Oracle® Communications EAGLE

A-Port User's Guide

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Oracle Communications EAGLE A-Port User's Guide, Release 46.7

E97341 Revision 1

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Introduction

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

Overview

This manual provides feature descriptions, commands, maintenance, measurements, and configuration details associated with the ANSI-41 Mobile Number Portability (**A-Port**) feature of the **EAGLE** and other features related to the A-Port feature. A-Port provides number portability functionality using a triggerless solution. Although the A-Port feature applies to ITU and ANSI networks, the A-Port feature focuses on service provider number portability on ANSI networks.

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

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

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

Scope and Audience

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

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 1-1   Admonishments

Icon	Description
DANGER	Danger: (This icon and text indicate the possibility of *personal injury*.)
WARNING	Warning: (This icon and text indicate the possibility of *equipment damage*.)
CAUTION	Caution: (This icon and text indicate the possibility of *service interruption*.)
TOPPLE	Topple: (This icon and text indicate the possibility of *personal injury* and *equipment damage*.)

Manual Organization

This document is organized into the following chapters:

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

- Feature Description provides a functional description of the A-Port and **MT-Based IS41 SMS NP** features, including network perspectives, assumptions and limitations, database overview, Service Module card provisioning and reloading, and A-Port user interface.

- Commands describes the commands that support the A-Port and MT-Based IS41 SMS NP features.

- Feature Configuration describes how to activate the A-Port and MT-Based IS41 SMS NP features.

- Measurements describes the measurements available for A-Port.

- Maintenance describes A-Port maintenance information including **EPAP** status and alarms, hardware verification messages, system status reports and commands, code and application data loading, and alarms.

My Oracle Support (MOS)

MOS (https://support.oracle.com) is your initial point of contact for all product support and training needs. A representative at Customer Access Support (CAS) can assist you with MOS registration.

Call the CAS main number at 1-800-223-1711 (toll-free in the US), or call the Oracle Support hotline for your local country from the list at http://www.oracle.com/us/support/contact/index.html. When calling, make the selections in the sequence shown below on the Support telephone menu:

1. Select 2 for New Service Request

2. Select 3 for Hardware, Networking and Solaris Operating System Support

3. Select one of the following options:

    •   For Technical issues such as creating a new Service Request (SR), Select 1

    •   For Non-technical issues such as registration or assistance with MOS, Select 2

You will be connected to a live agent who can assist you with MOS registration and opening a support ticket.

MOS is available 24 hours a day, 7 days a week, 365 days a year.

Emergency Response

In the event of a critical service situation, emergency response is offered by the Customer Access Support (CAS) main number at 1-800-223-1711 (toll-free in the US), or by calling the Oracle Support hotline for your local country from the list at http://www.oracle.com/us/support/contact/index.html. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

A critical situation is defined as a problem with the installed equipment that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical situations affect service and/or system operation resulting in one or several of these situations:

•   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 Oracle.

Related Publications

For information about additional publications related to this document, refer to the Oracle Help Center site. See Locate Product Documentation on the Oracle Help Center Site for more information on related product publications.

Customer Training

Oracle University offers training for service providers and enterprises. Visit our web site to view, and register for, Oracle Communications training:

http://education.oracle.com/communication

To obtain contact phone numbers for countries or regions, visit the Oracle University Education web site:

www.oracle.com/education/contacts

Locate Product Documentation on the Oracle Help Center Site

Oracle Communications customer documentation is available on the web at the Oracle Help Center (OHC) site, http://docs.oracle.com. You do not have to register to access these documents. Viewing these files requires Adobe Acrobat Reader, which can be downloaded at http://www.adobe.com.

1. Access the Oracle Help Center site at http://docs.oracle.com.

2. Click `Industries`.

3. Under the Oracle Communications subheading, click the `Oracle Communications documentation` link.

   The Communications Documentation page appears. Most products covered by these documentation sets will appear under the headings "Network Session Delivery and Control Infrastructure" or "Platforms."

4. Click on your Product and then the Release Number.

   A list of the entire documentation set for the selected product and release appears.

5. To download a file to your location, right-click the `PDF` link, select `Save target as` (or similar command based on your browser), and save to a local folder.

2
Feature Description

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

Introduction

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

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

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

MTP Routed SCCP Traffic

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

MNP Circular Route Prevention

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

DigitAction Expansion

The DigitAction Expansion feature provides more flexibility to formulate the SCCP **Called Party Address** (SCCP) Global Title Address (**GTA**) field of the MAP messages relayed by A-

Port. DigitAction Expansion is provisioned via the **PDBI** Enter Network Entity or Update Network Entity commands. DigitAction Expansion can also be modified via the Add an **NE** and Update an NE **GUI** screens.

Digit Action DELCCPREFIX

The Digit Action to delete country code if present and prefix database entity feature allows the DELCCPREFIX Digit Action to be applied to the Called Party Global Title Address (CdPA GTA) when the GTA has a National format, as well as when the GTA has an International format. The DELCCPREFIX option in the SCCPOPTS table specifies how the DELCCPREFIX digit action is applied to a Called Party Global Title Address (CdPA GTA).

- When the SCCPOPTS:DELCCPREFIX option is set to PFXWCC, the DELCCPREFIX digit action is applied to the CdPA GTA only when the address has a International format. The Country Code is deleted and the GTA is prefixed with the Entity ID.

- When the SCCPOPTS:DELCCPREFIX option is set to PFX4ALL, the DELCCPREFIX digit action is applied to the CdPA GTA in all cases. For an International format, the Country Code is deleted and the GTA is prefixed with the Entity ID. For a National format, the GTA is prefixed with the Entity ID.

The `chg-sccpopts` command is used to specify the `delccprefix` parameter value to configure the DELCCPREFIX Digit Action functionality.

MNP SCCP Service Re-Route

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

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

MO-Based IS41 SMS NP

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

MT-Based IS41 SMS NP

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

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

Non-call related messaging involves the short message service center (**SMSC**) querying the HLR for the destination subscriber for SMS delivery. For SMS, these query messages are called SMSREQ. The HLR responds to these messages with routing information that can be used by

the querying node (SMSC) to deliver the SMS message. In this feature, the EAGLE intercepts these SMSREQ messages destined to the HLR and replies with routing information for out-of-network destination subscribers.

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

- Intercept SMS routing information request from the SMSC before it reaches the HLR (A-Port function).

- Extract message destination address (SCCP Called Party GTA), condition the digits and perform lookup in the **Real Time Database** (**RTDB**) (A-Port function).

- For destination address/subscribers belonging to foreign networks, send reply message to the SMSC with routing information. This information can be used by the SMSC to route the message to their recipient networks.

- For in-network destination addresses, the SMS routing information request is relayed to the HLR according to the options set for normal A-Port routing.

Signaling Relay Function

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

SRF-based MNP processing involves the "intercepting" of existing MAP messages to check for ported numbers. For call-related messages, A-Port acts as a number portability home location register (HLR) when the number has been exported by responding to the switch with a LOCREQ ACK message. For calls to imported numbers and non-call related messages not selected for MT-Based IS41 SMS NP, A-Port performs message relay.

Routing Options

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

- With direct routing, the network where the call is originated is responsible for determining whether the called party has ported and routing the call to the new subscription network.

- With indirect routing, this is the responsibility of the network that originally owned the number.

Number Length Differences

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

A-Port Considerations

1. **GTT** must be on before the A-Port feature can be enabled.

2. The A-Port feature requires at least 4 GB Service Module cards.

3. A-Port can be turned on, but not turned off.

4. The A-Port, **IGM**, **G-Port MNP**, **G-Flex** C7 Relay, **AINPQ**, and **INP** features can run concurrently on an EAGLE.

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

6. A-Port and North American **LNP** are mutually exclusive on an EAGLE node, unless the Dual ExAP Configuration feature is enabled.

A-Port Protocol

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

Main Functions

A-Port and **MNPCRP** provide the following main functions:

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

Message Discrimination

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

RN Prefix Deletion - SCCP

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

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

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

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

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

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

- If CC is not equal to the DEFCC, the message falls through to GTT.

- If CC=DEFCC, then A-Port compares the digits after CC with the list of provisioned Home RN prefixes that are defined in the RTDB. If a match is found, then A-Port strips off the RN digits from the number. If no match is found, the no-prefix deletion is performed and A-Port processing continues.

RN Prefix Deletion - TCAP

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

- RN + DN

- CC+RN+DN

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

- If DEFCC is detected, then Home RN deletion is attempted using the CC+RN+DN format.

- All other MDNs will use the RN+DN format.

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

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

Number Conditioning

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

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

Database Lookup

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

- Match is Found with Network Entity (**NE**) Assigned

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

  For subscriber entries with a Signalling Point (**SP**) and any Portability Type (PT), LOCREQ and any IS41 messages are relayed. GTT is applied to any GSM or non-TCAP messages.

- Match is Found Without NE

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

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

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

GTT is applied to any IS41 message if an entry is found without an NE assigned. The EAGLE modifies only the MTP and SCCP information as required by standard GTT and keeps the TCAP portion of the message intact.

- Number conditioning fails. The DN is not found in the RTDB, or the DN is found with non-A-Port data.

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

  - Perform GTT if the incoming message is sent to the EAGLE **Self Point Code**.

  - Route the message to the MTP Destination Point Code (**DPC**) if the incoming message is MTP-routed. (The MTP DPC of the message is not the EAGLE Self Point Code.)

  The TCAP portion of the message remains intact.

  Normal routing is performing GTT if the incoming message is sent to the EAGLE Self Point Code. Normal routing is routing the message to the MTPDPC if the incoming message is MTP-routed. (The MTPDPC of the message is not the EAGLE Self Point Code.)

- A-Port modifies the TCAP information for LOCREQ messages only when a HomeRN was deleted from the TCAP DN and LOCREQ RMHRN = **YES**. Any gaps in the data caused by a change in field length will be resolved by shifting the remaining information up. Any IEC or NEC code is left.

  Because a DN may be the target of A-Port, G-Port, or Migration message processing in a hybrid network where an operator owns both GSM and IS41 network, message processing call disposition is based on which applications are turned on. Table 2-1 summarizes A-Port message processing.

Table 2-1   A-Port Message Processing

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

Database lookup results in the following:

1. Applying GTT or

2. Relaying the message to the destination as noted in the database or

3. Returning an acknowledge message to the originating switch.

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

Message Relay

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

• If DigitAction = none, the EAGLE does not overwrite the SCCP CdPA GTA.

• For all other values, the EAGLE formats the SCCP CdPA GTA according to the value assigned to DigitAction.

Table 2-2 identifies the required DigitAction options as well as examples of how the SCCP CdPA GTA of an outgoing message is formatted for each of the options. The example assumes the RN / SP ID is 1404 and default country code is 886.

Table 2-2   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 (No action is taken if country code is not present.)
delcc	886944000213	944000213	Delete country code
spare1	886944000213	treated as none	No change to the Called Party GTA (default)
spare2	886944000213	treated as none	No change to the Called Party GTA (default)

Returning Acknowledgement

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

• Allow users to specify which TCAP LOCREQ parameter (the TCAP Outgoing Called Party parameter) encodes the RN (and/or DN) information

• Allow users to specify the Digit Type value to encode the TCAP Outgoing Called Party parameter

• Allow users to specify the value to encode the Nature of Number field of the TCAP Outgoing Called Party parameter

• Allow users to specify the value to encode the Numbering Plan field of the TCAP Outgoing Called Party parameter

- Allow users to specify the digit encoding format of the LOCREQ TCAP Outgoing Called Party parameter;
- Allow users to specify the **MSCID** values to be encoded in the LOCREQ message
- Allow users to specify the Electronic Serial Number (**ESN**) values to be encoded in the LOCREQ message
- Allow users to specify how the digits of the LOCREQ MIN parameter shall be encoded

LOCREQ Query Response

The LOCREQ Query Response feature allows EAGLE to respond to **LOCREQ** query messages with a LOCREQ response message containing routing information for both **ported** and **non-ported** subscribers. **Service Portability (S-Port)** processing is used to control whether **Generic Routing Number** (**GRN**) or default **Routing Number (RN)** digits are used for the routing information in the LOCREQ response message.

The LOCREQ Query Response feature is applied to LOCREQ query messages received by EAGLE for local subsystem processing; however, EAGLE does not provide true subsystem support for these queries. Any LOCREQ query message to a True, Secondary, or Capability Point Code of the EAGLE is considered a potential candidate for LOCREQ Query Response feature. The query message is selected for LOCREQ Query Response processing if all of these conditions are met:

- The MTP DPC is a True, Secondary, or Capability Point Code of EAGLE.
- The message is a UDT or non-segmented XUDT message.
- The SCCP Called Party Address RI = SSN.
- The SCCP Called Party Address GTI is 0, 2, or 4. (GTI=4 is supported for only ITU SCCP messages.)
- The SCCP Calling Party Address RI = SSN.
- The TCAP variant is ANSI.
- The TCAP Operation Code is LocReq.

If all conditions are met and the MNP service state is `online`, then the LOCREQ query message is delivered to the MNP service handler for LOCREQ Query Response processing. If any of the conditions is not true, the LOCREQ query message is processed without LOCREQ Query Response processing.

If all conditions are met but the MNP service state is `offline`, then these actions occur:

- A UIM is issued.
- A TFP concerning the CPC is returned if the DPC in the original message was an MNP CPC.
- (X)UDTS:Subsystem Unavailable is returned, if Return on Error is set.
- The message is discarded.

LOCREQ Query Response Processing

For LOCREQ Query Response processing to occur, the LOCREQ Query Response feature must be enabled and turned on and the IS41OPTS option LOCREQRSPND must be set to `on`. The LOCREQ Query Response feature processes only ANSI TCAP Query with Permission messages with an Operation Code of LocReq.

LOCREQ Query Response processing functions include:

- The DN is retrieved from the TCAP portion.

- The NAI is determined based on the MTPLOCREQNAI value provisioned in the IS41OPTS table.

- A-Port or IGM number conditioning (for example, HomeRN Deletion and IEC/NEC Deletion) is applied to the DN.

- MNP Circular Route Prevention is not applied to LOCREQ query messages processed by the LOCREQ Query Response feature.

- Every LOCREQ query message processed by the LOCREQ Query Response feature is acknowledged with a response message.

Figure 2-1 shows the logic to determine the RN digits used in the LOCREQ query response.

Figure 2-1   LOCREQ Query Reponse RN Determination
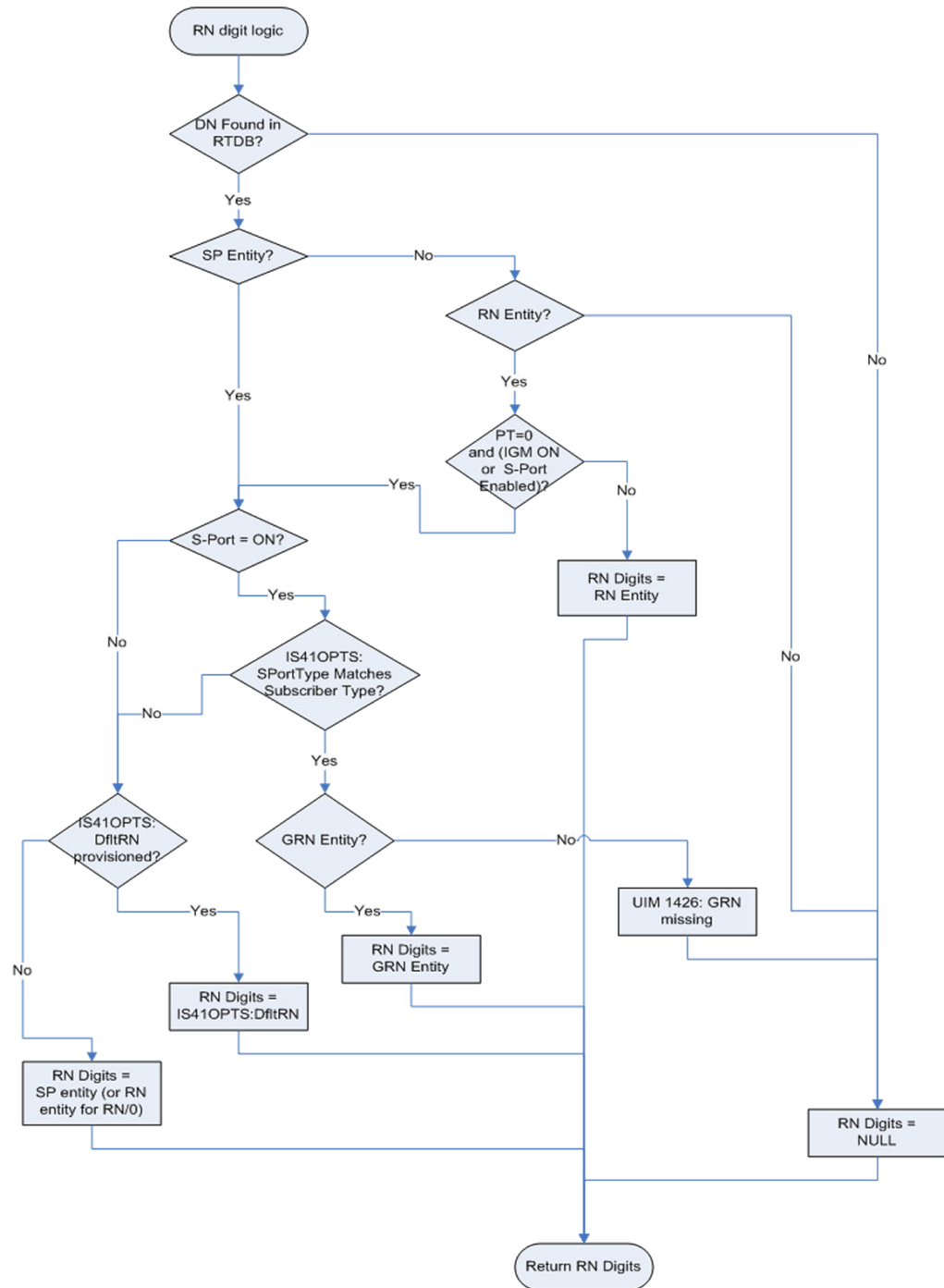
LOCREQ Query Response Errors

The LOCREQ Query Response feature responds to LOCREQ queries unless one of these errors occurs.

Decode Errors

Error result - (X)UDTS:Unqualified is generated; UIM is issued; MSU is discarded.

- The TCAP message is incorrectly formatted (invalid parameter tag or length).

- Called Party Number or Dialed Digits parameter does not exist.

- Digits parameter is less than 4 bytes.

- Number of digits is greater than 21.

- Encoding scheme is not BCD.

- Numbering Plan is not Telephony or ISDN.

Number Conditioning Errors

Error result - (X)UDTS:Unqualified is generated; UIM is issued; MSU is discarded.

- Default country code (DEFCC) parameter is required, but is not provisioned.

- Default Network Destination Code (DEFNDC) parameter is required, but is not provisioned.

- International (conditioned) digits are less than 5 or greater than 15.

Encode Errors

Error result - No response message is generated; UIM is issued; MSU is discarded.

- CgPA PC/OPC is not in the route table. CgPA PC is used if present in message,;otherwise OPC is used.

- CgPA PC/OPC is an Alias. No conversion is allowed.

LOCREQ Query Response Maintenance and Measurements

The LOCREQ Query Response feature increments counters against MNP service in the `rept-stat-sccp` output.

- *Failure* counter is incremented if a Return Result cannot be generated because of decode errors, number conditioning errors or encode errors.

- *Failure* counter is incremented if a message is received and MNP service state is `offline`.

- *Warning* counter is incremented if GRN was required but was missing, and the Return Result was sent.

- *Success* counter is incremented if a Return Result is generated, except if the Warning counter was incremented for missing GRN.

LOCREQ Query Response feature increments these Measurement registers, also used by A-Port and IGM features, if a LOCREQ query response message generates successfully:

- IS41LRMRCV

- IS41LRRTRN

- APLRACK (per SSP)

LOCREQ Query Response feature increments these Measurement registers, also used by A-Port and IGM features, if a LOCREQ query response message fails to be generated:

- IS41LRMRCV

- IS41LRERR

Service Portability for LOCREQ Query Response

Service Portability (S-Port) processing supports LOCREQ Query Response by controlling whether Generic Routing Number (GRN) or default Routing Number (RN) digits are used for the RN in the LOCREQ response message. Parameter SPORTTYPE (Service Portability Type) is provisioned in IS41OPTS table to specify the application of Service Portability that is to be applied to the associated feature. Parameter DFLTRN (Default Routing Number) is provisioned in IS41OPTS table to provide the RN digits if Service Portability is not turned on or the SPORTTYPE does not match the subscriber type.

Number Portability functions use the Network Entity Type (RN/SP) from the RTDB when formatting outgoing Called Party digits in the LOCREQ response message. The S-Port feature allows RTDB GRN Entity digits to be used for own-network GSM and IS41 subscribers in response digit formats. The GRN field in the RTDB is used to provision Service Portability prefixes on a per subscriber basis.

When Service Portability is applied, the LOCREQ response message is prefixed with the Generic Routing Number associated with the DN, instead of the Network Entity Type (RN/SP) that is used by number portability. The GRN digits can indicate the protocol (IS41 or GSM), calling area, and Operator network as defined by individual operators.

Table 2-3 shows whether Service Portability or Number Portability is applied when Service Portability is turned on and RTDB lookup is successful based on the value of the IS41OPTS parameters SPORTTYPE and DFLTRN.

Table 2-3   Service Portability vs Number Portability by Destination Subscriber Type

SPORTTYPE	Own-Network GSM Entity Type = SP, any Portability Type	Own-Network IS41 Entity Type = RN, Portability Type = 0	Foreign (OLO) and others Entity Type = RN, Portability Type ≠ 0 -or- No Entity Type , any Portability Type
None	Apply Number Portability	Apply Number Portability	Apply Number Portability
GSM	Apply Service Portability - use GRN	Apply Number Portability	Apply Number Portability
IS41	Apply Number Portability	Apply Service Portability - use GRN	Apply Number Portability
ALL	Apply Service Portability - use GRN	Apply Service Portability - use GRN	Apply Number Portability

MTP Routed SCCP Traffic

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

Msgs for SCCP Apps feature. The features can coexist, which means that both features can be turned on in the same system.

MTP Msgs for SCCP Apps

MTP routed SCCP messages are supported with the MTP Msgs for SCCP Apps feature. **LOCREQ** and **SMSREQ** messages are supported. A **Feature Access Key (FAK)** for part number 893-0174-01 is required to enable the MTP Msgs for SCCP Apps feature. ThisThe MTP Msgs for SCCP Apps feature (part number 893-0174-01) can be turned on and off, but cannot be enabled with a temporary FAK. GTT must be on to enable the MTP Msgs for SCCP Apps feature.

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

If the MTP routed messages have CdPA RI=GT or SSN and GTI $\neq$ 0 (GTI = 2 or 4), then a service selection (**SRVSEL**) lookup is performed using the SCCP CdPA information. If the result of the lookup is MNP service, then the message is sent to MNP handling. If a service selector does not match or the service is OFFLINE, then MTP routing is performed on the messages. MNP SCCP Service re-route is not performed on MTP routed messages.

If the MTP routed messages have CdPA GTI=0, the TCAP portion of ANSI TCAP messages is decoded. SMSMR service is invoked for SMDPP messages; IAR Base feature is invoked for Analyzed messages. For all other messages, MNP service is invoked.

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

If the message has ANSI TCAP, then:

• General TCAP/MAP verification for A-Port is performed if the A-Port or IGM feature is turned on. Only LOCREQ and SMSREQ messages are handled by A-Port or IGM for MTP routed messages.

• When GTI $\neq$ 0, message relay is performed on non-LOCREQ and non-SMSREQ ANSI TCAP messages based on the SCCP CdPA portion of the message.

• When GTI = 0, MTP routing is performed on non-LOCREQ ANSI TCAP messages.

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

• The message is considered for relaying based on the RTDB lookup results. General TCAP/MAP verification is not performed on the message.

• Message relay is performed based on the SCCP CdPA portion of the message with GTI = 2 or 4.

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

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

MTP Routed GWS Stop Action

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

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

After provisioning, the sccp stop action can be used by these features:

- A-Port

- G-Flex

- Info Analyzed Relay ASD

- Info Analyzed Relay Base

- Info Analyzed Relay GRN

- Info Analyzed Relay NP

- IS41 GSM Migration (IGM)

- ITUN-ANSI SMS Conversion

- MNP Circular Route Prevention

- MO-Based IS41SMS NP

- MO SMS ASD

- MO SMS B-Party Routing

- MO SMS GRN

- MO SMS IS41 to GSM Migration

- MTP MAP Screening

- MT-Based IS41 SMS NP

Refer to *Database Administration – GWS User's Guide* for additional information and provisioning procedures for the MTP Routed GWS Stop Action feature.

SMSREQ Handling for Migrated or Ported Subscribers

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

1. MNPCRP - If a circular route condition is detected, a UIM is generated and MTP routing is performed on the message.

2. IGM - If the DN is **own-network** GSM subscriber (Portability Type = 5) and SMSREQBYPASS = No, then send an SMSREQ Error Response (Return Result message) to the originator with SMS Access Denied Reason = 5.

3. MT-Based IS41 SMS NP - If the DN matches the MT-Based IS41 SMS NP feature criteria (IS41SMSOPTS:MTSMSTYPE), the SMSREQ response is generated.

4. A-Port - A-Port relays the message based on the RTDB lookup result. If relay information is not present in the RTDB data associated with the DN, then the message is MTP routed.

5. If A-Port is not turned on, then IGM relays the SMSREQ message for only own-network subscribers if the SMSREQ response is not previously sent for subscribers not handled by IGM. If relay information is not present in the Network Entity Type (RN/SP) associated with the DN or if Network Entity Type indicates an Other Licensed Operator (OLO) subscriber, then the message is MTP routed.

6. If none of the feature processing in the previous items is performed, then the message is MTP routed.

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

Table 2-4   Subscriber Portability Type

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

MNP SCCP Service Re-Route Capability

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

- Service State Management

- MNP Re-Routing

- MNP Capability Point Codes

Service State Management

Service state management is part of the **MNP SCCP** Service Re-**Route** Capability. Service state is used to indicate the current state of MNP, either *ONLINE* or *OFFLINE*. Service state also gives the user the option to mark **MNP** as *OFFLINE* or *ONLINE* based on the current behavior. If a MNP problem is identified, MNP can be marked *OFFLINE* to initiate the re-

routing procedure. When Service Module cards need to be reloaded, MNP can be marked *OFFLINE* until enough cards are in-service and then bring MNP *ONLINE* in a controlled fashion.

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

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

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

MNP Re-Routing

MNP Re-Routing is an optional feature and is enabled by defining a list of alternate PCs or by defining the GTT option. MNP re-routing is activated by marking MNP *OFFLINE*. When MNP is *OFFLINE* and alternate PCs are provisioned, any messages destined for MNP are re-routed to the available alternate PCs that are defined for MNP. If alternate PCs are not provisioned or none are available, then the GTT option is used. If the GTT option is set to YES, then messages destined for MNP will fall through to GTT as part of the re-routing procedure. Re-Routing is applied to all MNP messages (based on **SRVSEL**). There is no distinction of Destination Point Code (**DPC**) of the messages. The DPC of the message can be either True, Secondary, or Capability Point code.

MNP Capability Point Codes

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

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

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

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

MNP supports up to seven alternate PCs per domain. All six domains (ANSI, ITU-I, ITU-I Spare, ITU-N, ITU-N Spare, and ITU-N24) are supported. An entire set of alternate PCs is considered as a re-route set. A GTT option is supported for MNP re-route. When the MNP service is *OFFLINE*, MNP messages fall though to GTT based on the GTT option. This option is set to YES by default.

MNP SCCP Service Re-Route Capability Summary

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

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

Option 1

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

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

Option 2

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

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

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

Table 2-5 shows the actions taken when the MNP service is offline, a message arrives at the affected node requiring MNP service, and Service Module cards are available.

Table 2-5　MNP SCCP Service Re-Route Capability Summary

Result of service selector	DPC	Alternate point code defined and available	GTT to be performed as fall through	Message Handling	Network Management
MNP	MNP Capability PC	Yes	N/A	Re-Route to alternate point code based on relative cost	TFP concerning CPC
MNP	MNP Capability PC	No	Yes	Fall through to GTT and perform GTT	TFP concerning CPC
MNP	MNP Capability PC	No*	No	Generate **UDTS** (return cause = network failure)	TFP concerning CPC
MNP	MNP Capability PC	Not Defined	Yes	Fall through to GTT and perform GTT	TFP concerning CPC

Table 2-5   (Cont.) MNP SCCP Service Re-Route Capability Summary

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

*Alternate point codes are defined and unavailable (prohibited or congested).

A-Port Considerations

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

1. **SRI** responses are routed by both **MTP** and **Global Title Translation**.

2. The maximum length of the Application Context Name Object Identifier is 32 digits.

3. For A-Port Message Relay messages with E.164 numbers in the **SCCP CdPA**, it is assumed that no truncation occurred if and when the routing number was prepended and that SCCP CdPA contains the full Directory Number of the subscriber.

4. A-Port Message Relay to the **EAGLE** local subsystem is not supported.

5. Only the first 21 digits of the CdPA are decoded for A-Port Message Relay. For example, if the CdPA contains an **RN** prefixed to a **DN**, the RN is seven digits, and the DN is 15 digits, then the total is 22 digits. The DN used for processing will be only 14 digits (21 total digits less 7 RN digits).

6. With the Hex Digit Support for **GTT** feature enabled and turned on, Message Signaling Units (MSUs) containing either decimal or hexadecimal digits in the Called Party Address (CdPA) are processed. Unless the Hex Digit Support for GTT feature is enabled and turned on, GTT processes decimal digits only.

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

7. **MNP** applies within a single portability cluster. This is defined as a set of networks in a country or multi-country region having a common numbering plan and across which a subscriber, who is already inside the cluster, can port. Any individual A-Port node is required to support only an MNP within such a portability cluster.

8. The routing number found in the **NP** database is either prefixed to the dialed number to form a new concatenated Roaming Number that is returned to the switch, or is sent on its own as the Roaming Number.

9. All non-call related messages impacted by MNP contain the **MSISDN** number in the SCCP CdPA. In the case of the **SRI** message, A-Port may get the number from the **MAP** level.

10. **TCAP** operation codes uniquely distinguish Loc_req messages and do not change from one phase (or version) of MAP to another.

11. **PCs** and/or PC + **SSN**s 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 to route messages to them. For example, the point code may not have a route or the PC + SSN may not be in the MAP table for a final GTT. In this event, a **UIM** is output only when a message is discarded because of the lack of data.

12. The parameters of the SRI Ack message generated by A-Port are solely based on the provisioned data/options; they are not based on the MAP phase of the SRI message. For example, if the message received is phase 1 or 2, "**MSRNDIG**=RN", and the portability status is "NotKnowntobePorted", A-Port generates an SRI Ack contains **IMSI**, **MSRN**, **MDN**, and **NPS** parameters, despite the MDN and NPS parameters not being defined for phase 1 or 2.

13. If **SRF IMSI** is not provisioned with an RN entity and an incoming message is an SRI message, A-Port sets IMSI parameter as zero digits when the MAP phase is 1 or 2.

14. A-Port uses the MTP route for the SRI Ack message, even when the final GTT is performed on the response.

15. When the concatenated number (RN + MDN) option is selected for encoding the Routing Info (**MSRN**) in the SRI Ack message, A-Port encodes the complete concatenated number, because the concatenated number length may otherwise exceed 16 digits, which is the maximum allowed in MSRN.

General Numbering Requirements

Incoming called party numbers, from the SCCP portion, destined for IGM 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 IGM 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 IGM 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 must be previously provisioned by the EAGLE 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 **IGM**. 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 **IGM**. In this case, a UIM is issued, and the message falls through to GTT.

Maintenance

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

- Validation of A-Port Hardware Configuration
- *A-Port Loading Mode Support*
- *Audit Requirements*

Validation of A-Port Hardware Configuration

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

- **Service Module card Verification**

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

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

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

- **Service Module card Applique Memory Verification**

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

> ⚠️ **Caution:**
>
> A-Port cannot be enabled if any of the Service Module cards have less than 4 GB of memory installed.

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

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

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

  When the hardware configuration for a Service Module card is determined to be invalid for the A-Port application, **SCM** automatically inhibits loading for that specific **Service Module** card. A major alarm is generated indicating that card loading for that Service Module card has failed and has been automatically inhibited, which means it is prevented from reloading. See A-Port-Related Alarms for the specific alarm that is generated. When card loading has been inhibited, the primary state of the card is set to `oos-mt-dsbld`, and the secondary state of the card is set to **MEA** (Mismatch of Equipment and Attributes).

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

  - The Service Module card will not download the EAGLE databases.

  - The Service Module card will not download the real-time RTDB from the EPAP.

  - The Service Module card will not accept RTDB updates (including add, change, or delete) from the EPAP, nor will it accept **STP** database updates.

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

- **Unstable Loading Mode**

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

A-Port Loading Mode Support

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

the 80% threshold, loading mode support allows STP administrative updates to be rejected while cards finish loading and cross the 80% or greater threshold.

For A-Port, loading mode support is applicable for database updates originating from the EAGLE E5-MCAP cards destined for the Service Module cards.

Audit Requirements

The A-Port audit does not change EAGLE compliance to STP audit requirements, to which EAGLE currently adheres. A-Port subscriber database tables residing on the EAGLE are audited by the existing STP audit, which only verifies tables on the EAGLE active and standby E5-TDMs. Audit mechanisms for A-Port tables residing on the EPAP platform are downloaded to the Service Module cards. The audit mechanisms consist of the following.

- On each Service Module card and on the standby EPAP, a background audit calculates checksums for each A-Port RTDB table record and compares the calculated checksum against the checksum value stored in each record. If the checksums are not the same, then a *database corrupt* alarm is issued.

- A process that runs approximately every five seconds or less on the active EPAP sends the latest RTDB database level to all the Service Module cards and the standby EPAP. If the database levels do not match, the standby EPAP or Service Module card issues a *diff level* alarm.

For more information about the audit mechanisms, refer to *Administration Guide* for EPAP.

MT-Based IS41 SMS NP

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

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

1. Intercepts an SMSREQ message from the SMSC before the message reaches the home location register (**HLR**).

2. Extracts the message destination address (SCCP Called Party GTA), conditions the digits, and performs a lookup in the NP database.

3. If the destination address/subscribers belongs to a foreign network, then a reply message is sent to the SMSC with routing information. If the destination address/subscribers belongs to a local network, then the SMSREQ message is relayed to the HLR according to the options set for normal A-Port routing.

Options

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

- Selecting the Short Message Service Center (**SMSC**) response message type and digit format

- Specifying when an NP database lookup is considered to be successful

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

Feature Control Requirements

The MT-Based IS41 SMS NP feature (part number 893-0199-01) has the following control requirements:

- The `defcc` parameter in the `chg-stpopts` command must be set to a value other than **none** before the feature can be turned on.

- A FAK for part number 893-0199-01

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

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

- The feature cannot be enabled if the LNP feature is enabled.

- A temporary FAK cannot be used to enable the feature.

- The feature cannot be turned off after it has been turned on.

System Options for MT-Based IS41 SMS NP

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

The content of the IS41SMSOPTS table is used to help perform number conditioning, response generation, and other feature-specific options. Table 2-6 shows the options stored in the IS41SMSOPTS table, their possible values, and the action taken for each value.

Table 2-6   MT-Based IS41 SMS NP Options

IS41SMSOPTS Option	Value	Action in the EAGLE
MTSMSDNFMT	RN RNDN (default) CCRNDN	This setting specifies the required format of digits which will be encoded in the "SMS_Address" parameter of the SMSREQ ACK return result response. **Note:** 1. This feature requires STPOPTS:DefCC to be set before it can be activated. Also, DefCC is not be allowed to change to "NONE" as long as this feature is active. 2. MTSMSDNFMT is only used to handle digits if MTSMSPARM = DIGIT and MTSMSACKN = ACK.

Table 2-6   (Cont.) MT-Based IS41 SMS NP Options

IS41SMSOPTS Option	Value	Action in the EAGLE
	SRFIMSI	SMS_Address is encoded from the "SRFIMSI" parameter from the NPDB entity.
MTSMSTYPE	SP	When the lookup in the NPDB has entitytype=SP, then the lookup is considered successful.
	RN (default)	When the lookup in the NPDB has entitytype=RN, then the lookup is considered successful.
	SPRN	When the lookup in the NPDB has entitytype=SP or RN, then the lookup is considered successful.
	ALL	When the lookup in the NPDB has entitytype=SP or RN or no_entity, then the lookup is considered successful.
	NONSP	When the lookup in the NPDB has entitytype!=SP (not SP), then the lookup is considered successful.
MTSMSPARM	DIGIT (default)	This specifies that the encoding of the SMS_ADDRESS parameter is in DIGIT format, as follows: Digit_type=IS41SMSOPTS:MTSMSDIGTYPE NAI=International NP=E164 Encoding=BCD
	PCSSN	This specifies that the encoding of the SMS_ADDRESS parameter is in PCSSN format. The PCSSN is taken from the entity_data (point code). If no data is present or if the entity data has a non-ANSI point code, then the EAGLE ANSI Point Code is encoded, if available. If no ANSI SID is available, the point code will be encoded as 0 (0-0-0). If SSN is not available from entity data, then the SSN is encoded as MTSMSSSN .
MTSMSDLTR	NO (default)	This option specifies if delimiter digit(s) need to be inserted in the MTSMSDNFMT digits. A value of NO means that no delimiter is inserted.
	PRERN	This option specifies if delimiter digit(s) need to be inserted in the MTSMSDNFMT digits. A value of PRERN means that this delimiter is inserted before the RN. That is, RN is considered as being DLT+RN.
	POSTRN	This specifies if a delimiter needs to be inserted in the MTSMSDNFMT digits. POSTRN means that this delimiter is inserted after the RN. That is, RN is considered as being RN + DLT.
MTSMSDLTRV	1-5 hex digits	This specifies the delimiter digit string that is inserted in the MTSMSDNFMT digits. This value can consist of 1-5 hexadecimal digits. A value must be defined here before MTSMSDLTR can be set to PRERN or POSTRN. The system default is "NONE". Once set, the MTSMSDLTRV can never be configured to "NONE" again.
MTSMSACKN	ACK (default)	This indicates that when the SMSREQ lookup is considered successful, a SMSREQ ACK is returned.
	NACK	This indicates that when SMSREQ look is considered successful, a SMSREQ NACK is returned.
MTSMSESN	NO (default)	This indicates that NO ESN parameter be encoded when generating the SMSREQ return result message

Table 2-6   (Cont.) MT-Based IS41 SMS NP Options

IS41SMSOPTS Option	Value	Action in the EAGLE
	YES	This indicates that the ESN parameter should be encoded when generating the SMSREQ return result message. The ESN is obtained from IS41OPTS:ESNMFG and IS41OPTS:ESNSN.
		Note: The default value of the ESNMFG (0x00) and ESNSN options is 0 (0x00,00,00).
MTSMSSSN	2-255	This specifies the SSN to be encoded if the MTSMSPARM is set to PCSSN. The default value is 6.
		Note: SSN 0 is considered to be invalid. SSN 1 is reserved for SCCP management.
MTSMSNAKERR	0-255 (default value is 5)	This specifies the TCAP Access Denied Reason to be included in the SMSREQ NACK generated by SMS-MT. The default value is 0x5 (Reserved).
MTSMSDIGTYPE	0-255 (default value is 6)	This specifies the Type of Digits to be encoded in the SMS_ADDRESS parameter "Type of Digits" field in the SMSREQ ACK message. The default value is 6 (Destination Number).
MTSMSCHKSRC	YES (default value is NO)	This specifies that the SCCP CgPA GTA of the message will be used to determine whether the source of the message is a Home SMSC. If this option is YES and SCCP CgPA GTA is absent, then the source is assumed to be the Home SMSC. This is the recommended setting if it is necessary to ensure that the MT-Based SMS NP responses are received only by in-network SMSCs.
	NO	This specifies that EAGLE will not validate the SCCP CgPA GTA. Effectively, the source of the message is considered to be Home SMSC without checking SCCP CgPA GTA. This may be used by the service provider to disable SCCP CgPA checking, if the service provide ensures that only in-network nodes will send SMSREQ and receive the response generated by this feature.

MT-Based IS41 SMS NP Call Flows

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

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

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

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

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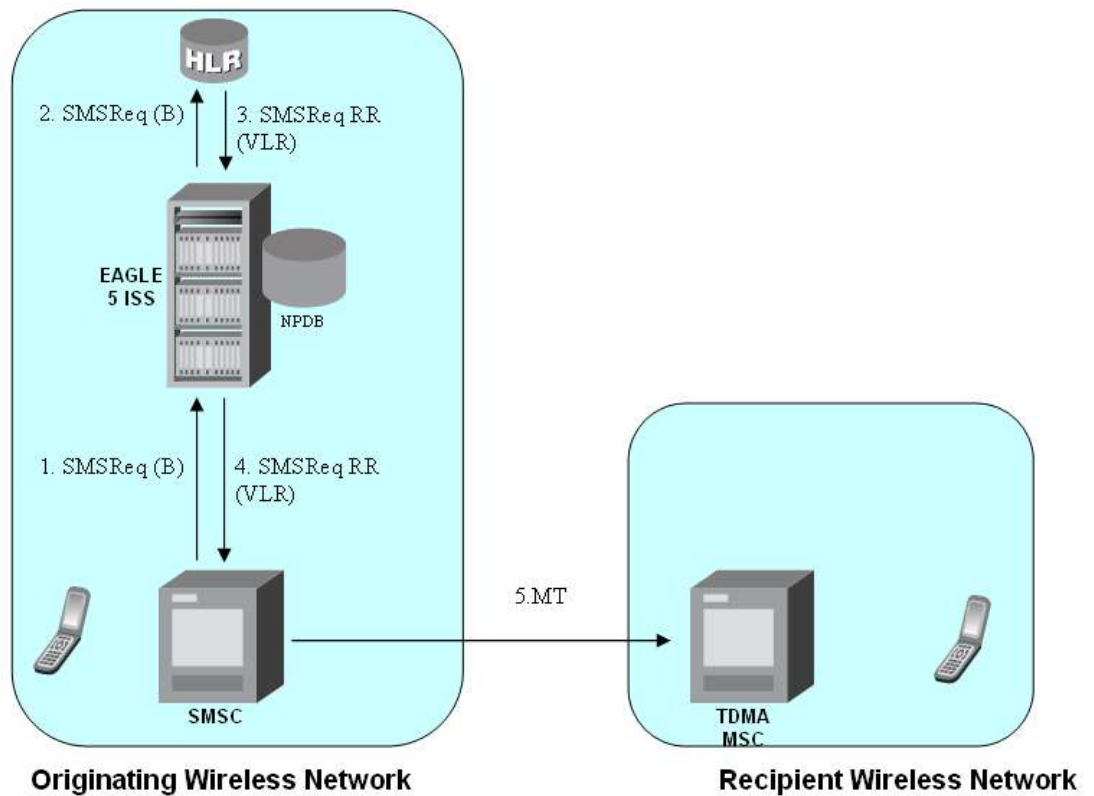
Call considerations:

- The TCAP calling party is a wireless IS41 subscriber.
- The TCAP called party is a non-ported or ported-in wireless subscriber that belongs to the same carrier as the TCAP calling party.

- The call type is SMS.

- SMSC has to be reconfigured to generate SMSReq to the HLR, regardless of called subscriber number being in or out of its own numbering range.

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

- If the called subscriber is GSM, EAGLE Migration feature ensures that the message is delivered in the GSM network.

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

Figure 2-3 depicts the message and control flows for a called subscriber who is in a different network from the calling subscriber.

Figure 2-3   MT-Based IS41 SMS NP Call Flow for Other-Network Subscriber
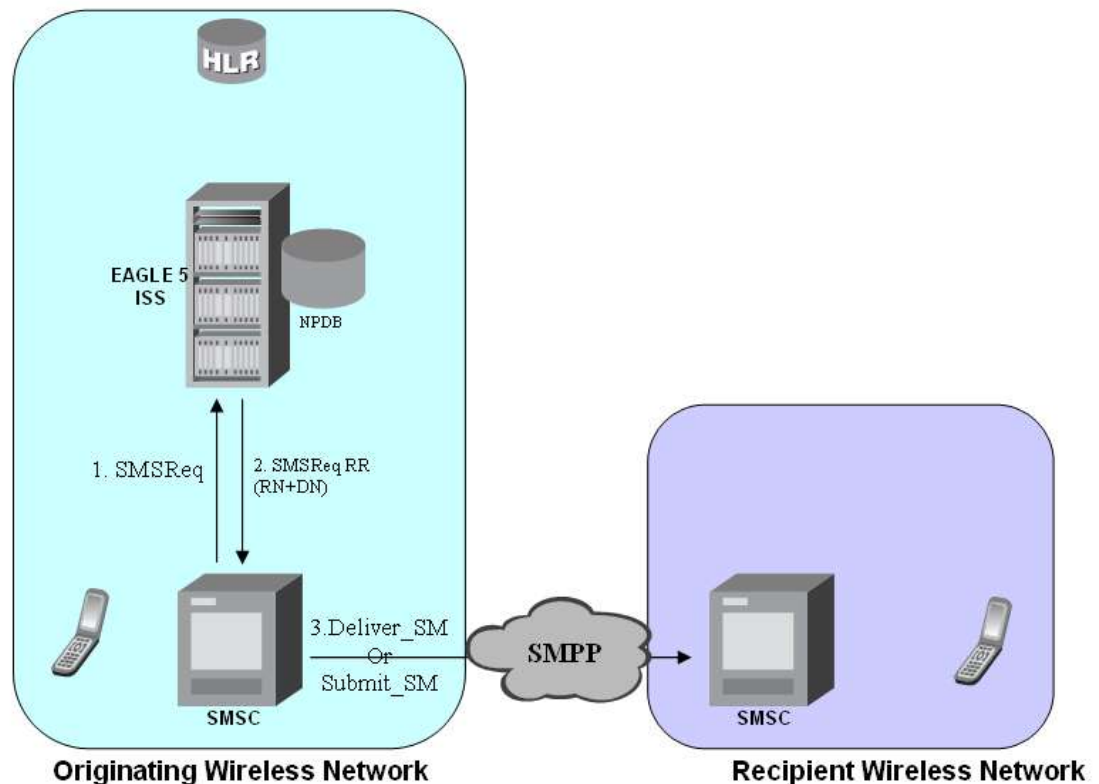
Call considerations:

- The TCAP calling party is a wireless TDMA subscriber.

- The TCAP called party is a non-ported or ported-out wireless subscriber that belongs to a different carrier from the TCAP calling party.

- The call type is SMS.

- The SMSC (Short Message Service Center) has to be configured to associate the RNs to their respective carriers.

- The called subscriber must be provisioned individually.

Hardware Requirements

EPAP-related features that perform an RTDB lookup require Service Module cards (E5-SM4G, E5-SM8G-B, or SLIC cards) running the SCCPHC application. The EAGLE can be equipped with up to 32 (31+1) Service Module cards.

Features that do not perform an RTDB lookup require Service Module cards only for GTT processing that might be performed for the feature. These features can coexist in systems with EPAP, but do not require an EPAP connection.

MPS/EPAP Platform

Oracle provides the Multi-Purpose Server (**MPS**) platform as a subsystem of the Oracle Communications EAGLE. The MPS provides support for **EPAP-related features** that perform **Real Time Database** (**RTDB**) lookups.

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 *Application B Card Hardware and Installation Guide*. The MPS provides the means of connecting the customer provisioning application with the EAGLE and accepts the customer number portability data, while accommodating numbers of varying lengths.

The Oracle Communications EAGLE Application Processor (**EPAP**) is software that runs on the MPS hardware platform. EPAP collects and organizes customer provisioning data, and forwards the data to the EAGLE Service Module cards. For detailed information about EPAP, refer to *Administration Guide* for EPAP.

In this manual, Service Module card refers to an E5-SM4G, E5-SM8G-B, or SLIC card unless a specific card is required. For more information about the supported cards, refer to *Hardware Reference*.

3

Commands

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

Introduction

This chapter describes the EAGLE commands used to administer the **MO SMS related** feature. The command descriptions include parameters that are used with the MO SMS related feature. Refer to *Commands User's Guide* for complete command descriptions including parameter names, valid parameter values, examples, and dependencies.

EAGLE IS41 Options Commands

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

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

Table 3-1   `chg-is41opts` Parameters - Class = DATABASE

Parameter	Range	Description
dfltrn	1-15 hexadecimal digits (0-9, a-f, A-F), none	Default Routing Number. This parameter specifies the routing digits when Service Portabilty is not applicable. This parameter can be modified only when the LOCREQ Query Response feature is enabled. Default value is `none`.
esnmfg	0-255, none	**TCAP** LOCREQ ESN Manufacturer Code. This parameter specifies the value to be encoded in the TCAP LOCREQ **ESN** parameter in manufacturer code section.
esnsn	0-16777215	TCAP LOCREQ ESN Serial Number. This parameter specifies the value to be encoded in the TCAP LOCREQ ESN parameter in serial number section.
iec	digit string 1-5 digits, none	International Escape Code
locreqdn	tcap, sccp	LOCREQ DN. This parameter specifies whether to obtain the Called Party, used for database lookup, from the **SCCP** layer or the TCAP layer of a received LOCREQ message.

Table 3-1   (Cont.) `chg-is41opts` Parameters - Class = DATABASE

Parameter	Range	Description
locreqrmhrn	yes, no	LOCREQ Remove HomeRN. This parameter specifies whether to remove the HomeRN from the TCAP Outgoing Called party for a relayed LOCREQ message. This parameter cannot be specified in the same command entry as the `on` and `off` parameters.
mscmktid	0-65535	LOCREQ **MSCID** Market ID. This parameter specifies the value to be encoded in LOCREQ MSCID parameter for Market ID.
mscswitch	0-255	LOCREQ MSCID Market ID Switch. This parameter specifies the value to be encoded in LOCREQ MSCID parameter in the market id switch section.
mtplocreqlen	5-15	The parameter specifies the number of terminating called party digits to extract from the LOCREQ message.
mtplocreqnai	ccrndn, frmsg, intl, natl, rnidn, rnndn, rnsdn, sub}, none	Message Translation Part LOCREQ Nature of Address Indicator. This parameter defines how Called Party obtained from the TCAP layer of a received **MTP**-routed LOCREQ message is interpreted.
nec	digit string 1-5 digits, none	National Escape Code
off	locreqrmhrn, locreqrspnd, smsreqbypass	This parameter turns off the specified options. Up to 8 comma-separated unique options can be specified. – locreqrmhrn - LOCREQ Remove HomeRN. This option specifies whether to remove the HomeRN from the TCAP Outgoing Called party for a relayed LOCREQ message. Option default is `off`. – locreqrspnd - LOCREQ Query Response. This option specifies whether to always respond to a LOCREQ query. This option can be changed only if the LOCREQ Query Response feature is turned on. Option default is `off`. – smsreqbypass - SMSREQ Bypass. This option specifies whether a received SMSREQ message that passes the MNP Service Selector (`serv=mnp` parameter of `chg-sccp-serv`) will undergo A-Port message processing. Option default is `off`. This parameter cannot be specified in the same command entry as the `locreqrmhrn` and `smsreqbypass` parameters.
on	locreqrmhrn, locreqrspnd, smsreqbypass	This parameter turns on the specified options. Up to 8 comma-separated unique options can be specified. See `off` parameter for option descriptions. This parameter cannot be specified in the same command entry as the `locreqrmhrn` and `smsreqbypass` parameters.
rspcdpapcp	off, on, frmsg	Response Called Party Point Present. This parameter specifies the point code present bit that will encode the SCCP CdPA GTA of a LOCREQ response message.
rspcdpari	frmsg, gt, ssn	Response Called Party Routing Indicator. This parameter specifies the value of the Routing Indicator bit to encode the SCCP CdPA GTA of a returned LOCREQ message.

Table 3-1   (Cont.) `chg-is41opts` Parameters - Class = DATABASE

Parameter	Range	Description
rspcgpanai	ccrndn, frmsg, intl, natl, rnidn, rnndn, rnsdn, sub}, none	Response Calling Party Nature of Address Indicator (**NAI**). This parameter specifies a new NAI value to override the NAI value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspcgpanp	0-15, none	Response Calling Party Numbering Plan. This parameter specifies a new Numbering Plan value to override the Numbering Plan value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspcgpapcp	frmsg, included, notincluded	Response Calling Party Point Code Present. This parameter specifies the value of the Point Code Present bit to encode the SCCP CgPA GTA of a returned LOCREQ message.
rspcgpari	frmsg, gt, ssn	Response Calling Party Routing Indicator. This parameter specifies the value of the Routing Indicator bit to encode the SCCP CgPA GTA of a returned LOCREQ message.
rspcgpatt	0-255, none	Response Calling Party Translation Type (TT). This parameter specifies a new **TT** value to override the TT value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspdig	ccrndn, hrnrndn, rn, rndn	Routing Number. This parameter specifies the digit encoding format of the TCAP Outgoing Called Party parameter for a LOCREQ response message on a per EAGLE node basis.
rspdigtype	0-255	Response Digit Type. This parameter specifies the value that will encode the DigitType field in the TCAP Outgoing Called Party parameter of a LOCREQ response message.
rspmin	homern, nothomern, tendelhomern, tenhomern, tenzero	Response LOCREQ MIN Parameter Encoding. This parameter specifies how the digits of the LOCREQ MIN parameter will be encoded.
rspnon	0-255, none	**MSRN** Nature of Number. This parameter specifies the Nature of Number value of the TCAP Outgoing Called Party parameter.
rspnp	0-15, none	MSRN Numbering Plan. This parameter specifies the Numbering Plan values of the TCAP Outgoing Called Party parameter.
rspparm	ddigit, rtdigit, tlist	Response Parameter. This parameter specifies which TCAP LOCREQ parameter (TCAP Outgoing Called Party) will encode the **RN** and/or **DN** information.
smsreqbypass	yes, no	SMSREQ Bypass. This parameter specifies whether a received SMSREQ message that passes the MNP Service Selector (`serv=mnp` parameter of `chg-sccp-serv`) will undergo A-Port message processing. This parameter cannot be specified in the same command entry as the `on` and `off` parameters. The MT-Based IS41 SMS NP feature does not consider the value of this parameter. If `smsreqbypass` has a value of `yes`, the A-Port processing will not be applied but the message will be considered for MT-Based IS41 SMS NP processing.

Table 3-1 (Cont.) `chg-is41opts` Parameters - Class = DATABASE

Parameter	Range	Description
sporttype	none, gsm, is41, all	Service Portability Type. This parameter specifies the application of Service Portability that is applied to the associated feature. This parameter can be modified only when the Service Portability and LOCREQ Query Response features are enabled. Deafult value is none.
tcapsnai	ccrndn, frmsg, intl, natl, rnidn, rnndn, rnsdn, sub}, none	This parameter specifies how the Called Party from the TCAP layer of a received LOCREQ message is interpreted.

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

EAGLE IS41 SMS Options Commands

The IS41 SMS options (`is41smsopts`) commands change and display SMS options in the EAGLE database for the MT-based IS41 SMS NP feature. The following sections describe the two variations: `chg-is41smsopts` and `rtrv-is41smsopts`.

chg-is41smsopts

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

```
Command: chg-is41smsopts          Class = DATABASE
```

Table 3-2 `chg-is41smsopts` Parameters - Class = DATABASE

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

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

- `chg-is41smsopts:mtsmsdnfmt=dn:mtsmstype=sp`

- `chg-is41smsopts:mtsmsdltr=no:mtsmsparm=digit`

- `chg-is41smsopts:mtsmsssn=2:mtsmsnakerr=55:mtsmsdigtype=25`

rtrv-is41smsopts

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

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

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

IS41 SMS OPTIONS
----------------------
MTSMSDNFMT     = RNDN
MTSMSTYPE      = RN
MTSMSPARM      = DIGIT
MTSMSDLTR      = NO
MTSMSDLTRV     = NONE
MTSMSACKN      = ACK
MTSMSESN       = NO
MTSMSSSN       = 6
MTSMSNAKERR    = 5
MTSMSDIGTYPE   = 6
MTSMSSCHKSRC   = NO
;
```

EAGLE A-Port Service Selector Commands

The **A-Port** service selector (srvsel) commands are used to provision, remove, change, and report on the applicable service selectors required to change a service entry for **Service Module card** services. These commands provide flexibility when provisioning the type of messages that require A-Port processing. Four variants of the service selector commands are described in the following sections: ent-srvsel, chg-srvsel, dlt-srvsel, and rtrv-srvsel.

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

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

  Table 3-3   ent-srvsel Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
serv	Mandatory	mnp	Service Module card service
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

Table 3-3   (Cont.) `ent-srvsel` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
snai	Optional	sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn	**Service Nature of Address Indicator**
snp	Optional	e164, e212, e214	Service Numbering Plan

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

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

Table 3-4   `chg-srvsel` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
ssn	Mandatory	0-255, *	Subsystem number
tt	Mandatory	0-255	**Translation Type**
nai	Optional	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	Mandatory	eir, gflex, gport, inpq, inpmr, smsmr, idps, idpr, mnp	New Service Module card service to be selected
nsnai	Optional	sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn	New **Service Nature of Address Indicator**
nsnp	Optional	e164, e212, e214	New Service Numbering Plan

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

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

Table 3-5   dlt-srvsel Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
tt	Mandatory	0-255	**Translation Type**
ssn	Mandatory	0-255, *	Subsystem number
nai	Optional	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 A-Port Service Selector Command**

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

Table 3-6   rtrv-srvsel Parameters - Class = DATABASE

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

EAGLE Feature Control Commands

The `ent/chg/rtrv-ctrl-feat` commands are used to enable, turn on, and display the feature status of the **A-Port** feature. A **Feature Access Key** is used to enable the A-Port feature. The feature must be purchased to receive a Feature Access Key for the feature. No temporary key is associated with the A-Port feature. After the feature is on, it cannot be turned off.

Additional verifications are performed to ensure that the correct hardware is present in the system.

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

  The `enable-ctrl-feat` command is used for the permanent enabling of the A-Port feature.

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

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

  The `chg-ctrl-feat` command is used to turn on the A-Port feature. The A-Port feature must be enabled before it can be turned on.

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

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

  The `rtrv-ctrl-feat` command is used display the status of the feature.

EAGLE MNP SCCP Service Commands

The MNP SCCP Service commands (`chg/dlt/rtrv-sccp-serv`) allow services to be taken online and offline and allow their processing load to be shifted to other designated nodes. These commands also support the assignment of PCs to PC groups used for MNP re-route assignment.

Entries are provisioned in the SCCP-SERV table using the **chg-sccp-serv** command, and are shown by the **rtrv-sccp-serv** command output. The maximum number of entries that the MRN table can contain is reduced by the number of entries shown in the **rtrv-sccp-serv** command output. For more information on provisioning MRN tables, refer to *Database Administration - GTT User's Guide*.

The `chg-sccp-serv` command is used to add point codes to an existing service group or to change the Relative Cost (RC) of existing point codes in a group. SCCP Service groups are organized by service (G-Flex, G-Port, MNP) and point code network type (ANSI, ITU-I, ITU-I Spare, ITU-N, ITU-N, ITU-N Spare, or ITU-N24). Up to seven PCs can be in a network type grouping for service re-route load sharing. The command allows for additions/modifications of up to four PCs at one time. The point code parameters support the Spare Point Code subtype prefix **s-** for ITU-I and ITU-N point codes. Table 3-7 describes the MNP SCCP Service configuration options that are contained in the SCCP-SERV table.

Table 3-7   MNP SCCP Service Configuration Options

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

4

Feature Configuration

This chapter describes the prerequisites, considerations, and steps to configure and activate the ANSI-41 Mobile Number Portability (A-Port) feature. This chapter also includes feature activation procedures for the following features:

- MT-Based IS41 SMS NP
- LOCREQ Query Response
- Service Portablity
- MTP Routed Messages for SCCP Applications

Introduction

This chapter identifies prerequisites for the A-Port feature activation procedure and provides the feature activation procedures performed at the EAGLE for the following features and functions:

- HLR Configuration
- A-Port
- MT-Based IS41 SMS NP
- LOCREQ Query Response
- Service Portability
- MTP Routed Messages for SCCP Applications

The A-Port feature and other related features are optional. Contact your Oracle Sales or Account Representative to determine whether you are entitled to use a specific feature or for additional information. The following features are related to the A-Port feature:

- Global Title Translation (GTT)
- Enhanced Global Title Translation (EGTT)
- Variable-Length Global Title Translation (VGTT)
- Mobile Number Portability Circular Route Prevention (**MNPCRP**)
- E5-SM4G Throughput Capacity - Refer to *Database Administration - GTT User's Guide* for the procedure *Activating E5-SM4G/E5-SM8G-B Throughput Capacity.*

Refer to *Commands User's Guide* for complete descriptions of the commands used in these procedures.

Summary of Feature Activation

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

Table 4-1   Feature Activation Summary

Feature Name	Part Number	Permanently On?
ANSI-41 Mobile Number Portability (A-Port)	893016601	Yes
MT-Based IS41 SMS NP	893019901	Yes
LOCREQ Query Response	893038501	Yes
Service Portability	893034301	No
MTP Msgs for SCCP Apps	893017401	No
1100 TPS/DSM for ITU NP	893018001	No
E5-SM4G Throughput Capacity	893019101	Yes
	893019102	
MNP Circular Route Prevention	893007001	No

Feature Activation Consideration

- 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 Oracle are available before turning on this feature. Contact your Oracle Sales or Account Representative to verify whether you are entitled to use the feature.

EPAP Entity Provisioning

Oracle recommends that EPAP entity (**SP** or **RN**) administration not be performed until after the Point Code and/or Subsystem Number has been entered into the EAGLE MAP table.

- EPAP-administered entity data can become out-of-sync with the EAGLE MAP table when the creation of Point Codes and/or Subsystem Numbers in the MAP table is performed after EPAP database administration.

- If this mismatch is discovered in real-time operations, a UIM is sent to the EAGLE maintenance terminal. (Example UIMs: `SCCP did not route - DPC not in MAP tbl`, `SCCP did not route - SS not in MAP tbl`.)

Prerequisites

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

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

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

The A-Port feature requires a Service Module card running the VSCCP application prior to turning on the A-Port feature. The A-Port feature cannot be turned on if any of the **Service Module** cards have less than 4 GB of memory installed.

The A-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 in a maintenance window that allows the reboot of Service Module cards (`init-card:loc=<Service Module card location>`) one at a time.

For in-service systems that have another EPAP-related feature enabled, perform only A-Port Feature Activation Procedure to enable and turn on the A-Port feature. With another EPAP-related feature feature enabled, the Service Module cards already contain the Real Time Database (RTDB).

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

HLR Configuration

This procedure configures the EAGLE system for Home Location Register (HLR) destinations before activating the **ANSI-41 Mobile Number Portability** (**A-Port**) feature. This procedure assumes that the EAGLE is an existing system in which the A-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. **Procedure Overview**

- Display current **PC**s, **CPC**s, **DPC**s, routes, and linksets using 1 through 6.

- Change current PCs, CPCs, DPCs, routes, linksets, and **LIM** cards using 7 through 25 .

For detailed information about specific configuration activities in this procedure, refer to these topics in *Database Administration - SS7 User's Guide*:

- Point Code Formats

- Adding a Point Code to the Self-Identification of the EAGLE

- Changing the Self-Identification of the EAGLE

- 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 code**s (DPC) in the Destination point code table (dpc/dpca/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 (pc/pca/pci/pcn/pcn24) or capability point code (cpc/cpca/cpcn) to be configured in this procedure is shown in 1, 2, or 3, choose another point code to configure with this procedure. If configuring an ITU-N network, continue to 5. If configuring a mated application but not configuring an ITU-N, network proceed to 6. Otherwise, proceed to 7.

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.

   The ITU-N point code format option npcfmti to determines 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 displayed in the output of the rtrv-stpopts command.

   To change the format of the ITU-N point code, refer to "Point Code Formats" in *Database Administration - SS7 User's Guide*.

   Continue to 6 to display mated applications in the database. Otherwise, proceed to 7.

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 *Database Administration - Features User's Guide*.

   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 2) and not the destination point code of a route (refer to output in 3).

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" and "Changing the Self-Identification of the EAGLE" in *Database Administration - SS7 User's Guide*.

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:dpc=002-100-002
   ```

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

   where:

   :dpc/dpca/dpcn
   Destination point code to add to the database

9. Verify the changes using the rtrv-dstn command and specifying the **DPC** entered in 8.

   Command examples:

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

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

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

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

DPC           CLLI        BEI ELEI  ALIASA       ALIASN/N24  DMN
002-100-002 --------     no  ---   --------      002-111-002  SS7
```

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

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

DPCN          CLLI        BEI ELEI  ALIASA       ALIASI       DMN
002-111-002 --------     no  ---   --------      002-100-002  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:apc=002-200-002:lsn=ls400001:lst=c`

`ent-ls:apcn=002-112-002:lsn=ls500001:lst=c`

where:

:apc/apca/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         APC     (SS7)  SCRN  SET  SET BEI LST LNKS ACT MES DIS SLSCI NIS
ls400001    002-200-002    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    002-112-002    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=limt1
ent-card:appl=ccs7itu:loc=1106:type=limt1
```

where:

:appl
Specifies that the application is **CCS7ITU**.

:loc
Specifies the slot number for the card.

:type
Specifies that the card is a **LIMT1** card.

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

Command examples:

```
ent-e1:loc=1105:t1port=1
ent-e1:loc=1106:t1port=1
```

where:

:loc
Card location or slot as stenciled on the shelf

:t1port
T1 card port number

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    LIMT1     CCS7ITU   ls400001     A    00  ----------- B    --
1106    LIMT1     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:t1port=1:ts=1
ent-
slk:l2tset=1:link=a:loc=1106:lsn=ls500001:slc=0:t1port=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.

t1port

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

ts

T1 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 23.

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

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

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

    where:

    :dpc/dpca/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:mpc=003-200-001:mssn=50:pc=002-100-00
1:ssn=12:rc=20
```

```
ent-
map:grp=grp07:materc=99:mpca=001-111-004:mssn=250:pca=001-111
-002: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 12 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 15 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   LIMT1    CCS7ITU   ls400001     A    00  ------------  B    --
    1106   LIMT1    CCS7ITU   ls500001     A    00  ------------  B    --
    ```

26. Back up the database changes using the `chg-db:action=backup:dest=fixed` command.

    The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

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

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

A-Port Feature Activation Procedure

Use this procedure to enable, turn on, and configure the **ANSI-41 Mobile Number Portability** (**A-Port**) feature.

> ⚠️ **Caution:**
>
> Before starting this procedure, contact My Oracle Support (MOS) for assistance in performing the feature activation procedure. Do not proceed without consulting with Technical Services.

1. Enter the `enable-ctrl-feat` command to enable the A-Port feature:

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

2. Enter the `chg-ctrl-feat` command to turn on the A-Port feature:

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

3. Change the **IS41** system options in the database using the `chg-is41opts` command.

4. Verify the changes using the `rtrv-is41opts` command to display all IS41 system options from the database.

5. Add routing number prefixes for the operating network using the `ent-homern` command. Add Home **RNs** that are prefixed to **DNs** for incoming 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).

6. Verify the changes using the `rtrv-homern` command to retrieve a list of routing number prefixes that belong to the operating network.

7. 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 1000 entries.

8. Enter the A-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:gtia=2:nai=intl:np=e164:serv=mnp:snai=intl:snp=e164:ssn=9:tt=1`

   where:

   :gtia
   Global title indicator, ANSI

   :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

9. 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:gtia=2`

   where:

   gtia
   Global title indicator, ANSI

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

10. 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.

11. After In-Service-Normal (IS-NR) state of the Service Module card is restored and verified using the `rept-stat-card` command, repeat 10 for each Service Module card in the system.

12. Set the MNP service state online using `chg-sccp-serv:serv=mnp:state=online`.

13. 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` .

14. Back up the database changes using the `chg-db:action=backup:dest=fixed` command.

    The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

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

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

The ANSI-41 Mobile Number Portability (A-Port) feature is now enabled, turned on, and operating in the system.

MT-Based IS41 SMS NP Feature Activation Procedure

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

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

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

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

1. Verify that the A-Port feature is enabled using the `rtrv-ctrl-feat` command.

2. If the A-Port feature is not enabled, enable it using A-Port Feature Activation Procedure before proceeding to 3.

3. Enter the `enable-ctrl-feat` command to enable the MT-Based IS41 SMS NP feature.

   `enable-ctrl-feat:partnum=893019901:fak=<feature access key>`

4. Enter the the `chg-stpopts` command to set the default country code to convert the nature of address indicator (**NAI**) of **MDNs** to the international format (`nai=intl`).

   The parameters in this command are used for number conditioning.

   For example, enter this command:

   `chg-stpopts:defcc=49`

   where:

   defcc
   The default country code.

5. Verify the new country code using the `rtrv-stpopts` command.

6. Enter the `rtrv-is41smsopts` command to view the values of the IS41SMSOPTS options.

7. If desired, change the **IS41** SMS options in the database for the MT-Based IS41 SMS NP feature using the `chg-is41smsopts` command.

   > **Note:**
   >
   > MTSMSDLTRV must be set to a value other than NONE before MTSMSDLTR can be set to either PRERN or POSTRN.

   For example, enter this command:

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

   where:

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

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

8. Verify the changes using the `rtrv-is41smsopts` command.

   This command displays all IS41 SMS options from the database.

   This is an example of the possible output:

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


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

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

   For example, enter this command:

   `ent-home-smsc:smsc=552611646`

10. Verify the SMSC table contents using the `rtrv-home-smsc` command.

    This command retrieves the HOME SMSC specific addresses currently used to identify Short Message Service Centers in the database.

    This is an example of the possible output:

```
rtrv-home-smsc

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

    13214564894498
    55231465465434
    5465455655656456

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

11. Verify that the A-Port feature is turned on using the `rtrv-ctrl-feat` command.

12. If the A-Port feature is not turned on, turn it on using A-Port Feature Activation Procedure before proceeding to 13.

13. Enter the `chg-ctrl-feat` command to turn on the MT-Based IS41 SMS NP feature.

    `chg-ctrl-feat:partnum=893019901:status=ON`

14. Back up the database changes using the `chg-db:action=backup:dest=fixed` command.

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The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

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

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

LOCREQ Query Response Activation Procedure

This procedure is used to enable and turn on the LOCREQ Query Response feature in the EAGLE.

Prerequisites

- A-Port or IS41 GSM Migration (IGM) must be enabled and turn on before the LOCREQ Query Response feature can be enabled.

- The LOCREQ Query Response feature is optional and must be purchased to receive the Feature Access Key (FAK) that is required to enable the feature. Contact your Sales Representative or Account Representative to determine whether you are entitled to use the LOCREQ Query Response feature has been purchased and for additional information.

The LOCREQ Query Response feature is enabled using part number 893038501 and the Feature Access Key (FAK). The LOCREQ Query Response feature cannot be disabled after it is enabled and cannot be enabled with a temporary FAK. After the LOCREQ Query Response feature is enabled and turned on, the LOCREQ Query Response feature cannot be turned off.

Some parameters and options used with the LOCREQ Query Response feature can be provisioned after the LOCREQ Query Response feature is enabled, but before the LOCREQ Query Response feature is turned on. The locreqrspnd option of the chg-is41opts command can be modified only if the LOCREQ Query Response feature is enabled and turned on. The dfltrn parameter of the chg-is41opts command can be modified only if the LOCREQ Query Response feature is enabled. The sporttype parameter of the chg-is41opts command can be modified only if both the Service Portabilty feature and the LOCREQ Query Response feature are enabled.

LOCREQ Query Response processing cannot occur until:

- The LOCREQ Query Response feature is enabled and turned on.

- The locreqrspnd option of the chg-is41opts command is set to on.

1. Display the status of controlled features controlled by Feature Access Keys (FAKs). The resulting output displays the features that are enabled in the system and the on/off status for each feature.

   Command example:

   ```
   rtrv-ctrl-feat
   ```
   Output example:

   ```
       rlghncxa03w 10-06-29 16:40:40 EST  EAGLE 42.0.0
       The following features have been permanently enabled:
       Feature Name            Partnum    Status  Quantity
       HC-MIM SLK Capacity     893012707  on            64
       APORT                   893016601  on          ----
       Service Portability     893034301  on          ----
   ;
   ```

The output shows the enabled features and the on/off status for each enabled feature in the EAGLE.

- If the `LOCREQ Query Response` entry appears in the `rtrv-ctrl-feat` output with status = on, this procedure does not need to be performed.

- If an entry for either `APORT` or `IGM` with a status of `on` does not appear in the `rtrv-ctrl-feat` output, then this procedure cannot be performed until either the A-Port or IS41 GSM Migration (IGM) feature is enabled and turned on.

- If the `LOCREQ Query Response` entry appears in the `rtrv-ctrl-feat` output with status = off, go to 4 to turn on the LOCREQ Query Response feature.

- To enable and turn on the LOCREQ Query Response feature, continue to 2.

2. Enable the LOCREQ Query Response feature.

   Command example:

   `enable-ctrl-feat:partnum=893038501:fak=<Feature Access Key>`

3. Verify that the LOCREQ Query Response feature is enabled.

   Command example:

   `rtrv-ctrl-feat`

   ```
       rlghncxa03w 09-06-29 16:40:40 EST  EAGLE 41.1.0
       The following features have been permanently enabled:
       Feature Name            Partnum    Status  Quantity
       HC-MIM SLK Capacity     893012707  on            64
       APORT                   893016601  on          ----
       Service Portability     893034301  on          ----
       LOCREQ Query Response   893038501  off         ----
     ;
   ```

   Some parameters and options can be provisioned after the feature is enabled but is turned off. LOCREQ Query Response processing cannot occur until the feature is enabled and turned on and the `locreqrspnd` option of the `chg-is41opts` command is set to `on`.

4. Turn on the LOCREQ Query Response feature.

   Command example:

   `chg-ctrl-feat:partnum=893038501:status=on`

5. Verify that the LOCREQ Query Response is enabled and turned on.

   Command example:

   `rtrv-ctrl-feat`

   ```
       rlghncxa03w 09-06-29 16:40:40 EST  EAGLE 41.1.0
       The following features have been permanently enabled:
       Feature Name            Partnum    Status  Quantity
       HC-MIM SLK Capacity     893012707  on            64
       APORT                   893016601  on          ----
       Service Portability     893034301  on          ----
       LOCREQ Query Response   893038501  on          ----
     ;
   ```

   LOCREQ Query Response processing cannot occur until the `locreqrspnd` option of the `chg-is41opts` command is set to `on`.

6. Specify the parameters `dfltrn` and `sporttype` used with LOCREQ Query Response and .Service Portability features

Command example:

```
chg-is41opts:dfltrn=48607:sporttype=is41
```

7. Set the `locreqrspnd` option of the `chg-is41opts` command to `on`.

    Command example:

    ```
    chg-is41opts:on=locreqrspnd
    ```

8. Verify that the `IS41OPTS` parameter setting are correct.

    Command example:

    ```
    rtrv-is41opts
    ```

    The LOCREQ Query Response feature is now enabled, turned on, and operating in the system. The feature cannot be disabled and cannot be turned off. LOCREQ Query Response processing can be halted by setting the `locreqrspnd` option of the `chg-is41opts` command to `off`.

9. Back up the database changes using the `chg-db:action=backup:dest=fixed` command.

    The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

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

Service Portability Activation Procedure

This procedure is used to enable and turn on the Service Portability (S-Port) feature in the EAGLE.

The Service Portability feature is optional and must be purchased from Oracle. The feature must be purchased to receive the Feature Access Key (FAK) that is required to enable the feature. Contact your Oracle Sales Representative or Account Representative to determine whether you are entitled to use the Service Portability feature has been purchased and for additional information.

The Service Portability (S-Port) feature is enabled using part number 893034301 and the Feature Access Key (FAK). The S-Port feature cannot be disabled after it is enabled and cannot be enabled with a temporary FAK. After the S-Port feature is enabled and turned on, the S-Port feature can be turned off.

S-Port options can be provisioned after the S-Port feature is enabled and before the S-Port feature is turned on. After the S-Port feature is enabled and provisioning is complete, the S-Port feature must be turned on (status set to *on*), before S-Port processing will occur.

1. Display the status of the controlled features that are controlled with Feature Access Keys (FAKs).

    Command example:

    ```
    rtrv-ctrl-feat
    ```

    The output shows the enabled features and the on/off status for each enabled feature in the EAGLE. If the `rtrv-ctrl-feat` output shows an LNP ported TNs quantity entry, this procedure cannot be performed. If the Service Portability entry appears in the `rtrv-ctrl-feat` output with status = on, this procedure does not need to be performed. If the

Service Portability entry appears in the `rtrv-ctrl-feat` output with status = off, go to 4 to turn on the S-Port feature. To enable and turn on the S-Port feature, continue to 2.

2. Enable the S-Port feature.

   Command example:

   `enable-ctrl-feat:partnum=893034301:fak=<Feature Access Key>`

3. Verify that the S-Port feature is enabled.

   Command example:

   `rtrv-ctrl-feat`

   ```
       rlghncxa03w 09-06-29 16:40:40 EST  EAGLE5 41.1.0
       The following features have been permanently enabled:
       Feature Name            Partnum    Status  Quantity
       HC-MIM SLK Capacity     893012707  on            64
       Service Portability     893034301  off        ----
    ;
   ```

   S-Port options can be provisioned after the feature is enabled. S-Port processing will not occur until the feature is enabled and turned on.

4. Turn on the S-Port feature.

   Command example:

   `chg-ctrl-feat:partnum=893034301:status=on`

5. Verify that the S-Port feature is enabled and turned on.

   Command example:

   `rtrv-ctrl-feat`

   ```
    rlghncxa03w 09-06-29 16:43:40 EST  EAGLE5 41.1.0
       The following features have been permanently enabled:
       Feature Name            Partnum    Status  Quantity
       HC-MIM SLK Capacity     893012707  on            64
       Service Portability     893034301  on         ----
    ;
   ```

   S-Port processing can occur after the feature is enabled and turned on.

6. Back up the database changes using the `chg-db:action=backup:dest=fixed` command.

   The following messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

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

The Service Portability (S-Port) feature is now enabled, turned on, and operating in the system. The feature can be turned off using the `chg-ctrl-feat` command, but cannot be disabled.

MTP Routed Messages for SCCP Applications Activation Procedure

This procedure is used to enable and turn on the MTP Routed Messages for SCCP Applications (**MTP Msgs for SCCP Apps**) feature in the EAGLE.

- Before the MTP Msgs for SCCP Apps feature can be enabled, GTT must be on.

- The MTP Msgs for SCCP Apps feature is optional and must be purchased from Oracle. The feature must be purchased to receive the Feature Access Key (FAK) that is required to enable the feature. Contact your Oracle Sales Representative or Account Representative to determine whether you are entitled to use the MTP Msgs for SCCP Apps feature has been purchased and for additional information.

The MTP Msgs for SCCP Apps feature is enabled using part number 893017401 and the Feature Access Key (FAK). The MTP Msgs for SCCP Apps feature cannot be disabled after it is enabled and cannot be enabled with a temporary FAK. After the MTP Msgs for SCCP Apps feature is enabled and turned on, the feature can be turned off.

The MTP Msgs for SCCP Apps feature must be enabled and turned on (status set to *on*) before MTP Msgs for SCCP Apps processing will occur.

1. Display the status of the controlled features that are controlled with Feature Access Keys (FAKs).

   Command example:

   ```
   rtrv-ctrl-feat
   ```

   The output shows the enabled features and the on/off status for each enabled feature in the EAGLE.

   - If the MTP Msgs for SCCP Apps entry appears in the `rtrv-ctrl-feat` output with status = on, this procedure does not need to be performed.

   - If the MTP Msgs for SCCP Apps entry appears in the `rtrv-ctrl-feat` output with status = off, go to 4 to turn on the MTP Msgs for SCCP Apps feature.

   - If the MTP Msgs for SCCP Apps entry does not appear in the rtrv-ctrl-feat output, continue with 2.

2. Enable the MTP Msgs for SCCP Apps feature.

   Command example:

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

3. Verify that the MTP Msgs for SCCP Apps feature is enabled.

   Command example:

   ```
   rtrv-ctrl-feat
   ```

   ```
       rlghncxa03w 09-06-29 16:40:40 EST  EAGLE5 41.1.0
       The following features have been permanently enabled:
       Feature Name            Partnum   Status  Quantity
       HC-MIM SLK Capacity     893012707  on          64
       MO-based IS41 SMS NP    893019501  on        ----
       MTP Msgs for SCCP Apps  893017401  off       ----
    ;
   ```

MTP Msgs for SCCP Apps processing will not occur until the feature is enabled and turned on.

4. Turn on the MTP Msgs for SCCP Apps feature.

Command example:

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

5. Verify that the MTP Msgs for SCCP Apps feature is enabled and turned on.

Command example:

```
rtrv-ctrl-feat

 rlghncxa03w 09-06-29 16:43:40 EST  EAGLE5 41.1.0
    The following features have been permanently enabled:
    Feature Name            Partnum    Status  Quantity
    HC-MIM SLK Capacity     893012707  on            64
    MO-based IS41 SMS NP     893019501  on          ----
    MTP Msgs for SCCP Apps   893017401  on          ----
 ;
```

MTP Msgs for SCCP Apps processing can occur after the feature is enabled and turned on.

6. Back up the database changes using the `chg-db:action=backup:dest=fixed` command.

The following messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

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

The MTP Msgs for SCCP feature is now enabled, turned on, and operating in the system. The feature can be turned off using the `chg-ctrl-feat` command, but cannot be disabled.

5

Measurements

This chapter describes the measurements information available from the EAGLE for the A-Port feature.

A-Port Measurements

Refer to *Measurements Reference* for information about measurement systems and reporting.

Refer to *Commands User's Guide* for descriptions of commands used to generate, schedule, and transfer measurements reports.

Refer to *Database Administration - System Management User's Guide* for provisioning information and procedures for these measurement systems:

- OAM-based Measurements - A-Port measurements are available using the File Transfer Area (**FTA**) feature and not directly by EAGLE terminals.
- Measurements Platform
- E5-OAM Integrated Measurements

Table 5-1 describes the peg counts of Message Signalling Units (MSUs) supported per-system for the A-Port feature.

Table 5-1   Pegs for Per System A-Port Measurements

Event Name	Description	Type	Unit
APSMSREL	Number of **SMS** Request messages relayed	System	Peg count
APSMRQREP	Number of SMSREQ messages received that result in SMSREQ ACK or SMSREQ NACK responses This count includes any SMSREQ NACKs generated by the Migration feature.	System	Peg count
APSMRQERR	Number of SMSREQ messages received that resulted in error This count is applicable only when the incoming message is SMSREQ . The peg count is incremented only when the MT-Based IS-41 SMS NP feature is turned on. If the IGM feature is also turned on and the IGM feature handles the message resulting in an error, this peg count will be incremented.	System	Peg count
IS41LRERR	Number of IS-41 Location Request - Error response messages sent	System	Peg count
IS41LRMRCV	Number of IS-41 Location Request messages received	System	Peg count
IS41LRRTRN	Number of IS-41 Location Request - Return Result messages sent	System	Peg count

Table 5-2 describes the peg counts of Message Signalling Units (MSUs) supported per-SSP for the A-Port feature.

Table 5-2   Pegs for Per SSP A-Port Measurements

Event Name	Description	Type	Unit
APLRACK	Number of call related LOCREQ messages acknowledged	Point Code	Peg count
APLRRLY	Number of call related LOCREQ messages relayed	Point Code	Peg count
APNOCL	Number of non-call non-LOCREQ related messages relayed	Point Code	Peg count
APNOCLGT	Number of non-call non-LOCREQ related messages that fell through to GTT	Point Code	Peg count
APSMRQREP	Number of SMSREQ messages received from a specific SSP that resulted in SMSREQ ACK or SMSREQ NACK repsonses This count will include any SMSREQ NACKs generated by the IGM feature.	Point Code	Peg count
APSMRQERR	Number of SMSREQ messages received from a specific SSP that resulted in error This count is applicable only when the incoming message is SMSREQ. The peg count is incremented only when the MT-Based IS-41 SMS NP feature is turned on. If the IGM feature is also turned on and the IGM feature handles the message resulting in an error, this peg count will be incremented.	Point Code	Peg count
GPSRACK	Number of call-related SRI responses	Point Code	Peg count
GPSRRLY	Number of call-related SRI messages relayed	Point Code	Peg count

Table 5-3 describes the peg counts of Message Signalling Units (MSUs) supported both per-system and per-SSP for the A-Port feature.

Table 5-3   Pegs for Per System and Per SSP A-Port Measurements

Event Name	Description	Type	Unit
APSMSRCV	Number of SMS Request messages received	System, Point Code	Peg count
MNPCRD	Number of times Circular Route is detected	System, Point Code	Peg count

6

Maintenance

This chapter describes the maintenance information available from the EAGLE for the A-Port feature. The information includes status, alarm messages (UAMs), and information messages (UIMs).

A-Port-Related Alarms

All A-Port related Unsolicited Alarm Messages (UAMs) are output to the Maintenance Output Group. *Unsolicited Alarm and Information Messages Reference* contains a complete description of all UAMs. Table 6-1 lists UAMs used to support the A-Port feature.

Refer to *Unsolicited Alarm and Information Messages Reference* for more information and corrective procedures for the EAGLE-related alarms.

Refer to *Alarms and Maintenance Guide* for EPAP for descriptions and corrective procedures for MPS-related alarms.

Table 6-1   A-Port Related UAMs

UAM	Severity	Message Text	MPS or EAGLE
0013	Major	Card is isolated from system	EAGLE
0084	Major	IP Connection Unavailable	EAGLE
0085	None	IP Connection Available	EAGLE
0099	Major	Incompatible HW for provisioned slot	EAGLE
0250	None	MPS available	MPS
0261	Critical	MPS unavailable	MPS
0328	None	SCCP is available	EAGLE
0329	None	SCCP capacity normal, cards abnormal	EAGLE
0330	Major	SCCP TPS Threshold exceeded	EAGLE
0331	Critical	SCCP is not available	EAGLE
0335	None	SCCP is removed	EAGLE
0336	Major	LIMs have been denied SCCP service	EAGLE
0370	Critical	Critical Platform Failures	MPS
0371	Critical	Critical Application Failures	MPS
0372	Major	Major Platform Failures	MPS
0373	Major	Major Application Failures	MPS
0374	Minor	Minor Platform Failures	MPS
0375	Minor	Minor Application Failures	MPS
0422	Major	Insufficient extended memory	EAGLE
0423	None	Card reload attempted	EAGLE
0441	Major	Incorrect MBD - CPU	EAGLE

Table 6-1   (Cont.) A-Port Related UAMs

UAM	Severity	Message Text	MPS or EAGLE
0442	Critical	**RTDB** database capacity is 95% full	EAGLE
0443	Major	RTDB database is corrupted	EAGLE
0444	Minor	RTDB database is inconsistent	EAGLE
0445	None	RTDB database has been corrected	EAGLE
0446	Major	RTDB database capacity is 80% full	EAGLE
0447	None	RTDB database capacity alarm cleared	EAGLE
0448	Minor	RTDB database is incoherent	EAGLE
0449	Major	RTDB resynchronization in progress	EAGLE
0451	Major	RTDB reload is required	EAGLE
0526	None	Service is available	EAGLE
0527	Minor	Service abnormal	EAGLE
0528	Critical	Service is not available	EAGLE
0529	Critical	Service is disabled	EAGLE
0530	None	Service is removed	EAGLE

A-Port UIMs

Unsolicited Alarm and Information Messages Reference contains a complete description of all Unsolicited Information Messages (**UIM**s) text and formats. Table 6-2 lists UIMs used to support the A-Port feature.

Table 6-2   A-Port UIMs

UIM	Text	Description	Action	Output Group (UI Output Direction)
1035	**SCCP** rsp did not route - invalid **GTI**	The SCCP response did not route due to an invalid GTI	Use a valid GTI in the **CGPA** part of the query	gtt
1036	SCCP rsp did not route - invalid **TT**	The SCCP response did not route due to an invalid TT	Provision the 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

Table 6-2   (Cont.) A-Port UIMs

UIM	Text	Description	Action	Output Group (UI Output Direction)
1039	SCCP rsp did not route - bad Selectors	The SCCP response did not route due to invalid selectors	Provision the CGPAGTI, TT, NP, and NAI in the **EGTT** selector table	gtt
1130	**IS412GSM** not provisioned	The **IS-41 to GSM Migration** prefix specified by the IS412GSM parameter is not provisioned on this system.	The IS412GSM prefix must be specified in the **GSMOPTS** table.	gtt
1131	Invalid digits in IS41MAP Digits parms	The EAGLE encountered an error in decoding the digits parameter in the LocationRequest message.	Correct the digits parameter	gtt
1169	SCCP rcvd inv TCAP portion	This indicates that SCCP discarded a message because the TCAP provided in the called party address is invalid in the EAGLE.	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
1246	Invalid length of conditioned digits	Invalid length of conditioned digits (length of conditioned international number is less than 5 or greater than 15)	Use an international number with length in the acceptable range	application subsystem
1256	**MNP** Circular Route Detected	This message indicates the network has incorrect number portability data for a subscriber.	Verify and update number portability data.	application subsystem
1294	Invalid digits in **MAP MSISDN** parameter	No digits found in MAPMSISDN parameter	Specify valid digits in the MSISDN	application subsystem

Table 6-2   (Cont.) A-Port UIMs

UIM	Text	Description	Action	Output Group (UI Output Direction)
1295	Translation PC is EAGLE	PC translation is invalid because it is PC of EAGLE.	Change the point code	application subsystem
1296	Translation **PC** type is **ANSI**	PC translation is invalid because it is an **ANSI** point code	Change the point code	application subsystem
1297	Invalid length of prefix/suffix digits	Attempted digit action of prefixing entity **ID** is invalid because combined length of entity **ID** and **GT** digits was greater than 21 digits	Change the attempted digit action or decrease the length of the entity ID and/or GT digits	application subsystem
1341	**SRI** rcvd - **GSM2IS41** not provisioned	**MIGRPFX=SINGLE** and GSM2IS41 prefix is **NONE**. The GSM to IS-41 Migration prefix is not provisioned on this system.	The GSM2IS41 prefix must be specified in the GSMOPTS table.	gtt
1374	SMS NP destination address decode failed	An error was detected during decode of SMS message destination address.	The message should be analyzed to determine the error, and the originating node should be contacted to send corrected message.	application subsystem
1375	SMS NP failed to modify TCAP message	The formatted outbound digit string length generated by SMS NP for encoding the TCAP message exceeded system limits.	The message and outbound digits formatting options should be analyzed to determine the error and the originating node or the requested outbound digit formatting option should be modified to correct the encoding error.	application subsystem
1376	SMS NP outbound digits leng exceed limit	During processing of SMS message, the formatted outbound digit string length exceeded limit for number of digits.	The message and the digit format provisioning should be analyzed to determine the error and the originating node or the requested outbound digit formatting option should be modified to correct the encoding error.	application subsystem

Maintenance Commands

The following commands can be used for maintenance when an EPAP-related feature is on.

Refer to *Commands User's Guide* for complete descriptions of the commands, including parameters, valid parameter values, rules for using the commands, and output examples.

Table 6-3   Maintenance Commands

Command	Description
rept-stat-sys	Reports the status of system entities, including cards. The output includes the number of Service Module cards that are in service (IS-NR) and how many are in another state (IS-ANR, OOS-MT, OOS-MT-DSBLD).
rept-stat-sccp	Reports operating status of services and subsystems, CPU usage, and Service Module card status. When the `loc` parameter is specified, the command displays detailed card traffic statistics, including cards that are denied SCCP service. See the section in this manual that describes the use of the `rept-stat-sccp` command.
rept-stat-mps	Displays the overall status of the EPAP application running on the MPS (multi-purpose server). Command output for the various reports of this command include overall MPS alarm status and card status, and status for a specific Service Module card when a feature is on.
rept-stat-trbl	Includes a summary of any trouble notifications (**UAM**s) for local subsystems, cards, and linksets. The severity of each alarm is indicated in the output report.
rept-stat-alm	Displays the alarm counts and totals for local subsystems and Service Module card/EPAP IP links.
rept-stat-db	Displays the status information for the EAGLE databases. This includes the level information for each Service Module card, and for the active and standby EPAP RTDB. The command reports database exception status such as corrupted, incoherent, or inconsistent, as well as providing the birth dates and levels. It shows the status of each PDB and RTDB when an EPAP-related feature is enabled.
rtrv-tbl capacity	Retrieves table use capacity summary information. For each table listed, the number of table entry elements in use and the total allowed number of table elements is presented, along with a percent (%) full value. Information is shown for some tables only if the feature that uses the table is enabled.
inh-card/alw-card	The `inh-card` command is used to change the operating state of the card from In-Service Normal (IS-NR) to Out-of-Service Maintenance-Disabled (OOS-MT-DSBLD). A craftsperson then can test the card or physically remove it from the shelf. The `alw-card` command is used to change the card from OOS-MT-DSBLD (Out-of-Service Maintenance-Disabled) to IS-NR (In-Service Normal) if card loading is successful.
inh-alm/unhb-alm	Used to allow and inhibit reporting of alarms for a given device, including the Service Module card ports. The commands allow both Port A and Port B to be specified. Inhibited alarms will not generate UAMs or cause alarm indicators to be turned on. All `rept-stat-xxx` commands continue to display the alarms with an indication that the device has its alarms inhibited.

Table 6-3   (Cont.) Maintenance Commands

Command	Description
rtrv-data-rtdb	Retrieves Entity data, DN data, IMEI data, IMSI data, TN data, NPANXX data, and LRN data from the RTDB on an active Service Module card.
	If the `loc` parameter is specified and the target card is an active Service Module card, the RTDB data is retrieved from that card.
	If the `loc` parameter is not specified, the RTDB data is retrieved on the active Service Module card that has the lowest IMT address.
	The RTDB status on the active Service Module card can be coherent or incoherent.

rept-stat-sccp

The `rept-stat-sccp` command provides statistics for local subsystem operating status, CPU usage related to the subsystem, and Service Module cards and the services that execute on the cards. Statistics can be displayed for all Service Module cards, or detailed card traffic statistics can be displayed for a single card when the `loc` parameter is specified.

In general, the text "GPORT" is displayed in `rept-stat-sccp` section headings if the G-Port feature is turned ON without the additional feature of IGM or A-Port being turned ON. If the IGM or A-Port feature is turned ON the text "GPORT" is replaced with the text "MNP".

Refer to *Commands User's Guide* for a complete description of the `rept-stat-sccp` command, iincluding parameter names, valid parameter values, examples, and dependencies.

A-Port Feature Statistics

The `rept-stat-sccp` command counts include the following statistics when the MNP service is used:

- SUCCESS = for the LOCREQ Query Response feature, incremented when a Return Result is generated (except in the no-GRN case).

- WARNINGS = incremented when

    - The Circular Route condition is detected

    - For the LOCREQ Query Response feature, GRN was required but missing, and Return Result was sent

- FAILURE = incremented when

    - SRI_SM Digit modification fails for modified DN > 21 digits

    - For the LOCREQ Query Response feature, a Return Result cannot be generated due to decode errors, number conditioning errors or encode errors

    - For the LOCREQ Query Response feature, a message is received and MNP service is Offline

- FORWARD TO GTT = incremented when

    - A GT-routed message is sent for GTT processing by the feature processing

        FORWARD to GTT is NOT incremented for messages that are MTP routed after MNP service processing.

EAGLE Debug Commands

The *Debug Commands* chapter of *Commands User's Guide* contains descriptions of commands that can be used in assessing and modifying system status and operation. The Debug commands are used only under the supervision of Oracle support personnel.

Status Reporting and Problem Identification

EAGLE commands can be used to obtain status and statistics for the EAGLE system, the EPAP systems, system devices including Service Module cards, EPAP-related features, local subsystems, and SCCP services.

Refer to *Commands User's Guide* for complete descriptions of the commands, including parameters and valid values, rules for using the commands correctly, and output examples.

Refer to *Unsolicited Alarm and Information Messages Reference* for descriptions and recovery procedures for UAMs and UIMs.

Refer to *Administration Guide* for EPAP for descriptions of EPAP functions and operation.

Refer to *Alarms and Maintenance Guide* for descriptions and recovery procedures for EPAP alarms.

Refer to the appropriate feature User's Guide for information about the functions and operation of EPAP-related features.

Table 6-4   Status Reporting for EPAP-Related Features

Reports, Status, and Statistics	Command
EAGLE	
Maintenance Status Report - indicates whether Maintenance, Routing, and SCCP Baselines have been established.	`rept-stat-sys`
Alarms and operating state for system devices, including Service Module ("SCCP") cards.	`rept-stat-sys`
Unsolicited Alarm Messages (UAMs) and Unsolicited Information Messages (UIMs)	`rept-stat-alm` `rept-stat-trbl`
EPAP/MPS (from the EAGLE)	
EPAP code version and operating state for each EPAP.	`rept-stat-mps`
MPS hexadecimal alarm strings for the active and standby EPAPs.	`rept-stat-mps`
Operating state and alarm status of equipped Service Module cards and their DSM ports and IP connections.	`rept-stat-mps` `rept-stat-mps:loc=<Service Module card location>`
Amount of memory used by the RTDB on the specified card, as a percent of available Service Module card memory.	`rept-stat-mps:loc=<Service Module card location>`

Table 6-4   (Cont.) Status Reporting for EPAP-Related Features

Reports, Status, and Statistics	Command
EPAP Provisioning Database (PDB), EPAP Real Time Database (RTDB), and Service Module card RTDB status information - Coherent, birthdate (date and time of creation), and exception (condition when a problem was detected).	`rept-stat-db` `rept-stat-db:db=mps`
Service Module Cards, EPAP-Related Features, Services, Local Subsystems	
Status of the Service Module cards, and the services executing on the cards for EPAP-related features that are turned on. Includes Service Report, Subsystem Report, and Alarm Status; Total Service Statistics.	`rept-stat-sccp`
Operating state and alarm status of equipped Service Module cards and their DSM ports and IP connections; EPAP-related feature status per card.	`rept-stat-mps:loc=<Service Module card location>`
Alarms and operating state for Service Module ("SCCP") cards.	`rept-stat-sys` `rept-stat-mps`
Any cards that are denied SCCP service.	`rept-stat-sccp`
Detailed view of the status of SCCP services provided by the specified Service Module card. Includes Card Alarm Status, Card Service Statistics	`rept-stat-sccp:loc=<Service Module card location>`
General SCCP traffic performance for Service Module cards. Message rates for TVG performance.	`rept-stat-sccp:mode=perf`
Statistics for EPAP-related feature local subsystems - Subsystem Report	`rept-stat-sccp`
Statistics for EPAP-related features	`rept-stat-sccp`

EPAP Status and Alarm Reporting

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

EPAP Maintenance Blocks

The EPAP forwards 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 status information that is displayed when a `rept-stat-mps` command is issued includes information that came from the 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 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 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.

- 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 used by the RTDB.

DSM Status Requests and DSM Status Messages

When the EPAP needs to know the status of a Service Module card, the EPAP sends a DSM Status Request to all Service Module cards, and each Service Module card returns its status to the EPAP.

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 RTDB; for example, the Service Module card determines that the RTDB needs to be downloaded because it is totally corrupted, or a user requests that the RTDB be reloaded. The Service Module card sends a Full Download Request message to the EPAP

- The Service Module card starts receiving RTDB downloads or updates. When a Service Module card starts downloading the RTDB or accepting updates, the Service Module card sends a DSM Status Message informing the EPAP of the first record received. This helps the EPAP keep track of downloads in progress.

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.

- **Load Mode Status**. This indicator indicates whether or not a sufficient number of the IS-NR (In-Service Normal) LIMs have access to SCCP services.

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