8-8:rc4=10
```

```
chg-sccp-serv:serv=gport:state=offline
```

Option 2

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

`chg-sccp-serv:serv=gport:gtt=yes` (it is yes by default)

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

Table 7: G-Port SCCP Service Re-Route Capability Summary on page 51 shows the actions taken when the G-Port service is offline, a message arrives at the affected node requiring G-Port service, and Servicve Module cards are available.

Table 7: G-Port 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
G-Port	G-Port Capability PC	Yes	N/A	Re-Route to alternate point code based on relative cost	TFP concerning CPC
G-Port	G-Port Capability PC	No*	Yes	Fall through to GTT and perform GTT	TFP concerning CPC
G-Port	G-Port Capability PC	No*	No	Generate UDTS (return cause = network failure)	TFP concerning CPC
G-Port	G-Port Capability PC	Not Defined	Yes	Fall through to GTT and perform GTT	TFP concerning CPC
G-Port	G-Port Capability PC	Not Defined	No	Generate UDTS (return cause = no xlation for this addr)	TFP concerning CPC
Not G-Port	G-Port Capability PC	N/A	N/A	Perform appropriate Service/GTT	None
G-Port	True or Secondary PC or non-G-Port CPC	Yes	N/A	Re-Route to alternate point code based on relative cost	None
G-Port	True or Secondary PC or non-G-Port CPC	No*	No	Generate UDTS (return cause = network failure)	None
G-Port	True or Secondary PC or non-G-Port CPC	No*	Yes	Fall through to GTT and perform GTT	None

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

Table 8: G-Port LIM Re-Route Message Handling Summary on page 52 shows the actions of LIM re-route functionality when Service Module cards are unavailable or down.

Table 8: G-Port LIM Re-Route Message Handling Summary

Routing Indicator in Incoming Message	DPC	Full or Partial Failure	G-Port Service Status	Message Handling	Network Management
rt-on-gt	G-Port Capability PC	Full	N/A	Generate UDTS	TFP concerning CPC, UPU
rt-on-gt	Non G-Port Capability PC	Full	N/A	Generate UDTS	TFP concerning CPC, UPU
rt-on-gt	True PC	Full	N/A	Generate UDTS	UPU
rt-on-gt	G-Port Capability PC	Partial*	ONLINE	Generate UDTS	None

Routing Indicator in Incoming Message	DPC	Full or Partial Failure	G-Port Service Status	Message Handling	Network Management
rt-on-gt	True PC or non G-Port Capability PC	Partial*	ONLINE	Generate UDTS	None
rt-on-gt	G-Port CPC	Partial*	OFFLINE	Generate UDTS	TFP concerning CPC, UPU
rt-on-gt	True PC or non-G-Port CPC	Partial*	OFFLINE	Generate UDTS	None

* A partial failure occurs if some Service Module cards are available but are overloaded.

MT-Based GSM SMS NP

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

The MT-Based GSM SMS NP feature allows database lookup to be performed on short message service (SMS) messages that are routed from a short message service center (SMSC).

The MT-Based GSM SMS NP feature intercepts SRI_SM messages and sends response messages with routing information for out-of-network destination subscribers using the following process:

1. An SRI_SM message is intercepted by the Eagle 5 ISS before the message reaches the home location register (HLR).
2. The message destination address (SCCP Called Party GTA) is extracted, the digits are conditioned, and lookup is performed in the 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 SRI_SM message is relayed to the HLR.

Options

The MT-Based GSM SMS NP feature provides configurable options for controlling processing of SRI_SM messages and the content of the response:

- Selecting the SMSC response message type and digit format
- Specifying when a database lookup is considered to be successful

- Specifying the format of digits encoded in the response message.

Feature Control Requirements

The MT-Based GSM 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.
- The defmcc parameter in the `chg-gsmopts` command must be set to a value other than **none** before the feature can be turned on.
- A FAK for part number 893-0200-01
- The G-Port feature must be enabled before the MT-Based GSM SMS NP feature can be enabled.
- The G-Port feature must be turned on before the MT-Based GSM SMS NP feature can be turned on.
- The MT-Based GSM SMS NP feature cannot be enabled if the LNP feature is enabled.
- A temporary FAK cannot be used to enable the feature.
- The feature cannot be turned off after it has been turned on.

System Options for MT-Based GSM SMS NP

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

The content of the GSMSMSOPTS table is used to help perform number conditioning, response generation, and other feature-specific options. *Table 9: MT-Based GSM SMS NP Options* on page 54 shows the options stored in the GSMSMSOPTS table, their possible values, and the action taken for each value.

Table 9: MT-Based GSM SMS NP Options

GSMSMSOPTS Option	Value	Action in the EAGLE 5 ISS
MTSMSIMSI	RN	This setting specifies the required format of digits which will be encoded in the "IMSI" parameter of the SRI_SM return result response (ACK). **Note:** The MT-Based GSM SMS NP feature will require STPOPTS:DefCC to be set before the feature can be activated. Also, DefCC will not be allowed to change to "NONE" as long as this feature is turned ON.
	RNDN	
	CCRNDN	
	DN	
	SRFIMSI	IMSI is encoded from the "SRFIMSI" parameter from the RTDB entity.

GSMSMSOPTS Option	Value	Action in the EAGLE 5 ISS
	MCCRNDN (default)	IMSI is encoded as MCCRNDN. The MCC will be encoded using the GSMOPTS:DefMCC setting. **Note:** The MT-Based GSM SMS NP feature requires GSMOPTS:DefMCC to be set before the feature can be turned on. GSMOPTS:DefMCC will not be allowed to change to "NONE" as long as this feature is turned ON.
MTSMSNNI	RN (default)	This setting specifies the required format of digits which will be encoded in the "Network Node Number" parameter ISDN digits field within the LocationInfoWithLMSI TCAP parameter in the of the SRI_SM response (ACK). In the response, the Nature of Number field will always be encoded as "International" (0x1) and the numbering plan will always be encoded as ISDN/Telephony Numbering (Rec ITU-T E.164) (0x1).
	RNDN	
	CCRNDN	
	DN	
	SRFIMSI	IMSI is encoded from the "SRFIMSI" parameter from the RTDB entity.
	MCCRNDN	IMSI is encoded as MCCRNDN. The MCC will be encoded using the GSMOPTS:DefMCC setting. **Note:** The MT-Based GSM SMS NP feature requires GSMOPTS:DefMCC to be set before the feature can be turned ON. GSMOPTS:DefMCC will not be allowed to change to "NONE" as long as this feature is turned ON.
	NONE	This parameter is not encoded in the response message. The LocationInfoWithLMSI TCAP parameter is included; the Network Node number sub-parameter is present; however the length of the parameter is 0.
MTSMSTYPE	SP	When the lookup in the RTDB has entitytype=SP, then the lookup is considered successful.
	RN (default)	When the lookup in the RTDB has entitytype=RN, then the lookup is considered successful.

GSMSMSOPTS Option	Value	Action in the EAGLE 5 ISS
	SPRN	When the lookup in the RTDB has entitytype=SP or RN, then the lookup is considered successful.
	ALL	When the lookup in the RTDB has entitytype=SP or RN or no_entity, then the lookup is considered successful.
	NONSP	When the lookup in the RTDB does not have an entitytype SP, then the lookup is considered successful. This could mean that no entity was found or an entity with type RN was found.
	Note: This option is applied to messages in which the source is considered to be a Home SMSC.	
MTSMSACKN	ACK (default)	This indicates that when the SRI_SM lookup is considered successful, a SRI_SM_ACK (Return Result Last) is sent back.
	NACK	This indicates that when SRI_SM look is considered successful, a SRI_SM_NACK (Return Error) is sent back.
	Note: This option is applied to messages in which the source is considered to be a Home SMSC.	
MTSMSDLTR	NO (default)	This option specifies if delimiter digit(s) need to be inserted in the MTSMSIMSI and MTSMSNNI digits. A value of NO means that no delimiter is inserted.
	PRERN	This option specifies that a delimiter (MTSMSDLTRV) is to be inserted before the RN when the RN is used in the MTSMSIMSI and MTSMSNNI digits. (RN included in the digit format is MTSMSDLTRV + RN from RTDB)
	POSTRN	This option specifies that a delimiter (MTSMSDLTRV) is to be inserted after the RN when the RN is used in the MTSMSIMSI and MTSMSNNI digits. (RN included in the digit format is RN from RTDB + MTSMSDLTRV)
MTSMSDLTRV	1-5 hex digits	This specifies if delimiter digit(s) need to be inserted in the MTSMSIMSI and MTSMSNNI if required (per MTSMSDLTR). This value can consist of 1-5 hexadecimal digits. A value must be defined here before MTSMSDLTR can be set to PRERN or POSTRN.

GSMSMSOPTS Option	Value	Action in the EAGLE 5 ISS
		Once set, the MTSMSDLTRV can never be configured to "NONE" again.
MTSMSNAKERR	0-255 (default is 0x1 - Unknown Subscriber)	This specifies the TCAP error choice code to be included in the SRI_SM_ACK generated by SMS_MT. **Note:** This option will affect only the Error code choice byte. Certain error code choices (e.g., systemFailure and callBarred) have additional mandatory data as per GSM specifications. However, the MT-Based GSM SMS NP feature will not encode any additional data in SRI_SM_NACK. **Note:** The MTSMSNAKERR is applicable to responses generated to both the SMSC and MMSC.
MTSMSCHKSRC	YES	This parameter value 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 set to YES and the SCCP CgPA GTA is present and there is not a match in the Home SMSC list, the source of the message is not considered to be a Home SMSC. In this case, the message is considered inapplicable for MT-SMS processing. If this option is YES and SCCP CgPA GTA is not present or has a 0 length, then it is assumed that the source is a Home SMSC. If this option is YES and SCCP CgPA GTA is present and there is a match in the Home SMSC list, then the message source is considered to be Home SMSC. **Note:** The order of checks performed follows: **1.** Home MMSC check is performed. If a Home MMSC check is to be performed (The MT-Based GSM MMS NP Feature is turned ON and GSMSMSOPTS:MTMMSGTA is not "NONE"), the SCCP CgPA GTA will be compared against GSMSMSOPTS:MTMMSGTA for a match. A match identifies the source to be a Home MMSC. This option (MTSMSCHKSRC) does

GSMSMSOPTS Option	Value	Action in the EAGLE 5 ISS
		not influence this first check for Home MMSC. 2. If the Home MMSC check is not successful, AND MTSMSCHKSRC is YES, then Home SMSC check is required if SCCP CgPA GTA is present.
	NO (default)	This parameter value specifies that Eagle will not validate the SCCP CgPA GTA for Home SMSC check. If the initial check for Home MMSC is not successful and if this option is NO, then the source is assumed to be Home SMSC. This option may be used by the service provider to disable SCCP CgPA-checking for Home SMSC check, if the service provider ensures that only in-network nodes will send SRI_SM and receive the response generated by this feature.

MT-Based GSM SMS and MMS NP Call Flows

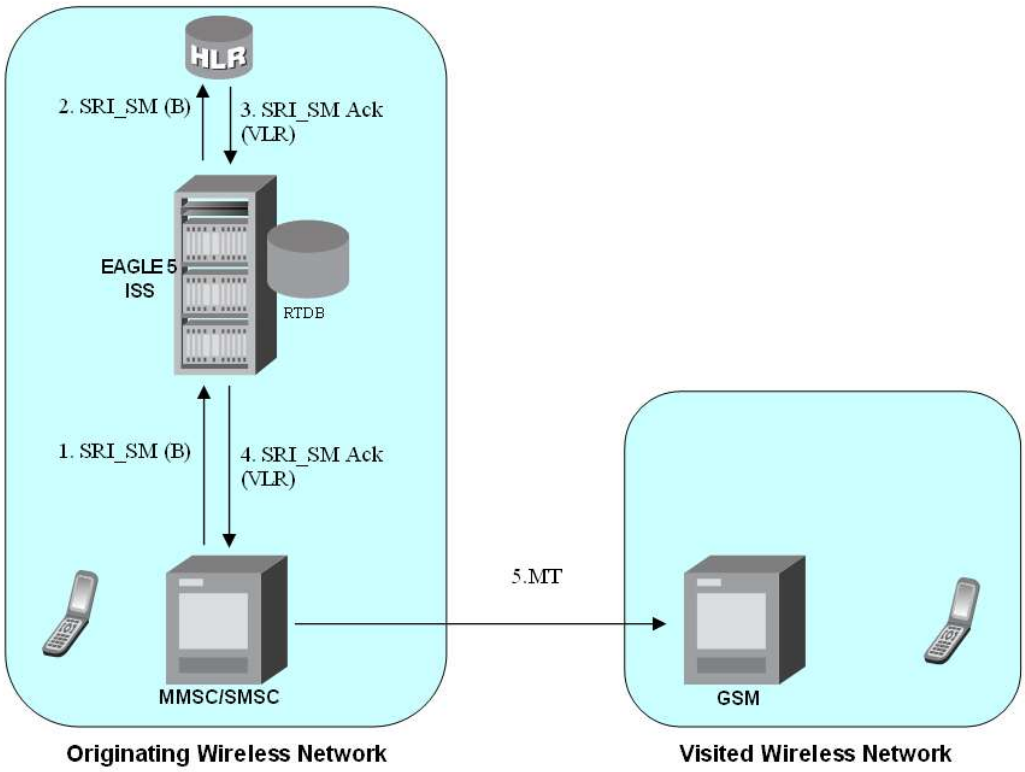
This section illustrates the sequence of messages that occur in the processing of SMS and MMS messages destined for mobile-terminated subscribers in a number portability environment. Two scenarios exist:

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

MT-Based GSM SMS and MMS NP Call Flow for In-Network Subscriber

Figure 15: MT-Based GSM SMS and MMS NP Call Flow for In-Network Subscriber on page 58 depicts the message and control flows for a called subscriber that is in the same network as the calling subscriber.

Figure 15: MT-Based GSM SMS and MMS NP Call Flow for In-Network Subscriber



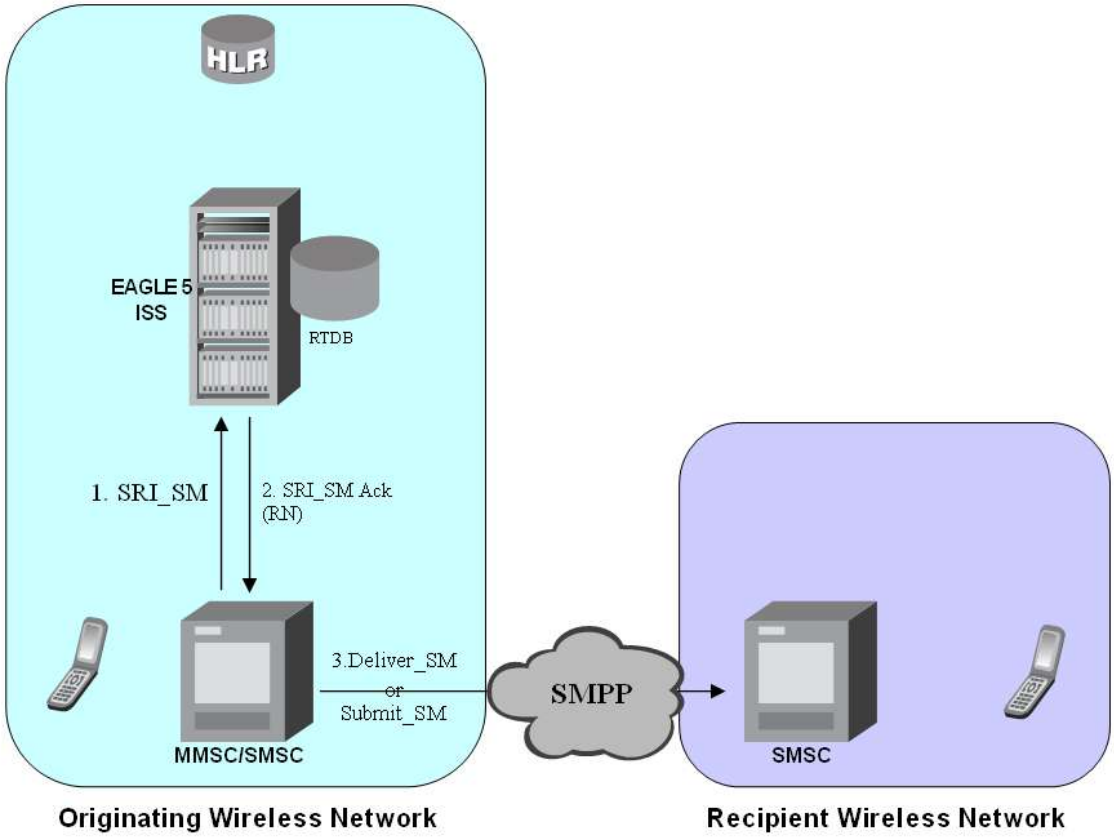
Call considerations:

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

MT-Based GSM SMS and MMS NP Call Flow for Other-Network Subscriber

Figure 16: MT-Based GSM SMS and MMS NP Call Flow for Other-Network Subscriber on page 59 depicts the message and control flows for a called subscriber that is a different network from the calling subscriber.

Figure 16: MT-Based GSM SMS and MMS NP Call Flow for Other-Network Subscriber



Call considerations:

- The TCAP calling party is a wireless GSM 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 or MMS.
- 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.

MT-Based GSM MMS NP

The Mobile Terminated (MT)-Based GSM MMS NP feature allows wireless operators to route Multimedia Message Service (MMS) messages destined to mobile subscriber within a number portability (NP) environment. If the MT-Based GSM MMS NP feature is not enabled and turned on, then messages are processed by the G-Port feature.

The Mobile Terminated (MT)-Based GSM MMS NP feature allows database lookup to be performed on MMS messages that are routed from a Multimedia Message Service Center (MMSC).

The MT-Based GSM MMS NP feature intercepts SRI_SM messages and sends response messages with routing information for out-of-network destination subscribers using the following process:

1. An SRI_SM message is intercepted by the Eagle 5 ISS before it reaches the home location register (HLR).
2. The message destination address (SCCP Called Party GTA) is extracted, the digits are conditioned, and lookup is performed in the database.
3. If the destination address/subscribers belongs to a foreign network, then a reply message is sent to the MMSC with routing information. If the destination address/subscribers belongs to a local network, then the SRI_SM message is relayed to the HLR or according to the options set for normal G-Port routing.

Options

The MT-Based GSM MMS NP feature provides the following configurable options for controlling processing of Multimedia Message Service (MMS) routing request messages and the content of the response:

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

Feature Control Requirements

The MT-Based GSM MMS NP feature has the following control requirements:

- The MT-Based GSM SMS NP feature must be enabled and turned on.
- A FAK for part number 893-0241-01
- The feature cannot be turned off after it has been turned on.
- A temporary FAK cannot be used to enable the feature.

System Options for MT-Based GSM MMS NP

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

The content of the GSMSMSOPTS table is used to help perform number conditioning, response generation, and other feature-specific options. *Table 10: MT-Based GSM MMS NP Options* on page 62 shows the feature-specific options stored in the GSMSMSOPTS table, their possible values, and the action taken for each value.

Note: The options described in *Table 10: MT-Based GSM MMS NP Options* on page 62 are accessible only when the MT-Based GSM MMS NP feature is enabled. Processing of MSUs from MMSCs will also require the use of the GSMSMSOPTS options described for the MT-Based GSM SMS feature in *Table 9: MT-Based GSM SMS NP Options* on page 54.

Table 10: MT-Based GSM MMS NP Options

GSMSMSOPTS	Value	Action in the EAGLE 5 ISS
MTMMSGTA	5-21 hex digits (default is NONE)	This option pertains to Home MMSC check. When an SCCP CgPA GTA is present in the message, this option is used to compare the SCCP CgPA GTA of the incoming SRI_SM message to determine whether the originator is a Home MMSC. If a match is found, the MTMMSTYPE and MTMMSACKN options are used to determine whether SRI_SM ACK or NACK is to be sent, and the conditions when lookup is considered to be successful for MMS. The nature of match is a "Prefix match". That is, the leading digits must match all the digits provisioned in MTMMSGTA. **Note:** The digits for compare can have more than the number of digits configured in MTMMSGTA This option can be set to NONE at any time. A value of NONE implies that the special processing of MMS is not required, and MT-Based SMS NP processing will follow. A setting of NONE will not match any SCCP CgPA GTA.
MTSMSTYPE	SP	When the lookup in the RTDB has entitytype=SP, then the lookup is considered successful.
	RN (default)	When the lookup in the RTDB has entitytype=RN, then the lookup is considered successful.
	SPRN	When the lookup in the RTDB has entitytype=SP or RN, then the lookup is considered successful.
	ALL	When the lookup in the RTDB has entitytype=SP or RN or no_entity, then the lookup is considered successful.
	NONSP	When the lookup in the RTDB does not have an entitytype SP, then the lookup is considered successful. This could mean that no entity was found or an entity with type RN was found.
	Note:	

GSMSMSOPTS	Value	Action in the EAGLE 5 ISS
	This option is applied to messages in which the source is considered to be a Home SMSC. Duplicate options are provided for this parameter for MTMMS and MTSMS in order to be able to control processing of messages from the Home MMSC independently from those coming from a Home SMSC.	
MTMMSACKN	ACK (default)	This indicates that when the SRI_SM lookup is considered successful, a SRI_SM_ACK (Return Result Last) is returned.
	NACK	This indicates that when SRI_SM lookup is considered successful, a SRI_SM_NACK (Return Error) is returned.
	Note: This option is applied to messages in which the source is considered to be a Home SMSC. Duplicate options are provided for this parameter for MTMMS and MTSMS in order to be able to control processing of messages from the Home MMSC independently from those coming from a Home SMSC.	

MT-Based GMS MMS NP Call Flows

The MT-Based GMS MMS NP feature call flows are identical to those used by the MT-Based GMS SMS NP feature and are described in *MT-Based GSM SMS and MMS NP Call Flows* on page 58.

GSM MAP SRI Redirect to Serving HLR

The GSM MAP SRI Redirect to Serving HLR feature provides the capability to resolve network problems introduced by maintaining equipment from multiple manufacturers with vendor-specific proprietary implementations. Normally. the G-Port feature relays an SRI message to an operator's own HLR for a ported-in number. This feature allows the operator to route those messages based on the type of equipment at the source MSC and destination HLR. Vendor Type, Vendor Number, and Vendor Prefix are used to provision this information.

If the originating Mobile Switching Center (MSC) of the Send Route Information (SRI) message and the destination Home Location Register (HLR) are the same vendor type, the message is relayed to the HLR associated in the RTDB to the service provider. If the originating MSC of the SRI message and the destination HLR are not the same vendor type, G-Port checks whether the vendor type is deployed in more than one network; each network has its own vendor/network prefixes.MSC SRI message Home Location Register (HLR)

If the vendor types of the originating MSC and destination HLR are different and the destination HLR vendor type is deployed in more than one network, the vendor/network prefix that points to the network where the hosting HLR resides is appended. If the vendor types of the originating

MSC and destination HLR are different and the vendor type of destination HLR is deployed in only one network, the vendor/network prefix that is assigned to the network is appended.

The GSM MAP SRI Redirect to Serving HLR feature supports provisioning of a Vendor Prefix List of up to three entries and a Vendor ID List of up to 200 entries. Each Vendor Prefix List entry contains the Vendor Number and associated Vendor Prefix (maximum of six digits). Each Vendor ID List entry contains the Vendor ID, Vendor Type, and Vendor (network) Number. All Vendor IDs must be the same length which is provisionable for 1 to 15 digits using the `ent-vendid` command. A Vendor ID cannot be entered into the database until the associated Vendor Prefix is defined.

Table 11: Vendor Prefix List example

Vendor Number	Vendor Prefix
1	1004
2	1003
3	1004

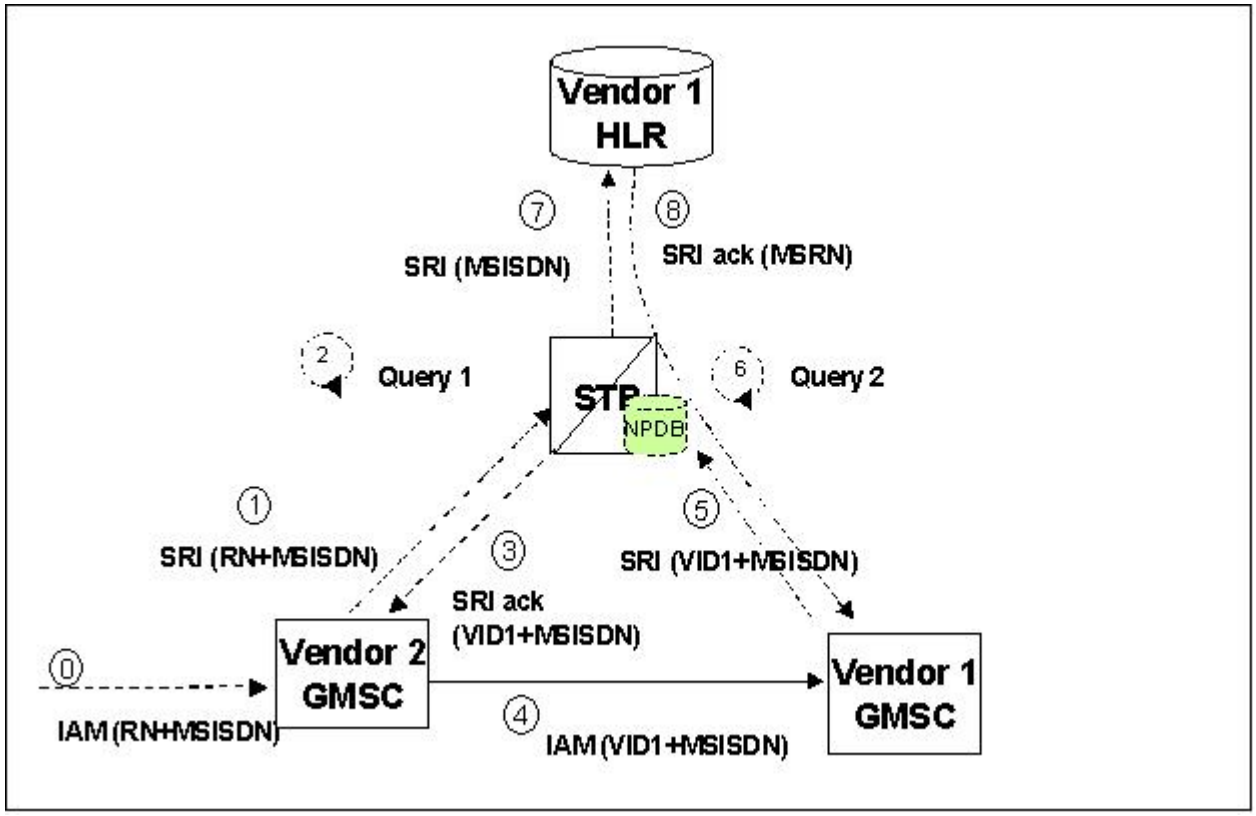
Table 12: Vendor ID List example

Vendor/Network Type	Vendor Number	Vendor ID
1	1	886932
1	1	886935
1	3	886938
2	2	886936

GSM MAP SRI Redirect to Serving HLR Call Flows

Refer to *Figure 17: GSM MAP SRI Redirect to Serving HLR Call Flows* on page 64 for a graphical representation of the GSM MAP SRI Redirect to Serving HLR call flow.

Figure 17: GSM MAP SRI Redirect to Serving HLR Call Flows



For a ported-in number, Gateway Mobile Switching Center (GSMC) Vendor 2 receives an Initial Address Message (IAM) with CdPN.

1. The receiving GMSC interrogates the Home Location Register (HLR) for the current location of the subscriber by issuing a Send Route Information (SRI) message.
2. When an SRI message is received that meets the G-Port service selector criteria, HomeRN deletion and number conditioning are performed on the DN. The DN database is searched. If the DN is found in the database with a service provider (HLR entity address) associated with the called party MSISDN, the Vendor ID list is searched for the service provider. If the service provider is found in the Vendor ID list, the CgPA is checked for a valid length GTA. The Vendor ID list is searched for the CgPA GTA. If the CgPA GTA is found in the Vendor ID list, the two vendor numbers associated with the CgPA GTA and the service provider are compared. If the GMSC and the HLR are the same vendor type, go to step #7. If the GMSC and the HLR are different vendor types, go to step #3.
3. If the destination network belongs to a vendor type that is deployed in more than one network, an SRI_ACK is generatd eusing the Vendor Prefix of the destination network as the RN. The MSRN is filled using various options provisioned in the GSMOPTS table for the G-Port SRI_ACK. The SRI_ACK is sent to the originating GMSC.
4. Based on the Vendor Prefix, the originating GMSC routes the call to the GMSC of the network associated with the vendor by the IAM.
5. The subscription network GMSC formulates and sends an SRI message to the Eagle 5 ISS to interrogate the current location of the subscriber.

6. G-Port performs a database lookup based on the MSISDN in the SRI and determines that the number belongs to its network. The service provider (HLR entity address) associated with the MSISDN and the CgPA GTA (GMSC/MSC) are confirmed to be the same vendor type. .
7. The SRI is relayed to the HLR asociated to the service provider.
8. The HLR returns an SRI_ACK to the GMSC through the Eagle 5 ISS.

Chapter 3

Commands

Topics:

This chapter contains brief descriptions of the EAGLE 5 ISS commands that are used for the configuration, control, maintenance, and measurements of the G-Port, MT-Based GSM SMS NP, and MT-Based GSM MMS NP features.

Introduction

This chapter briefly describes the EAGLE 5 ISS commands used to administer the G-Port feature. The command descriptions include the functions provided by the commands and examples of command usage. Refer to *Commands Manual* for comprehensive command descriptions including parameter names, valid parameter values, and output examples.

Debug Commands

G-Port uses the `ent-trace` command to provide a trap-and-trace function for MSUs on the Service Module cards. G-Port also includes a trigger so the user can trigger on DN and IMSI.

The user can create a MSU trigger on the Service Module card on one or more criteria (both old and new) defined in the following using the `ent-trace`command. When multiple trigger criteria are entered, the MSU is trapped when any one of the criteria is satisfied.

CAUTION:

As with other debug commands, this command can cause OAM to reset if too many MSUs are trapped.

- **RN or SP address (Entity ID) -** Use this new criterion to trap messages immediately after performing the RTDB database lookup. If the RN or SP obtained from the database lookup matches the Entity ID provisioned in the command, the message is trapped. This parameter supports a variable number of hexadecimal digits from 1 to 15 digits, and the Entity ID specified must be the one stored in the G-Port RTDB.
- **E.164 MSISDN number (DN)** – Use this criterion to trap messages immediately before performing a G-Port search based on the MSISDN numbers defined in the G-PortRTDB. This parameter accepts a range of digits, from 5 to 15. The number specified must be an International E.164 number (MSISDN or Entity Number).
- **Global Title digits (GT)** – Use this criterion to trap messages based on CdPA Global Title Address (that is, either MSISDN (+ST) number or RN + MSISDN (+ST)) present in the SCCP part of the message.
- **Origination point code** (SSPI/SSPN) – Use this criterion to trap messages based on CgPA SPC present in the SCCP part of the message. If no point code is present in the CgPASPC, the criteria is matched with the OPC present in the MTP part of the message.

A trace must be set on all Service Module cards; specify `card=sccp-all`. Use a repetition parameter (`rep`) to control the number of MSUs that are trapped.

MSUs that satisfy any trigger criteria are trapped on the Service Module cards are forwarded to OAM, and are displayed. Refer to *Commands Manual* for a complete description of the `ent-trace` command.

EAGLE 5 ISS Options Commands

The STP system options commands (`stpopts`) change and display STP wide options in the EAGLE 5 ISS database. The following sections describe the two variations: `chg-stpopts` and `rtrv-stpopts`. For further details on these commands, refer to the *Commands Manual*.

- **chg-stpopts: Change STP System Options Command** – The `chg-stpopts` command changes STP system options in the database. This command updates the STPOPTS table. The `defcc` and `defndc` parameters are used to convert non-international numbers received in the MSU to an international number. The `defcc` and `defndc` parameters can be specified only if the G-Port, Prepaid IDP Query Relay (IDPR), Prepaid SMS Intercept (PPSMS), V-Flex, or ATINP feature is enabled, or if the G-Flex, INP, or AINPQ feature is turned on. A command example follows:

  ```
  chg-stpopts:defcc=333:defndc=22345
  ```

  Where:

  defcc={1-3 digits, none} Default country code
  defndc={1-5digits, none} Default network destination code

  Note: If the MT-Based GSM SMS NP or ATINP feature is turned on, the `defcc` parameter cannot be set to `none`.

- **rtrv-stpopts: Retrieve STP System Options Command** – The `rtrv-stpopts` command is used to retrieve all STP options from the database. The options that appear in the output vary, depending on the features that are enabled or turned on.

EAGLE 5 ISS G-Port System Options Commands

The G-Port system options (`gsmopts`) commands change and display G-Port-specific system options in the EAGLE 5 ISS database. The following sections describe the two variations: `chg-gsmopts` and `rtrv-gsmopts`. For details about these commands, refer to the *Commands Manual*.

chg-gsmopts

Change G-Port System Options Command – The `chg-gsmopts` command changes G-Port-specific system options in the database. This command updates the GSMOPTS table. The default parameters are always overwritten when specified.

Table 13: chg-gsmopts Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
defmapvr	Optional	1-3	Default MAP version

Parameter	Optional/ Mandatory	Range	Description
defmcc	Optional	1-3 digits, none	E212 default mobile country code
gsm2is41	Optional	1-15 digits, none	GSM to IS41 migration prefix
is412gsm	Optional	1-15 digits, none	IS-41 to GSM migration prefix.
migrpfx	Optional	multiple, single	Migration Prefix
msisdntrunc	Optional	1 digit (0-5)	Number of MSISDN digits to delete from the MISISDN before formulating the MSRN for SRI-ack response
msrndig	Optional	rn, rndn, ccrndn, rnccdn, rnasd, asdrn, rnasddn, asdrndn, ccrnasddn, ccasdrndn, rnasdccdn, asdrnccdn	RN used as-is or with MSISDN
msrnnai	Optional	1-7	NAIV for the MSRN
msrnnp	Optional	0-15	Numbering plan for the MSRN
multcc	Optional	1 to 3 digits (0-9, a-f, or A-F)	Multiple Country Code
nmultcc	Optional	1 to 3 digits (0-9, a-f, A-F, or NONE)	New Multiple Country Code
nppsmsgta	Optional	digits (0-9, A-F, a-f) or none	New entity address of an IN platform for PPSMS
serverpfx	Optional	1-4 digits, none	Server SRI prefix
srfaddr	Optional	1-15 digits, none	Entity address of MNP_SRF node
srfnai	Optional	0-127	NAIV of the MNP_SRF
srfnp	Optional	0-15	Numbering plan value of the MNP_SRF Network Code
sridn	Optional	tcap, sccp	SRIDN location

Parameter	Optional/ Mandatory	Range	Description
sridnnotfound	Optional	gtt, srinack	When G-Port encounters an RTDB query result that indicates that the given DN is not known, the SRIDNNOTFOUND parameter value determines further processing. The default value is gtt.

Command examples follow.

- `chg-gsmopts:srfnai=4:srfnp=2:srfaddr=331111111111`
- `chg-gsmopts:srfaddr=333221234567890:msrndig=rn:srfnai=1:srfnp=1:msrnnai=4:msrnnp=10`
- `chg-gsmopts:sridn=tcap`
- `chg-gsmopts:is412gsm=0123456789abcde`

rtrv-gsmopts

Retrieve G-Port System Options Command

The `rtrv-gsmopts` command displays all G-Port-specific system options from the database.

EAGLE 5 ISS GSM SMS Options Commands

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

The `mtmmsackn`, `mtmmsgta`, and `mtmmstype` parameters apply to only messages that are modified by the MT-Based GSM MMS NP feature. The MT-Based GSM MMS NP feature must be enabled to specify these parameters.

The `mtsmsackn`, `mtsmschksrc`, `mtsmsdltr`, `mtsmsdltrv`, `mtsmsimsi`, `mtsmsnakerr`, `mtsmsnni`, and `mtsmstype` parameters apply to only messages that are modified by the MT-Based GSM SMS NP feature. The MT-Based GSM SMS NP feature must be enabled to specify these parameters.

chg-gsmsmsopts

Change GSM SMS Options Command – The `chg-gsmsmsopts` command changes GSM SMS system options in the database. This command updates the GSMSMSOPTS table. The default parameters are always overwritten when specified.

Table 14: chg-gsmsmsopts Parameters Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
mtmmsackn	Optional	ack, nack	MT-based MMS acknowledgement
mtmmsgta	Optional	5-21 digits, none	MT-based MMS GTA
mtmmstype	Optional	sp, rn, sprn, all, nonsp	MT-based MMS type
mtsmsackn	Optional	ack, nack	MT-based SMS acknowledgement
mtsmschksrc	Optional	yes, no	MT-based SMS check source
mtsmsdltr	Optional	no, prern, postrn	MT-based SMS delimiter
mtsmsdltrv	Optional	1-5 digits	MT-based SMS delimiter value
mtsmsimsi	Optional	rn, rndn, ccrndn, dn, srfimsi, mccrndn	MT-based SMS IMSI
mtsmsnakerr	Optional	0-255	MT-based SMS negative acknowledgement error
mtsmsnni	Optional	rn, rndn, ccrndn, dn, srfimsi, mccrndn, none	MT-based SMS network node indicator
mtsmstype	Optional	sp, rn, sprn, all, nonsp	MT-based SMS type

Command example:

- `chg-gsmsmsopts:mtsmsnakerr=55:mtsmsimsi=dn:mtsmsnni=rndn:mtsmstype=sprn`

rtrv-gsmsmsopts

Retrieve GSM SMS Options Command

The `rtrv-gsmsmsopts` command displays all GSM SMS and MMS options from the database.

EAGLE 5 ISS G-Port Service Selector Commands

The G-Port service selector (`srvsel`) commands are used to provision new selectors for the G-Port service, providing greater flexibility when provisioning the type of messages that require G-Port processing. The following sections describe the four variants: `ent-srvsel`, `chg-srvsel`,

`dlt-srvsel`, and `rtrv-srvsel`. For further details on the EAGLE 5 ISS G-Port service selector commands (such as command rules and output format), refer to the *Commands Manual*.

ent-srvsel: Enter G-Port Service Selectors Command – The `ent-srvsel` command specifies that the applicable G-Port service selectors indicating G-Port processing are required. The available parameters follow:

Table 15: ent-srvsel Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
serv	Mandatory	eir, gflex, gport, inpq, inpmr, smsmr, idps, idpr, mnp, vflex, atinp	GSM service
snai	Mandatory	1sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn	Service Nature Of Address Indicator
snp	Mandatory	1e164, e212, e214	Service Numbering Plan
ssn	Mandatory	0-255, *	Subsystem Number
tt	Mandatory	0-255	Translation Type
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

chg-srvsel: Change G-Port Service Selector Command – The `chg-srvsel` command specifies the applicable G-Port selectors required to change an existing G-Port selector entry. The available parameters follow:

Table 16: 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	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
nserv	Optional	eir, gflex, gport, inpq, inpmr, smsmr, idpr, idps, mnp, vflex, atinp	New GSM service
nsnai	Optional	sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn	New Service Nature Of Address Indicator
nsnp	Optional	e164, e212, e214, none	New Service Numbering Plan

dlt-srvsel: Delete G-Port Service Selector Command – The `dlt-srvsel` command deletes a G-Port service selector. The available parameters follow:

Table 17: dlt-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

Parameter	Optional/ Mandatory	Range	Description
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

rtrv-srvsel: Retrieve G-Port Service Selector Command – The `rtrv-srvsel` command displays a list of administered G-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 follow:

Table 18: 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	eir, gflex, gport, inpq, inpmr, smsmr, idps, idpr, mnp, vflex, atinp	GSM service
snai	Optional	sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn	Service Nature Of Address Indicator
snp	Optional	e164, e212, e214	Service Numbering Plan
ssn	Optional	0-255, *	Subsystem Number

Parameter	Optional/ Mandatory	Range	Description
tt	Optional	0-255	Translation Type

EAGLE 5 ISS SCCP Service Commands

The `sccp-serv` commands allow for services to be taken online and offline and for their processing load to be shifted to other designated nodes. These commands also support the assignment of point codes to service groups used for service re-route assignment. Three variations are described in this section: `chg-sccp-serv`, `dlt-sccp-serv`, and `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 information on provisioning MRN tables, refer to *Database Administration Manual - Global Title Translation*.

Refer to *Commands Manual* for additional details about the EAGLE 5 ISS SCCP service commands.

chg-sccp-serv: Change SCCP 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 and point code network type (ANSI, ITU-I, Spare ITU-I, ITU-N, Spare ITU-N, or ITUN-24). Up to seven point codes may be in a network type grouping for service re-route load sharing. This command allows for additions or modifications of up to four point codes. The point code parameters support the Spare Point Code subtype prefix `s-` for ITU-I and ITU-N point codes.

Table 19: chg-sccp-serv Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
serv	Mandatory	gport, gflex, mnp	Service
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

Parameter	Optional/ Mandatory	Range	Description
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
state	Optional	offline, online	Service State

dlt-sccp-serv: Delete G-Port SCCP Service Command – The `dlt-sccp-serv` command is used remove entries from the SCCP Service table. A single command may remove either a PCU from a group or the entire group. The available parameters follow:

Table 20: 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* deletes all point codes from a service

rtrv-sccp-serv: Retrieve 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.

EAGLE 5 ISS Feature Key Control Commands

These commands are used to enable, update, view, and control the G-Port, MNPCRP, MT-Based GSM SMS NP, and MT-Based GSM MMS NP features on the EAGLE 5 ISS. A separate Feature Access Key is required to turn on each feature. Features must be purchased to have access to the Feature Access Key, which must be used when enabling these features.

Two steps are performed to activate the G-Port feature. The first step is to enable the feature. The second step is to set the status to *on*. After the feature G-Port feature is turned on, it cannot be turned off. A temporary feature access key is associated with the G-Port and MNPCRP features.

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 SCCP GLP cards are provisioned. Refer to *Commands Manual* for details of these commands.

enable-ctrl-feat: EnableControl Feature Command –The `enable-ctrl-feat` command is used for temporary and permanent enabling of controlled features. An example of the command using the G-Port part number is:

```
enable-ctrl-feat:partnum=893017201:fak=<Feature Access Key>
```

chg-ctrl-feat: Change Control Feature Command –The `chg-ctrl-feat` command is used to turn on controlled features: G-Port, MNPCRP, MT-Based GSM SMS NP, and MT-Based GSM MMS NP. The MNPCRP, MT-Based GSM SMS NP, and MT-Based GSM MMS NP features require the G-Port feature to be enabled as a prerequisite. This command is also used to turn off ON/OFF features and to clear the critical alarm caused by an expired temporary key.

Command example using the MNPCRP part number:

```
chg-ctrl-feat:partnum=893007001:status=on
```

rtrv-ctrl-feat: Retrieve Control Feature Command–The `rtrv-ctrl-feat` command is used display the on/off status of controlled features and the trial period remaining for temporary enabled features.

EAGLE 5 ISS Database Commands

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

The `rept-stat-db` command displays both the STP and the G-Port database status and level information for each DSM network card, and for the active and standby EPAP databases.

Maintenance and Measurements User Interface

This section provides a description of the user interface for maintenance and measurements for the G-Port features. These commands allow provisioning, operations, and maintenance activities for Service Module cards.

Maintenance Commands

Refer to *Commands Manual* for detailed descriptions of all commands, parameters, parameter values, output examples, and restrictions. Commands described in this section include:

rept-stat-sys

The `rept-stat-sys` command is used to determine the location of troubles in the system. The display shows the number of these items that are in service (IS-NR) and how many are in another state (IS-ANR, OOS-MT, OOS-MT-DSBLD).

rept-stat-sccp

This command is used to display the status of the Service Module cards and the Global Title Translation (GTT), GSM Flexible Numbering (G-Flex), GSM Mobile Number Portability (G-Port), ANSI-41 Mobile Number Portability (A-Port), IS41 GSM Migration (IGM), INAP-based Number Portability (INP), and Equipment Identity Register (EIR) services running on those cards. This command also displays any cards that are denied SCCP service.

rept-stat-mps

Two variations of this command are:

- `rept-stat-mps` - produces a summary report showing the overall status of the G-Port provisioning system and a moderate level of information for each Service Module card.
- `rept-stat-mps:loc=xxxx` - produces a detailed report showing the G-Port status of a specific Service Module card. This version of the command displays the percent utilization of a specific Service Module card memory.

rept-meas

This command includes G-Port measurements in the output sent to the EAGLE 5 ISS terminal.

chg-measopts

This command is used to enable or disable the automatic generation and FTP transfer of scheduled measurement reports to the FTP server.

rept-stat-meas

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

rept-ftp-meas

This command manually initiates generation and FTP transfer of a measurements report from the MCPM to the FTP server.

rtrv-measopts

This command generates a user interface display showing the enabled/disabled status of all FTP scheduled reports.

rept-stat-trbl

This command displays the G-Port subsystem and Service Module card/EPAP IP link alarms.

rept-stat-alm

This command displays the alarm totals of the G-Port subsystem and Service Module card/EPAP IP links.

rept-stat-db

This command displays both EAGLE 5 ISS and G-Port database status and level information for each network card, and for the active and standby EPAP databases. The commands reports database exception status such as corrupted, incoherent, or inconsistent, as well as providing the birthdates and levels.

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) to permit the card to be tested or physically removed from the shelf.

The `alw-card` command is used to change the card from OOS-MT-DSBLD to IS-NR if the loading is successful.

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. This command includes a CPC type for G-Port.

The CPC parameter is used to support incoming messages routed via Intermediate GTT (rt-gt) to the EAGLE 5 ISS (with DPC = CPC) for G-Port.

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.

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 link code, and the ports.

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

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

The `chg-gpl` command is used to copy a generic program load from the system removable cartridge or drive to the destination active and standby system disks as a "trial" version. The system release identification file is uploaded from the system removable cartridge or drive to the active and standby fixed drives along with each GPL. This command also provides a parameter to turn GPL auditing *on* and *off*.

The `act-gpl` command is used to change the status of the trial GPL from *trial* to *approved*. The status of the previously approved GPL is changed to *trial*.

The `rtrv-gpl` command is used to show the version numbers of the GPLs stored on each fixed disk or removable cartridge or drive, and the system release table stored on each fixed disk.

The `rept-stat-gpl` command is used to display the version of GPLs currently running for an application, and the approved and trial versions of the GPL that will run if the card is restarted.

The `copy-gpl` command is used to copy all approved GPLs from one drive to another. The GPLs can be copied only from the fixed disk on the active TDM to the removable cartridge or drive, or from the removable cartridge or drive to the fixed disk on the standby TDM.

ent-home-smsc / dlt-home-smsc / rtrv-home-smsc

The ent-home-smsc command is used to enter HOME SMSC specific addresses in the database.

The dlt-home-smsc command is used to delete HOME SMSC specific addresses currently used to identify Short Message Service Centers (SMSC) in the database.

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

inh-alm / unhb-alm

The `inh-alm` command is used inhibit the reporting of alarms for the given device. Inhibited alarms will not generate unsolicited output or cause alarm indicators to be turned on. All `rept-stat-xxx` commands continue to display the alarm with an indication that the device has its alarms inhibited.

The `unhb-alm` command is used to restore the reporting of alarms for the given device.

chg-ip-card / rtrv-ip-card

The `chg-ip-card` command is used to provision the Internet Protocol networking parameters for any given Service Module card.

The `rtrv-ip-card` command is used to report on the Internet Protocol networking parameters for any given Service Module card.

chg-ip-lnk / rtrv-ip-lnk

The `chg-ip-lnk` command is used to provision the Internet Protocol link table.

The `rtrv-ip-lnk` command is used to report on the Internet Protocol link table.

ent-ip-host / dlt-ip-host / rtrv-ip-host

These commands are used to provision, remove, and report on the entries in the Internet Protocol host table. The IP host table defines local and remote host names for IP addresses.

pass

The `pass` command allows remote execution of a selected command by the targeted card. These commands recognize the Service Module cards. Selected commands are allowed as follows.

- `pass:cmd="ping"`
- `pass:cmd="netstat"`
- `pass:cmd="nslookup"`
- `pass:cmd="arp"`
- `pass:cmd="help"`

For this feature, the `loc` parameter must be a Service Module card location. Additional details for the `pass` command are available in *Commands Manual*.

pass: cmd="ping"

The `'ping' pass` command supports troubleshooting of the private EPAP/DSM IP network. This example demonstrates typical usage:

```
    eagle10506 99-08-11 08:43:45 EST EAGLE 37.0.0
    pass:loc=1215:cmd="ping     -h"
    Command entered at terminal #2.
;
    eagle10506 99-08-11 08:43:45 EST EAGLE 37.0.0
    PASS: Command sent to card
;
    eagle10506 99-08-11 08:43:45 EST EAGLE 37.0.0
```

```
    Usage: ping <hostname | ipaddr> [-h] [-i size] [-n count]
    Options:
    -h        Displays this message
    -i count  Number of pings to send. Range=1..5. Default=3.
    -n size   Sets size of ICMP echo packet. Range=12..2048. Default=64.
    hostname  Name of machine to ping
    ipaddr    IP Address of machine to ping (d.d.d.d)
;
```

pass:cmd="netstat"

The `'netstat' pass` command supports troubleshooting of network interface and routing configuration problems within the private EPAP/Service Module card IP network. This example demonstrates typical usage.

```
eagle10506 99-08-11 08:43:00 EST EAGLE 37.2.0
    pass:loc=1215:cmd="netstat  -h"
    Command entered at terminal #2.
;
    eagle10506 99-08-11 08:43:00 EST EAGLE 37.2.0
    PASS: Command sent to card
;
    eagle10506 99-08-11 08:43:00 EST EAGLE 37.2.0
    Usage: netstat [-a] [-i] [-h] [-m data|sys|dd] [-p icmp|ip|tcp|udp] [-r]
    Options:
        -a        display socket information for all protocols
        -h        Displays this message
        -i        display interface information for all interfaces
        -m        display buffer pool information for 1 of the system pools
        -p        display socket information for 1 of the protocols
        -r        display the route table information
;
```

pass:cmd="nslookup"

The `'nslookup' pass` command supports debugging of domain name server (DNS) to IP addressing tables. DNS is not supported for EPAP cards for the initial release.

This example demonstrates typical usage.

```
    eagle10506 99-08-11 08:45:57 EST EAGLE 37.2.0
    pass:loc=1215:cmd="nslookup"
    Command entered at terminal #2.
;
    eagle10506 99-08-11 08:45:57 EST EAGLE 37.2.0
    PASS: Command sent to card
;
    eagle10506 99-08-11 08:45:57 EST EAGLE 37.2.0
    Usage: nslookup [hostname|ipaddr]
    Options:
        hostname  String name
        ipaddr    d.d.d.d
;
```

pass:cmd="arp"

The `'arp' pass` command supports theverification of and correction of IP stack ARP tables. This command is not required for normal operation.

The following example demonstrates typical usage.

```
    eagle10506 99-08-11 08:43:23 EST EAGLE 37.2.0
    pass:loc=1215:cmd="arp      -h"
    Command entered at terminal #2.
;
    eagle10506 99-08-11 08:43:23 EST EAGLE 37.2.0
    PASS: Command sent to card
;
    eagle10506 99-08-11 08:43:23 EST EAGLE 37.2.0
    Usage: arp [-a] [-d ipaddr] [-f] [-h] [-s ipaddr enetaddr]
    Options:
        -a        Display All entries in ARP table
        -d        Delete specified entry (ipaddr) from ARP table
        -f        Flush all entries from ARP table
        -h        Displays this message
        -s        Set ARP table entry to associate ipaddr with enetaddr
        enetaddr  x:x:x:x:x:x
        ipaddr    d.d.d.d
;
    eagle10506 99-08-11 08:43:25 EST EAGLE 37.2.0
    ARP command complete
;
```

pass:cmd="help"

The `'help' pass` command provides a list of supported `pass` commands for the target location.

The following example demonstrates typical usage.

```
    eagle10506 99-08-11 08:42:18 EST EAGLE 37.2.0
    pass:loc=1215:cmd="help"
    Command entered at terminal #2.
;
    eagle10506 99-08-11 08:42:18 EST EAGLE 37.2.0
    PASS: Command sent to card
;
    eagle10506 99-08-11 08:42:18 EST EAGLE 37.2.0
    List of commands supported is:
    nslookup
    netstat
    arp
    ping
    help
    END of LIST
;
```

Chapter 4

Feature Activation

Topics:

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

- MT-Based GSM SMS NP
- MT-Based GSM MMS NP
- G-Port SRI Query for Prepaid
- GSM MAP SRI Redirect to Serving HLR
- 1100 TPS/DSM for ITU NP
- E5-SM4G Throughput Capacity

Introduction

This chapter identifies prerequisites for the G-Port feature activation procedure and provides the feature activation procedures for the following features:

- G-Port
- MT-Based GSM SMS NP
- MT-Based GSM MMS NP
- G-Port SRI Query for Prepaid
- GSM MAP SRI Redirect to Serving HLR
- 1100 TPS/DSM for ITU NP
- E5-SM4G Throughput Capacity

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

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

- Global Title Translation (GTT)
- Enhanced Global Title Translation (EGTT)
- Variable-Length Global Title Translation (VGTT)
- Eagle Provisioning Application Processor (EPAP)
- Mobile Number Portability Circular Route Prevention (MNPCRP)

In addition, the following performance-related feature is related to G-Port:

- E5-SM4G Throughput Capacity

Note:

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

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

Summary of Feature Activation

This table summarizes the feature activation attributes for the features in this chapter.

Table 21: Feature Activation Summary

Feature Name	Part Number	Temporary FAK Available?	Permanently On?
GSM Mobile Number Portability (G-Port)	893017201	Yes	Yes
MNP Circular Route Prevention (MNPCRP)	893007001	Yes	No
MT-Based GSM SMS NP	893020001	No	Yes
MT-Based GSM MMS NP	893024101	No	Yes
G-Port SRI Query for Prepaid	893017701	No	Yes
GSM MAP SRI Redirect to Serving HLR	893014001	No	Yes
1100 TPS/DSM for ITU NP	893018001	No	No
E5-SM4G Throughput Capacity	893019101	No	Yes

Prerequisites

The G-Port feature activation assumes that the feature Global Title Translation (GTT), Enhanced Global Title Translation (EGTT), or Variable-Length Global Title Translation (VGTT) is already provisioned. Refer to *Database Administration Manual - Global Title Translation* for provisioning procedures.

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

The G-Port feature activation assumes that the Service Module cards to be installed are identified.

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

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

For in-service systems with another EPAP-feature enabled, perform only *G-Port Feature Activation Procedure* on page 94 to enable and turn on the G-Port feature. With another EPAP-feature enabled, the Service Module cards already contain the Real Time Database (RTDB).

For new systems, all Service Module cards may be rebooted at the same time using the `init-card:appl=vsccp` command. The GTT, EGTT, or VGTT feature must be turned on prior to adding the Service Module cards.

EAGLE 5 ISS Configuration

This procedure configures the EAGLE 5 ISS system for Home Location Register (HLR) destinations before activating the GSM Mobile Number Portability (G-Port) feature. This procedure assumes that the EAGLE 5 ISS is an existing system in which the G-Port feature is being activated. The route to the HLR database may already be configured. Perform this procedure to verify that all HLR destinations for the feature are provisioned and to configure changes, as needed. The G-Port feature applies to ITU-I (international), ITU-N (national), and ANSI networks.

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

Procedure Overview

- Display current PCs, CPCs, DPCs, routes, and linksets using *Step 1* on page 88 through *Step 6* on page 89
- Change current PCs, CPCs, DPCs, routes, linksets, and LIM cards using *Step 7* on page 89 through *Step 25* on page 93.

For detailed information about specific configuration activities in this procedure, refer to *Database Administration Manual - SS7*. Useful procedures include:

- Adding a Point Code to the Self-Identification of the EAGLE 5 ISS
- Changing the Self-Identification of the EAGLE 5 ISS
- Adding a Destination Point Code
- Adding an SS7 Linkset
- Adding an SS7 Signaling Link
- Adding a Route Containing an SS7 DPC

1. Display the current self-identification characteristics (PC and CPC) of the system using the `rtrv-sid` command.

   The self-identification characteristics of the system displayed by the `rtrv-sid` command include the point code (PC) assigned to the system, the CLLI code of the system, the capability point code of the STP (CPC), and the type of point codes supported by the system.

   If the ITUDUPPC (ITU national duplicate point code) feature is on, the ITU national point code also contains a group code. The group code is a two-character field from *aa* to *zz* that is entered as the last subfield of an ITU national point code, *nnnnn-gc* (for example, 2112-aa).
2. Display the current destination point codes (DPC) in the Destination point code table (`dpci/dpcn`) using the `rtrv-dstn` command.
3. Display the current route and linkset configuration using the `rtrv-rte` command.
4. If the system point code (`pci/pcn`) or capability point code (`cpci/cpcn`) to be configured in this procedure is shown in *Step 1* on page 88, *Step 2* on page 88, or *Step 3* on page 88, choose another point code to configure with this procedure. If configuring an ITU-N network, continue to *Step 5* on page 88. If configuring a mated application but not configuring an ITU-N, proceed to *Step 6* on page 89. Otherwise, proceed to *Step 7* on page 89.
5. Use the `rtrv-stpopts` command to display the PC or CPC format when configuring the system point code or capability point code (`pcn` or `cpcn`) of an ITU-N Network.

Specify the ITU-N point code format option `npcfmti` with the `rtrv-stpopts` command to determine the format of the ITU-N point code in the database and how it is displayed in all system outputs. The defined value is shown in the `NPCFMTI` field.

To change the format of the ITU-N point code, refer to "ITU National Point Code Formats" in *EAGLE 5 ISS Database Administration Manual - SS7*.

Continue to *Step 6* on page 89 to display mated applications in the database. Otherwise, proceed to *Step 7* on page 89.

6. Display the mated applications in the database using the `rtrv-map` command.
   a) If the point code of the system is displayed in the `rtrv-map` command output (`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 *EAGLE 5 ISS Database Administration Manual - Features*.
   b) If the point code of the system or capability point code is a destination point code of a route, select a point code that is not in the destination point code table (refer to output in *Step 2* on page 88) and not the destination point code of a route (refer to output in *Step 3* on page 88).
7. Change the point code of the system and capability point code by network type using procedures "Adding a Point Code to the Self-Identification of the EAGLE 5 ISS" and "Changing the Self-Identification of the EAGLE 5 ISS" in *Database Administration Manual - SS7*.
8. Enter a destination point code for the HLR location in the Destination table by network type using the `ent-dstn` command.

   Command examples:

   `ent-dstn:dpci=2-100-2`

   `ent-dstn:dpcn=21112`

   where:

   :dpci/dpcn

   Destination point code to add to the database

9. Verify the changes using the `rtrv-dstn` command and specifying the DPC entered in *Step 8* on page 89.

   Command examples:

   `rtrv-dstn:dpci=2-100-2`

   `rtrv-dstn:dpcn=21112`

   Example of possible output for the **DPCI** command example:

```
tekelecstp51 09-08-24 21:16:37 GMT EAGLE 41.0.0

DPCI        CLLI        BEI ELEI  ALIASA       ALIASN/N24  DMN
2-100-2     --------    no  ---   --------     ----------  SS7
```

   Example of possible output for the **DPCN** command example:

```
tekelecstp51 09-08-24 21:16:37 GMT EAGLE 41.0.0

DPCN        CLLI        BEI ELEI  ALIASA       ALIASI  DMN
21112       --------    no  ---   --------     ------  SS7
```

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

Command examples:

```
ent-ls:apci=2-200-2:lsn=ls400001:lst=a
```

```
ent-ls:apcn=21122:lsn=ls500001:lst=a
```

where:

:apci/apcn

Adjacent point code - the DPC of the adjacent signaling node at the far end of the linkset

:lsn

Linkset name

:lst

Linkset type

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

Command example:

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

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

Example of possible output for lsn400001 command example:

```
tekelecstp51 09-08-24 21:16:37 GMT EAGLE 41.0.0

                                  L3T  SLT              GWS GWS GWS
LSN          APCI   (SS7)  SCRN  SET  SET BEI LST LNKS ACT MES DIS SLSCI NIS
ls400001     2-200-2       scr1  1    2   no  a   0    on  off off no    on
CLLI         TFATCABMLQ  MTPRSE  ASL8
RLGHNCXA03W  1           no      no
                     L2T       L1              PCR PCR
LOC  PORT SLC TYPE   SET BPS   MODE TSET ECM   N1  N2
```

Example of possible output for lsn500001 command example:

```
tekelecstp51 09-08-24 21:16:37 GMT EAGLE 41.0.0

                                  L3T SLT              GWS GWS GWS
LSN          APCN   (SS7)  SCRN  SET SET BEI LST LNKS ACT MES DIS SLSCI NIS
ls500001     21122         scr3  1   2  no  a   0 on   off  off no    on
CLLI         TFATCABMLQ  MTPRSE  ASL8
RLGHNCXA03W  1           no      no
                     L2T       L1              PCR PCR
LOC  PORT SLC TYPE   SET BPS   MODE TSET ECM   N1  N2
```

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

Command examples:

```
ent-card:appl=ccs7itu:loc=1105:type=lime1
```

```
ent-card:appl=ccs7itu:loc=1106:type=lime1
```

where:

:appl

Specifies that the application is CCS7ITU.

:loc

Specifies the slot number for the card.

:type

Specifies that the card is a LIME1 card.

13. Enter the E1 interface using the `ent-e1` command.

Command examples:

```
ent-e1:loc=1105:e1port=1
```

```
ent-e1:loc=1106:e1port=1
```

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

Command examples:

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

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

Example of possible output for command example:

```
tekelecstp51 09-08-24 21:16:37 GMT EAGLE 41.0.0

CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
1105   LIME1     CCS7ITU   ls400001      A    00  ------------  B    --
1106   LIME1     CCS7ITU   ls500001      A    00  ------------  B    --
```

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

Command example:

```
ent-slk:l2tset=1:link=a:loc=1105:lsn=ls400001:slc=0:e1port=1:ts=1
```

```
ent-slk:l2tset=1:link=a:loc=1106:lsn=ls500001:slc=0:e1port=1:ts=1
```

where:

:l2tset

Level 2 timer set. A signaling link can be assigned to any of the thirty timer sets.

:link

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

:loc

Card location to which the signaling link is assigned

:lsn

Unique linkset name

:slc

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

e1port

Port for E1 interface on the E1 card to which the signaling link and timeslot are being assigned

ts

E1 timeslot for the assigned signaling link

Signaling links are the only elements in the database supported directly by a hardware device. When a link is added to a linkset, the link remains in Out-of-Service-Maintenance-Disabled (OOS-MT-DSBLD) state until it is activated; see *Step 23* on page 93.

16. Verify the changes using the `rtrv-slk` command, specifying the card location and ID of the signaling link entered in *Step 15* on page 91.

    Command examples:

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

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

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

    Command examples:

    ```
    ent-rte:dpci=2-100-2:lsn=ls400001:rc=10
    ```

    ```
    ent-rte:dpcn=21112:lsn=ls500001:rc=10
    ```

    where:

    :dpci/dpcn

    Destination point code of the node to which the traffic is bound

    :lsn

    Linkset name associated with this route

    :rc

    Relative cost or priority of this route

18. Verify the changes using the `rtrv-rte` command and specifying the destination point code of the route.
19. Add a mated application by network type to the database using the `ent-map` command.

    Command examples:

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

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

    where:

    :grp

    Concerned point code broadcast list (CSPC) group name. This parameter specifies the name of a group of point codes that should be notified of the subsystem status. A different CSPC group can be assigned to each mated PC/SSN.

    :materc

    Mate relative cost

    :mpc/mpca/mpci/mpcn

    Mate remote point code.

    :mssn

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

:pci/pcn

ITU international/national point code

:rc

Relative cost

:ssn

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

20. Verify the changes using the `rtrv-map` command.
21. Allow the LIM cards that were entered in *Step 12* on page 90 by using the `alw-card` command.

    Command examples:

    `alw-card:loc=1105`

    `alw-card:loc=1106`

    This message appears:

    ```
    tekelecstp51 09-08-24 21:16:37 GMT EAGLE 41.0.0
    Card has been allowed.
    ```

22. Verify In-Service-Normal (IS-NR) state of the cards using the `rept-stat-card` command.
23. Activate the signaling links entered in *Step 15* on page 91 using the `act-slk` command.

    Command examples:

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

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

    The link changes state from Out-of-Service-Maintenance-Disabled (OOS-MT-DSBLD) to In-Service-Normal (IS-NR). The output confirms the activation.

    ```
    tekelecstp51 09-08-24 21:16:37 GMT EAGLE 41.0.0
    Activate Link message sent to card
    ```

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

    Command examples:

    `rept-stat-slk:loc=1105`

    `rept-stat-slk:loc=1106`

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

    Example of a possible output:

    ```
    tekelecstp51 09-08-24 21:16:37 GMT EAGLE 41.0.0
    CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
    1105   LIME1     CCS7ITU   ls400001      A    00  ------------  B    --
    1106   LIME1     CCS7ITU   ls500001      A    00  ------------  B    --
    ```

The HLR destinations are now configured and ready for G-Port feature activation.

G-Port Feature Activation Procedure

Use this procedure to enable, turn on, and configure the GSM Mobile Number Portability (G-Port) feature. Refer to *Commands Manual* for detailed descriptions of the commands that are used in this procedure.

CAUTION: Before starting this procedure, contact the *Customer Care Center* on page 3 for assistance in performing the G-Port feature activation procedure. Do not proceed without consulting with Technical Services.

1. Enter the `enable-ctrl-feat` command to enable the G-Port feature:
   `enable-ctrl-feat:partnum=893017201:fak=<Feature Access Key>`
2. Enter the `chg-ctrl-feat` command to turn on the G-Port feature:
   `chg-ctrl-feat:partnum=893017201:status=on`
3. Enter the default country code and default network destination code to convert the nature of address indicator (NAI) of MSISDNs to the international format (`nai=intl`) with the `chg-stpopts` command.

   Command example:

   `chg-stpopts:defcc=1:defndc=38:dsmaud=on:npcfmti=2-9-2-1`

   where:

   :defcc

   Default country code

   :defndc

   Default network destination code

   :dsmaud

   Service Module card checksum audit running state (*on* or *off*)

   :npcfmti

   ITU National Point Code Format Identifier, which identifies how the ITU national point code is entered into the database and how it is displayed in all EAGLE 5 ISS outputs. The ITU national point code is a 14-bit integer.
4. Verify the new country code and network destination code using the `rtrv-stpopts` command.
5. Change the GSM system options in the database using the `chg-gsmopts` command.

   Command example:

   `chg-gsmopts:defmapvr=2:msrsndig=ccrndn:srfaddr=23448:srfnai=7:srfnp=15`

   where:

   :defmapvr

   Default MAP version

   :msrndig

Routing number to be used as is or to be concatenated with the MSISDN

:srfaddr

Entity address of the MNP_SRF node

:srfnai

Nature of address indicator value of the MNP_SRF

:srfnp

Numbering plan value of the MNP_SRF

6. Verify the changes using the `rtrv-gsmopts` command to display all GSM system options from the database.
7. Add routing number prefixes for the operating network using the `ent-homern` command. Add Home RNs that are prefixed to DNs for incoming INP MR messages. Up to 100 routing number prefixes for the operating network can be added to the HOMERN table.

   Command example:

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

   where:

   :rn

   Home routing number prefix. Parameter value is 1 to 15 hex digits (0-F).

8. Verify the changes using the `rtrv-homern` command to retrieve a list of routing number prefixes that belong to the operating network.
9. Display the list of administered service selector combinations using the `rtrv-srvsel` command.

   Avoid lengthy output by filtering the list using various parameter combinations. The service selector table can have over 1,000 entries.

10. Enter the G-Port service selectors by network type, if necessary, using the `ent-srvsel` command.

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

    Command example:

    ```
    ent-srvsel:gtii=4:nai=intl:np=e164:serv=gport:snai=intl:snp=e164:ssn=9:tt=1
    ```

    where:

    :gtii

    Global title indicator, ITU international

    :nai

    Nature of address indicator

    :np

    Numbering plan

    :serv

    Service feature

:snai

International Service Nature of Address Indicator

:snp

Service numbering plan

:ssn

Subsystem number

:tt

Translation type

11. Verify the changes using the `rtrv-srvsel` command to retrieve the list of administered service selector combinations.

    Avoid lengthy output by filtering the list using various parameter combinations. The service selector table can have over 1,000 entries.

    Command examples:

    ```
    rtrv-srvsel:gtii=2
    ```

    ```
    rtrv-srvsel:gtii=4
    ```

    where:

    gtii

    Global title indicator, ITU international

    CAUTION:

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

12. Verify that the Service Module card returns to In-Service-Normal (IS-NR) state using the `rept-stat-card` command.

    WARNING: Do not proceed until In-Service-Normal (IS-NR) state of the Service Module card is restored.

13. After In-Service-Normal (IS-NR) state of the Service Module card is restored and verified using the `rept-stat-card` command, repeat *Step 12* on page 96 for each Service Module card in the system.
14. Set the G-Port service state online using `chg-sccp-serv:serv=gport:state=online`.
15. Confirm that the activation steps were successful by performing the following verifications:

    - Verify that all Service Module cards are loaded and are in In-Service-Normal (IS-NR) state using the `rept-stat-sccp` command.
    - Verify that all Service Module cards and the EPAP are connected and operational using the `rept-stat-mps` command.

- Verify that database levels are identical for the EPAP PDB and RTDB. Display the RTDBs on the Service Module cards using `rept-stat-db:display=all` .

The GSM Mobile Number Portability (G-Port) feature is now enabled, turned on, and operating in the system.

Service Module Card Installation and VSCCP Configuration

This procedure installs Service Module cards in available odd-even slots and configures the Service Module cards to run the VSCCP application. The Service Module card requires two slots and must be installed in an odd slot with an empty even slot to the right. This procedure uses card slots 1107 and 1108 as the available slots for the installation of a Service Module card. Substitute the correct card slot values for your installation in the appropriate steps.

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

1. Determine the available pair of odd-even card slots for the Service Module card using the `rtrv-card` command.
2. Install the Service Module card in the identified slots. This procedure uses card slots 1107 and 1108 as an example.
   a) Open the ejector levers on the card.
   b) Align the card edges with the top and bottom card guides and slowly slide the card into the chassis until the rear connectors of the card contact the mating connectors of the shelf backplane.
   c) Push the left edge of the card faceplate using a constant pressure until the card connectors are securely inserted into the backplane connectors.

      warning: Do not push on the card faceplate with extreme or abrupt force to insert the card connectors into the backplane connectors. Extreme or abrupt force on the card faceplate may damage the faceplate, connector pins, or connector housings.

   d) Engage (push inward) the top and bottom ejector levers to lock the card in the slot and ensure a secure connection between the card and backplane connectors.
   e) Verify that both IMT bus LEDs are illuminated green.
   f) Install the cabling required to connect the card to the MPS.

      Refer to *Hardware and Installation - T1000* and *MPS Platform Software and Maintenance - T1000* for details.

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

   Command example:

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

   where:

   :appl

   Application for the card

:loc

Card location or slot number for the card. For any Service Module card, this card location must be an odd number.

:type

Type of card

4. Verify the addition of the Service Module card to the database using the `rtrv-card` command with the card location specified.

   Command example:

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

   Example of possible output:

   ```
   RLGHNCXA03W 09-08-24 09:12:36 GMT EAGLE 41.0.0
   CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
   1107   DSM       VSCCP     ------------  A    --  ------------  B    --
   ```

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

   Example of possible output:

   ```
   RLGHNCXA03W 09-08-24 21:14:37 GMT EAGLE 41.0.0
   LOC PORT IPADDR   SUBMASK    DUPLEX  SPEED  MACTYPE  AUTO  MCAST
   1107 A   -------  --------   HALF    10     DIX      NO    NO
   1107 B   -------  --------   HALF    10     DIX      NO    NO
   ```

6. Enter the IP address and other parameter values associated with the Service Module card in the database using the `chg-ip-lnk` command.

   Command examples:

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

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

   where:

   :loc

   Card location or slot number of the Service Module card in the EAGLE 5 ISS

   :port

   Ethernet interface Port ID - the physical interface of the Service Module card

   :ipaddr

   IP address for the specified port. This is a TCP/IP address expressed in standard dot notation. IP addresses consist of the network number of the system and the unique host number.

   :submask

   Subnet mask of the IP interface in the form of an IP address with a restricted range of values

   :duplex

   Mode of operation of the interface

:speed

Interface bandwidth in megabits per second. The speed is either 100 Mbps for main Service Module network or 10 Mbps for backup Service Module network.

:mactype

Media Access Control Type of the interface. Specify `dix` for the Digital/Inter/Xerox *de facto* standard for Ethernet 2.

:mcast

Multicast Control to enable or disable multicast support for the interface. This parameter value must be `yes` to establish the connection from the Service Module card to the MPS system.

7. Verify the IP address and other parameter values associated with the Service Module card in the database by entering the `rtrv-ip-lnk` command.

   Example of possible output:

```
RLGHNCXA03W 09-08-24 21:14:37 GMT EAGLE 41.0.0
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
```

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

   Example of possible output:

```
RLGHNCXA03W 09-08-24 21:17:37 GMT EAGLE 41.0.0
IPADDR          HOST
192.1.1.32      KC_HLR2
192.1.1.50      DN_MSC1
192.1.1.52      DN_MSC2
```

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

   Command examples:

   `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

   Host name. Each VSCCP link must be specified separately.

   :ipaddr

   IP network address for each EPAP. The first three octets of the IP address must be the same as MPS A and B ports, respectively. The fourth octet identifies the Service Module card and must have a a unique octet identifier for the card IP address.

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

    Example of possible output:

```
RLGHNCXA03W 09-08-24 21:19:37 GMT EAGLE 41.0.0
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
```

11. Enter local domain and IP router address for the Service Module card using the `chg-ip-card` command.

    Note: Most G-Port customer private networks do not require setting up a default router for the Service Module card. If your network configuration requires a default router to connect the Service Module card communication to the EPAP, then only one default router is assignable to each Service Module card. Assign the default router address to each Service Module card as shown in this step.

    Command example:

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

    where:

    :defrouter

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

    :domain

    Domain name of domain server

    :loc

    Card location or slot number of the Service Module card in the EAGLE 5 ISS

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

    Example of possible output:

```
RLGHNCXA03W 09-08-24 21:21:37 GMT EAGLE 41.0.0
   LOC 1107
     SRCHORDR  LOCAL
     DNSA      -----------
     DNSB      -----------
     DEFROUTER 192.168.122.250
     DOMAIN    NC.TEKELEC.COM
```

13. Boot the Service Module card that was added in *Step 3* on page 97 using the `alw-card` command.

    Command example:

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

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

15. 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 that is either a hostname or IP address.

    Command examples:

    ```
    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".`

where:

:loc

Card location or slot number in the EAGLE 5 ISS

:cmd

Command string passed to Service Module card for processing

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

```
rlghncxa03w 09-08-24 08:30:44 GMT EAGLE 41.0.0
pass: loc=1107: cmd="ping 192.168.122.100"
Command entered at terminal #1.
;
rlghncxa03w 09-08-24 08:30:44 GMT EAGLE 41.0.0
PASS: Command sent to card
;
rlghncxa03w 09-08-24 08:30:44 GMT EAGLE 41.0.0
PING command in progress
;
rlghncxa03w 09-08-24 08:30:46 GMT EAGLE 41.0.0
PING 192.168.122.100: 56 data bytes
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=0.time=5. ms
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=1.time=0. ms
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=2.time=0. ms
----192.168.100.3 PING Statistics----
3 packets transmitted, 3 packets received, 0% packet loss
round-trip (ms) min/avg/max = 0/1/5
PING command complete
```

If the `pass` commands with the `ping` parameter are not successful, verify the correct connection of the hardware cabling and repeat this step. If the command fails again, contact *Customer Care Center* on page 3.

16. Repeat *Step 2* on page 97 through *Step 15* on page 100 to add all Service Module cards (N+1) to be installed in available slots.

The Service Module cards have been added in available slots and are configured for the VSCCP application.

MT-Based GSM SMS NP Feature Activation Procedure

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

Before this feature can be enabled, the G-Port feature must be enabled.
Before the MT-Based GSM SMS NP feature can be turned on, the G-Port Feature must be turned on.
The MT-Based GSM SMS NP feature can be enabled before the G-Port feature is turned on.

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

1. Verify that the G-Port Feature is enabled using the `rtrv-ctrl-feat` command.

2. If the G-Port Feature is not enabled, enable it using *G-Port Feature Activation Procedure* on page 94 before proceeding.
3. Enter the `enable-ctrl-feat` command to enable the MT-Based GSM SMS NP feature.

   ```
   enable-ctrl-feat:partnum=893020001: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 network destination code using the `rtrv-stpopts` command.
6. Enter the `rtrv-gsmopts` command to view the values of the GSMOPTS table options.
7. Change the value DefMCC in the GSMOPTS table using the `chg-gsmopts` command. If desired, other GSM system options may also be changed with this command.

   Note: GSMOPTS:DefMCC must be set to a valid value before the MT-Based GSM SMS NP feature can be turned on.

   For example, enter this command:

   ```
   chg-gsmopts:defmcc=253
   ```

   where:

   defmcc

   Specifies the E212 default mobile country code.

8. Verify the changes using the `rtrv-gsmopts` command.

   This command displays GSM system options from the database.

9. Enter the `rtrv-gsmsmsopts` command to view the values of the GSMSMSOPTS table options.
10. If desired, change the GSM SMS options in the database for the MT-Based GSM SMS NP feature using the `chg-gsmsmsopts` command.

    Note: MTSMSDLTRV must be set to a value other than "NONE" before MTSMSDLTR can be set to either PRERN or POSTRN. For details about all options that can be changed using the `chg-gsmsmsopts` command, see the *Commands Manual*.

    For example, enter this command:

    ```
    chg-gsmsmsopts:mtsmsimsi=mccrndn:mtsmstype=rn
    ```

    where:

    mtsmsimsi

    Specifies the format of the IMSI parameter of the SRI_SM ACK response.

    mtsmstype

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

11. Verify the changes using the `rtrv-gsmsmsopts` command.
    This command displays all GSM SMS options from the database.
12. If the value of GSMSMSOPTS: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
    ```
13. 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.
14. Verify that the G-Port Feature is turned on using the `rtrv-ctrl-feat` command.
15. If the G-Port Feature is not turned on, see *G-Port Feature Activation Procedure* on page 94 before proceeding.
16. Enter the `chg-ctrl-feat` command to turn on the MT-Based GSM SMS NP feature.
    ```
    chg-ctrl-feat:partnum=893020001:status=ON
    ```

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

MT-Based GSM MMS NP Feature Activation Procedure

This procedure is used to activate the MT-Based GSM MMS NP feature.

Before this feature can be enabled, the MT-Based GSM SMS NP feature must be enabled.
Before the MT-Based GSM MMS NP feature can be turned on, the MT-Based GSM SMS NP feature must be turned on.
The MT-Based GSM MMS NP feature can be enabled before the MT-Based GSM SMS NP feature is turned on.

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

1. Verify that the MT-Based GSM SMS NP feature is enabled using the `rtrv-ctrl-feat` command.
2. If the MT-Based GSM SMS NP feature is not enabled, enable it using *MT-Based GSM SMS NP Feature Activation Procedure* on page 101 before proceeding.
3. Enter the `enable-ctrl-feat` command to enable the MT-Based GSM MMS NP feature.
    ```
    enable-ctrl-feat:partnum=893024101:fak=<Feature Access Key>
    ```
4. Enter the `rtrv-gsmsmsopts` command to view the values of the GSMSMSOPTS table option.
5. If desired, MT-Based GSM MMS NP feature options may be changed with this command.
    For example, enter this command:
    ```
    chg-gsmsmsopts:mtmmsgta=12345:mtmmsackn=ack:mtmmstype=rn
    ```
    where:
    mtmmsgta

Specifies the GTA that is compared to the SCCP CgPA GTA of an SRI_SM message to determine whether the originator of the messages is a Home MMSC.

mtmmsackn

Specifies the message that is generated in response to a successful RTDB lookup for an SRI_SM message from a Home MMSC.

mtmmstype

Specifies the value of the entity type that indicates that a successful lookup occurred in the RTDB for messages that are modified by the MT-Based GSM MMS NP feature.

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

6. Verify the changes using the `rtrv-gsmsmsopts` command.
   This command displays the GSM SMS options from the database.
7. Verify that the MT-Based GSM SMS NP feature is turned on using the `rtrv-ctrl-feat` command.
8. If the MT-Based GSM SMS NP feature is not turned on, refer to the *MT-Based GSM SMS NP Feature Activation Procedure* on page 101 before proceeding.
9. Enter the `chg-ctrl-feat` command to turn on the MT-Based GSM MMS NP feature.
   ```
   chg-ctrl-feat:partnum=893024101:status=ON
   ```

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

G-Port SRI Query for Prepaid Feature Activation Procedure

This procedure is used to activate the G-Port SRI Query for Prepaid feature.

Before this feature can be enabled, the G-Port feature must be enabled and turned on.
The G-Port SRI Query for Prepaid feature cannot be enabled with a Tempoarary Feature Access key (FAK).
The G-Port SRI Query for Prepaid feature cannot be turned off after the feature is turned on.

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

1. Verify that the G-Port Feature is enabled and turned on using the `rtrv-ctrl-feat` command.
2. If the G-Port Feature is not enabled and tuned on, enable and turn on the G-Port feature using *G-Port Feature Activation Procedure* on page 94 before proceeding.
3. Enter the `enable-ctrl-feat` command to enable the G-Port SRI Query for Prepaid feature.
   ```
   enable-ctrl-feat:partnum=893017701:fak=<Feature Access Key>
   ```
4. Enter the `ent-gserv-data` command to provision the translation type, originating point code, or global title address data in the GSERV table.
   These values are used to determine whether a Send Routing Information (SRI) request receives G-Port SRI Query for Prepaid service or normal G-Port service..
   Command example:

```
ent-gserv-data:tt=77
```

where:

tt

Translation Type.

5. Verify the new values of the GSERV table using the `rtrv-gserv-data` command.
6. Enter the chg-ctrl-feat command to turn on the G-Port SRI Query for Prepaid feature.

```
chg-ctrl-feat:partnum=893017701:status=ON
```

The G-Port SRI Query for Prepaid feature is now enabled, turned on, and operating in the system.

GSM MAP SRI Redirect to Serving HLR Feature Activation Procedure

This procedure is used to activate the GSM MAP SRI Redirect to Serving HLR feature.

Before this feature can be enabled, the G-Port feature must be enabled and turned on.
The GSM MAP SRI Redirect to Serving HLR feature cannot be enabled with a Temporary Feature Access Key.
The GSM MAP SRI Redirect to Serving HLR feature cannot be turned off after the feature is turned on.

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

1. Verify that the G-Port Feature is enabled and turned on using the `rtrv-ctrl-feat` command.
2. If the G-Port Feature is not enabled and turned on, enable and turn on the G-Port feature using *G-Port Feature Activation Procedure* on page 94 before proceeding.
3. Enter the `enable-ctrl-feat` command to enable the GSM MAP SRI Redirect to Serving HLR feature.

```
enable-ctrl-feat:partnum=893014001:fak=<Feature Access Key>
```

4. Enter the `chg-prefix-feat` command to relate the GSM MAP SRI Redirect to Serving HLR feature to vendor prefix values, and to specify the prefix numbers that associate to entries in the Vendor ID List. A maximum of three prefix values can be entered in the Vendor Prefix Table for the GSM MAP SRI Redirect to Serving HLR feature.

   Command examples:

```
chg-prefix:feature="gsm map sri redirect"prefixnum=1:prefix=1004
chg-prefix:feature="gsm map sri redirect"prefixnum=2:prefix=1003
chg-prefix:feature="gsm map sri redirect"prefixnum=3:prefix=1004
```

   where:

   feature

   Feature Name.

   prefixnum

   Prefix Number. GSM MAP SRI Redirect to Serving HLR feature uses 1 - 3.

   prefix

Prefix Value.

5. Verify the Vendor Prefix Table entries using the `rtrv-prefix` command.
6. Enter Vendor ID Length for the Vendor ID List using the `ent-vendid` command.

   Command example:

   ```
   ent-vendid:vendidlen=6
   ```

   where:

   vendidlen

   Vendor ID Length. All Vendor IDs defined for the GSM MAP SRI Redirect to Serving HLR feature must contain this number of digits.

7. Enter the Vendor IDs and Vendor Numbers using the `ent-vendid` command.

   Command example:

   ```
   ent-vendid:vendid=886932:vendnum=1:vendtype=1
   ent-vendid:vendid=886936:vendnum=1:vendtype=1
   ent-vendid:vendid=886935:vendnum=2:vendtype=2
   ent-vendid:vendid=886938:vendnum=3:vendtype=1
   ```

   where:

   vendid

   Vendor ID.

   vendnum

   Vendor Number, used as a reference to the Vendor prefix.

   vendtype

   Vendor Type.

8. Verify that all G-Port provisioning information is specified: service selector, HomeRN deletions, default GTT, and GSMOPTS valuues.
9. Enter the `chg-ctrl-feat` command to turn on the GSM MAP SRI Redirect to Serving HLR feature.

   ```
   chg-ctrl-feat:partnum=893014001:status=ON
   ```

The GSM MAP SRI Redirect to Serving HLR feature is now enabled, turned on, and operating in the system.

Activating the 1100 TPS/DSM for ITU NP Feature

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

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

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

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

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

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

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

Note: To enter and lock the serial number of the EAGLE 5 ISS, the `ent-serial-num` command must be entered twice. The first entry of the `ent-serial-num` command adds the correct serial number to the database with the `serial` parameter. The second entry of the `ent-serial-num` command with the `serial` and `lock=yes` parameters locks the serial number. Verify that the serial number in the database is correct before locking the serial number. The serial number is on a label attached to the control shelf (shelf 1100).

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

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

   Example of a possible output:

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

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

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

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

2. Based on the output in *Step 1* on page 107, perform one of the following:

- If the `rtrv-ctrl-feat` output shows that the LNP feature is enabled, this procedure cannot be performed. The 1100 TPS/DSM for ITU NP feature cannot be enabled if the LNP feature is enabled.
- If the 1100 TPS/DSM for ITU NP entry of the `rtrv-ctrl-feat` output shows that the 1100 TPS/DSM for ITU NP feature is enabled and the feature status is on, no further action is necessary.
- If the feature is enabled and the feature status is off, go to *Step 13* on page 110.
- If the 1100 TPS/DSM for ITU NP and LNP features are not enabled, continue to *Step 3* on page 108.

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

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

   - If the G-Flex feature is on, continue to *Step 4* on page 108.
   - If the G-Flex feature is off, go to *Step 5* on page 108.

4. Verify that the ANSI G-Flex option is not enabled or turned on by entering the `rtrv-stpopts` command.

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

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

   - If the ANSIGFLEX value is *yes* in the `rtrv-stpopts` output , the ANSI G-Flex option is enabled and the remainder of this procedure cannot be performed.
   - If the ANSIGFLEX value is *no* in the `rtrv-stpopts` output, the ANSI G-Flex option is not enabled. Proceed to *Step 6* on page 108.

5. Determine whether the GTT feature is turned on by examining the output of the `rtrv-feat` command.

   The 1100 TPS/DSM ITU NP feature cannot be enabled unless the GTT feature is turned on. The GTT feature is shown by the GTT entry in the `rtrv-feat` output in *Step 3* on page 108.

   - If the GTT feature is turned on, continue to *Step 6* on page 108.
   - If the GTT feature is turned off, perform "Adding a Service Module" in *Database Administration Manual - Global Title Translation* to turn on the GTT feature and to add the required number of Service Module cards to the database. After "Adding a Service Module" has been performed, go to *Step 11* on page 109.

6. Verify the number of Service Module cards provisioned in the database using the `rtrv-card:appl=vsccp` command:

   Example of a possible output:

```
tklc1110501 07-04-12 17:28:02 EST  EAGLE5 37.0.0
CARD   VERSION      TYPE      GPL        PST            SST        AST
1111   128-015-000  DSM       SCCPHC     IS-NR          Active     -----
1101   128-015-000  DSM       VSCCP      IS-NR          Active     -----

Command Completed.
```

7. Based on the output shown in *Step 6* on page 108, perform one of the following:

- If the required number of Service Module cards is provisioned in the database, continue to *Step 8* on page 109.
- If the required number of Service Module cards is not provisioned in the database, perform "Adding a Service Module" in *Database Administration Manual - Global Title Translation* to add the required number of Service Module cards to the database. After "Adding a Service Module" has been performed, continue with *Step 8* on page 109.

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

   Example of a possible output:

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

System serial number = nt00000123

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

9. Compare the serial number located on a label affixed to the control shelf (shelf 1100) to the output shown in *Step 8* on page 109, then perform one of the following:

   - If the serial number is not correct and is locked, this feature cannot be enabled and the remainder of this procedure cannot be performed. Contact *Customer Care Center* on page 3 to change an incorrect and locked serial number.
   - If the serial number is not correct and is not locked, continue to *Step 10* on page 109.
   - If the serial number is correct but is not locked, go to *Step 12* on page 109.
   - If the serial number is correct and is locked, go to *Step 13* on page 110.

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

    Command example:

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

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

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

11. Verify with the `rtrv-serial-num` command that the serial number entered in *Step 10* on page 109 was entered correctly. If the serial number was not entered correctly, repeat *Step 10* on page 109 and enter the correct serial number.

    Example of a possible output:

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

System serial number is not locked.

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

12. Lock the serial number in the database by entering the `ent-serial-num` command with the correct serial number as shown in *Step 11* on page 109 and with the `lock=yes` parameter value.

    Command example:

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

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

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

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

    Command example:

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

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

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

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

14. Perform on of the following:

    - To turn on the 1100 TPS/DSM for ITU NP feature, go to *Step 15* on page 110.
    - To not turn on the 1100 TPS/DSM for ITU NP feature, go to *Step 17* on page 110. The transaction rate will remain at 850 TPS per Service Module card.

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

    Command example:

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

    This message is displayed:

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

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

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

    Command example:

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

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

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

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

    Command example:

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

Example of a possible output:

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

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

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

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

    Command example:

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

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

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

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

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

This message is displayed:

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

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

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

This message is displayed:

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

Activating the E5-SM4G Throughput Capacity Feature

This procedure is used to enable and turn on the E5-SM4G Throughput Capacity feature.

The E5-SM4G Throughput Capacity 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, the maximum number of 25 E5-SM4G cards must be provisioned and installed in the EAGLE 5 ISS and one or more EPAP-related features enabled and turned on.

The E5-SM4G Throughput Capacity feature cannot be enabled unless the EAGLE 5 ISS contains Service Module cards. Service Module cards cannot be installed in the EAGLE 5 ISS unless HIPR cards are installed in all shelves containing Service Module cards. Use the `rept-stat-gpl:gpl=hipr` command to verify whether HIPR cards are installed in all shelves containing Service Module cards.

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 feature access key for the E5-SM4G Throughput Capacity feature is provided by Tekelec. Contact your Tekelec Sales Representative or Account Representative before beginning the feature activation procedure if you do not have the feature access key for this feature. Based on the feature part number and the serial number of the EAGLE 5 ISS, the feature access key is site-specific. The feature access key contains thirteen alphanumeric characters and is not case sensitive. The E5-SM4G Throughput Capacity feature cannot be enabled with a temporary feature access key. The E5-SM4G Throughput Capacity feature cannot be turned off after the feature is turned on.

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

Note:

To enter and lock the serial number of the EAGLE 5 ISS, the `ent-serial-num` command must be entered twice. The first entry of the `ent-serial-num` command adds the correct serial number to the database with the `serial` parameter. The second entry of the `ent-serial-num` with the `serial` and `lock=yes` parameters locks the serial number. Verify that the serial number in the database is correct before locking the serial number. The serial number is on a label affixed to the control shelf (shelf 1100).

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

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

   Example of a possible output:

```
rlghncxa03w 09-08-24 21:15:37 EST  EAGLE 40.1.0
The following features have been permanently enabled:

Feature Name              Partnum    Status  Quantity
HC-MIM SLK Capacity       893012707  on            64
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                 893006403  on          8000

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.
```

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 `rtrv-ctrl-feat` output shows the E5-SM4G Throughput Cap entry status as *on*, then the E5-SM4G Throughput Capacity feature is enabled and turned on. No further action in this procedure is necessary.

If the `rtrv-ctrl-feat` output shows the E5-SM4G Throughput Cap entry status as *off*, then the E5-SM4G Throughput Capacity feature is enabled but not turned on. Go to *Step 9* on page 115 to turn on the feature.

If the E5-SM4G Throughput Capacity and LNP features are not enabled, continue to *Step 2* on page 113.

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

   The STPLAN feature is displayed as the LAN entry in the `rtrv-feat` output.

   If the STPLAN feature is turned on, the E5-SM4G Throughput Capacity feature cannot be enabled and this procedure cannot be performed.

   If the STPLAN feature is turned off, continue to *Step 3* on page 113.

3. Verify that the GTT feature is turned on.

   The GTT feature is displayed as the GTT entry in the rtrv-feat output in *Step 2* on page 113. To enable the E5-SM4G Throughput Capacity feature, the GTT feature must be turned on.

   If the GTT feature is turned off, continue to *Step 4* on page 113.

   If the GTT feature is turned on, go to *Step 5* on page 113.

4. Perform "Adding a Service Module" in *Database Administration Manual - Global Title Translation* to:

   - Turn on the GTT feature
   - Add the required number of Service Module cards to the database

   After the "Adding a Service Module" procedure is completed, go to *Step 6* on page 114

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

   Example of a possible output.

```
rlghncxa03w 09-08-24 11:40:26 EST  EAGLE 40.1.0
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 Service Module cards is provisioned in the database, continue to *Step 6* on page 114.

If the required number of Service Module cards is not provisioned in the database, perform "Adding a Service Module" in *Database Administration Manual - Global Title Translation* to add the required number of Service Module cards to the database. After the "Adding a Service Module" procedure is completed, continue to *Step 6* on page 114..

6. 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.

```
rlghncxa03w 09-08-24 11:40:26 EST  EAGLE 40.1.0
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, continue to *Step 7* on page 114.

If HIPR cards are not installed on all shelves containing E5-SM4G cards, perform the procedure in *Installation Manual - EAGLE 5 ISS* to install the HIPR cards. After the HIPR cards have been installed, continue to *Step 7* on page 114.

7. Display the serial number in the database with the `rtrv-serial-num` command. The serial number is on a label affixed to the control shelf (shelf 1100).

Example of a possible output:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
System serial number = nt00001231

System serial number is not locked.

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

If the serial number is not correct and is locked, this feature cannot be enabled and the remainder of this procedure cannot be performed. Contact *Customer Care Center* on page 3 to change an incorrect and locked serial number.

If the serial number is not correct and is not locked, continue to *Step 8* on page 114.

If the serial number is correct and is not locked, go to *Step 10* on page 115.

If the serial number is correct and locked, go to *Step 11* on page 115.

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

Command example:

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

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

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

9. Verify that the serial number entered in *Step 8* on page 114 was entered correctly using the `rtrv-serial-num` command.

   Example of a possible output:

```
rlghncxa03w 09-08-24 21:15:37 EST  EAGLE 40.1.0
System serial number = nt00001231

System serial number is not locked.

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

   If the serial number was not entered correctly, repeat *Step 8* on page 114 and enter the correct serial number.

10. Lock the serial number in the database by entering the `ent-serial-num` command with the correct serial number as shown in *Step 9* on page 115 and with the `lock=yes` parameter value.

    Command example:

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

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

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

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

    Command example:

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

    Note: The feature access key for the E5-SM4G Throughput Capacity feature is provided by Tekelec. Contact your Tekelec Sales Representative or Account Representative if you do not have the feature access key for this feature. This feature cannot be enabled with a temporary feature access key.

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

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

12. Perform one of the following:

    - To turn on the E5-SM4G Throughput Capacity feature, continue to *Step 13* on page 115.
    - To not turn on the E5-SM4G Throughput Capacity feature, go to *Step 14* on page 116.

13. Turn on the E5-SM4G Throughput Capacity feature using the `chg-ctrl-feat` command, specifying the E5-SM4G Throughput Capacity feature part number and the `status=on` parameter value.

    Note: After this feature is turned on, it cannot be turned off.

    Command example:

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

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

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

14. Verify the changes by entering the `rtrv-ctrl-feat` command with the E5-SM4G Throughput Capacity feature part number .

    Command example:

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

    Example of a possible output:

    ```
    rlghncxa03w 09-08-24 21:15:37 EST  EAGLE 40.1.0
    The following features have been permanently enabled:

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

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

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

15. Back up the new changes using the `chg-db` command.

    Command example:

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

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

Chapter 5

Maintenance and Measurements

Topics:

This chapter describes the maintenance and measurements information available from the EAGLE 5 ISS for the G-Port feature. The information includes status, alarms (UAMs), information messages (UIMs), and reports from the Measurements Platform.

Hardware Requirements

The EPAP-related features require Service Module cards that run the VSCCP application. The EAGLE 5 ISS can equipped with from 1 to 25 Service Module cards to support the EPAP-related features.

EPAP Status and Alarms

Because EPAP has no direct means of accepting user input or displaying output messages on EAGLE 5 ISS terminals, maintenance, measurements, and status information are routed through a Service Module card. EPAP sends two types of messages to the Service Module card: *EPAP Maintenance Blocks* on page 118 and *DSM Status Requests* on page 119. Each message type is discussed in the following sections.

EPAP Maintenance Blocks

The active EPAP generates and sends maintenance blocks to the primary Service Module card. One maintenance block is sent as soon as the IP link is established between the active EPAP and the primary Service Module card. Additional maintenance blocks are sent whenever the EPAP needs to report any change in status or error conditions. The information returned in maintenance blocks is included in the output of the `rept-stat-mps` and `rept-stat-sccp` commands.

The EPAP sends maintenance blocks that contain at least the following information:

- Status of EPAP 'A' - actual states are active, standby, and down (inoperative). Maintenance blocks include a field for this information so that it can be forwarded to the EPAP A Device Control Block (DCB), where it is available for the output of the `rept-stat-mps` command.
- Status of EPAP 'B' - actual states are active, standby, and down (inoperative). Maintenance blocks include a field for this information so that it can be forwarded to the EPAP B DCB, where it is available for the output of the `rept-stat-mps` command.
- Identification of Active EPAP - a field to identify the active EPAP.
- Congestion Indicator - an indicator showing provisioning link congestion. The link between the EPAPs and the external source of provisioning data can become congested in high-provisioning traffic situations. When this occurs and subsequently as the congestion clears, the EPAP sends maintenance blocks to the Service Module card. The EPAP must ensure that no more than one maintenance block per second is sent to the primary Service Module card if the only reason is to report a change in congestion status.
- Alarm Conditions - an error code field. If the EPAP needs to report an alarm condition, it puts an appropriate UAM identifier in this field.
- Current MPS Database Size - a field indicating the current RTDB size. The Service Module card uses this information to calculate the percentage of memory utilized by the RTDB.

DSM Status Requests

When the EPAP needs to know the status of a Service Module card, it sends a DSM status request to that Service Module card. Because status messages are sent over UDP, the EPAP broadcasts the DSM status request (to all Service Module cards) and each Service Module card returns its status to the EPAP.

DSM Status Reporting to the EPAP

The sections that follow describe the DSM status reporting for the EPAP.

DSM Status Messages – When Sent

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

- The Service Module card is booted.
- The Service Module card receives a DSM Status Request message from the EPAP
- The Service Module card determines that it needs to download the entire database, for example, if the Service Module card determines that the RTDB needs to be downloaded (for instance, if the database is totally corrupted), or if a craftsperson requests that the database be reloaded.
- The Service Module card starts receiving database downloads or database updates. When a Service Module card starts downloading the RTDB or accepting database updates, it sends a DSM Status Message informing the EPAP of the first record received. This helps the EPAP keep track of downloads in progress.

DSM Status Messages Fields

The DSM Status Message provides the following information to the EPAP:

- **DSM Memory Size**. When the Service Module card is initialized, it determines the amount of memory present. The EPAP uses the value to determine if the Service Module card has enough memory to hold the RTDB.

  Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.
- **Load Mode Status**. This indicator indicates whether or not 80% of the IS-NR (In-Service Normal) LIMs have access to SCCP services.

Hourly Maintenance Report

The Hourly Maintenance Report, generated automatically, includes the alarm totals of the G-Port subsystem and Service Module card /EPAP IP links. A sample follows.

```
    eagle10506 99-10-10 16:00:01 EST EAGLE 37.5.0
    5072.0000 REPT COND GSM SS
    "GSM SS :0440,MTCEINT-0,SA,99-10-10,16:00:01,,,,*C"
;
    eagle10506 99-10-10 16:00:01 EST EAGLE 37.5.0
    5073.0000 REPT COND INP SS
```

```
    "INP SS :0440,MTCEINT-0,SA,99-10-10,16:20:01,,,,*C"
;
    eagle10506 99-10-10 16:00:01 EST EAGLE 37.5.0
    5077.0000 REPT COND EPAPDSM
    "EPAPDSM :0084,MTCEINT-0,SA,99-10-10,16:00:01,,,,**"
;
    eagle10506 99-10-10 16:00:01 EST EAGLE 37.5.0
    5007.0000 REPT COND CARD
    "CARD 1102:0422,SCMMA,SA,99-10-10,16:00:01,,,,**"
;
    eagle10506 99-09-13 16:00:01 EST EAGLE 37.5.0
    3561.0000 REPT COND ALARM STATUS
    "ALARMS:PERM. INHIBITED,0,0,0"
    "ALARMS:TEMP. INHIBITED,0,0,0"
    "ALARMS:ACTIVE,10,14,3"
    "ALARMS:TOTAL,10,14,3"
;
```

G-Port System Status Reports

Status reporting described here includes the following:

- System status
- G-Port status
- Service Module card memory capacity status
- Loading mode support status

System Status Reporting

The `rept-stat-sys` command supports the Service Module cards running the VSCCP application.

The `rept-stat-sccp` command supports the Service Module cards running the VSCCP application and reports G-Port statistics.

G-Port Status Reporting

The `rept-stat-mps` command supports G-Port system reporting. rept-stat-mps concentrates on reporting the status of the provisioning system. See "Maintenance and Measurements User Interface Commands", for more details. G-Port statistics are placed in the `rept-stat-sccp` command.

Service Module card Memory Capacity Status Reporting

As described in the *DSM Status Messages Fields* on page 119, the Service Module card sends a message to the EPAP containing the amount of memory on the Service Module card. The EPAP determines whether the Service Module card has enough memory to store the RTDB and sends an ack or nak back to the Service Module card indicating whether or not the Service Module card 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 Service Module card database capacity requirements.

When the EPAP sends database updates to the Service Module cards, the update messages include a field that contains the new database memory requirements. Each Service Module card monitors the DB size requirements, and issues a minor alarm if the size of the DB exceeds 80% of its memory. If a database increases to the point that there is insufficient Service Module card memory, a major alarm is issued.

The `rept-stat-mps:loc=xxxx` command shows the amount of memory used by the RTDB as a percent of available Service Module card memory.

Loading Mode Support Status Reporting

The OAM application determines whether or not the system is in an unstable loading mode since it knows the state of all LIM, SCCP, and Service Module cards in the system. When the loading mode is unstable, the `rept-stat-sys` command reports the existence of the unstable loading mode and the specific conditions that caused it. Refer to *Loading Mode Support* on page 122, for more details.

Code and Application Data Loading

Service Module Code Loading

The EAGLE 5 ISS OAM code loads the Service Module card.

EPAP Application Data Loading

The G-Port feature requires that new TDM-resident data tables be loaded in addition to those currently supported by EAGLE 5 ISS. The GPL and data loading support this additional table loading while maintaining support for loading the existing EAGLE 5 ISS tables.

In order to support both RTDB and EAGLE 5 ISS data loading, the Service Module card GPL verifies its hardware configuration during initialization to determine if it has the capacity to support the RTDB.

The Service Module card GPL application data loader registers all tables for loading, independent of the G-Port feature provisioning and main board / applique hardware configuration. As a result, load requests are always identical. During loading, multiple Service Module card load requests are combined into a single download, reducing the overall download time. The Service Module card stores or discards RTDB table data based on whether or not it has RTDB-capable hardware for features like G-Port, G-Flex, INP, and EIR.

The OAM, on the other hand, downloads or sets memory boundaries for the G-Port options, HOMERN, and service selector tables only if the G-Port feature is provisioned. When the G-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 G-Port Data Initialization

If the Service Module card's hardware configuration cannot support the RTDB, the G-Port tables are marked as absent during Service Management System initialization. Memory is not reserved for the G-Port table data. G-Port tables are registered with the application data loader (ADL),

specifying a data discard function. G-Port table data is discarded during loading by the ADL discard function, rather than storing it in memory.

EPAP-Service Module Card Loading Interface

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

Loading Mode Support

No more than 16 LIMs can be serviced by each Service Module card.

80% Threshold of Support

Loading mode is based on the ability of the system to provide SCCP service to at least 80% of the LIMs.

Service Module Card Capacity

An insufficient number of Service Module cards that are in the is-nr (In Service - Normal) or oos-mt-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 Service Module cards to be inhibited or to have problems that prevent them from operating normally. If enough Service Module cards are out of service, it may not be possible for the remaining is-nr Service Module cards to service at least 80% of the number of is-nr LIMs. This is called "insufficient SCCP service." When this occurs, some of the LIMs are denied SCCP service. It is possible to inhibit LIMs to bring the ratio back to 16:1 (or better).

Conditions That Create an Unstable Loading Mode

The current system implementation interrupts and aborts card loading upon execution of an STP database `chg` command. Loading mode support denies the execution of EAGLE 5 ISS database `chg` commands when the system is in an unstable loading mode. An unstable loading mode exists when any of the following conditions are true:

- The system's maintenance baseline has not been established.
- Less than 80% of the number of LIMs provisioned are is-nr or oos-mt-dsbld.
- The number of is-nr and oos-mt-dsbld Service Module cards running the VSCCP application is insufficient to service at least 80% of all provisioned LIMs.
- Insufficient SCCP service occurs when an insufficient number of is-nr Service Module cards are available to service at least 80% of the number of is-nr LIMs.
- LIM cards are being denied SCCP service and any Service Module cards are in an abnormal state (oos-mt or is-anr).

Effects of System in an Unstable Loading Mode

- No affect on RTDB downloads or updates.

  Unstable loading mode has no impact on RTDB downloads or the stream of RTDB updates.

- `rept-stat-sys` reports unstable loading mode.

  When the loading mode is unstable, the `rept-stat-sys` command response reports the existence of the unstable loading mode and the specific trigger that caused it.

- No STP database updates allowed.

  Once an STP database has been loaded, that database can be updated (as long as the system is not in an unstable loading mode). However, if an STP update arrives during STP database loading, the Service Module card aborts the current loading, issues a class 01D7 obit, and reboots. *Figure 18: Obit Message for Abort of Card Loading* on page 123 shows an example.

Figure 18: 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

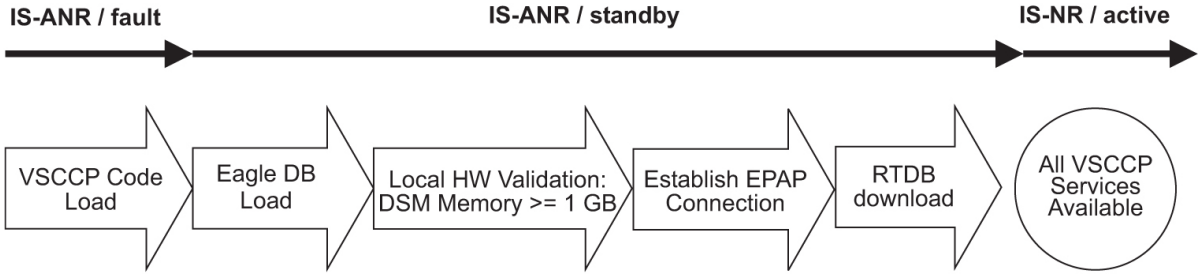
Use the force option to force the execution of commands that would put the system in unstable loading mode. If executing the `ent-card` or `inh-card` commands would cause the system to enter an unstable loading mode, use the force option on the command.

State Transitions During Start-Up

Figure 19: EPAP-related Feature Enabled, Normal Operating Sequence on page 124 through *Figure 25: EPAP-related Feature Activation Unsuccessful due to Insufficient Database* on page 126 show the transitions that a Service Module card goes through as it boots, loads code and data, and runs various VSCCP services. These figures do not illustrate every possible situation, but they do include the most common scenarios involving EPAP-related features.

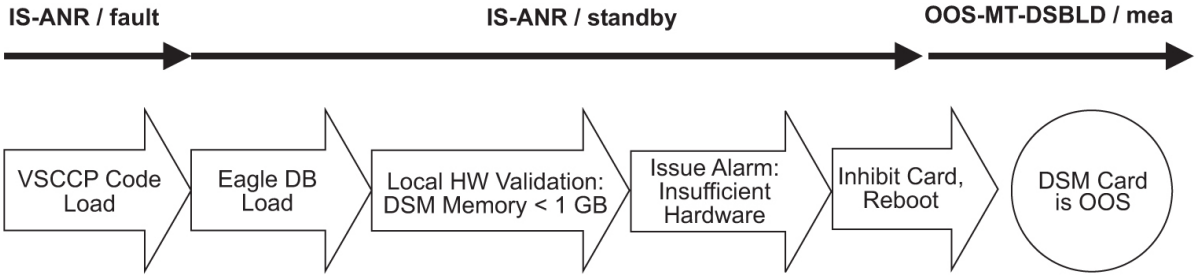
In *Figure 19: EPAP-related Feature Enabled, Normal Operating Sequence* on page 124, the EPAP-related feature is enabled, and the Service Module card memory is at least 1 GB and is connected to the EPAP. A normal Service Module card operating sequence occurs, providing EPAP-related feature service.

Figure 19: EPAP-related Feature Enabled, Normal Operating Sequence



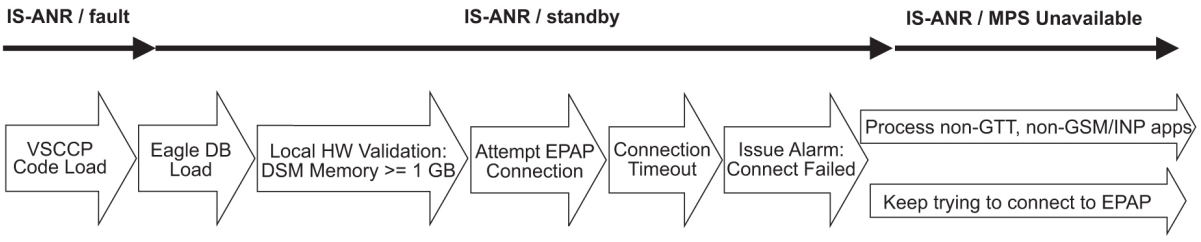
In *Figure 20: EPAP-related Feature Enabled, but Service Module card Memory Less Than 1 GB* on page 124, the EPAP-related feature is enabled, but the Service Module card memory is less than 1 GB. The EPAP-related feature cannot begin operation. Refer to *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information about the dimensioning rules and the Service Module card database capacity requirements.

Figure 20: EPAP-related Feature Enabled, but Service Module card Memory Less Than 1 GB



In *Figure 21: EPAP-related Feature Enabled, but Service Module card Not Connected to EPAP* on page 124, the EPAP-related feature is enabled, the Service Module card memory has at least 1 GB, but the Service Module card is unable to connect EPAP; the EPAP-related feature cannot begin operation.

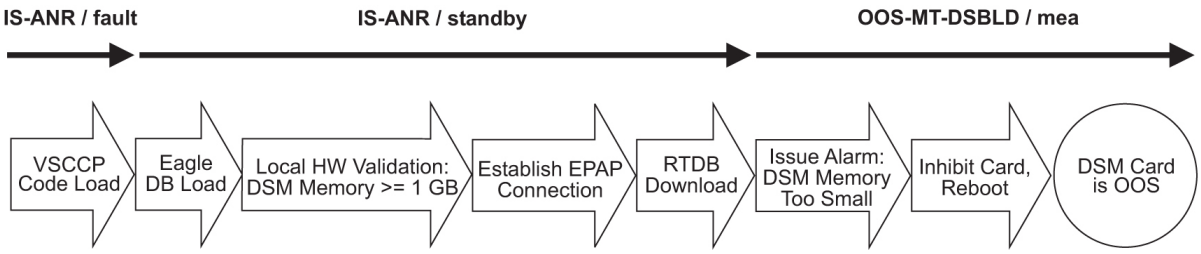
Figure 21: EPAP-related Feature Enabled, but Service Module card Not Connected to EPAP



In *Figure 22: EPAP-related Feature Enabled, but Service Module card Memory Insufficient for Database* on page 125 , the EPAP-related feature is enabled, the Service Module card has the required 1 GB memory and is connected to the EPAP, but the Service Module card is too small for the required database; the EPAP-related feature cannot begin operation. Refer to *Dimensioning Guide for EPAP*

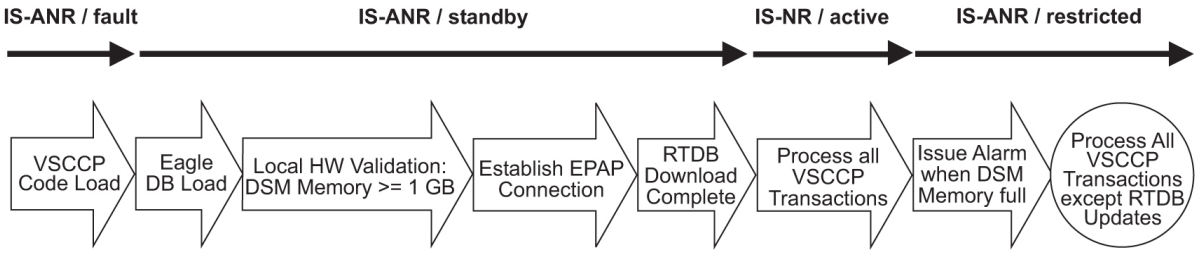
Advanced DB Features Technical Reference for important information about the dimensioning rules and the Service Module card database capacity requirements.

Figure 22: EPAP-related Feature Enabled, but Service Module card Memory Insufficient for Database



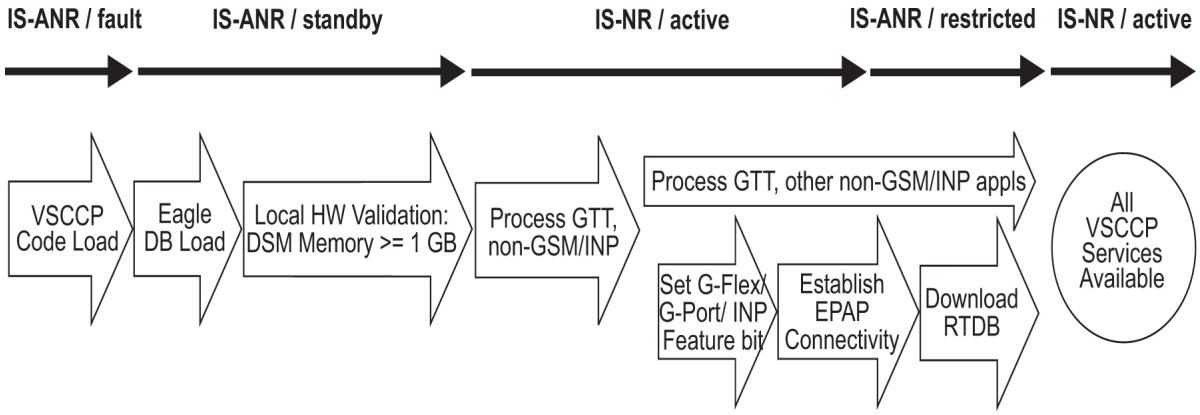
In *Figure 23: EPAP-related Feature Enabled, but Database Exceeds Service Module card Memory* on page 125, the EPAP-related feature is enabled, the Service Module card is connected to the EPAP, but the RTDB grows eventually to exceed the capacity of the Service Module card memory, despite its memory size of at least 1 GB (an alarm is issued when the Service Module card memory becomes full from the RTDB update). The EPAP-related feature cannot begin operation. Refer to *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information about the dimensioning rules and the Service Module card database capacity requirements.

Figure 23: EPAP-related Feature Enabled, but Database Exceeds Service Module card Memory



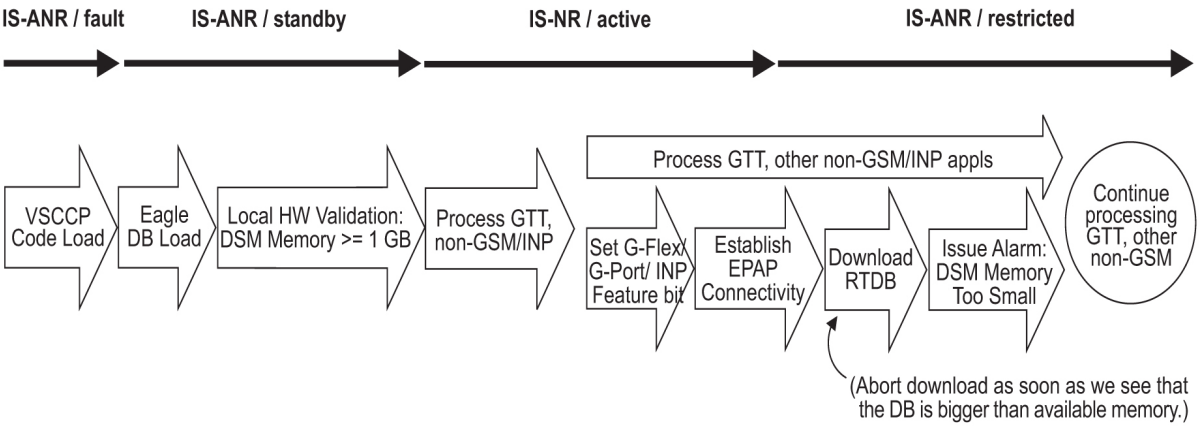
In *Figure 24: EPAP-related Feature Not Enabled at First, but then Activated on Service Module card* on page 125, the EPAP-related feature is not initially enabled; the Service Module card memory has at least 1 GB but no EPAP connection; the Service Module card is running other applications when the EPAP-related feature is turned on; the Service Module card has sufficient memory to provide EPAP-related feature service.

Figure 24: EPAP-related Feature Not Enabled at First, but then Activated on Service Module card



In *Figure 25: EPAP-related Feature Activation Unsuccessful due to Insufficient Database* on page 126, the EPAP-related feature is not initially enabled; the Service Module card memory has at least 1 GB but no EPAP connection, and is running other applications when the EPAP-related feature is turned on. However, the Service Module card memory is insufficient for the needed database, and the cannot provide EPAP-related feature operation. Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information about the dimensioning rules and the Service Module card database capacity requirements.

Figure 25: EPAP-related Feature Activation Unsuccessful due to Insufficient Database



G-Port Related Alarms

Refer to the *Unsolicited Alarm and Information Messages* manual for a complete description and the associated corrective procedure for all G-Port related UAMs.

EPAP - Service Module card Connection Status

The EPAP and the Service Module are connected over a 100-Mbit Ethernet link and use TCP/IP. If this connection is inoperative, the Service Module generates an appropriate UAM. Loss of connectivity or inability of the EPAP to communicate (for example, hardware or software failure) is detected and reported within 10 seconds.

EPAP UAMs

The maintenance blocks from the EPAP have a field used to identify error message requests. The Service Module processes the incoming maintenance blocks and generates the requested UAM. The actual EPAP UAMs are defined in the *Unsolicited Alarm and Information Messages* manual; the Service Module acts only as a delivery agent.

Service Module card Failure

No new alarms have been created to report Service Module failure. The existing card alarm UAM 013, Card *is isolated from the system*, indicates a Service Module card failure. The Service Module failure alarm is output to the Card Output Group.

Service Module card-EPAP Link

Two alarms are used to indicate the Service Module card-to-EPAP link status:

- 0084, IP *Connection Unavailable* (Major)
- 0085, IP *Connection Available* (Normal/Clearing)

The Service Module-EPAPLink alarms are output to the Link Maintenance Output Group. See the *Unsolicited Alarm and Information Messages* manual for details on these UAM formats.

Example:

```
        1         2         3         4         5         6         7
8
12345678901234567890123456789012345678901234567890123456789012345678901234567890

    station1234 00-09-30 16:28:08 EST EAGLE 37.0.0-35.10.0
**  3582.0084 ** VSCCP PORT B   1217          IP Connection Unavailable
```

Service Module card Hardware-Related Alarms

A major alarm appears when a Service Module card does not have thehardware configuration required for the G-Port application. Loading the Service Module card is automatically inhibited. Card alarms can be inhibited and uninhibited with the `inh-alm` and `unhb-alm` commands. The DSM Hardware-Related alarms are output to the Card Output Group.

A major alarm is displayed when a Service Module card detects that its applique memory is at least 80% full. The actual memory usage can be displayed by entering the `rept-stat-mps:loc=xxxx` command.

Example:

```
        1         2         3         4         5         6         7
8
12345678901234567890123456789012345678901234567890123456789012345678901234567890

    station1234 99-09-30 16:28:08 EST EAGLE 37.0.0-31.7.0
**  0012.0446 ** CARD 1108 VSCCP         RTDB database capacity is 80% full
```

A critical alarm is generated when a Service Module card detects that its applique memory is 95% full. Loading of the Service Module card is automatically inhibited when it reaches 100% of capacity. The actual memory usage can be displayed by entering the `rept-stat-mps:loc=xxxx` command.

Example:

```
         1         2         3         4         5         6         7
8
12345678901234567890123456789012345678901234567890123456789012345678901234567890

    station1234 99-09-30 16:28:08 EST EAGLE 37.0.0-31.7.0
*C  0012.0442 *C CARD 1108 VSCCP         RTDB database capacity is 95% full
```

When the `alw-card` command is executed, loading of the Service Module card is attempted. The following message appears, indicating that card loading is no longer inhibited.

Example:

```
         1         2         3         4         5         6         7
8
12345678901234567890123456789012345678901234567890123456789012345678901234567890

    station1234 00-09-30 16:28:08 EST EAGLE 37.0.0-35.10.0
0012.0423    CARD 1108 VSCCP         Card reload attempted
```

DSM Database Audit Alarm

During an audit of the Service Module cards, the status of the RTDB is examined and an alarm is raised when a corrupted database is found. When any RTDB database becomes corrupted, a major alarm is raised. The DSM Database Audit alarm is output to the Card Output Group.

Example:

```
         1         2         3         4         5         6         7
8
12345678901234567890123456789012345678901234567890123456789012345678901234567890

    station1234 00-09-30 16:28:08 EST EAGLE 37.0.0-35.10.0
** 0012.0443 ** CARD 1108 VSCCP        RTDB Database is corrupted
```

DSM Database Alarms

During the operation of Service Module cards, the status of databases is examined and alarms can be raised.

When the RTDB of a Service Module card is inconsistent (that is, the Service Module card birthdate and level do not match the active EPAP RTDB birthdate and level), a minor alarm is raised. The DSM Database alarms are output to the Card Output Group.

Example:

```
         1         2         3         4         5         6         7
8
12345678901234567890123456789012345678901234567890123456789012345678901234567890

    station1234 00-09-30 16:28:08 EST EAGLE 37.0.0-35.10.0
*   0012.0444 * CARD 1108 VSCCP        RTDB Database is inconsistent
```

When the RTDB database download is in-process or after an update faileds, the database is in an incoherent state. A alarm is raised.

Example:

```
         1         2         3         4         5         6         7
```

```
8
1234567890123456789012345678901234567890123456789012345678901234567890123456789

    station1234 00-09-30 16:28:08 EST EAGLE 37.0.0-35.10.0
*   0012.0448 * CARD 1108 VSCCP        RTDB Database is incoherent
```

When an inconsistent, incoherent, or corrupted Service Module card RTDB has been fixed when the Service Module card is in an `is-nr` condition, an alarm is raised.

Example:

```
        1         2         3         4         5         6         7
8
1234567890123456789012345678901234567890123456789012345678901234567890123456789

    station1234 00-09-30 16:28:08 EST EAGLE 37.0.0-35.10.0
0012.0445 CARD 1108 VSCCP          RTDB Database has been corrected
```

G-Port Subsystem Alarms

The same alarms that are output for an SCCP subsystem are output for the G-Port functions, including G-Port traffic (*Table 22: G-Port Subsystem Alarms* on page 129).

Table 22: G-Port Subsystem Alarms

UAM #	Severity	Message Text	Output Group (UI Output Direction)
0328	None	SCCP is available	`gtt`
0329	None	SCCP capacity normal, card(s) abnormal	`gtt`
0330	Major	SCCP TPS Threshold exceeded	`gtt`
0331	Critical	SCCP is not available	`gtt`
0335	None	SCCP is removed	`gtt`
0336	Major	LIM(s) have been denied SCCP service	`gtt`
0526*	None	Service is available	sys_maint
0527*	Minor	Service abnormal	sys_maint
0528*	Critical	Service is not available	sys_maint
0529*	Critical	Service is disabled	sys_maint

UAM #	Severity	Message Text	Output Group (UI Output Direction)
0530*	None	Service is removed	sys_maint
*GPORT will display in the text of the message if the G-Port feature is enabled without the additional features of A-Port or IGM being enabled. If the A-Port and/or IGM features are enabled, the text GPORT will be replaced with the text MNP.			

G-Port Related UIMs

G-Port UIM formats for the EGTT feature support GTT requirements.

The *Unsolicited Alarm and Information Messages* manual contains a complete description of all UIM text and formats. If the G-Port is provisioned, then the UIMs in *Table 23: G-Port UIMs* on page 130 are used.

Table 23: G-Port UIMs

UIM	Text	Description	Action	Output Group (UI Output Direction)
1035	SCCP rsp did not route - invalid GTI	The SCCP response did not route due to an invalid GTI	Use a valid GTI in the CGPA part of the query	gtt
1036	SCCP rsp did not route - invalid TT	The SCCP response did not route due to an invalid TT	Provision the CGPA TT in the GTT TT table	gtt
1037	SCCP rsp did not route - bad Xlation	The SCCP response did not route due to a bad translation	Provision the CGPA GTA 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 CGPA GTI, TT, NP, and	gtt

UIM	Text	Description	Action	Output Group (UI Output Direction)
			NAI in the EGTT selector table	
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
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=xxxxx`	application subsystem

UIM	Text	Description	Action	Output Group (UI Output Direction)
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 MAP MSISDN parameter	No digits found in MAP MSISDN parameter	Specify valid digits in the MSISDN	application subsystem
1295	Translation PC is Eagle's	PC translation is invalid because it is one of EA GLE 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
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	The message and outbound digits formatting options	application subsystem

UIM	Text	Description	Action	Output Group (UI Output Direction)
		encoding the TCAP message exceeded system limits.	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.	
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

G-Port Measurements

Refer to the *Unsolicited Alarm and Information Messages* manual for detailed measurement usage information.

OAM Based Measurements

G-Port measurements are available via the File Transfer Area (FTA) 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 RS-232 I/O ports of the EAGLE 5 ISS, as described in *Network Connections* on page 24.

See *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, IGM, A-Port, and G-PORT measurements data. The interface to the customer network supports the FTP transfer of Measurements reports to an FTP server. 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.

Pegs per System measurement peg counts of G-Port Message Signaling Units (MSUs) in *Table 24: Pegs for Per System G-Port Measurements* on page 134 are supported for the G-Port feature.

Table 24: Pegs for Per System G-Port Measurements

Event Name	Description	Type	Unit
GPSRRCV	Number of call-related SRI messages received	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 G-Port service	System	Peg count
GPSRERR	Number of call-related messages that cause errors and SRI Negative ACK	System	Peg count

Pegs per SSP measurement peg counts of G-Port MSUs in *Table 25: Pegs for Per SSP G-Port Measurements* on page 134 are supported for the G-Port feature.

Table 25: Pegs for Per SSP G-Port Measurements

Event Name	Description	Type	Unit
GPSRACK	Number of call-related SRI responses	Point Code	Peg count
GPSRRLY	Number of call-related SRI messages relayed	Point Code	Peg count

Pegs for both Per System and Per SSP G-Port measurement peg counts of G-Port MSUs in *Table 26: Pegs for Per System and Per SSP G-Port Measurements* on page 135 are supported for the G-Port feature.

Table 26: Pegs for Per System and Per SSP G-Port Measurements

Event Name	Description	Type	Unit
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
GPSRSMREP	Number of SRI_SM messages that result in SRI_SM_ACK or SRI_SM_NACK responses	System, Point Code	Peg count
GPSRSMERR	Number of SRI_SM messages that result in error	System, Point Code	Peg count
GPSRSMRCV	Number or SRI_SM messages received	System, Point Code	Peg Count

The following equations apply:

∑GPSRRCV = GPSRGTT + GPSRREP + GPSRERR

∑GPSRREP = GPSRACK + GPSRRLY

The following measurement events are included on the STP Daily Maintenance (MTCD) and STP Day-to-Hour (MTCDTH) measurement reports and include peg counts for G-Port MSUs..

MSSCCPFL MSUs discarded due to SCCP routing failure.

GTTUN0NS GTT unable to perform; no such type

GTTUN1NT GTT unable to perform: no translation on this address

GTTPERFD Total number of GTT performed

This implementation does not discriminate between the MSSCCPFL, GTTUN0NS, GTTUN1NT, or GTTPERFD pegs for G-Port or GTT applications. For example, a search failure could result from a problem in either the G-Port or GTT database.

Measurement Reports

Measurements are available with these report commands. Refer to the *Commands Manual* for detailed usage information.

OAM daily: `rept-meas:type=mtcd:enttype=np`

OAM hourly: `rept-meas:type=mtch:enttype=np`

MP daily: `rept-ftp-meas:type=mtcd:enttype=np`

MP hourly: `rept-ftp-meas:type=mtch:enttype=np`

Glossary

A

ACK	Data Acknowledgement
ADL	Application Data Loader
AINPQ	ANSI-41 INP Query
ANSI	American National Standards Institute An organization that administers and coordinates the U.S. voluntary standardization and conformity assessment system. ANSI develops and publishes standards. ANSI is a non-commercial, non-government organization which is funded by more than 1000 corporations, professional bodies, and enterprises.
ANSI-41 Mobile Number Portability	A feature that enables IS-41 subscribers to change their service provider while retaining the same Mobile Dialed Number (MDN).
A-Port	ANSI-41 Mobile Number Portability
AS	Application Server A logical entity serving a specific Routing Key. An example of an Application Server is a virtual switch element handling all call processing for a unique range of PSTN trunks, identified by an SS7 DPC/OPC/CIC_range. Another example is a virtual database

A

element, handling all HLR transactions for a particular SS7 DPC/OPC/SCCP_SSN combination. The AS contains a set of one or more unique Application Server Processes, of which one or more normally is actively processing traffic.

C

CC — Country Code

CCS7ITU — The application for the ITU SS7 signaling links that is used with card types `limds0, limch, lime1, and limt1`.

CdPA — Called Party Address

The portion of the MSU that contains the additional addressing information of the destination of the MSU. Gateway screening uses this additional information to determine if MSUs that contain the DPC in the routing label and the subsystem number in the called party address portion of the MSU are allowed in the network where the EAGLE 5 ISS is located.

CgPA — Calling Party Address

The point code and subsystem number that originated the MSU. This point code and subsystem number are contained in the calling party address portion of the signaling information field of the MSU. Gateway screening uses this information to determine if MSUs that contain this point code and subsystem number area allowed in the network where the EAGLE 5 ISS is located.

C

Circular Route Prevention	See CRP.
CLLI	Common Language Location Identifier The CLLI uniquely identifies the STP in terms of its physical location. It is usually comprised of a combination of identifiers for the STP's city (or locality), state (or province), building, and traffic unit identity. The format of the CLLI is: The first four characters identify the city, town, or locality. The first character of the CLLI must be an alphabetical character. The fifth and sixth characters identify state or province. The seventh and eighth characters identify the building. The last three characters identify the traffic unit.
CPC	Capability Point Code A capability point code used by the SS7 protocol to identify a group of functionally related STPs in the signaling network.

D

Database	All data that can be administered by the user, including cards, destination point codes, gateway screening tables, global title translation tables, links, LNP services, LNP service providers, location routing numbers, routes, shelves, subsystem applications, and 10 digit telephone numbers.
DB	Database

D

	Daughter Board
	Documentation Bulletin
DCB	Device Control Block
DEFCC	Default Country Code
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.
DNS	Domain Name Services
DPC	Destination Point Code DPC refers to the scheme in SS7 signaling to identify the receiving signaling point. In the SS7 network, the point codes are numeric addresses which uniquely identify each signaling point. This point code can be adjacent to the EAGLE 5 ISS, but does not have to be.
DPCI	Destination Point Code International
DPCN	Destination Point Code National
DSM	Database Service Module.

D

	The DSM provides large capacity SCCP/database functionality. The DSM is an application card that supports network specific functions such as EAGLE Provisioning Application Processor (EPAP), Global System for Mobile Communications (GSM), EAGLE Local Number Portability (ELAP), and interface to Local Service Management System (LSMS).

E

EA	Expedited Data Acknowledgment
EGTT	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.
EIR	Equipment Identity Register A network entity used in GSM networks, as defined in the 3GPP Specifications for mobile networks. The entity stores lists of International Mobile Equipment Identity (IMEI) numbers, which correspond to physical handsets (not subscribers). Use of the EIR can prevent the use of stolen handsets because the network operator can enter the IMEI of these handsets into a 'blacklist' and prevent them from being registered on the network, thus making them useless.
Enhanced Global Title Translation	See EGTT.

E

EPAP	EAGLE Provisioning Application Processor
ES	The shelves in the EAGLE 5 ISS that contain the LIM, ASM, and ACM cards. This shelf cannot contain the CAM, TDM, or the MDAL card. This shelf can be added to and removed from the database. These shelves are numbered from 1200 to 6100.
ETSI	European Technical Standards Institute

F

FTA	File Transfer Area A special area that exists on each OAM hard disk, used as a staging area to copy files to and from the EAGLE 5 ISS using the Kermit file-transfer protocol.
FTP	File Transfer Protocol A client-server protocol that allows a user on one computer to transfer files to and from another computer over a TCP/IP network.

G

GB	Gigabyte — 1,073,741,824 bytes
G-Flex	GSM Flexible numbering A feature that allows the operator to flexibly assign individual subscribers across multiple HLRs and route signaling messages, based on subscriber numbering, accordingly.
GPL	Generic Program Load

G

	Software that allows the various features in the system to work. GPLs and applications are not the same software.
G-Port	GSM Mobile Number Portability A feature that provides mobile subscribers the ability to change the GSM subscription network within a portability cluster, while retaining their original MSISDN(s).
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 A feature of the signaling connection control part (SCCP) of the SS7 protocol that the EAGLE 5 ISS uses to determine which service database to send the query message when an MSU enters the EAGLE 5 ISS and more information is needed to route the MSU. These service databases also verify calling card numbers and credit card numbers. The service databases are identified in the SS7 network by a point code and a subsystem number.

G

GUI	Graphical User Interface The term given to that set of items and facilities which provide the user with a graphic means for manipulating screen data rather than being limited to character based commands.

H

HLR	Home Location Register
HOMERN	Home Network Routing Number Prefix

I

IAM	Initial Address Message
ID	Identity, identifier
IGM	IS41 GSM Migration
IMSI	International Mobile Subscriber Identity
IMT	Inter-Module-Transport The communication software that operates the inter-module-transport bus on all cards except the LIMATM, DCM, DSM, and HMUX.
IN	Intelligent Network A network design that provides an open platform for developing, providing and managing services.
INAP	Intelligent Network Application Protocol

I

INE	Intelligent Network Entity Interrogating Network Entity
INP	INAP-based Number Portability Tekelec's INP can be deployed as a stand-alone or an integrated signal transfer point/number portability solution. With Tekelec's stand-alone NP server, no network reconfiguration is required to implement number portability. The NP server delivers a much greater signaling capability than the conventional SCP-based approach. Intelligent Network (IN) Portability
IP	Internet Protocol IP specifies the format of packets, also called datagrams, and the addressing scheme. The network layer for the TCP/IP protocol suite widely used on Ethernet networks, defined in STD 5, RFC 791. IP is a connectionless, best-effort packet switching protocol. It provides packet routing, fragmentation and re-assembly through the data link layer.
IS-41	Interim Standard 41, same as and interchangeable with ANSI-41. A standard for identifying and authenticating users, and routing calls on mobile phone networks. The standard also defines how users are identified and calls are routed when roaming across different networks.
IS41 GSM Migration	A feature that adds GSM IS-41 migration functions to the existing

I

	IS-41 to GSM feature. This enhancement provides flexibility in the encoding and decoding of parameters of LOCREQ messages and responses to number migration from one mobile protocol to another.
IS-ANR	In Service - Abnormal The entity is in service but only able to perform a limited subset of its normal service functions.
ISDN	Integrated Services Digital Network
IS-NR	In Service - Normal
ISDN	Integrated Services Digital Network Integrates a number of services to form a transmission network. For example, the ISDN network integrates, telephony, facsimile, teletext, Datex-J, video telephony and data transfer services, providing users with various digital service over a single interface: voice, text, images, and other data.
ISS	Integrated Signaling System
ITU	International Telecommunications Union
ITU-N	ITU National
ITUDUPPC	ITU National Duplicate Point Code

I

This feature applies only to 14-bit ITU national point codes. This feature allows an EAGLE 5 ISS mated pair to route traffic for two or more countries that may have overlapping point code values.

L

LED — Light Emitting Diode

An electrical device that glows a particular color when a specified voltage is applied to it.

LIM — Link Interface Module

Provides access to remote SS7, IP and other network elements, such as a Signaling Control Point (SCP) through a variety of signaling interfaces (DS0, MPL, E1/T1 MIM, LIM-ATM, E1-ATM, IPLIMx, IPGWx). The LIMs consist of a main assembly and possibly, an interface appliqué board. These appliqués provide level one and some level two functionality on SS7 signaling links.

Link — Signaling Link

LNP — Local Number Portability

M

MAP — Mobile Application Part

MCPM — Measurement Collection and Polling Module

The Measurement Collection and Polling Module (MCPM) provides comma delimited core STP measurement data to a remote server for processing. The MCPM

M

	is an EDSM with 2 GB of memory running the MCP application.
MNP	Mobile Number Portability
MNP 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.
MO	Magneto Optical Managed Object Mobile Originated Refers to a connection established by a mobile communication subscriber. Everything initiated by the mobile station is known as mobile originated.
MP	Measurement Platform Message Processor The role of the Message Processor is to provide the application messaging protocol interfaces and processing. However, these servers also have OAM&P components. All Message Processors replicate from their System OAM's database and generate faults to a Fault Management System.
MPS	Multi-Purpose Server The Multi-Purpose Server provides database/reload functionality and a variety of high capacity/high speed offboard database functions

M

	for applications. The MPS resides in the General Purpose Frame.
MR	Message Relay
MRN	Message Reference Number An unsolicited numbered message (alarm or information) that is displayed in response to an alarm condition detected by the system or in response to an event that has occurred in the system. Mated Relay Node A mated relay node (MRN) group is provisioned in the database to identify the nodes that the traffic is load shared with, and the type of routing, either dominant, load sharing, or combined dominant/load sharing.
MSISDN	Mobile Station International Subscriber Directory Number The MSISDN is thenetwork specific subscriber number of a mobile communications subscriber. This is normally the phone number that is used to reach the subscriber.
MSRN	Mobile Station Roaming Number
MSU	Message Signaling Unit The SS7 message that is sent between signaling points in the SS7 network with the necessary information to get the message to its destination and allow the signaling points in the network to set up either a voice or data connection between themselves. The message contains the following information:

M

- The forward and backward sequence numbers assigned to the message which indicate the position of the message in the traffic stream in relation to the other messages.
- The length indicator which indicates the number of bytes the message contains.
- The type of message and the priority of the message in the signaling information octet of the message.
- The routing information for the message, shown in the routing label of the message, with the identification of the node that sent message (originating point code), the identification of the node receiving the message (destination point code), and the signaling link selector which the EAGLE 5 ISS uses to pick which link set and signaling link to use to route the message.

MT

Mobile Terminated

All transmissions that reach the mobile station and are accepted by it, such as calls or short messages.

MTP

The levels 1, 2, and 3 of the SS7 protocol that control all the functions necessary to route an SS7 MSU through the network.

N

NAI

Nature of Address Indicator

Standard method of identifying users who request access to a network.

N

NAIV	NAI Value
NC	Network Cluster Network Code
NDC	Network destination code
NE	Network Element An independent and identifiable piece of equipment closely associated with at least one processor, and within a single location.
NP	Number Plan

O

OAM	Operations, Administration, and Maintenance The generic load program (application) that operates the Maintenance and Administration Subsystem which controls the operation of the EAGLE 5 ISS.
OOS-MT	Out of Service - Maintenance The entity is out of service and is not available to perform its normal service function. The maintenance system is actively working to restore the entity to service.
OOS-MT-DSBLD	Out of Service - Maintenance Disabled The entity is out of service and the maintenance system is preventing the entity from performing its normal service function.

O

OPC — Originating Point Code

OPS — Operator Provisioning System

P

PC — Point Code

The identifier of a signaling point or service control point in a network. The format of the point code can be one of the following types:

- ANSI point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**).
- Non-ANSI domestic point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**).
- Cluster point codes in the format network indicator-network cluster-* or network indicator-*-*.
- ITU international point codes in the format **zone-area-id**.
- ITU national point codes in the format of a 5-digit number (**nnnnn**), or 2, 3, or 4 numbers (members) separated by dashes (**m1-m2-m3-m4**) as defined by the Flexible Point Code system option. A group code is required (**m1-m2-m3-m4-gc**) when the ITUDUPPC feature is turned on.
- 24-bit ITU national point codes in the format main signaling area-subsignaling area-service point (**msa-ssa-sp**).

The EAGLE 5 ISS LNP uses only the ANSI point codes and Non-ANSI domestic point codes.

P

PDB	Provisioning Database
PDBA	Provisioning Database Application There are two Provisioning Database Applications (PDBAs), one in EPAP A on each EAGLE 5 ISS. They follow an Active/Standby model. These processes are responsible for updating and maintaining the Provisioning Database (PDB).
PDBI	Provisioning Database Interface The interface consists of the definition of provisioning messages only. The customer must write a client application that uses the PDBI request/response messages to communicate with the PDBA.
PLMN	Public Land Mobile Network
PPP	Point-to-Point Protocol
PPSMS	Prepaid Short Message Service Prepaid Short Message Service Intercept
PT	Portability Type

R

RC	Relative Cost
RFC	Request for Comment RFCs are standards-track documents, which are official specifications of the Internet protocol suite defined by the

R

	Internet Engineering Task Force (IETF) and its steering group the IESG.
RMTP	Reliable Multicast Transport Protocol
RN	Routing Number
RNIDN	Routing Number - International DN
Route	A path to another signaling point.
RTDB	Real Time Database

S

SCCP	Signaling Connection Control Part
SCM	System Configuration Manager System Configuration Matrix.
Service Nature of Address Indicator	See SNAI.
SIM	Subscriber Identity Module An ID card the size of a credit card for GSM network subscribers, and is typically referred to as a chip card or smartcard.
SMS	Short Message Service
SMSC	Short Message Service Center

S

SNAI	Service Nature of Address Indicator An internal G-Port parameter that allows a user to specify how to interpret the signaling connection control part (SCCP) called party address (CdPA) GTA of a LOCREQ/SMSREQ message.
SOR	Support of Optimal Routing System Out of Service Request
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.
SPC	Secondary Point Code The SPC enables the EAGLE 5 ISS to assume more than one point code for SS7 routing. The EAGLE 5 ISS uses the SPC for routing and provisioning as if the SPC were an actual point code of the EAGLE 5 ISS. The EAGLE 5 ISS supports one ANSI true point code and up to seven secondary point codes.

S

	Spare Point Code
SRF	Signaling Relay Function The SRF determines the HLR of the destination mobile station. If the mobile station is not ported, the original HLR is queried. If the mobile station is ported, the recipient HLR is queried.
SRI	Send_Route_Information Message
SS	Subsystem
SSP	Subsystem Prohibited network management message. Subsystem Prohibited SCCP (SCMG) management message. (CER)
STP	Signal Transfer Point STPs are ultra-reliable, high speed packet switches at the heart of SS7 networks, which terminate all link types except F-links. STPs are nearly always deployed in mated pairs for reliability reasons. Their primary functions are to provide access to SS7 networks and to provide routing of signaling messages within and among signaling networks.
Subsystem Number	See SSN.

T

TCAP	Transaction Capabilities Application Part

T

TCP	Transfer Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TDM	Terminal Disk Module Time Division Multiplexing
TFA	TransFer Allowed (Msg)
TFP	TransFer Prohibited (Msg) A procedure included in the signaling route management (functionality) used to inform a signaling point of the unavailability of a signaling route.
TT	Translation Type. Resides in the Called Party Address (CdPA) field of the MSU and determines which service database is to receive query messages. The translation type indicates which Global Title Translation table determines the routing to a particular service database.

U

UAM	Unsolicited Alarm Message.
UDP	User Datagram Protocol
UDTS	Unitdata Service message
UI	User Interface

U

UIM	Unsolicited Information Message
UPU	User Part Unavailable

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 Service Module card to support the G-Flex, G-Port, INP, AINPQ, EIR, A-Port, IGM, V-Flex, and LNP features. If the G-Flex, G-Port, INP, AINPQ, EIR, A-Port, IGM, V-Flex, or LNP feature is not turned on, and a Service Module card is present, the VSCCP GPL processes normal GTT traffic.

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