Tekelec EAGLE® 5

Feature Manual - MO SMS

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1

Introduction

Topics:

This chapter contains a brief overview of the Mobile Originated Short Message Service (MO SMS) features. This chapter also includes the scope, audience, and organization of the manual; how to find related publications; and how to contact Tekelec for assistance.

Overview

This manual provides feature descriptions, along with commands, maintenance, measurements, and configuration details associated with the Mobile Originated Short Message Service (MO SMS) features of the EAGLE 5 Integrated Signaling System (EAGLE 5 ISS). The MO SMS features allow wireless network operators to route Short Message Service (SMS) messages within number portability environments for GSM, IS41, and IS41-to-GSM Migration.

Wireless operator SMSCs typically use the SMS destination subscriber address to route an SMS message. Information about whether the destination subscriber is within the operator's network or belongs to a foreign network, and about the network protocol to be used (GSM or IS41) is required to correctly route the SMS message. Before the implementation of number portability, operators could determine the destination subscriber's network by comparing the called party number against the predefined number ranges allocated to network operators. With number portability, the SMSC cannot make this determination based solely on the called party number.

The MO SMS features provide the routing information for the called subscriber to the SMSC, enabling the SMSC to correctly route the SMS message.

Refer to *Database Administration Manual - Global Title Translation* for information about MO SMS B-Party Routing (GSM and IS41) features and Prepaid SMS Intercept feature for GSM B-Party.

Scope and Audience

This manual is intended for anyone responsible for installing, maintaining, and using the MO SMS features of the EAGLE 5 ISS. Users of this manual must have a working knowledge of telecommunications and network installations.

Manual Organization

This document is organized into the following chapters:

- *Introduction* contains general information about the Mobile Originated Short Message Service (MO SMS) documentation, the organization of this manual, and how to request technical assistance.

- *Feature Description* provides a functional description of the MO SMS features which include: MO-Based GSM SMS NP, MO-Based IS41 SMS NP, MO SMS IS41-to-GSM Migration, and Portability Check for MO SMS. The chapter also includes MO SMS feature options, considerations, and call flows.

- *Commands* describes the commands that support the MO SMS features.

- *Feature Configuration* contains procedures to configure the MO SMS features.

- *Measurements* describes the measurements and reports available for MO SMS features.

- *Maintenance* describes maintenance information available for MO SMS features including: status and alarms, hardware verification messages,system status reports and commands, code and application data loading, and alarms.

Documentation Admonishments

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

Table 1: Admonishments

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

Customer Care Center

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

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

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

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

Tekelec - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

   Phone:

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

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

TAC Regional Support Office Hours:

8:00 a.m. through 5:00 p.m. (GMT minus 5 hours), Monday through Friday, excluding holidays

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

Phone:

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

TAC Regional Support Office Hours (except Brazil):

10:00 a.m. through 7:00 p.m. (GMT minus 6 hours), Monday through Friday, excluding holidays

  - **Argentina**

    Phone:

    0-800-555-5246 (toll-free)

  - **Brazil**

    Phone:

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

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    Phone:

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  - **Colombia**

    Phone:

    01-800-912-0537

  - **Dominican Republic**

    Phone:

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  - **Peru**

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  8:30 a.m. through 5:00 p.m. (GMT), Monday through Friday, excluding holidays

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    +44 1784 467 804 (within UK)

  - **Software Solutions**

    Phone:

    +33 3 89 33 54 00

- **Asia**

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  - **Singapore**

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Emergency Response

In the event of a critical service situation, emergency response is offered by the Tekelec Customer Care Center 24 hours a day, 7 days a week. 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 that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical problems affect service and/or system operation resulting in:

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

- Corruption of system databases that requires service affecting corrective actions

- Loss of access for maintenance or recovery operations

- Loss of the system ability to provide any required critical or major trouble notification

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

Related Publications

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

Documentation Availability, Packaging, and Updates

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

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

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

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

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

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

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

Locate Product Documentation on the Customer Support Site

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

1. Log into the *Tekelec Customer Support* site.

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

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

Chapter

2

Feature Description

Topics:

This chapter describes the Mobile Originated Short Message Service (MO SMS) features which include:

- Mobile Originated Based GSM SMS Number Portability (MO-Based GSM SMS NP)
- Mobile Originated Based IS41 SMS Number Portability (MO-Based IS41 SMS NP)
- Mobile Originated SMS IS41-to-GSM Migration (MO SMS IS-41-to-GSM Migration)
- Portability Check for Mobile Originated SMS (MNP SMS)
- Prepaid Short Message Service Intercept (PPSMS)
- MO SMS Additional Subscriber Data (MO SMS ASD)
- MO SMS Generic Routing Number (MO SMS GRN)

Introduction

The Mobile Originated Short Message Service (MO SMS) features address the number portability requirements of wireless network operators for delivery of Mobile Originated SMS messages. The EAGLE 5 ISS MO SMS features apply number portability database lookup to SMS messages for IS41 and GSM networks, migrates subscribers from IS41 to GSM networks, validates subscriber use of the correct Short Message Service Center, and delivers messages to Prepaid Servers if either the Calling Party Number or Called Party Number is associated with a prepaid subscriber.

These features include:

- Mobile Originated Based GSM SMS Number Portability (MO-Based GSM SMS NP)
- Mobile Originated Based IS41 SMS Number Portability (MO-Based IS41 SMS NP)
- Mobile Originated SMS IS41-to-GSM Migration (MO SMS IS41-to-GSM Migration)
- Portability Check for Mobile Originated SMS (MNP SMS)
- Prepaid Short Message Service Intercept (PPSMS)
- Mobile Originated SMS Additional Subscriber Data (MO SMS ASD)
- Mobile Originated SMS Generic Routing Number (MO SMS GRN)

The MO SMS features are based on the EAGLE 5 ISS platform with EPAP. Numbering Plan Processor (NPP) is used by the MO SMS features for number conditioning and service logic execution.

Mobile Originated Based GSM SMS Number Portability

The Mobile Originated Based GSM SMS Number Portability (MO-Based GSM SMS NP) feature provides network information to the Short Message Service Center (SMSC) for subscribers in the GSM network. This ported information allows the SMSC to distribute the messages to the correct operating network for the Called Party Number.

The MO-Based GSM SMS NP feature:

- Intercepts SMS messages after they have undergone Prepaid Short Message Service Intercept (PPSMS) and Portability Check for Mobile Originated SMS (MNP SMS) processing and before they reach the SMSC.

  Note: The MO-Based GSM SMS NP feature does not require the PPSMS or MNP SMS features to be enabled.

- Decodes the TCAP/MAP message destination address and performs lookup in the number portability (NP) database
- Modifies the destination address in the TCAP message with dialed number (DN) porting information,
- Relays the message to the SMSC

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

The MO-Based GSM SMS NP feature applies to GSM MAP ForwardSM MSUs for either ITU or ANSI MTP messages.

Mobile Originated Based IS41 SMS Number Portability

The Mobile Originated Based IS41 SMS Number Portability (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 environment. The MO-Based IS41 SMS NP feature:

- Intercepts SMS messages before they reach the Home Short Message Service Center (SMSC)
- Decodes the TCAP/MAP message destination address and performs lookup in the Real-time Database (RTDB) to identify whether the destination number is ported.
- Modifies the destination address in the TCAP message with DN (dialed number) porting information
- Relays the SMS message to its original destination

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

The MO-Based IS-41 SMS NP feature applies to ANSI IS41 SMDPP MSUs for either ITU or ANSI MTP messages.

MO SMS IS41-to-GSM Migration

The MO SMS IS41-to-GSM Migration feature allows IS41 to GSM migration. This feature migrates subscribers based on Called Party Number from IS41 networks to GSM networks, and also allows the IS412GSM Migration Prefix to be used instead of the Routing Number (RN) obtained from the Real-time Database (RTDB). The MO SMS IS41-to-GSM Migration feature:

The MO SMS IS41-to-GSM Migration feature applies to ANSI TCAP/MAP and ANSI or ITU transport (MTP and SCCP).

- Intercepts SMS messages before they reach the Home Short Message Service Center (SMSC)
- Decodes the TCAP/MAP message destination address and performs lookup in the Real-time Database (RTDB)
- Modifies the destination address in the TCAP message with DN (dialed number) porting information or the IS412GSM Migration Prefix.
- Relays the SMS message to its original destination

Portability Check for Mobile Originated SMS

When the Portability Check for Mobile Originated SMS (MNP SMS) feature is enabled and turned on, the EAGLE 5 ISS filters incoming messages based on the MAP Operation Code. If the message is an MO Forward Short Message (MO FSM), the MSISDN number of the originating subscriber is used to search the G-Port Mobile Number Portability database. If a match is found indicating the subscriber has been ported-out, the EAGLE 5 ISS uses the destination SMSC address obtained from the SCCP CdPA to search a list of home network SMSC addresses. If a match is found, indicating the ported-out subscriber is fraudulently attempting to send SMS using the SMSC of the old network, the message is discarded and an error message is generated and returned to the originating MSC.

Prepaid Short Message Service Intercept

The Prepaid Short Message Service Intercept (PPSMS) feature applies to only mobile originated SMS, which are messages sent from a mobile handset through an Mobile Switching Center (MSC) to the Short Message Service Center (SMSC). PPSMS screens incoming messages from the MSC based on the MAP operation code. Message Discrimination determines whether the MSISDN of the sender is retrieved and a database lookup performed. Database lookup determines if the MSISDN belongs to a contract subscriber or a prepaid subscriber. If the MSISDN belongs to a contract subscriber, the

message is routed to the SMSC. If the MSISDN belongs to a prepaid subscriber, the message is diverted to a Prepaid SMS Server for a credit check before allowing the message to be delivered to the SMSC.

MO SMS Additional Subscriber Data

The MO SMS Additional Subscriber Data (MO SMS ASD) feature allows for the insertion of Additional Subscriber Data (ASD) values into the outgoing message. The MO SMS ASD feature supports the ASDLKUP or CGPNASDRQD NPP Service Actions for GSM or IS41 MO SMS NPP Services. The ASDLKUP and CGPNASDRQD NPP Service Actions are mutually exclusive within the same NPP Rule.

The ASDLKUP Service Action populates the ASD digits retrieved from an RTDB lookup of the individual or range DN table. The ASD digits are used with the Formatting Action. ASDLKUP supports both Calling Party and Called Party NPP Services for GSM and IS41: MOSMSGCDPN, MOSMSGCGPN, MOSMSICDPN, MOSMSICGPN. If no ASD digits are found, no action is taken.

The CGPNASDRQD Service Action retrieves the ASD digits from the RTDB lookup of the Calling Party Number. The ASD digits are used with the Formatting Action for the Called Party Number. CGPNASDRQD supports Called Party NPP Services for GSM or IS41: MOSMSGCDPN, MOSMSICDPN.

MO SMS Generic Routing Number

The MO SMS Generic Routing Number (MO SMS GRN) feature allows for the insertion of a Generic Routing Number (GRN) digit string into the outgoing message. The MO SMS GRN feature supports the GRNLKUP or CGPNGRNRQD NPP Service Actions in GSM or IS41 MO SMS NPP Services. The GRNLKUP and CGPNGRNRQD NPP Service Actions are mutually exclusive within the same NPP Rule.

The GRNLKUP Service Action populates the GRN digits retrieved from an RTDB lookup of the individual or range DN table. The GRN digits are used with the Formatting Action. GRNLKUP supports both Calling Party and Called Party NPP Services for GSM and IS41: MOSMSGCDPN, MOSMSGCGPN, MOSMSICDPN, MOSMSICGPN. If no GRN digits are found, no action is taken.

The CGPNGRNRQD Service Action retrieves the GRN digits from the RTDB lookup of the Calling Party Number. The GRN digits are used with the Formatting Action for the Called Party Number. CGPNGRNRQD supports Called Party NPP Services for GSM or IS41: MOSMSGCDPN, MOSMSICDPN.

Service Portability

Service Portability (S-Port) extends the scope of the MO SMS Number Portability solutions beyond traditional number portability processing. Service Portability allows a subscriber to retain the same subscriber number when moving from one network type or service technology to another within the network of a single operator. Unlike traditional number portability, the subscriber does not move from one network operator or service provider to another. Service Portability provides different routing number digits for formats that require routing numbers. Service Portability does not affect message flows.

MTP Routed SCCP Traffic

When the MTP Msgs for SCCP Apps feature is turned on, all MTP routed UDT/non-segmented XUDT SCCP messages are routed to Service Module cards. When the MTP Routed GWS Stop Action feature is turned on, messages are filtered based on the provisioned Gateway Screening rules on a per linkset basis. This 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.

TCAP Segmented SMS Support Phase 1

The TCAP Segmented SMS Support Phase 1 enhancement allows the Portability Check for Mobile Originated SMS and Mobile-Originated Based GSM SMS NP features to correctly process TCAP Segmented SMS messages. If a segmented message is subjected to the service associated with either of these features, then the EAGLE 5 ISS routes the initial TC_Begin message using standard GTT processing. The subsequent TC_Continue message is subjected to the specified service. The GTT feature and either the Portability Check for Mobile Originated SMS or the Mobile-Originated Based GSM SMS NP feature must be turned on before the TCAP Segmented SMS Support Phase 1 enhancement can be provisioned. The MOSMSTCAPSEG parameter of the chg-gsmsmsopts command is used to provision TCAP Segmented SMS Support Phase 1.

HomeSMSC Match with Digits

The HomeSMSC Match with Digits option enhances the ability of the EAGLE 5 ISS to compare the Home Short Message Service Center (HomeSMSC) digits in the SCCP CdPA, if present, of incoming Mobile Originated Forward Short Messages (MO_FSM) or the SMDPP message to HomeSMSCs that are stored in the database. If the beginning digits of the incoming HomeSMSC matches a stored HomeSMSC, then the HomeSMSCs are considered a match, even if additional digits are attached to the end of the incoming HomeSMSC. If a match is found, then the message is processed further.

This option can be used with these features:

- MO-Based GSM SMS NP
- MO-Based IS41 SMS NP
- MO SMS IS41-to-GSM Migration
- Portability Check for Mobile Originated SMS
- Service Portability (S-Port)

The HomeSMSC Match with Digits option is provisioned with the MOSMSDIGMAT parameter of commands chg-is41smsopts and chg-gsmsmsopts. The possible values of the parameter are:

- GSMSMSOPTS:MOSMSDIGMAT= exact, bestfit
- IS41SMSOPTS:MOSMSDIGMAT= exact, bestfit, bypass

If a message is subjected to multiple SMS-related features that require matching with the provisioned HomeSMSCs, a single HomeSMSC address lookup in the HomeSMSC table is performed; the result is used for subsequent processing by all features which need the HomeSMSC address result.

Because the CdPA GTA digits are not available for GTI=0 MTP routed messages, the message is checked to determine whether the MTP DPC is a HomeSMSC in the Destination table. If the MTP DPC is a HomeSMSC in the Destination table, the HomeSMSC match is considered successful.

HomeSMSC Check Bypass

The HomeSMSC Check Bypass option allows the HomeSMSC address check to not be performed. In some IS41 networks, the SCCP CdPA digits do not contain the SMSC address used by the HomeSMSC check. This bypass option applies to only the MO-Based IS41 SMS NP and MO SMS IS41-to-GSM Migration features; the bypass option is not needed in GSM networks.

System Options for MO SMS Features in GSM Networks

The system level options stored in the GSMSMSOPTS table are used to perform number conditioning, response generation, and other feature-specific options. *Table 2: System Options - MO SMS Features in GSM Networks* shows the MO SMS options in the GSMSMSOPTS table, possible values, and the actions taken for each value.

The MO-Based GMS SMS NP, MO SMS ASD, MO SMS GRN, Portability Check for MO SMS, or Prepaid SMS Intercept feature must be enabled before these options can be specified in the GSMSMSOPTS table. Refer to `chg-gsm41smsopts` in *EAGLE 5 ISS GSM SMS Options Commands* and in *Commands Manual* for associations and limitations.

Table 2: System Options - MO SMS Features in GSM Networks

GSMSMSOPTS Option	Value	Action in the EAGLE 5 ISS
DEFRN	1-15 digits, NONE (default)	The value is the default routing number used for own-network subscribers.
MOSMSACLEN	0-8 (default =0)	The value is the number of digits from the MO SMS CgPA used as the Area Code in the MO SMS CdPA.
MOSMSDIGMAT	BESTFIT	When the HomeSMSC Match with Digits option is set to *BESTFIT*, an exact match is attempted on the incoming SCCP CdPA digits in the Home SMSC table. If an exact match is not found, a best fit match of the leading digits of the incoming SCCP CdPA digits is attempted to the Home SMSC table entries.
	EXACT (default)	When the HomeSMSC Match with Digits option is set to *EXACT*, an exact match must be made of the incoming SCCP CdPA digits in the Home SMSC table.
MOSMSFWD	NO (default)	No MO-SMS forward will be performed.
	YES	If the MO-SMS TCAP Called Party Number is modified, then the MO-SMS message will be redirected by modifying the SCCP CdPA, to the GTA value identified in the MOSMSGTA field. This option cannot be set to YES unless the MOSMSGTA option has a valid value specified.
MOSMSGTA	5-21 digits, NONE (default)	This option is used to replace the SCCP CdPA in the MO-SMS message. If the MO-SMS TCAP Called Party Number is modified, then the MO-SMS message will be redirected by modifying the SCCP.

GSMSMSOPTS Option	Value	Action in the EAGLE 5 ISS
		This option cannot be specified unless a GTA with the same value has been provisioned in the GTT translation table. For more information about the GTT translation table, refer to the *Database Administration Manual - GTT*.
MOSMSNAI	INTL (default)	When SNAI=INTL, no number conditioning is required before lookup in the Number Portability database.
	NAI	The NAI from the MO_SMS message is used for conditioning before lookup in database. • If the NAI is INTL, then Number Portability lookup is performed immediately. • If the NAI is any other value, then the number is considered to be in national format. The CC is added before Number Portability lookup is performed.
	NAT	The CdPN is treated as National number for lookup in the Number Portability database. When SNAI=NAT, the CC will be added to the DN before lookup in the Number Portability database.
	UNKNOWN	When this value is set, the NAI will be treated as Unknown for the purposes of Number Conditioning.
MOSMSSA	NO (default)	No subaddress is searched for in the B party number from the TCAP part.
	YES	The subaddress is searched in the B party number. If the subaddress (identified by "#" present in the B party number) is found, the subaddress is removed before Number Portability database lookup is performed.
MOSMSTCAPSEG	OFF (default)	Mobile Originated Segmented TCAP messages are not supported.
	ON	Mobile Originated Segmented TCAP messages are supported.
MOSMSTYPE	ALL	When the lookup in the Number Portability database has entitytype=SP or RN or no_entity, then the lookup is considered successful.
	RN	When the lookup in the Number Portability database has entitytype=RN, then the lookup is considered successful.

GSMSMSOPTS Option	Value	Action in the EAGLE 5 ISS
	SP	When the lookup in the Number Portability database has entitytype=SP, then the lookup is considered successful.
	SPRN (default)	When the lookup in the Number Portability database has entitytype=SP or RN, then the lookup is considered successful.
SPFILL	OFF (default)	The Numbering Plan Processor (NPP) does not populate both RN and SP entities for own-network subscribers at the same time.
	ON	The Numbering Plan Processor (NPP) populates both RN and SP entities for own-network subscribers at the same time.
SPORTTYPE	ALL	The Service Portability prefix (GRN from RTDB) for own-network GSM and IS41 subscribers is applied.
	GSM	The Service Portability prefix (GRN from RTDB) for own-network GSM subscribers is applied.
	IS41	The Service Portability prefix (GRN from RTDB) for own-network IS41 subscribers is applied.
	NONE (default)	Service Portability is not performed for the associated feature.

System Options for for MO SMS Features in IS41 Networks

The system level options stored in the IS41SMSOPTS table are used to perform number conditioning, response generation, and other feature-specific options. *Table 3: System Options - MO SMS Features in IS41 Networks* shows the MO SMS options in the IS41SMSOPTS table, possible values, and the actions taken for each value.

The MO-Based IS41 SMS NP, MO SMS IS41-to-GSM Migration, MO SMS ASD, or MO SMS GRN feature must be enabled before these options can be specified in the IS41SMSOPTS table. Refer to `chg-is41smsopts` in *EAGLE 5 ISS IS41 SMS Options Commands* and in *Commands Manual* for associations and limitations.

Table 3: System Options - MO SMS Features in IS41 Networks

IS41SMSOPTS Option	Value	Action in the EAGLE 5 ISS
DEFRN	1-15 digits, NONE (default)	The value is the default routing number used for own-network subscribers.
MODAPARAM	DA (default)	The SMS_Destination_Address from the IS41 SMDPP message is used for conditioning, lookup, and modification.
	ODA	The SMS_Original_Destination_Address from the IS41 SMDPP message is used for conditioning, lookup, and modification.
MOIGMPFX	IS412GSM	IS412GSM digits are used as a prefix to modify the destination address in the outgoing SMDPP.
	NE (default)	Digits from the RTDB network entity (NE) associated with the B number are used as a prefix to modify the destination address in the outgoing SMDPP.
MOSMSACLEN	0-8 (default = 0)	The value is the number of digits from the MO SMS CgPA used as the Area Code in the MO SMS CdPA.
MOSMSDIGMAT	BESTFIT	When the HomeSMSC Match with Digits option is set to *BESTFIT*, an exact match is attempted on the incoming SCCP CdPA digits in the Home SMSC table. If an exact match is not found, a best fit match of the leading digits of the incoming SCCP CdPA digits is attempted to the Home SMSC table entries.
	BYPASS	When the HomeSMSC Match with Digits option is set to *BYPASS*, the HomeSMSC Match with Digits look up is not performed.
	EXACT (default)	When the HomeSMSC Match with Digits option is set to *EXACT*, an exact match must be made of the incoming SCCP CdPA digits in the Home SMSC table.
MOSMSNAI	INTL (default)	When SNAI=INTL, no number conditioning is required before lookup in the Number Portability database.
	NAI	The NAI from the SMDPP (short message delivery point to point) message is used for conditioning before lookup in the Number Portability database. • If the NAI is INTL, then Number Portability database lookup is performed immediately.

IS41SMSOPTS Option	Value	Action in the EAGLE 5 ISS
		• If the NAI is any other value, then the number is considered to be in national format. DEFCC is added before Number Portability database lookup is performed.
	NAT	The CdPN is treated as National number for lookup in the Number Portability database. DEFCC will be added to the DN before lookup in the NP database.
	UNKNOWN	When this value is set, the NAI is treated as Unknown for the purposes of Number Conditioning.
MOSMSTYPE	ALL	When the lookup in the Number Portability database has entitytype=SP or RN or no_entity, then the lookup is considered successful.
	RN	When the lookup in the Number Portability database has entitytype=RN, then the lookup is considered successful.
	SP	When the lookup in the Number Portability database has entitytype=SP, then the lookup is considered successful.
	SPRN (default)	When the lookup in the Number Portability database has entitytype=SP or RN, then the lookup is considered successful.
SPFILL	OFF (default)	The Numbering Plan Processor (NPP) does not populate both RN and SP entities for own-network subscribers at the same time.
	ON	The Numbering Plan Processor (NPP) populates both RN and SP entities for own-network subscribers at the same time.
SPORTTYPE	ALL	The Service Portability prefix (GRN from RTDB) for own-network GSM and IS41 subscribers is applied.
	GSM	The Service Portability prefix (GRN from RTDB) for own-network GSM subscribers is applied.
	IS41	The Service Portability prefix (GRN from RTDB) for own-network IS41 subscribers is applied.
	NONE (default)	Service Portability is not performed for the associated feature.

MO SMS Considerations

1. GTT must be turned on before enabling the MO-Based GSM SMS NP, MO-Based IS41 SMS NP, and MO SMS IS41-to-GSM Migration features.
2. The MO-Based GSM SMS NP and MO-Based IS41 SMS NP features can be turned on, but not turned off.
3. The MO SMS IS41-to-GSM Migration feature can be turned on or off; however, after the feature is enabled, it cannot be disabled.
4. No Temporary Feature Access Key is provided for the MO SMS features with the exception of the MNP SMS feature.
5. The enabling or turning on of the MO SMS features is not dependent upon the A-Port or G-Port feature being enabled or turned on.
6. All MO SMS features can co-exist with other EPAP-related EAGLE 5 ISS features, including G-Port, A-Port, INP, G-Flex, and EIR.
7. All MO SMS features are mutually exclusive with all features that require ELAP, such as LNP and TLNP.
8. The MO SMS features require Service Module cards running the VSCCP application.
9. The MO SMS features require that the Service Module cards have a minimum of 4 GB of memory. If the MO SMS features are enabled and a Service Module card with less than 4 GB of memory is inserted, the Service Module card will be auto-inhibited. If a Service Module card with less than 4 GB of memory is provisioned and installed, then the MO SMS features will not be allowed to be enabled. Service Module cards include DSM-4G cards and E5-SM4G cards.

MO-Based GSM SMS NP

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

The MO-Based GSM SMS NP feature:

• Intercepts SMS messages after they have undergone Prepaid Short Message Service Intercept (PPSMS) and Portability Check for Mobile Originated SMS (MNP SMS) processing and before they reach the SMSC

  Note: The MO-Based GSM SMS NP feature does not require the PPSMS or MNP SMS features to be enabled.

• Decodes the TCAP/MAP message destination address and performs lookup in the number portability (NP) database
• Modifies the destination address in the TCAP message with directory number (DN) porting information
• Relays the message to the SMSC

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

The MO-Based GSM SMS NP feature applies to ForwardSM SMS MSUs with ITU TCAP/MAP for either ITU or ANSI MTP messages.

Options

The MO-Based GSM SMS NP feature provides the following configurable options for controlling the processing of GSM SMS messages:

- Modifying SMS destination address information for processing
- Outbound digit format
- When an NP DB lookup is considered to be successful
- Handling of sub address field in destination address

Feature Control Requirements

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

- The part number is 893-0194-01.
- The feature cannot be enabled if LNP is enabled.
- A temporary FAK cannot be used to enable the feature.
- The feature cannot be turned off after it has been turned on.

MO-Based GSM SMS NP Protocol Handling

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

- The MO-Based GSM SMS NP feature traps the MO_SMS message and performs NPDB lookup based on the B number from the TCAP SM-RP-UI parameter. If the entity type is the same as the value of the MOSMSTYPE option in the GSMSMSOPTS table, then this feature modifies the outgoing MO_SMS based on the value of the MOSMSDNFMT option.
- When the outgoing MO-SMS is modified, the NAI is based on the value of the MOSMSDNNAI parameter in the GSMSMSOPTS table.
- The MO-Based GSM SMS NP feature performs SCCP CdPA GTA lookup against the SMSC list maintained by the STP. If the lookup is not successful, the MSU falls through to GTT handling.
- When both the MO-Based GMS SMS NP feature and the Portability Check for MO-SMS feature are enabled:
  - Both features must have the same service-selector service.
  - The MO-Based GSM SMS NP feature processes an MSU only when the MSU has passed the processing by the Portability Check for MO_SMS feature and no NACK has been sent.
- The MO-Based GSM SMS NP feature is required only for MO_SMS messages with SMS-Submit and SMS-Command.
- The number conditioning is based on the Conditioning Actions provisioned in the NPP Rule Set.
- For messages handled within this feature, the SCCP CdPA is always used to route the message.
- If the MOSMSTYPE=ALL, MOSMSDNFMT=RN, and the RTDB lookup has no entity assigned to the DN, then the MO_SMS message is not modified.
- The MAP Called Party Number is modified by the formatted digits computed by the Formatting Actions in the NPP Rule Set.

- If the MOSMSSA=YES, then the subaddress is searched and removed from MAP called Party number for NPDB lookup. The subaddress is not removed from the final MO_SMS message.
- If the number of called party digits in the modified MO_SMS message is greater than 20, then the digits are not modified and the original message is routed to the SMSC based on SCCP CdPA.
- The MO-Based GSM SMS NP feature considers a successful RTDB lookup with entitytype=RN and portabilitytype=0 to be entitytype=SP, if the IS41-to-GSM Migration feature is turned on or Sevice Portability is enabled.
- If the MOSMSFWD=Yes and the MO-SMS TCAP called-party number is modified after successful RTDB lookup, then the MO-SMS message is redirected to the GTA identified in the MOSMSGTA field by modifying the SCCP CdPA.

MO-Based GSM SMS NP Call Flows

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

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

Note: The MO-Based GSM SMS NP feature must be enabled and turned on before messages are processed as shown in this section.
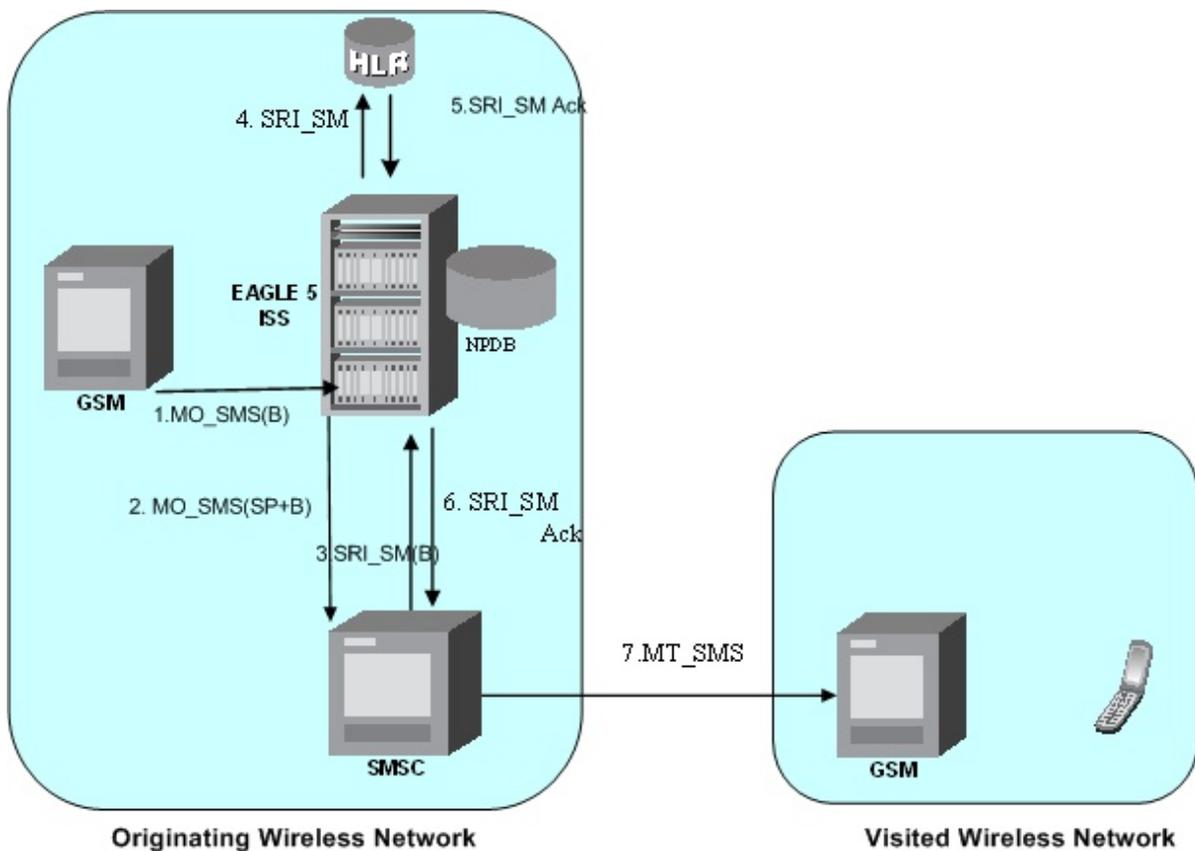
Figure 1: MO-Based GSM SMS NP Call Flow for In-Network Subscriber

Call considerations:

- The TCAP calling party is a wireless GSM subscriber.
- The TCAP called party is a non-ported or ported-in wireless subscriber that belongs to the same carrier as the TCAP calling party.
- The call type is SMS.
- The SMSC (Short Message Service Center) has to remove the prefix that indicates that the DN (dialed number) is ported in.
- If the called subscriber is ported-in, it must be provisioned individually.

Message Flow:

1. MO_SMS(B) - EAGLE 5 ISS intercepts SMS messages after they have undergone Prepaid Short Message Service Intercept (PPSMS) and Portability Check for Mobile Originated SMS (MNP SMS) processing and decodes the TCAP/MAP message destination address.
2. MO_SMS(SP+B) - If successful, modify B-party Number and relay to SMSC.
3. SRI_SM(B) - Send message to HLR to find B-party.
4. SRI_SM - Send message to HLR to locate B-party.
5. SRI_SM Ack - HLR sends message to EAGLE 5 ISS.
6. SRI_SM Ack - EAGLE 5 ISS routes message to SMSC.
7. MT_SMS - Deliver message to in-network subscriber.
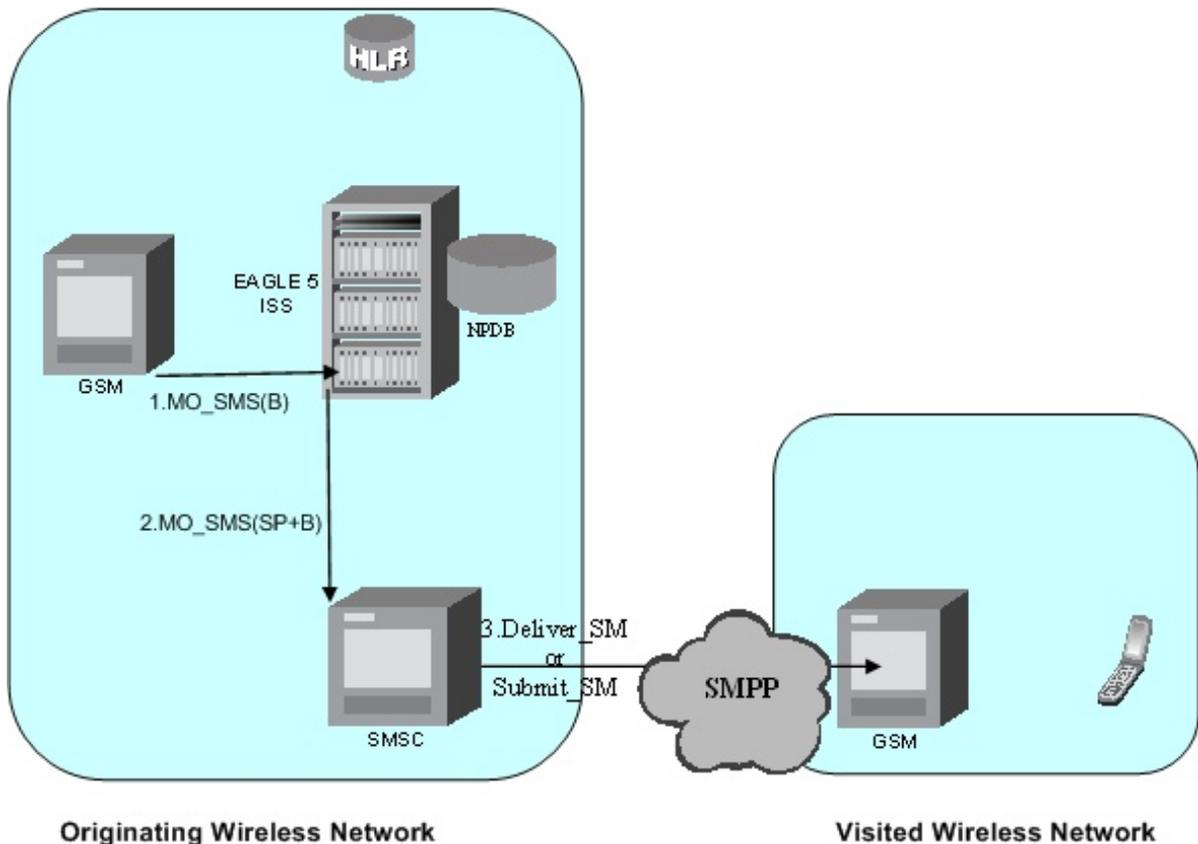
Figure 2: MO-Based GSM SMS NP Call Flow for Other-Network Subscriber

Call considerations:

- The TCAP calling party is a wireless IS41 subscriber.

- The TCAP called party is a non-ported or ported-in wireless subscriber that belongs to a different carrier from the TCAP calling party.
- The call type is SMS.
- The SMSC (Short Message Service Center) has to remove the prefix that indicates that the DN (dialed number) is ported in If the called subscriber is ported-out, it must be provisioned individually.
- If the called subscriber is TDMA, the EAGLE Migration feature ensures that the message gets delivered in the TDMA network.

Message Flow:

1. MO_SMS(B) - EAGLE 5 ISS intercepts SMS messages after they have undergone Prepaid Short Message Service Intercept (PPSMS) and Portability Check for Mobile Originated SMS (MNP SMS) processing and decodes the TCAP/MAP message destination address.
2. MO_SMS(SP+B) - If successful, modify B-party Number and relay to SMSC.
3. Deliver_SM - Forward message or submit message other network.

MO-Based IS41 SMS NP

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

The MO-Based IS41 SMS NP feature:

- Intercepts SMDPP messages before they reach the SMSC
- Decodes the TCAP/MAP message destination address and performs lookup in the number portability (NP) database
- Modifies the destination address in the TCAP message with Directory Number (DN) porting information
- Relays the message to the SMSC

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

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

Options

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

- How to consider SMDPP destination address for processing
- Outbound digit format
- When an RTDB lookup is considered to be successful

Feature Control

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

- The feature part number is 893-0195-01
- 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.

MO-Based IS41 SMS NP Protocol Handling

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

- The MO-Based IS41 SMS NP feature traps the SMDPP message and performs RTDB lookup based on the TCAP SMS_Destination_Address or SMS_Original_Destination_Address parameter. If MODAPARAM=DA, then SMS_Destination_Address is chosen. If MODAPARAM=ODA, then SMS_Original_Destination_Address is chosen. If the entity type is the same as the value of the MOSMSTYPE option in the IS41SMSOPTS table (see *Table 3: System Options - MO SMS Features in IS41 Networks*), then the MO-Based IS41 SMS NP feature modifies the outgoing MO_SMS based on the value of the MOSMSDNFMT option.
- When the outgoing SMDPP is modified, the NAI is based on the value of the MOSMSNAI parameter in the IS41SMSOPTS table.
- The MO-Based IS41 SMS NP feature performs SCCP CDPA GTA lookup against the SMSC list maintained by the STP. If the lookup is not successful, the MSU falls through to GTT handling.
- The number conditioning is based on the value of the MOSMSNAI option:

  - If MOSMSNAI=NAT, then the number is treated like a national number: DEFCC is prepended before performing lookup in the RTDB.
  - If MOSMSNAI=INTL, then the number is treated like an international number: this number is used for lookup in the RTDB.
  - If MOSMSNAI=NAI, then the conditioning is based on the NAI value from the TCAP part.
  - If MOSMSNAI=UNKNOWN, then a lookup in the CSL table is performed. The matching leading digits are deleted from the incoming digits, and the number is treats as a national number.

- For messages handled within this feature, the SCCP CDPA is always used to route the message.
- If the MOSMSTYPE=ALL and MOSMSDNFMT=RN and the RTDB lookup has no entity assigned to the DN, then the message is not modified.
- If the modified SMDPP message SMS_Destination_Address or SMS_Original_Destination_Address digits are greater than 21, then the digits are not modified and the original message is routed to the SMSC based on SCCP CDPA.
- The MO-Based IS41 SMS NP feature considers a successful RTDB lookup with entitytype=RN and portabilitytype=0 to be entitytype=SP, if the IS41-to-GSM Migration feature is turned on or Service Portability is enabled. When the IS41-GSM Migration feature is enabled, entitytype=RN, and portabilitytype=0, the subscriber is considered to be migrated, and therefore is considered to be local (in-network, SP) for the MO-Based IS41 SMS NP feature.

MO-Based IS41 SMS NP Call Flows

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

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

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

Figure 3: MO-Based IS41 SMS NP Call Flow for In-Network Subscriber depicts the message and control flows for a called subscriber who is in the same network as the calling subscriber.


Figure 3: MO-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.
- The SMSC (Short Message Service Center) has to remove the prefix that indicates that the DN (dialed number) is ported in.
- If the called subscriber is ported-in, it must be provisioned individually.
- If the called subscriber is TDMA, the EAGLE IS41-to-GSM NP feature ensures that the message is delivered in the TDMA network.

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

Figure 4: MO-Based IS41 SMS NP Call Flow for Other-Network Subscriber depicts the message and control flows for a called subscriber who is in a different network from the calling subscriber.

Figure 4: MO-Based IS41 SMS NP Call Flow for Other-Network Subscriber

Call considerations:

- The TCAP calling party is a wireless IS41 subscriber.
- The TCAP called party is a non-ported or ported-in wireless subscriber that belongs to a different carrier from the TCAP calling party.
- The call type is SMS.
- The SMSC (Short Message Service Center) has to remove the prefix that indicates that the DN (dialed number) is ported in. If the called subscriber is ported-out, it must be provisioned individually.
- If the called subscriber is TDMA, the MO SMS IS41-to-GSM Migration feature ensures that the message is delivered in the TDMA network.

MO SMS IS41-to-GSM Migration

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

The MO SMS IS41-to-GSM Migration feature:

- Intercepts SMDPP messages before they reach the SMSC

- Decodes the TCAP/MAP message destination address and performs lookup in the number portability (NP) database
- Modifies the destination address in the TCAP message with Directory Number (DN) porting information or the IS412GSM Migration Prefix
- Relays the message to the SMSC

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

The MO SMS IS41-to-GSM Migration feature applies to ANSI TCAP/MAP and ANSI or ITU transport (MTP and SCCP) messages.

Options

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

- How to consider SMDPP destination address for processing
- Outbound digit format
- When an RTDB lookup is considered to be successful

Feature Control

The MO SMS IS41-to-GSM Migration feature has the following feature control requirements:

- The feature part number is 893-0262-01
- The feature cannot be enabled if the LNP feature is enabled.
- A temporary FAK cannot be used to enable the feature.
- The feature can be turned off after it has been turned on.

System Options for MO SMS IS41-to-GSM Migration

The system level options in the IS41SMSOPTS table are used to perform number conditioning, response generation, and other feature-specific options. *Table 3: System Options - MO SMS Features in IS41 Networks* shows the options stored in the IS41SMSOPTS table, their possible values, and the action taken for each value for the MO SMS IS41-to-GSM Migration feature.

MO SMS IS41-to-GSM Migration Protocol Handling

After the MO SMS IS41-to-GSM Migration feature has been enabled and turned on, the feature provides the following protocol handling:

- The MO SMS IS41-to-GSM Migration feature traps the SMDPP message and performs RTDB lookup based on the TCAP SMS_Destination_Address or SMS_Original_Destination_Address parameter. If MODAPARAM=DA, then SMS_Destination_Address is chosen. If MODAPARAM=ODA, then SMS_Original_Destination_Address is chosen. If the entity type = SP and the portability type = 5 (migrated), then the MO SMS IS41-to-GSM Migration feature modifies the outgoing MO_SMS based on the value of the MOSMSDNFMT option.
- When the outgoing SMDPP is modified, the NAI is based on the value of the MOSMSNAI parameter in the IS41SMSOPTS table.

- The MO SMS IS41-to-GSM Migration feature performs SCCP CDPA GTA lookup against the SMSC list maintained by the STP. If the lookup is not successful, the MSU falls through to GTT handling.
- The number conditioning is based on the value of the MOSMSNAI option:

  - If MOSMSNAI=NAT, then the number is treated like a national number: DEFCC is prepended before performing lookup in the RTDB.
  - If MOSMSNAI=INTL, then the number is treated like an international number: this number is used for lookup in the RTDB.
  - If MOSMSNAI=NAI, then the conditioning is based on the NAI value from the TCAP part.
  - If MOSMSNAI=UNKNOWN, then a lookup in the CSL table is performed. The matching leading digits are deleted from the incoming digits, and the number is treated as a national number.

- For messages handled within this feature, the SCCP CDPA is always used to route the message.
- If the modified SMDPP message SMS_Destination_Address or SMS_Original_Destination_Address digits are greater than 21, then the digits are not modified and the original message is routed to the SMSC based on SCCP CDPA.

Portability Check for Mobile Originated SMS

The Portability Check for Mobile Originated SMS (MNP SMS) feature is designed to prevent subscriber use of an incorrect Short Message Service Center by filtering incoming messages based on MAP Operation Code. If the message is a MO Forward Short Message (MOFSM), the Mobile Subscriber Integrated Services Digital Network (MSISDN) number of the originating subscriber, or subscriber phone number, is used to search the G-Port Mobile Number Portability database.

When a mobile subscriber sends a Mobile Originated Short Message Service message (MOSMS) using a GSM handset, the message is first deposited in a Short Message Service Center (SMSC). The SMSC determines where the intended recipient, who is also a mobile subscriber, is located by querying the Home Location Register (HLR) of the recipient to determine the current Mobile Switching Center (MSC) of the recipient.

The SMSC address to which a message is routed is programmed into the GSM mobile handset. After a subscriber ports to another network, the handset is reprogrammed with the SMSC address for the new network; however, the subscriber could change the SMSC address to the address of the former network, causing Short Message Service (SMS) messages to be sent incorrectly to the former network SMSC of the subscriber. Because the former network would not have billing records for the ported-out subscriber, the subscriber would receive free SMS service.

If a match is found in the G-Port Mobile Number Portability database to indicate that the subscriber has been ported-out, the EAGLE 5 ISS uses the destination SMSC address obtained from the SCCP CdPA to search a list of home network SMSC addresses. If a match is found to indicate that the ported-out subscriber is attempting to send a short message using the SMSC of the subscriber's former network, the message is discarded. An error message is generated and returned to the originating MSC.

Portability Check for Mobile Originated SMS Call Flow

The MAP_FORWARD_SHORT_MESSAGE (FSM), in the following Call Flow example is used to carry a text message (short message) being transmitted from the mobile handset of one subscriber to the mobile handset of another subscriber. In practice, the short message is delivered first to the Short

Message Service Center (SMSC) of the sending subscriber, and then the SMSC is responsible for sending the short message to the intended recipient.

Refer to the following steps in the flow for this call.

The EAGLE 5 ISS will perform the following with respect to MNP SMS Feature functionality.

1. The EAGLE 5 ISS receives an UDT message.

2. EAGLE 5 ISS checks whether the service selector value is smsmr. If the service selector matches smsmr, continue to the next step. If the service selector is not smsmr, the message falls through to GTT (#12).

3. The MAP OpCode is examined. If the OpCode is MO_FSM, PPSMS processing continues with the next step. If the OpCode is not MO_FSM, the message falls through to GTT (#12).

4. If the PPSMS feature is on, the message falls through to PPSMS processing (#8). If the PPSMS feature is not on, processing continues with the next step.

5. If the MNP SMS feature is on, the Mobile Subscriber Integrated Services Digital Network (MSISDN) number is used to search the G-Port Mobile Number Portability subscriber database. If the MNP SMS feature is not on, the message falls through to GTT (#12).

6. If the MSISDN Number is found in the PDB/DN table, then the portability type of the subscriber is checked for *Not Known to be Ported (0) / Ported-out (1) / FNPTFN (2) /Not identified to be ported (36)* and processing continues. If the MSISDN Number is not found in the PDB/DN table, the message falls through to GTT (#12). If the portability type is in the range of *Prepaid1 (3)* to *Prepaid32 (35)*, the message falls through to GTT (#12).

7. The SCCP CdPA Address is used to search the list of home network SMSC addresses. If a match is found, the ported-out subscriber is fraudulently attempting to send SMS using the SMSC of the old network. The message is discarded; UIM #1129 is issued; an error message is generated and returned to the originating MSC, and the message falls through to #15. If the message is not on the list, the message falls through to GTT (#12).

8. If the message is from one of the IN Platforms (PPSMS Servers), The message exits from MNP SMS feature functionality and falls through to PPSMS processing (#14). If the message is not from one of the PPSMS Servers, processing continues to the next step.

9. The MSISDN number (phone number) of the originating subscriber is used to search the G-Port Mobile Number Portability subscriber database. If the MSISDN Number is found in the PDB/DN table, then continue to the next step. Otherwise, exit from MNP SMS feature functionality and continue with Normal GTT processing (#12).

10. Check the portability type of the subscriber. If the portability type matches the range of *Prepaid1 (3)* to *Prepaid32 (35)*, go to #14; otherwise, continue with the next step.

11. If the subscriber portability type is *Not Known to be Ported (0) /Ported-out (1) / FNPTFN (2) /Not identified to be ported (36)* and MNP SMS feature is also ON, then go to #7. Otherwise, exit from MNP SMS feature functionality and continue with Normal GTT processing.

12. Exit from MNP SMS feature functionality and continue with existing processing for other services or GTT.

13. Exit from MNP SMS feature functionality and continue with existing processing for G-Port.

14. Exit from MNP SMS feature functionality and continue with existing processing for PPSMS.

15. Exit from MNP SMS feature functionality.

Prepaid Short Message Service Intercept

Prepaid Short Message Service Intercept (PPSMS) is applicable to the A-Party (MSISDN) and B-Party (TP-DA of SM-RP-UI) sides of the GSM Forward Short Message. Refer to *Database Administration Manual - Global Title Translation* for information about the Prepaid Short Message Service Intercept feature for B-Party.

PPSMS performs the following main functions:

Message Discrimination

PPSMS uses the G-Port message selection methods to determine whether the message should receive PPSMS/G-Port service versus GTT.

If the incoming selectors match a SRVSEL entry and the entry has SERV=SMSMR, PPSMS is performed. If no match is found in SRVSEL table then GTT is performed. If the SSN is for HLR, G-Port is performed. If the SSN is for MSC, PPSMS is performed, and if the SSN is for neither, GTT is performed. Next, the MAP Operation Code received in the message is examined. Only Mobile originated forward short message calls receive PPSMS service. Other messages fall through to GTT. After MAP operation code discrimination, PPSMS provides discrimination based on SCCP CgPA GTA digits. This allows the operator to decide whether messages from certain CgPAs will receive PPSMS service or fall through to GTT, even if the messages meet all of the previous service selection criteria.

Number Conditioning

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

When PPSMS is required to be performed on a message and the number is not international (that is, the NAI of MSISDN number is "National (Significant) Number" or "Subscriber Number)", the National/Local to International number conditioning is triggered.

For a National (Significant) Number, the received MSISDN digits are prepended with the default country code and for a Subscriber number, the MSISDN digits are prepended with the default country code and the default network code. If the NAI is neither International or Subscriber, the message is treated as National.

Prepaid Screening

Once the number is conditioned, the PPSMS feature performs a database search to determine if the MSISDN belongs to a prepaid subscriber. This is determined by the portability type field associated with the database entry for the MSISDN. PPSMS performs the database lookup using the international MSISDN. The individual number database is searched first, and if the number is not found, then the number range database is searched. If a match is not found in individual nor range-based database, then GTT is performed on the message. In case of MSISDN numbers in the PPSMS database being odd and the last digit of the decoded MSISDN from the FSM being 'zero', PPSMS first performs a database lookup once using the even number. If no match is found, then PPSMS performs the database lookup again, now using the odd number (without last digit).

Message Relay to IN Platform

If the database search determines that the subscriber is prepaid, the message is redirected to one of the two IN platforms using the translation data in the PPSOPTS table. If the routing indicator in the IN platform translation data is route-on-SSN, the mated application table is accessed to determine the point code/subsystem status for the IN platform, and if it has a mate. The SCCP CdPA GTA should not be changed as a result of this operation. If the RI in the translation data indicates route-on-GT, and if the Intermediate GTTLoad Sharing feature is turned on, the Mated Relay Node (MRN) table is accessed to determine the point code status and if the IN platform has a mate. Subsystem status is not maintained in the mated relay node.

Prepaid Short Message Service Intercept Message Handling

Prepaid Short Message Service Intercept (PPSMS) performs message handling in the following steps.

1. The message arrives at the EAGLE 5 ISS route-on-gt. The EAGLE 5 ISS decodes the SCCP portion and uses the data to perform the G-Port selection based on the CdPA NP, NAI, TT, SSN, and GTI. The result of the selection provides a service indicator. The service indicator is SMSMR if PPSMS is required. If a SMSMR selector does not match the incoming GT fields, the message is passed on for GTT selection.

2. If #1 indicates PPSMS is required, and the message is not a UDTS generated by EAGLE 5 ISS, the EAGLE 5 ISS performs PPSMS service.

3. If the message is a UDTS generated by the EAGLE 5 ISS, then regular GTT is performed on the message.

4. If the EAGLE 5 ISS receives a UDTS message from another node, it is treated in the same manner as any other message. If GTT is indicated, then the UDTS translation is based on the CdPAGTA, and the message is routed to the translated address. If GTT is not indicated, the UDTS is through switched via MTP routing. The one exception is that if translation fails on the UDTS, the EAGLE 5 ISS will not generate another UDTS to send to the originator of the UDTS that failed.

5. The TCAP/MAP portion of the message is decoded by PPSMS. If the message is not a TC_BEGIN, the message falls through to GTT.

6. If the message is a TC_BEGIN, PPSMS decodes the Operation Code of the MAP message to distinguish MO_FSMs from the rest. If the OpCode is not FSM (MAP version 1 or 2) or MO_FSM (MAP version 3), the message falls through to GTT.

7. If the OpCode is FSM (MAP version 1 or 2) or MO_FSM (MAP version 3), the MAP portion of the message is decoded and searched for a MSISDN tag. If a MSISDN tag is not found, the message falls through to GTT. For version 3 MO_FSMs, the SMRPOA parameter would contain the MSISDN tag. For version 1 or 2 FSMs, a MSISDN tag is found if the message is mobile originated. If it is mobile terminated, a MSISDN tag is not found and the message falls through to GTT.

8. If the MSISDN is found in #7, the SCCP CgPA GTA is compared to the IN platform GTAs provisioned in the PPSOPTS table. If the decoded GTA matches one of the IN platform Gas, the message falls through to GTT.

9. If the SCCP CgPA GTA in #8 does not match any of the IN platform GTAs, the MSISDN from the MAP portion is decoded and conditioned to an international number before performing the lookup. The number conditioning is based on NAI of MSISDN parameter. The number is converted to an international number, if necessary.

10. The database lookup is performed in two parts:

    *   The exception or individual number database is searched for a match. If the match is found, the data associated with this entry is considered.

- If the conditioned number is absent in the exception database, the number range database is searched. If the match is found, the data associated with this range entry is considered. If the search is unsuccessful, the result is no match.

In case of MSISDN numbers in the PPSMS database being odd and the last digit of the decoded MSISDN from the FSM being 'zero', PPSMS first performs database lookup once using the even number. If no match is found then PPSMS performs the database lookup again, using the odd number (without last digit).

11. If a number match is found as a result of the search, the portability type field associated with the entry is examined.

- If the portability type is in the range of *Prepaid1* to *Prepaid32*, the IN platform translation information (PC and RI) associated with that type is retrieved from the GSM options. If the RI is SSN, the information is used to access the mated application (MAP) table for point code status and to see if the selected IN platform is in a load sharing relationship with another. If the RI is GT, and if the IGTTLoad Sharing feature is on, the mated relay node table is used for this purpose. If the point code is available, the message is routed the IN platform. If the point code is in a load sharing relationship with other point codes, messages are equally divided between them.

- If the portability type is not in the range of *Prepaid1* to *Prepaid32*, the message falls through to GTT.

12. If a number match is not found as a result of the search in #10, the message falls through to GTT.

Prepaid Short Message Service Intercept Call Flows

The MAP_FORWARD_SHORT_MESSAGE (FSM), in the following Call Flow examples is used to carry a text message (short message) being transmitted from the mobile handset of one subscriber to the mobile handset of another subscriber. In practice, the short message is delivered first to the Short Message Service Center (SMSC) of the sending subscriber, and then the SMSC is responsible for sending the short message to the intended recipient.

Successful Delivery of Mobile Originated FSM from Contract/Postpaid Subscriber

Refer to *Figure 5: Successful Delivery of MO_FSM from Contract Subscriber* for the steps in the flow for this call.

Figure 5: Successful Delivery of MO_FSM from Contract Subscriber

1. The Gateway Mobile Switching Center (GMSC) sends the Mobile Originated Forward Short Message (MO_FSM) to the EAGLE 5 ISS with PPSMS (TCBEGIN).

   Based on MTP DPC = EAGLE 5 ISS point code and SCCP CdPA TT, NP, NAI, SSN, and GTI, the message is pre-selected for PPSMS service. If service is not PPSMS, the message falls through to GTT.)

   Next, the MAP OpCode and SCCP CgPA GTA are examined. The OpCode is MO_FSM and the CgPA GTA is not from one of the IN platforms, therefore, PPSMS processing continues. (If the OpCode is not MO_FSM, or if CgPA GTA is for one of the IN platforms, the message falls through to GTT.)

   The EAGLE 5 ISS queries the DB using the sender's MSISDN from the OA field in the MAP portion of message.

   MSISDN is present in the database, but the portability type is not in the range of *prepaid1* to *prepaid32*, meaning the sender is not a prepaid subscriber.

2. The EAGLE 5 ISS therefore GTT-routes the MO_FSM to the SMSC (TCBEGIN).

3. The SMSC returns the MO_FSM_ack (TCEND).

4. One of two possibilities:

   a. The SMSC sends the MO_FSM_ack route-on-SSN to the GMSC, then the SRF will simply MTP route the MO_FSM_ack to the GMSC. G-Port is not involved.

   b. The SMSC sends the MO_FSM_ack route-on-GT, and the service selectors indicate G-Port/PPSMS. CdPA SSN = GMSC, which is same as SMSC, so PPSMS is selected. As PPSMS decodes message, it discovers it is a TCEND. Therefore, the message falls through to normal GTT and is routed to the GMSC.

Successful Delivery of Mobile Originated FSM from Prepaid Subscriber

Refer to *Figure 6: Successful Delivery of Mobile Originated FSM from Prepaid Subscriber* for the steps in the flow for this call.
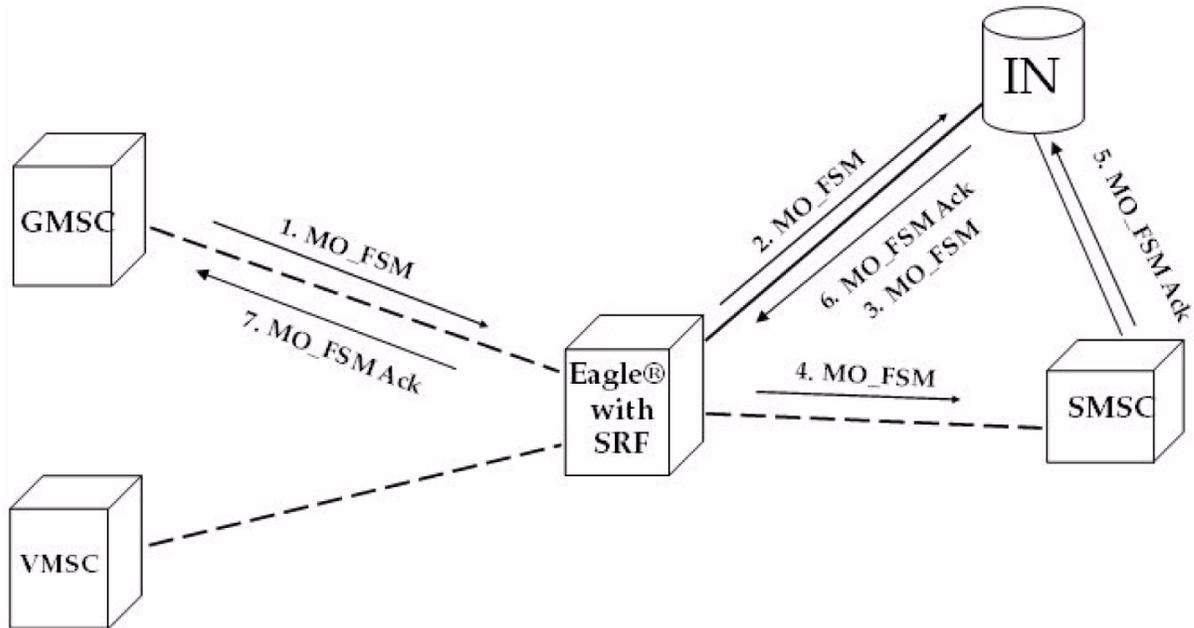
Figure 6: Successful Delivery of Mobile Originated FSM from Prepaid Subscriber

1. The Gateway Mobile Switching Center (GMSC) sends the Mobile Originated Forward Short Message (MO_FSM) to the EAGLE 5 ISS with PPSMS (TC BEGIN).

   Based on MTPDPC = EAGLE 5 ISS point code and SCCP CdPA TT, NP, NAI, SSN, and GTI, the message is pre-selected for PPSMS service. If service is not PPSMS, the message falls through to GTT.

   Next, the MAP OpCode and SCCP CgPA GTA are examined. The OpCode is MO_FSM and the CgPAGTA is not from one of the IN platforms, therefore, PPSMS processing continues. If OpCode is not MO_FSM, or if CgPA GTA is for one of the IN platforms, the message falls through to GTT.

   The EAGLE 5 ISS queries the DB using sender's MSISDN from SM RP OA field in MAP portion of message.

   MSISDN is present in the database, and the portability type is *prepaid1*, meaning the sender is a prepaid subscriber.

2. The EAGLE 5 ISS forwards the MO_FSM to the IN Platform (TCBEGIN) associated with *prepaid1*, after checking mated application or mated relay node table.

   The portability types *prepaid1* through *prepaid32* are used to select which of the IN platforms the message should be sent.

3. The IN Platform checks the account, finds there is enough credit to send the message, opens a new TCAP dialogue, and returns the MO_FSM to the SRF (TCBEGIN-2).

4. The message arrives at EAGLE 5 ISS and is again selected for PPSMS service based on CdPATT, NP, NAI, GTI, and CdPA SSN = SMSC. The OpCode is MO_FSM but the SCCP CgPA GTA is IN

platform, therefore, PPSMS service is not indicated and the message falls through to GTT and is routed to the SMSC.

5. The SMSC returns the MO_FSM_ack to the IN platform (TCEND-2). There are two possibilities:

   a. The SMSC sends the MO_FSM_ack route-on-SSN to the IN platform, then the SRF will simply MTP route the MO_FSM_ack to the IN platform. G-Port is not involved.

   b. The SMSC sends the MO_FSM_ack route-on-GT, and the service selectors indicate G-Port/PPSMS. CdPA SSN = GMSC, which is same as SMSC, so PPSMS is selected. As PPSMS decodes the message, it discovers it is a TCEND. Therefore, the message falls through to normal GTT and is routed to the GMSC.

6. The IN Platform transfers the MO_FSM_ack to the first transaction and returns the MO_FSM_ack to the SRF (TCEND).

7. One of two possibilities:

   a. The IN platform sends the MO_FSM_ack route-on-SSN to the GMSC, then the SRF will simply MTP route the MO_FSM_ack to the GMSC. G-Port is not involved.

   b. The IN platform sends the MO_FSM_ack route-on-GT, and the service selectors indicate G-Port/PPSMS. CdPA SSN = GMSC, which is same as SMSC, so PPSMS is selected. PPSMS decodes message, discovers it is a TCEND, and the message falls through to normal GTT and is routed to the GMSC.

Unsuccessful Delivery of Mobile Originated FSM from Prepaid Subscriber - Credit Check Failure

Refer to *Figure 7: Unsuccessful Delivery of Mobile Originated FSM from Prepaid Subscriber at SCP* for the steps in the flow for this call.
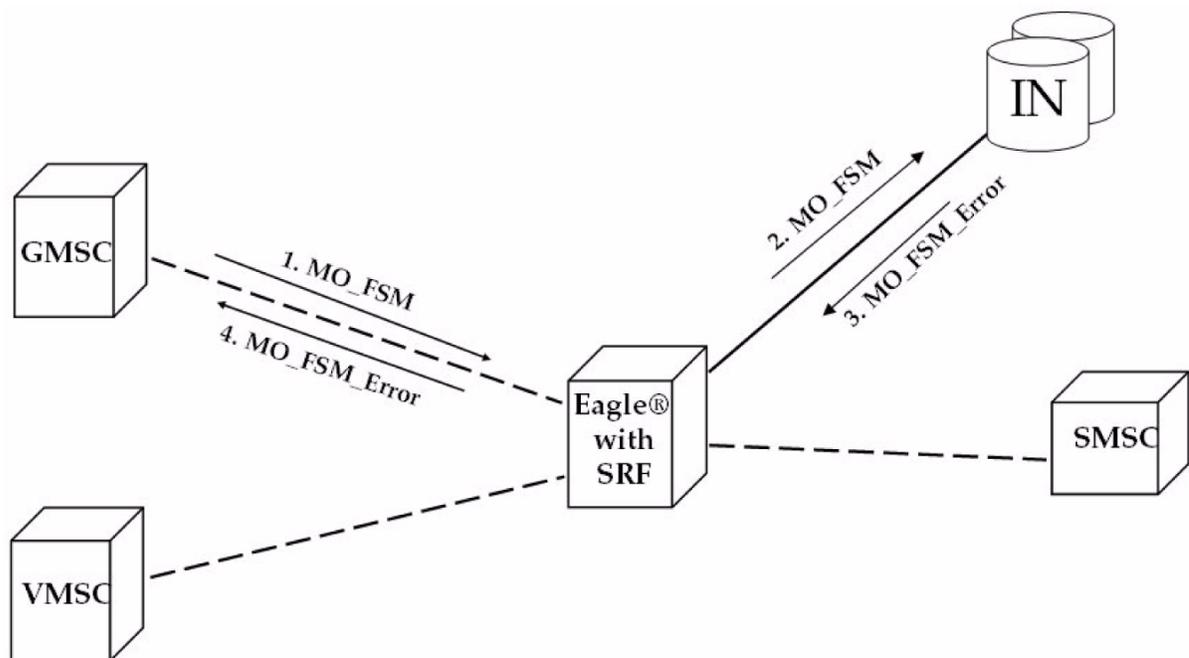
Figure 7: Unsuccessful Delivery of Mobile Originated FSM from Prepaid Subscriber at SCP

1. The Gateway Mobile Switching Center (GMSC) sends the Mobile Originated Forward Short Message (MO_FSM) to the EAGLE 5 ISS with PPSMS (TCBEGIN).

   Based on MTPDPC = EAGLE 5 ISS point code and SCCP CdPA TT, NP, NAI, and GTI, the message is pre-selected for PPSMS service. If service is not PPSMS, the message falls through to GTT.

   Next, the MAP OpCode and SCCP CgPA GTA are examined. The OpCode is MO_FSM and the CgPAGTA is not from one of the IN platforms, therefore, PPSMS processing continues. If the OpCode is not MO_FSM, or if CgPA GTA is for one of the IN platforms, the message falls through to GTT.

   The EAGLE 5 ISS queries the DB using sender's MSISDN from the SM RP OA field in the MAP portion of message.

   MSISDN is present in the database, and the portability type is *prepaid1*, meaning the sender is a prepaid subscriber.

2. The EAGLE 5 ISS forwards the MO_FSM to the IN Platform (TCBEGIN) associated with *prepaid1*.

   The portability types *prepaid1* through *prepaid32* are used to select to which of the IN platforms the message should be sent.

3. The IN Platform checks the account, finds there is not enough credit to send the message, and rejects the message by returning a MO_FSM_Neg_Response to the SRF (TCEND).

4. One of two possibilities:

   a. The IN platform sends the MO_FSM_Neg_Response route-on-SSN, then the SRF will simply MTP route the MO_FSM_Neg_Response to the GMSC. G-Port is not involved.

   b. The IN platform sends the MO_FSM_Neg_Response route-on-GT, and the service selectors indicate G-Port/PPSMS. CdPA SSN = GMSC, which is same as SMSC, so PPSMS service is selected. PPSMS decodes message, discovers it is a TCEND, and the message falls through to normal GTT and is routed to the GMSC.

Numbering Plan Processor for MO SMS Features

Numbering Plan Processor for MO SMS features (MO SMS NPP) provides comprehensive NPP number conditioning and service logic execution for MO SMS features that support the GSM and IS41 protocols. The MO SMS features can be selected and sequenced as required without repetitive number conditioning functions. NPP resolves complex number conditioning using a flexible provisioning logic. For detailed information about NPP, refer to *Numbering Plan Processor (NPP) Overview*.

Numbering Plan Processor for MO SMS features (MO SMS NPP) supports the following features:

- MO-Based GSM SMS NP
- MO-Based IS41 SMS NP
- MO SMS IS41-to-GSM Migration
- Portability Check for MO SMS (MNP SMS)
- Prepaid SMS Intercept (PPSMS)
- MO SMS Additional Subscriber Data (MO SMS ASD)
- MO SMS Generic Routing Number (MO SMS GRN)

• Service Portability (S-Port)

MO SMS NPP Message Processing

After decoding the MTP and SCCP portion of the MSU, the system verifies whether the SCCP parameters of the message match any of the provisioned Service Selectors. If the Service Selector = smsmr, MO SMS processing begins. The TCAP portion of the message is decoded.

NPP-related functions are performed next. The incoming Called Party Number or Calling Party Number is conditioned to international format using Conditioning Actions. All Service Actions provisioned for the NPP Services are performed after verifying whether the feature is enabled and turned on.

After the NPP service functions are completed, the message is directed to post-NPP processing. The message is encoded and dispatched. If the message is redirected to Global Title Translation (GTT), translation can be performed based on the SCCP Called Party Address digits or the TCAP Called Party Number.
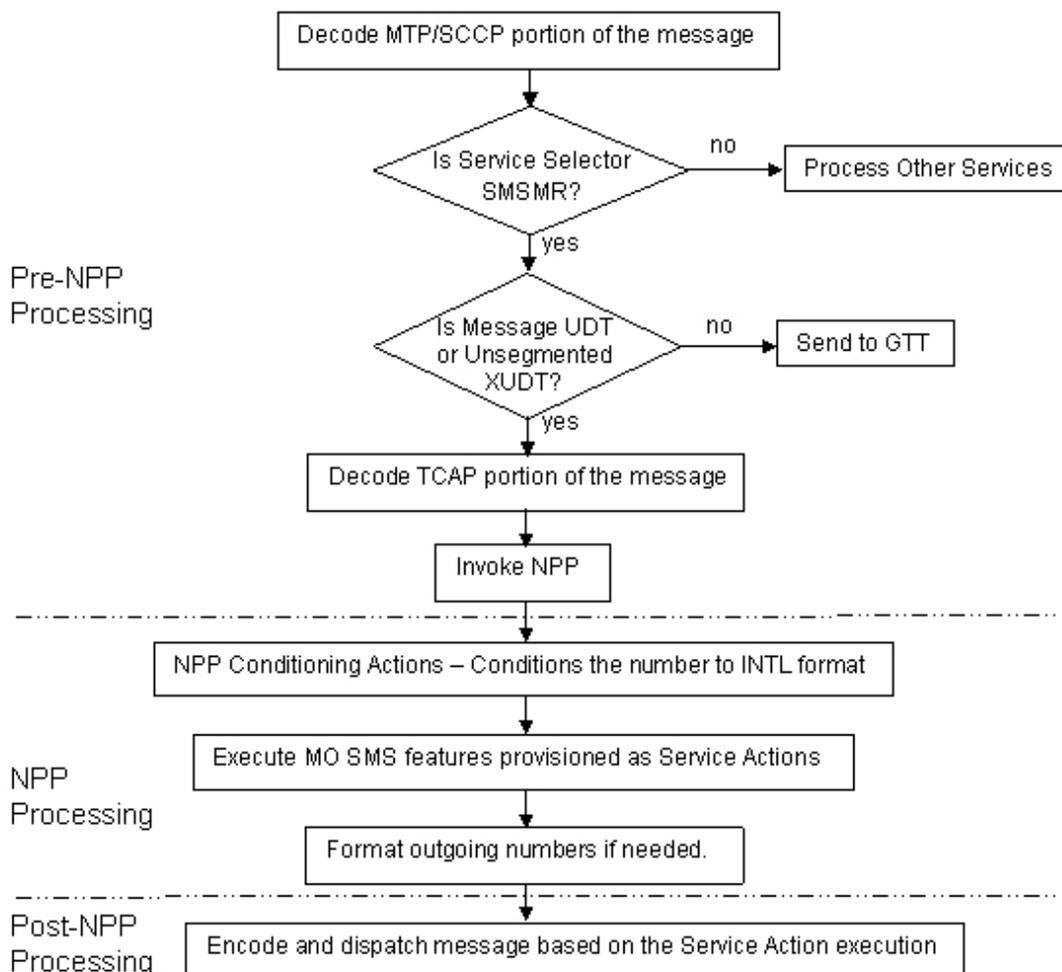
Figure 8: MO SMS NPP Message Processing

NPP Processing

NPP processing supports both GSM Forward Short Message Mobile Originated (MO) messages and IS41 SMDPP messages. GSM protocol supports MO-Based GSM SMS NP, Portability Check for MO SMS, and Prepaid SMS Intercept. IS41 protocol supports MO-Based IS41 SMS NP and MO SMS IS41-to-GSM Migration features.

NPP processing for GSM

NPP processing performed for GSM protocol and possible Service Actions that can be provisioned are shown in *Figure 9: MO SMS NPP - GSM NPP Processing*. GSM protocol supports two NPP Services: MOSMSGCDPN for processing Called Party Numbers and MOSMSGCGPN for processing Calling Party Numbers. The Calling Party Number is processed first. The Calling Party Number is the MSISDN digits of the SM-RP-OA parameter of the Forward Short Message. The Called Party Number is processed second. The Called Party Number is the TP-DA digits of the SM-RP-UI parameter of the message being processed.
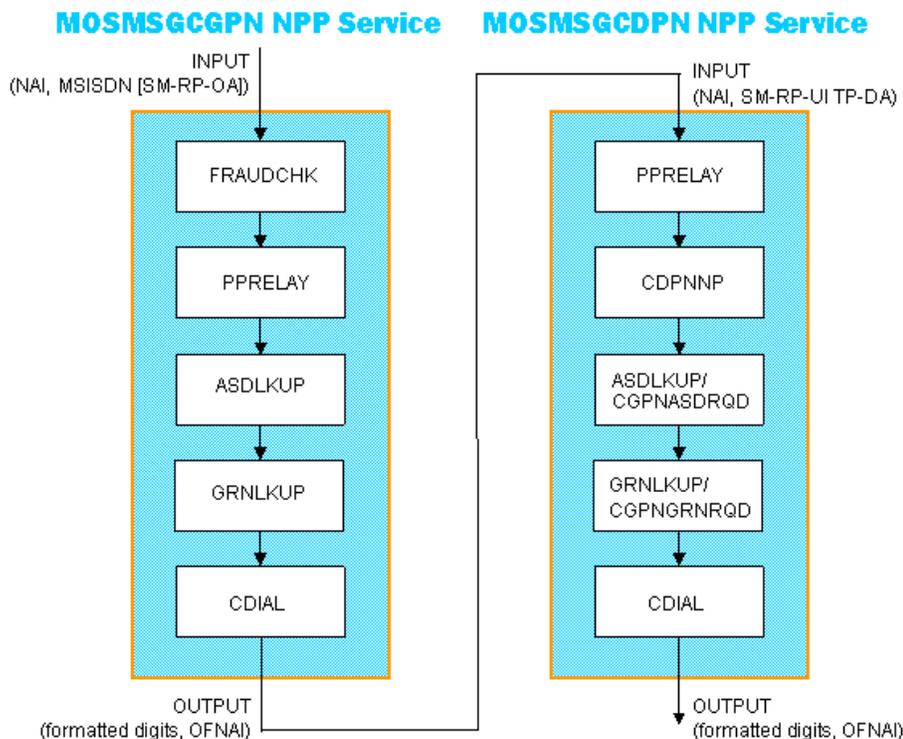
Figure 9: MO SMS NPP - GSM NPP Processing

NPP processing for IS41

NPP processing performed for IS41 protocol and possible Service Actions that can be provisioned are shown in *Figure 10: MO SMS NPP - IS41 Processing*. IS41 protocol supports two NPP Services: MOSMSICDPN for processing Called Party Numbers and MOSMSICGPN for processing Calling Party Numbers. The Calling Party Number is processed first. The Calling Party Number is the Original Originating Address (OOA) digits of the message. The Called Party Number is processed second. The Called Party Number can be either the Destination Address (DA) or Original Destination Address (ODA) parameter of the message being processed.
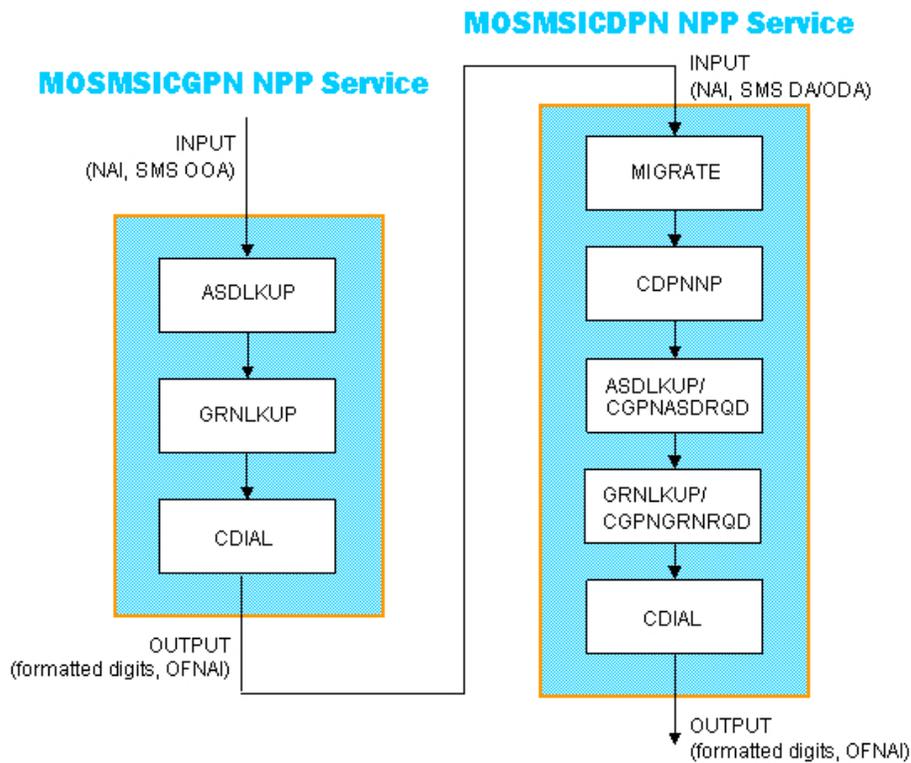
Figure 10: MO SMS NPP - IS41 Processing

Post-NPP Processing

After conditioning the number, performing Service Actions, and formatting the number passed to NPP, the decoded message is encoded and sent to the correct module or destination for further processing. For IS41 protocol, only two features are supported and the message falls through to GTT. For GSM protocol, several dispositions are possible:

- The message can be sent to a Prepaid Server after PPRELAY Service Action processing.
- The message can be NACK if the FRAUDCHK Service Action determines that the message is fraudulent.
- The message can fall through to GTT after CDPNNP Service Action processing.
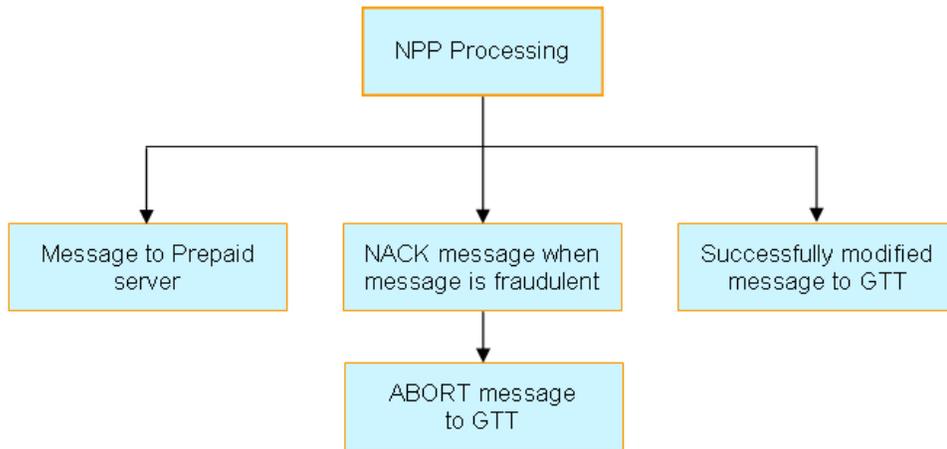
Figure 11: Post-NPP Processing

RTDB Lookup for NPP Services

An entry for a conditioned number can be found in either an Individual DN RTDB Table or a range DN RTDB Table. If an entry is found in the Individual DN RTDB Table, the range DN table is not searched. An Individual DN Table entry has precedence over a range DN Table entry. Most NPP Service Actions require an RTDB Lookup result. For a given NPP Service, RTDB Lookup is performed only once. This RTDB Lookup is performed by the first Service Action that needs an RTDB Lookup result.

NPP Provisioning

Numbering Plan Processing (NPP) provides number conditioning and service logic execution for the following MO SMS-related features:

- Mobile Originated Based GSM SMS Number Portability (MO-Based GSM SMS NP)

- Mobile Originated Based IS41 SMS Number Portability (MO-Based IS41 SMS NP)
- Mobile Originated SMS IS41-to-GSM Migration (MO SMS IS-41-to-GSM Migration)
- Portability Check for Mobile Originated SMS (MNP SMS)
- Prepaid Short Message Service Intercept (PPSMS)
- Mobile Originated Additional Subscriber Data (MO SMS ASD)
- Mobile Originated Generic Routing Number (MO SMS GRN)

NPP Services

The NPP Service in the first column of *Table 4: Required NPP Services* must be provisioned before turning on the MO SMS-related feature in the second column for the feature to be functional.

Table 4: Required NPP Services

Feature	NPP Service
MO-Based GSM SMS NP	MOSMSGCDPN

Feature	NPP Service
MO-Based IS41 SMS NP	MOSMSICDPN
MO SMS IS-41-to-GSM Migration	MOSMSICDPN
MNP SMS	MOSMSGCGPN
PPSMS	MOSMSGCDPN and MOSMSGCGPN
MO SMS ASD	MOSMSGCDPN, MOSMSGCGPN, MOSMSICDPN, and MOSMSICGPN
MO SMS GRN	MOSMSGCDPN, MOSMSGCGPN, MOSMSICDPN, and MOSMSICGPN

The NPP Services to process Called Party and Calling Party Numbers in GSM and IS41protocols are described below:

- MOSMSGCDPN - NPP Service to process the Called Party Number of the SM-RP-UI TP-DA parameter of SMS-SUBMIT or SMS-COMMAND GSM Forward Short Message.

- MOSMSGCGPN - NPP Service to process the Calling Party Number MSISDN SM-RP-OA parameter of SMS-SUBMIT or SMS-COMMAND GSM Forward Short Message.

- MOSMSICDPN - NPP Service to process the Called Party Number SMS-DA or SMS-ODA parameter of the IS41 SMDPP message.

- MOSMSICGPN - NPP Service to process the Calling Party Number SMS-OOA parameter of the IS41 SMDPP message. Currently, no MO SMS features exist which use this NPP Service.

Service Actions

The NPP Service Actions supported by MO SMS NPP are shown in *Table 5: Supported Service Actions*. The precedence and applicability of the service actions are specified for each NPP Service.

Table 5: Supported Service Actions

Service Action	MOSMSGCDPN	MOSMSGCGPN	MOSMSICDPN	MOSMSICGPN
ASDLKUP	50	50	50	50
CDIAL	10	10	10	10
CDPNNP	60	n/a	60	n/a
CGPNASDRQD	50	n/a	50	n/a
CGPNGRNRQD	50	n/a	50	n/a
FRAUDCHK	n/a	90	n/a	n/a
GRNLKUP	50	50	50	50
MIGRATE	n/a	n/a	70	n/a
PPRELAY	80	80	n/a	n/a

Table 6: Service Action Value Definitions by NPP Service

Service Action Value	MOSMSGCDPN	MOSMSGCGPN	MOSMSICDPN	MOSMSICGPN
ASDLKUP	Populates ASD FA with ASD data received from DN RTDB Lookup	Populates ASD FA with ASD data received from DN RTDB Lookup	Populates ASD FA with ASD data received from DN RTDB Lookup	Populates ASD FA with ASD data received from DN RTDB Lookup
CDIAL	Performs corrective dialing	Performs corrective dialing	Performs corrective dialing	Performs corrective dialing
CDPNNP	Performs CdPN RTDB Lookup and determines whether ported	-	Performs CdPN RTDB Lookup and determines whether ported	-
CGPNASDRQD	Populates ASD FA with CgPN ASD data if available from CgPN RTDB Lookup by MOSMSGCGPN	-	Populates ASD FA with CgPN ASD data if available from CgPN RTDB Lookup by MOSMSICGPN	-
CGPNGRNRQD	Populates GRN FA with CgPN GRN data if available from CgPN RTDB Lookup by MOSMSGCGPN	-	Populates GRN FA with CgPN GRN data if available from CgPN RTDB Lookup by MOSMSICGPN	-
FRAUDCHK	-	Performs CgPN RTDB Lookup and discards message if the subscriber is fraudulent	-	-
GRNLKUP	Populates GRN FA with GRN data received from DN RTDB Lookup	Populates GRN FA with GRN data received from DN RTDB Lookup	Populates GRN FA with GRN data received from DN RTDB Lookup	Populates GRN FA with GRN data received from DN RTDB Lookup
MIGRATE	-	-	Performs CdPN RTDB Lookup and determines whether migrated	-
PPRELAY	Performs CdPN RTDB Lookup and redirects message to prepaid subscriber if CdPN is prepaid	Performs CdPN RTDB Lookup and redirects message to prepaid subscriber if CdPN is prepaid	-	-

Conditioning Actions

In addition to the general Conditioning Actions available in the NPP feature, the ACCGPN Conditioning Action is supported by the MOSMSGCDPN and MOSMSICDPN NPP Services:

- ACCGPN (Area Code from CgPN) is used to extract the Called Party Number (CdPN) area code information from the Calling Party Number (CgPN).

Formatting Actions

In addition to the general Formatting Actions available in the NPP feature, the following Formatting Actions support MO SMS NPP.

- RNOSPODN - RN or SP value, if RN or SP was found in RTDB Lookup; Otherwise, the Conditioning Action DNx is used for this Formatting Action value.
- RNOSPOZN - RN or SP value, if RN or SP was found in RTDB Lookup; Otherwise, the Conditioning Action SNx is used for this Formatting Action value.
- RNOSPOSN - RN or SP value, if RN or SP was found in RTDB Lookup; Otherwise, the Conditioning Action ZNx is used for this Formatting Action value.

Service Portability for Mobile Originated SMS

Service Portability (S-Port) supports MO-based IS41 SMS NP for IS41 SMDPP message processing and MO-based GSM SMS NP for GSM Forward Short Message Mobile Originated message processing. S-Port applies to the messages selected for number portability processing which are destined for own-network GSM or IS41 subscribers. The SPORTTYPE option indicates whether Service Portability processing applies to the messages.

The CDPNNP Service Action includes Number Portability and Service Portability functionality. Because the CDPNNP Service Action requires the MO-based IS41 SMS NP or the MO-based GSM SMS NP feature to be turned on, Service Portability processing occurs only when the S-Port feature is turned on and either the MO-based IS41 SMS NP or the MO-based GSM SMS NP feature is turned on.

Number Portability functions use the Network Entity Type (RN/SP) from the RTDB when formatting outgoing Called Party digits in a relayed 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 Destination address in outgoing messages is prefixed with the Generic Routing Number (GRN) 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 7: Service Portability vs Number Portability by Destination Subscriber Type shows whether Service Portability or Number Portability is applied when Service Portability is turned on and RTDB lookup is successful based on the MOSMSTYPE option of GSMSMSOPTS or IS41SMSOPTS. The GSMSMSOPTS:SPORTTYPE option is used for GSM Forward Short Message Mobile Originated messages. The IS41SMSOPTS:SPORTTYPE option is used for SMDPP messages. If Service Portability is turned off and RTDB lookup is successful based on the MOSMSTYPE option, Number Portability is applied. If RTDB lookup is not successful based on the MOSMSTYPE option, neither Service Portability nor Number Portability is applied and the CDPNNP Service Action is skipped. Neither

Service Portability nor Number Portability is applied if the message is handled by the MIGRATE Service Action.

Table 7: 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

S-Port Subscriber Differentiation

S-Port Subscriber Differentiation is used to allow use of provisioned ASD digits in place of GRN digits as an alternative Routing Number for own-network subscribers. For example, the ASD digits are used as the subscriber's private routing number for message relay features and the GRN digits are used as the subscriber's public routing number for query/response features.

S-Port Subscriber Differentiation processing occurs if the S-Port Subscriber Differentiation feature is enabled and turned on using Part Number 893-0379-01 and a Feature Access Key. The SUBDFRN option value must also be on to allow S-Port Subscriber Differentiation processing. The SUBDFRN option cannot be specified by the `chg-sccpopts` command unless the S-Port Subscriber Differentiation feature is enabled and turned on.

Provisioned ASD digits are used in place of GRN digits when these conditions are met:

- The Service Portability feature is enabled and turned on.
- The GSMSMSOPTS:SPORTTYPE or IS41SMSOPTS:SPORTTYPE option is provisioned. Refer to *Table 7: Service Portability vs Number Portability by Destination Subscriber Type*.
- The S-Port Subscriber Differentiation feature is enabled and turned on.
- The SUBDFRN option value is on.
- Service Portability is applicable.

Subscribers without provisioned ASD digits follow standard Service Portability processing and always use GRN digits.

MTP Routed SCCP Traffic

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

MTP Msgs for SCCP Apps

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

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

MTP Routed GWS Stop Action

The MTP Routed GWS Stop Action feature provides a Gateway Screening (GWS) stop action: `sccp`. This stop action allows IS41-based features to process MTP routed traffic. GWS rules are used to filter MTP routed SCCP messages (UDT, UDTS, XUDT, and XUDTS) on a per linkset basis. The messages

are then forwarded to Service Module cards for processing by features that support MTP routed messages based on Service Selection criteria. A Feature Access Key (FAK) for part number 893-0356-01 is required to enable the MTP Routed GWS Stop Action feature. This feature can be turned on and off, but cannot be enabled with a temporary FAK. 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 Manual – Gateway Screening* for additional information and provisioning procedures for the MTP Routed GWS Stop Action feature.

SMSREQ Handling for Migrated or Ported Subscribers

The SMSREQ Handling for Migrated or Ported Subscribers enhancement allows MTP routed SMSREQ messages to be supported by A-Port, IGM, 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 8: 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

Hardware Requirements

EPAP-related features that perform an RTDB lookup require Service Module cards (DSM cards or E5-SM4G cards) running the VSCCP application. The EAGLE 5 ISS 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

Tekelec provides the Multi-Purpose Server (MPS) platform as a subsystem of the EAGLE 5 ISS. 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 *Tekelec 1200 Application Server Hardware Manual.* The MPS provides the means of connecting the customer provisioning application with the EAGLE 5 ISS and accepts the customer number portability data, while accommodating numbers of varying lengths.

The EAGLE Provisioning Application Processor (EPAP) is software that runs on the MPS hardware platform. It collects and organizes customer provisioning data, and forwards the data to the EAGLE 5 ISS Service Module cards. *Figure 12: MPS/EPAP Platform Architecture* shows the overall system architecture from customer provisioning through the MPS subsystem to the EAGLE 5 ISS Service Module card databases.

Note: In this manual, Service Module card refers to either a DSM card or an E5-SM4G card unless a specific card is required. For more information about the supported cards, refer to *EAGLE 5 ISS Hardware Manual*.
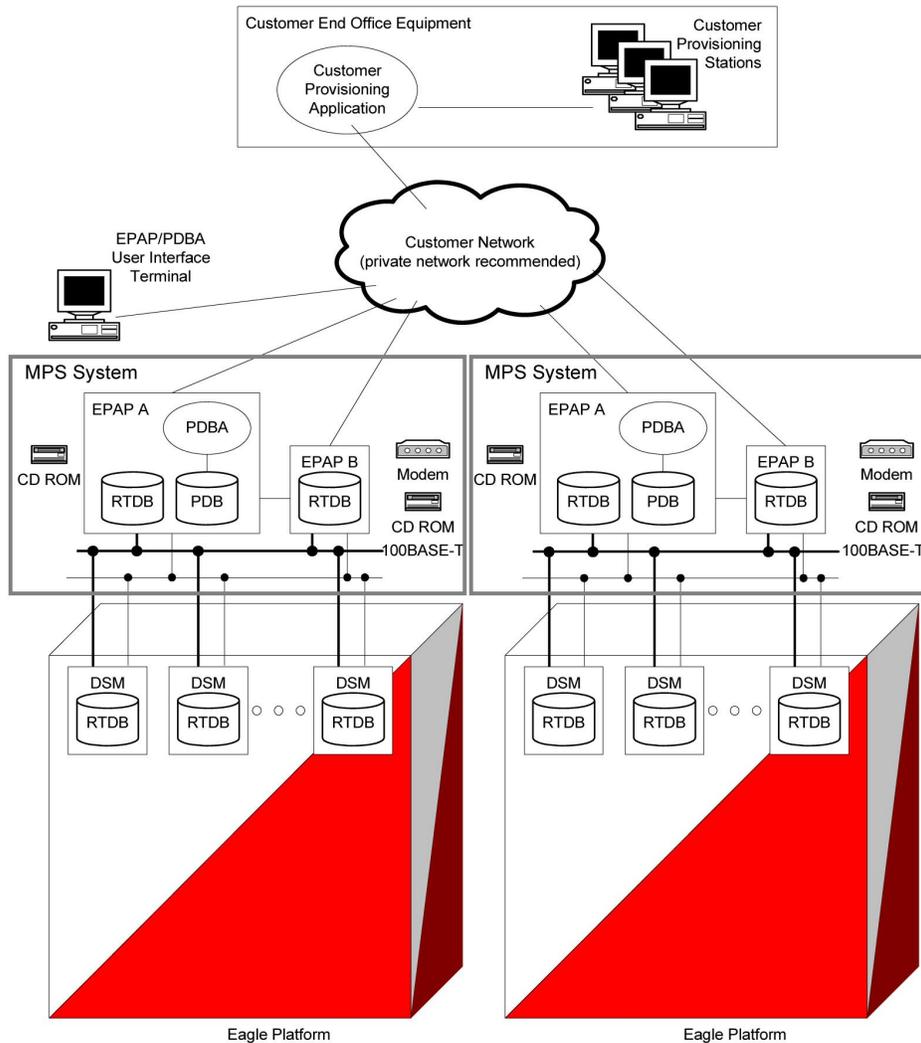
Figure 12: MPS/EPAP Platform Architecture

Design Overview and System Layout

Figure 12: MPS/EPAP Platform Architecture identifies the tasks, databases and interfaces which constitute the overall system architecture. The system consists of two mated MPS servers. Each MPS contains two EPAP platforms - EPAP A and EPAP B with each containing a Real Time Database (RTDB) , Provisioning Database (PDB), servers, optical media, modems, and network switches when using a T1200 AS system. Each MPS and its associated EPAPs is an *EPAP system*; the EPAP system and the mated EAGLE 5 ISS are the *mated EPAP system*. Each EPAP system is a T1200 AS system with a total of four Ethernet interfaces: one from each EPAP to the 100BASE-T Ethernet and one from each EPAP to either a 10BASE-T or a 100BASE-T Ethernet. See *Table 9: Service Module Card Provisioning and Reload Settings* for the link speed.

On the EAGLE 5 ISS, a set of Service Module cards, which hold the RTDB, is part of the STP. Two high-speed Ethernet links connect the Service Module cards and the EPAPs. One of the links is a 100BASE-T Ethernet bus, and the other is either a 10BASE-T or a 100BASE-T Ethernet bus. See *Table 9: Service Module Card Provisioning and Reload Settings* for the link speed.

The RTDB is provisioned and maintained through the EPAPs. EPAP A and EPAP B act as the active EPAP and the standby EPAP. One link serves as the active link, and the other link as the standby link. Only one EPAP and one link are active at a time. The database is provisioned through the active link by the active EPAP; the other EPAP provides redundancy.

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

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

The major modules on the EPAP are:

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

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

Functional Overview

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

The RTDB on the EPAP contains a coherent, current copy of the subscriber database. If the current copy of the RTDB on the Service Module cards becomes *out-of-sync* because of missed provisioning or card rebooting, the EPAP Service Module card provisioning module sends database information through the provisioning link to the Service Module cards. The Service Module cards are reprovisioned with current subscriber information.

EPAP/PDBA Overview

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

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

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

The EPAP platform performs the following:

- Maintains an exact copy of the real time database (RTDB) on the EPAP

- Distributes the subscription database to the Service Module cards
- Maintains a redundant copy of the RTDB database

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

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

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

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

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

- Variety of hardware components and vendors

- Availability of third party communication and database tools

- Standard communication protocols

- Availability of personnel with related experience

Each EPAP server maintains a copy of the Real Time Database (RTDB) in order to provision the EAGLE 5 ISS Service Module cards. The EPAP server must comply with the hardware requirements in the *Tekelec 1200 Application Server Hardware Manual*. *Figure 12: MPS/EPAP Platform Architecture* illustrates the EPAP architecture contained in the MPS subsystem.

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

Subscriber Data Provisioning

Figure 13: Subscriber Data Provisioning Architecture (High Level) shows a high-level view of the subscriber data provisioning architecture. Only those parts of the EAGLE 5 ISS platform that are relevant to subscriber data provisioning are shown. This section defines requirements for the Provisioning Database Interface (PDBI) between the EPAP and the operator's provisioning system (OPS). Provisioning clients connect to the EPAPs using the PDBI. This interface contains commands that allow all of the provisioning and retrieval of subscription data. The PDBI is used for real-time provisioning of subscriber and network entity data only. Refer to *Provisioning Database Interface Manual* for more details.
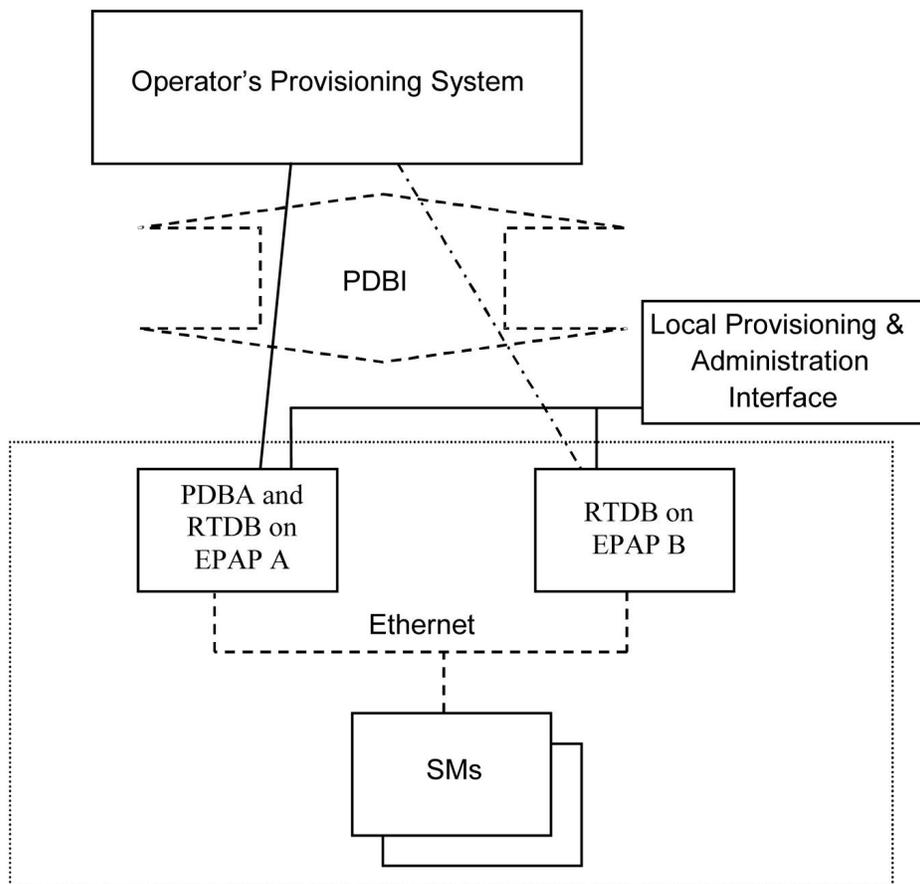
Figure 13: Subscriber Data Provisioning Architecture (High Level)

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

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

Distributed Administrative Architecture

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

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

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

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

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

EPAP (EAGLE Provisioning Application Processor)

As shown in *Figure 12: MPS/EPAP Platform Architecture*, a single MPS system contains two EAGLE Provisioning Application Processor (EPAP) servers. At any given time, only one EPAP actively communicates with the Service Module cards on the EAGLE 5 ISS. The other EPAP server is in standby mode. In addition, two MPS systems can be deployed in a mated pair configuration.

The primary purpose of the EPAP system is to maintain the Real Time Database (RTDB) and Provisioning Database (PDB), and to download copies of the RTDB to the Service Module cards.

The PDB on the active EPAP receives subscription data from the customer network through the Provisioning Database Interface (PDBI), the external source of provisioning information. The Provisioning Database Application(PDBA) continually updates the PDB of the active EPAP. The PDB uses MySQL database software. After an update is applied to the active PDB, the data is sent to the RTDBs on the active and standby EPAPs.

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

A mated pair configuration has two mated MPS Systems, as shown in *Figure 12: MPS/EPAP Platform Architecture*. The PDB on the active EPAP automatically updates the PDB on the mate platform. The PDB on the mate platform then updates RTDBs on its EPAPs, which in turn update the RTDBs on the associated Service Module cards.

Provisioning of the EAGLE 5 ISS Service Module cards is performed through two interfaces using two different sets of commands. Provisioning is accomplished by the STP updates from EAGLE 5 ISS terminals and by updates from the customer's external provisioning system. This system of dual provisioning is illustrated in *Figure 14: Database Administrative Architecture*.
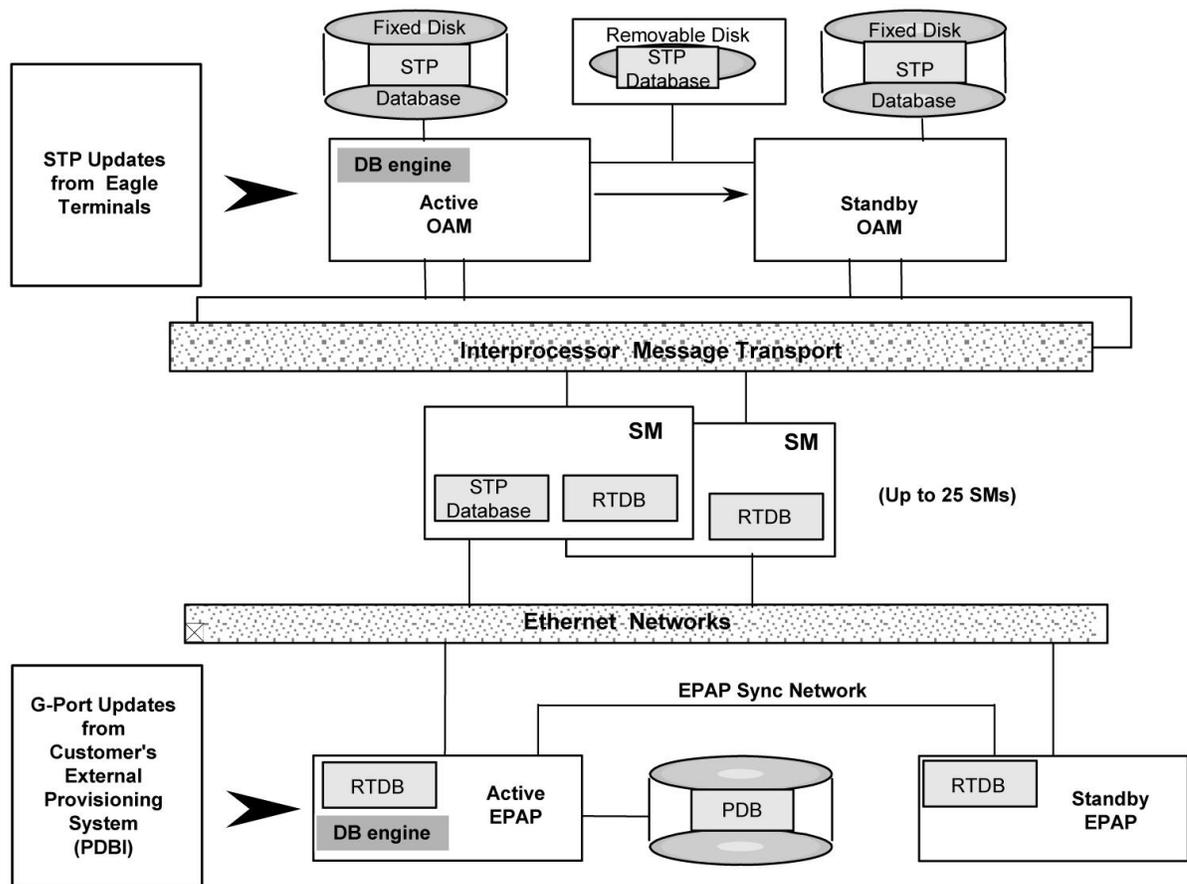
Figure 14: Database Administrative Architecture

Service Module Cards

Up to 32 cards (31+1) Service Module cards can be provisioned with one or more EPAP-related features enabled and EPAP running on a T1200 AS.

EPAP-related features require that all Service Module cards contain 4 GB of memory. *Figure 14: Database Administrative Architecture* illustrates each Service Module card having two Ethernet links, the main DSM network on the 100BASE-T link and the backup DSM network . See *Table 9: Service Module Card Provisioning and Reload Settings* for the link speed. The Service Module cards run the VSCCP software application.

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

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

• When a Service Module card is initialized, the card downloads the current copy of the database from the EPAP. While that card is being loaded, it cannot receive new updates that have arrived at the EPAP since reload began.

- Card databases can become out-of-sync with the EPAP RTDB when the EPAP receives updates from its provisioning source, but it has not yet sent the updates down to the Service Module cards. Updates are applied to the Provisioning Database (PDB) as they are received.

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

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

Overview of EPAP to Service Module Card Communications

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

- UDP - sending Service Module card status messages

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

- IP - reporting EPAP maintenance data

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

- IP Multicast - downloading GSM database

  Because of the large size of the database and the need to download it quickly on up to 32 Service Module cards, EPAP-related features use a technique known as IP multicasting. This technique is based on Reliable Multicast Transport Protocol-II (RMTP-II), a product of Globalcast Communications. IP multicasting downloads the RTDB and database updates to all of the Service Module cards simultaneously.

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

Service Module Card Provisioning and Reload

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

Table 9: Service Module Card Provisioning and Reload Settings

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

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

The Service Module cards do the following:

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

Service Module Card Reload Model

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

EPAP Continuous Reload

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

record stream and notifies the Service Module card provisioning task of the first record it read. This continues until all Service Module cards are satisfied.

Service Module Card Database Levels and Reloading

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

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

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

EPAP Status and Error Reporting via 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 maintenance blocks eventually update EPAP Device Control Blocks (DCBs) located on the EAGLE 5 ISS. The DCBs provide the status information that is received when a `rept-stat-mps` command is issued.

Network Connections

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

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

The following discussion is an overview of these private networks. It expands on the networks in the architecture diagram shown in *Figure 15: Customer Provisioning Network*. For details about configuring these networks, refer to *EPAP Administration Manual*.

Customer Provisioning Network

The customer network carries the following traffic:

- Customer queries and responses to the PDB via the PDBI from the customer provisioning network

- Updates between PDBs of a mated EAGLE 5 ISS pair
- Updates between a PDB on one EAGLE 5 ISS and RTDBs on a mated EAGLE 5 ISS
- PDBA import/export (file transfer) traffic
- Traffic from a PDBA reloading from its mate
- EPAP and PDBA user interface traffic.

A typical customer network is shown in *Figure 15: Customer Provisioning Network*.
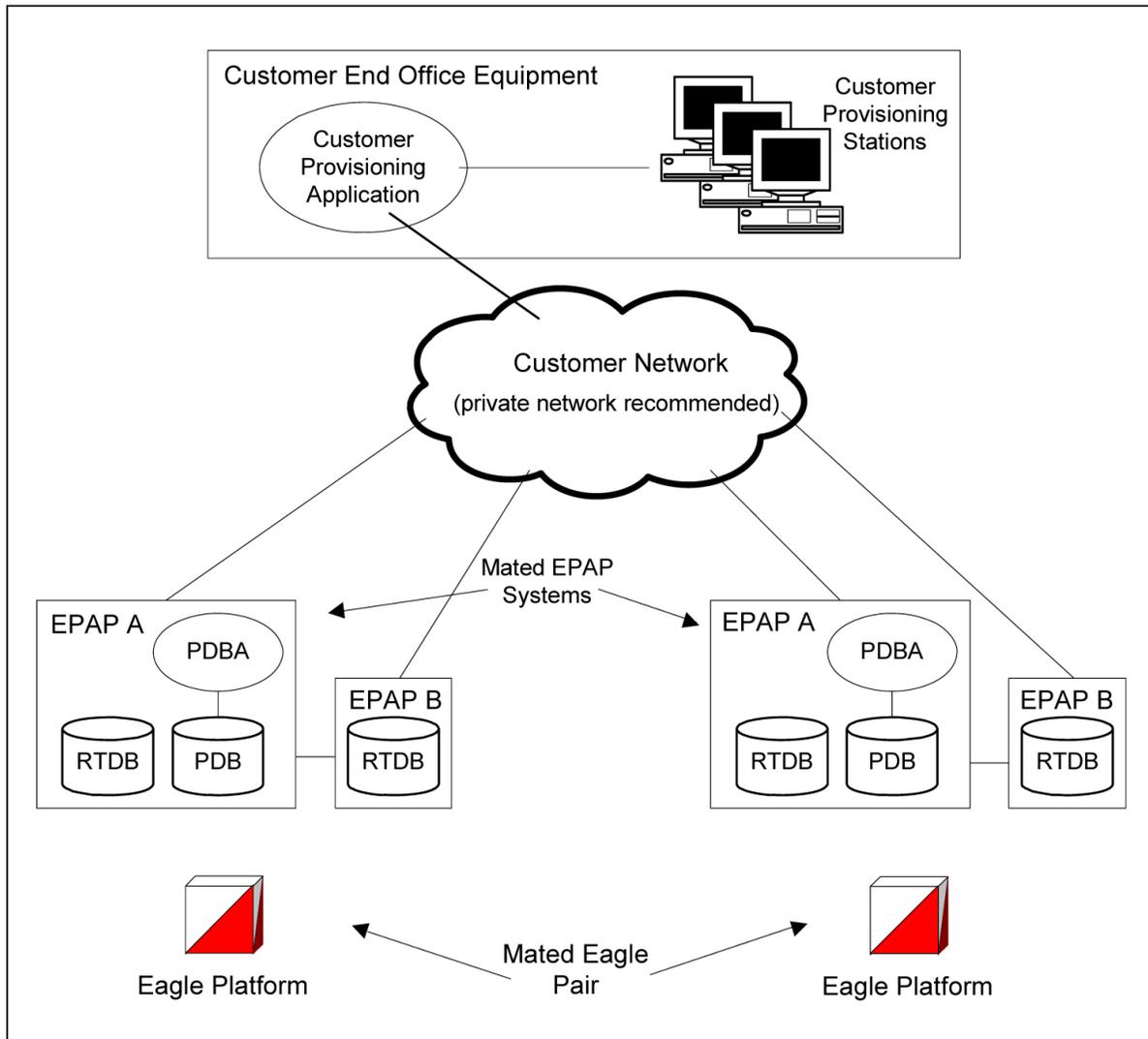
Figure 15: Customer Provisioning Network

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

EPAP Sync Network

The EPAP sync network carries RTDB and maintenance application traffic between active and standby EPAP servers on an MPS system. It synchronizes the contents of the RTDBs of both EPAP A and B. The EPAP Sync network is a single Ethernet connection between EPAP A and EPAP B running at 100BASE-T, as shown in *Figure 16: EPAP Sync Network*. The T1200 EPAP Sync network is truncated with the EPAP backup DSM connection and communicates through the switch.
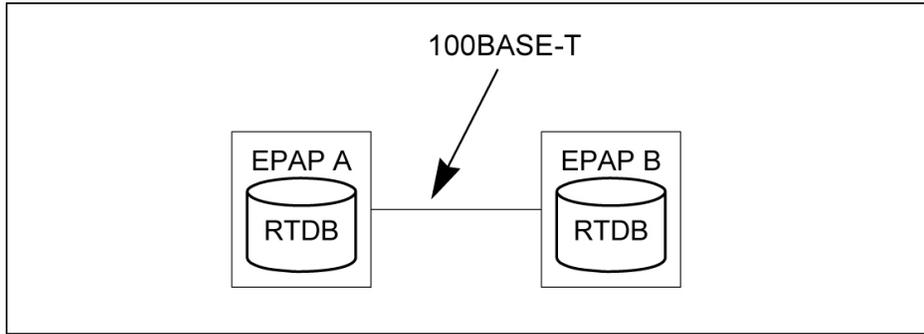
Figure 16: EPAP Sync Network

DSM Networks

The DSM networks are shown in *Figure 17: DSM Networks*. They carry provisioning data from the active EPAP RTDB to the Service Module cards. They also carry reload and maintenance traffic to the Service Module cards.

The DSM networks consist of two Ethernet networks: the main DSM network running at 100BASE-T, and the backup DSM network running at either 10BASE-T or 100Base-T. See *Table 10: EPAP IP Addresses in the DSM Network* for the link speed. Both Ethernet networks connect EPAP A and EPAP B with every Service Module card on a single EAGLE 5 ISS platform.
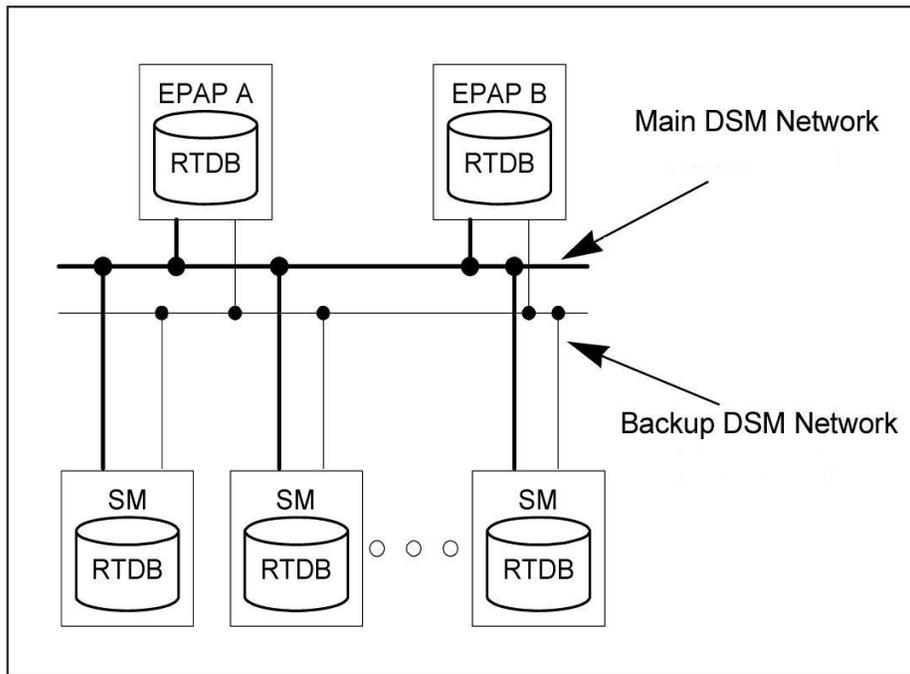
Figure 17: DSM Networks

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

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

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

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

The fourth octet of the address is specified as follows:

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

Table 10: EPAP IP Addresses in the DSM Network summarizes the contents of each octet.

Table 10: EPAP IP Addresses in the DSM Network

Octet	Value
1	*192*
2	*168*
3	One customer-provisioned value for DSM network A and another for DSM network B

Octet	Value
4	*100* for EPAP A and *200* for EPAP B

Dial-Up PPP Network

The dial-up PPP network allows multiple user-interface sessions to be established with the EPAP. The network connects a remote EPAP/PDBA user interface terminal with the EPAP in the EAGLE 5 ISS's MPS subsystem. The dial-up PPP network is illustrated in *Figure 18: Dial-Up PPP Network*.
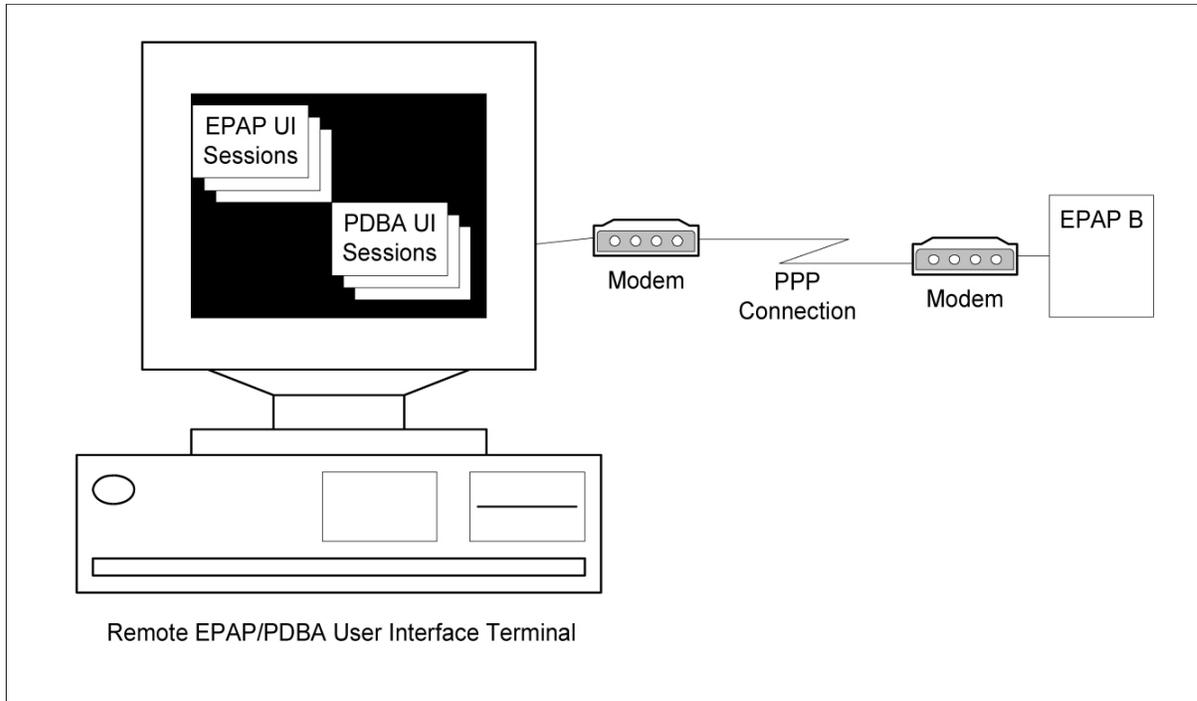
Figure 18: Dial-Up PPP Network

Chapter

3

Commands

Topics:

This chapter contains brief descriptions of the EAGLE 5 ISS commands that are used for the configuration, control, maintenance, and measurements of the Mobile Originated Short Message Service (MO SMS) features.

Introduction

This chapter describes the EAGLE 5 ISS 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 Manual* for complete command descriptions including parameter names, valid parameter values, examples, and dependencies.

EAGLE 5 ISS STP System Options Commands

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

chg-stpopts

Change STP System Options Command – The `chg-stpopts` command changes STP system options in the database. This command updates the STPOPTS table. The `defcc` and `defndc` parameters are used to convert non-international numbers received in the MSU to an international number.

Table 11: chg-stpopts Parameters - Class = DATABASE

Parameter	Range	Description
defcc	1-3 digits, none	Default country code
defndc	1-5 digits, none	Default network destination code

Command example:

- `chg-stpopts:defcc=33:defndc=22345`

rtrv-stpopts

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

EAGLE 5 ISS GSM System Options Commands

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

chg-gsmopts

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

Table 12: `chg-gsmopts` Parameters - Class = DATABASE

Parameter	Range	Description
defmapvr	1-3	Default MAP version
is412gsm	1-15 digits, none	IS41 to GSM migration prefix

Command example:

- `chg-gsmopts:defmapvr=2`

rtrv-gsmopts

Retrieve GSM System Options Command

The `rtrv-gsmopts` command displays all GSM system options from the database. The G-Port, EIR, IGM, MO-based GSM SMS NP, MO SMS IS41-to-GSM Migration, MO SMS ASD, MO SMS GRN, MO SMS B-Party Routing, Prepaid SMS Intercept, or V-Flex feature must be enabled, or the G-Flex feature must be turned on before the command output is displayed.

EAGLE 5 ISS GSM SMS Options Commands

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

The MO SMS ASD, MO SMS GRN, or MO-based GSM SMS NP feature must be enabled to specify the parameters: `mosmsfwd, mosmsgta, mosmssa, mosmstype`.

The MO-based GSM SMS NP or Portability Check for MO SMS feature must be enabled to specify the `mosmsdigmat` parameter.

The MO-based GSM SMS NP or Portability Check for MO SMS feature must be turned on to specify the `mosmstcapseg` parameter.

The MO SMS ASD, MO SMS GRN, MO-based GSM SMS NP, or PPSMS feature must be enabled to specify the parameters: `mosmsaclen, mosmsnai`.

The MO-based GSM SMS NP feature must be enabled to specify the parameters: `defrn, spfill`.

The Service Portability feature must be enabled to specify the `sporttype` parameter.

chg-gsmsmsopts

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

Table 13: `chg-gsmsmsopts` Parameters - Class = DATABASE

Parameter	Range	Description	Applies to
defrn	1-15 hexadecimal digits, none	Default Routing Number for own-network subscribers	This parameter applies to only messages modified by the MO-based GSM SMS NP feature.
mosmsaclen	0-8	Area Code length. This parameter specifies the number of digits taken from the MO SMS CgPA parameter and used as the Area Code in the MO SMS CdPA parameter.	This parameter applies to only messages modified by the MO SMS ASD, MO SMS GRN, MO-based GSM SMS NP, or PPSMS feature.
mosmsdigmat	exact, bestfit	MO-based SMS HomeSMSC match.	This parameter applies to only messages processed by the MO-based GSM SMS NP feature or the Portability Check for MO SMS feature.
mosmsfwd	yes, no	MO-based SMS forward	This parameter applies to only messages modified by the MO SMS ASD, MO SMS GRN, or MO-based GSM SMS NP feature.
mosmsgta	5-21 digits, none	MO-based SMS GTA	This parameter applies to only messages modified by the MO SMS ASD, MO SMS GRN, or MO-based GSM SMS NP feature.
mosrnsnai	intl, nai, nat, unknown	MO-based SMS NAI	This parameter applies to only messages modified by the MO SMS ASD, MO SMS GRN, MO-based GSM SMS NP, or PPSMS feature.
mosmssa	yes, no	MO-based SMS sub-address	This parameter applies to only messages modified by the MO SMS ASD, MO SMS GRN, or MO-based GSM SMS NP, or PPSMS feature.
mosmstcapseq	on, off	MO-based SMS TCAP Segmentation for GSM	This parameter applies to only messages that are modified by the

Parameter	Range	Description	Applies to
			Portability Check for MO SMS feature or the MO-based GSM SMS NP feature.
mosmstype	sp, rn, sprn, all	MO-based SMS type	This parameter applies to only messages modified by the MO-based GSM SMS NP feature.
spfill	on, off	Fill SP Formatting Action. This parameter applies to the handling of own-network subscribers, and controls whether NPP populates both SP and RN Formatting Action values.	This parameter applies to only messages modified by the MO-based GSM SMS NP feature.
sporttype	gsm, is41, all, none	Service Portability Type. This parameter indicates which of the own-network subscribers need Service Portability applied.	This parameter applies to only messages modified by the MO-based GSM SMS NP feature.

Command example for setting the GSM SMS options when the MO-based GSM SMS NP feature is enabled:

- `chg-gsmsmsopts:mosmsnai=intl:mosmstype=sp:mosmssa=no`

Command example for setting the GSM SMS options when the MO-based GSM SMS NP or Portability Check for MO SMS feature is enabled and turned on:

- `chg-gsmsmsopts:mosmsdigmat=bestfit`

rtrv-gsmsmsopts

Retrieve GSM SMS Options Command

The `rtrv-gsmsmsopts` command displays all GSM SMS options from the database when at least one GSM SMS-related feature is enabled.

EAGLE 5 ISS IS41 SMS Options Commands

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

The MO SMS ASD, MO SMS GRN, MO-based IS41 SMS NP, or MO SMS IS41-to-GSM Migration feature must be enabled to specify the parameters: `modaparam`, `mosmsaclen`, `mosmsnai`.

The MO-based IS41 SMS NP or MO SMS IS41-to-GSM Migration feature must be enabled to specify the `mosmsdigmat` parameter.

The MO-based IS41 SMS NP feature must be enabled to specify the `mosmstype` parameter.

The MO SMS IS41-to-GSM Migration feature must be enabled to specify the `moigmpfx` parameter.

The MO-based IS41 SMS NP feature must be enabled to specify the parameters: `defrn`, `spfill`.

The Service Portability feature must be enabled to specify the `sporttype` parameter.

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.

Table 14: `chg-is41smsopts` Parameters - Class = DATABASE

Parameter	Range	Description	Applies to
defrn	1-15 hexadecimal digits, none	Default Routing Number for own-network subscribers	This parameter applies to only messages modified by the MO-based IS41 SMS NP feature.
modaparam	da, oda	Specifies whether the SMS_DestinationAddress or SMS_Original DestinationAddress from the IS41 SMDPP message is used for conditioning, lookup, and modification.	This parameter applies to only messages modified by the MO SMS ASD, MO SMS GRN, MO-based IS41 SMS NP, or MO SMS IS41-to-GSM Migration feature.
moigmpfx	ne, is412gsm	MO SMS IS41-to-GSM Migration prefix. This parameter specifies whether the MO SMS IS41-to-GSM Migration feature uses digits from the RTDB network entity (NE) associated with the B number or the `is412gsm` parameter as a prefix to modify the destination address in the outgoing SMDPP.	This parameter applies to only messages modified by the MO SMS IS41-to-GSM Migration feature.
mosmsaclen	0-8	Area Code length. This parameter specifies the number of digits taken from the MO SMS CgPA parameter and used as the Area Code in the MO SMS CdPA parameter.	This parameter applies to only messages modified by the MO SMS ASD, MO SMS GRN, MO-based IS41 SMS NP, or MO SMS IS41-to-GSM Migration feature.
mosmsdigmat	exact, bestfit, bypass	HomeSMSC Match with Digits search option	This parameter applies to only messages modified by the MO-based IS41 SMS NP or MO

Parameter	Range	Description	Applies to
			SMS IS41-to-GSM Migration feature.
mosmsnai	intl, nai, nat, unknown	MO-based SMS Nature Address Indicator	This parameter applies to only messages modified by the MO SMS ASD, MO SMS GRN, MO-based IS41 SMS NP, or MO SMS IS41-to-GSM Migration feature.
mosmstype	sp, rn, sprn, all	MO-based SMS Type	This parameter applies to only messages modified by the MO-based IS41 SMS NP feature.
spfill	on, off	Fill SP Formatting Action. This parameter applies to the handling of own-network subscribers, and controls whether NPP populates both SP and RN Formatting Action values.	This parameter applies to only messages modified by the MO-based IS41 SMS NP feature.
sporttype	gsm, is41, all, none	Service Portability Type. This parameter indicates which of the own-network subscribers need Service Portability applied.	This parameter applies to only messages modified by the MO-based IS41 SMS NP feature.

Command example for setting the IS41 SMS options when the MO-based IS41 SMS NP feature is enabled:

- `chg-is41smsopts:mosmstype=sp:mosmsnai=intl:mosmsdigmat=exact:modaparam=da:mosmsaclen=3`

rtrv-is41smsopts

Retrieve IS41 SMS Options Command

The `rtrv-is41smsopts` command displays all IS41 SMS options from the database when at least one IS41 SMS-related feature is enabled.

EAGLE 5 ISS Prepaid SMS Options Commands

The Prepaid SMS options (`ppsopts`) commands change and display specific SMS options in the EAGLE 5 ISS database for the Prepaid Short Message Service Intercept (PPSMS) feature. The following sections describe the two variations: `chg-ppsopts` and `rtrv-ppsopts`. For details about these commands, refer to the *Commands Manual*.

The Prepaid Short Message Service Intercept (PPSMS) feature must be enabled to use this command.

chg-ppsopts

Change Prepaid SMS Options Command – The `chg-ppsopts` command changes Prepaid SMS system options in the database. This command updates the PPSOPTS table with entries that correspond to Intelligent Network (IN) platforms. The default parameters are always overwritten when specified.

Table 15: `chg-ppsopts` Parameters - Class = DATABASE

Parameter	Range	Description
pci	s-. 0-255, none	ITU international point code with subfields zone-area-id. The prefix subfield indicates a spare point code (prefix-zone-area-id).
pcn	s-, 0-16383. aa-zz, none	ITU national point code in the format of • a 5-digit number *(nnnnn)*, or • two to four numbers (members) separated by dashes *(m1-m2-m3-m4)* The `prefix` subfield indicates a spare point code.
ppt	1-32	Prepaid portability type. This parameter specifies the IN platform where the incoming message is sent.
ri	gt, ssn	Routing indicator. This parameter specifies the IN platform routing indicator.
setid	1-36000, none, dflt	Set ID. This parameter specifies the MAP set ID if `ri=ssn`, or MRN set ID if `ri=gt`. The Set ID is used by a loadsharing IN platform.
ssn	2-255, none	Subsystem number. This value is used as the CdPA `ssn` when routing the message to a Prepaid server. If `ssn=none` and `ri=ssn`, the subsystem number is populated using the `ssn` value from the incoming message CdPA parameter. If subsystem number value is not in the CdPA, then `ssn=8` is used to route the message. If a value is specfied for `ssn`, then the `pci` or `pcn` must be provisioned for the corresponding Prepaid server.

Command example for setting the Prepaid SMS options when the Prepaid SMS Intercept feature is enabled:

• `chg-ppsopts:ppt=1:pci=1-1-1:ssn=1:ri=gt`

rtrv-ppsopts

Retrieve Prepaid SMS Options Command

The `rtrv-ppsopts` command displays all Prepaid SMS options from the database.

EAGLE 5 ISS Feature Control Commands

These commands are used to enable, update, view, and control features. A feature must be purchased to have access to the Feature Access Key (FAK). Two steps are required to activate a feature.

1. A Feature Access Key and feature part number are used to enable a feature with the `enable-ctrl-feat` command.
2. The feature part number is used to turn on a feature with the `chg-ctrl-feat` command.

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

chg-ctrl-feat

Change Controlled Feature command - The `chg-ctrl-feat` command is used with controlled features that have been purchased and enabled with the `enable-ctrl-feat` command. The chg-ctrl-feat command requires a feature to be enabled as a prerequisite. The chg-ctrl-feat command is used to:

- Turn on or turn off On/Off features
- Turn on Permanently On features, which are features that cannot be turned off after being turned on
- Clear an expired temporary key alarm without purchasing a permanent Feature Access Key

Command example:

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

enable-ctrl-feat

Enable Controlled Feature command - The `enable-ctrl-feat` command is used to enable a purchased feature. Additional verifications are performed before enabling certain features. These checks include verifying that GTT is turned on before enabling the MO-Based GSM SMS NP, MO-Based IS41 SMS NP, MO SMS IS41-to-GSM Migration, Portability Check for MO SMS, Prepaid SMS Intercept, MO SMS ASD, or MO SMS GRN feature.

Command example:

- `enable-ctrl-feat:partnum=893009301:fak=<Feature Access Key>`

rtrv-ctrl-feat:

Retrieve Controlled Feature Command - The `rtrv-ctrl-feat` command is used display the on/off status of the features and to show the remaining trial period if features are temporarily enabled.

EAGLE 5 ISS Numbering Plan Processor Commands

The Numbering Plan Processor (NPP) commands enter, change, delete, and display specific NPP components and options in the EAGLE 5 ISS database. *Numbering Plan Processor for MO SMS Features*

and the following sections describe the NPP command parameters and values specific to the MO SMS features.

For details about these commands, refer to *Commands Manual*. Refer to *Numbering Plan Processor (NPP) Overview* for comprehensive descriptions of NPP components: Service Actions, Conditioning Actions, Formatting Actions, Action Sets, Rules, and Service Rule Sets.

ent/chg/dlt/rtrv-npp-as

These commands are used to enter, change, delete, and display Numbering Plan Processor (NPP) Actions Sets that contain Service Actions, Conditioning Actions, and Formatting Actions. An Action Set is used by NPP to assist with digit string filtering, conditioning, and encoding. The default parameters are overwritten when specified.

Table 16: NPP Action Set Parameters for MO SMS NPP - Class = DATABASE

Parameter	Range	Description
fa1 through fa12	rnospodn, rnospozn, rnosposn	Formatting Action
sa1 through sa8	asdlkup, cdial, cdpnnp, cgpnasdrqd, cgpngrnrqd, fraudchk, grnlkup, migrate, pprelay	Service Action

ent/chg/dlt/rtrv-npp-serv

These commands are used to enter, change, delete, and display a Numbering Plan Procesor (NPP) Service entry. An NPP Service is any EAGLE 5 ISS application that uses NPP to assist with processing of digit strings.

Table 17: NPP Service Entries for MO SMS NPP

Parameter	Range	Description
srvn	mosmsgcdpn, mosmsgcgpn, mosmigcdpn, mosmigcgpn	NPP Service name

ent/chg/dlt/rtrv-npp-srs

These commands are used to enter, change, delete, and display a Numbering Plan Procesor (NPP) Service Rules Set. A Service Rules Set is a collection of NPP Rules associated with an NPP Service. An NPP Rule is an association between a single NPP filter and a single NPP Action Set.

Table 18: NPP Service Rules Set

Parameter	Range	Description
srvn	mosmsgcdpn, mosmsgcgpn, mosmigcdpn, mosmigcgpn	NPP Service name

MO SMS NPP Test Tool Commands

The MO SMS NPP Test Tool is used to send a test message to a specified NPP service to verify the call flow behavior when message information is injected into the call path without permitting an effect on actual traffic. Refer to *MO SMS NPP Test Tool* for a description of the provisionable table parameters. Refer to *Commands Manual* for a complete description of the MO SMS NPP Test Tool commands, parameters, and parameter values.

The `tst-msg` command invokes the test for the specified ISUP test message from the TESTMSG table, and displays the results.

chg/rtrv-gsm-msg

These commands are used with the MO SMS NPP Test Tool to change and display provisioned parameters for MO SMS GSM test messages. These messages test the flow of MO SMS GSM feature processing.

chg/rtrv-is41-msg

These commands are used with the MO SMS NPP Test Tool to change and display provisioned parameters for MO SMS IS41 test messages. These messages test the flow of MO SMS IS41 feature processing.

tst-msg

This command invokes the Test Tool to test the feature call flow for the message specified from the TESTMSG table. The command sends the specified message from the TESTMSG table to an EAGLE 5 ISS Service Feature. The test message that is sent does not create a new raw MSU. The test message is used to modify the internal data structures to analyze call flow behavior when a message with the specified parameters is injected into the call path. The test message is not transmitted to the network.

EAGLE 5 ISS Service Selector Commands

The service selector (`srvsel`) commands are used to provision service selectors for DSM services. The following sections describe the four variants: `chg-srvsel`, `dlt-srvsel`, `ent-srvsel` and `rtrv-srvsel`. Refer to *Commands Manual* for further details on the EAGLE 5 ISS service selector commands

The `smsmr` value for the `nserv` or `serv` parameters specifies the features:

- MO-based GSM SMS NP
- MO-based IS41 SMS NP
- MO SMS IS41-to-GSM Migration
- Portability Check for Mobile Originated SMS (MNP SMS)
- Prepaid Short Message Service Intercept (PPSMS)
- Mobile Originated SMS Additional Subscriber Data (MO SMS ASD)
- Mobile Originated SMS Generic Routing Number (MO SMS GRN)

chg-srvsel

Change Service Selector Command – The `chg-srvsel` command command assigns the applicable service selectors required to change a service entry for Service Module card services.

Table 19: chg-srvsel Parameters - Class = DATABASE

Parameter	Range	Description
gti, gtia, gtii, gtin, gtin24	2, 4	Global Title Indicator
ssn	0-255, *	Subsystem Number
tt	0-255	Translation Type
nai	sub, rsvd, natl, intl	Nature of Address Indicator
naiv	0-127	NAI Value
np	e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	0-15	Numbering Plan Value
nserv	eir, gflex, gport, inpq, inpmr, smsmr, idpr, idps, mnp, vflex, atinp	New service
nsnai	sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn, none	New Service Nature of Address Indicator
nsnp	e164, e212, e214, none	New Service Numbering Plan

dlt-srvsel

Delete Service Selector Command – The `dlt-srvsel` command deletes a service selector.

ent-srvsel

Enter Service Selector command – The `ent-srvsel` command assigns the applicable service selectors required to specify a service entry for DSM services.

rtrv-srvsel

Retrieve Service Selector Command – The `rtrv-srvsel` command displays a list of the administered service selectors combinations. Output is sorted first by service, then by global title domain, GTI, translation type, numbering plan, and nature of address indicator. The output can be filtered using various optional parameter combinations.

EAGLE 5 ISS SCCP Options Commands

The SCCP options commands (`sccpopts`) change and display the SCCP option indicators in the EAGLE 5 ISS database. For details about these commands, refer to *Commands Manual*.

chg-sccpopts

Change SCCP System Options – The `chg-sccpopts` command changes the value of one or more SCCP option indicators. This command updates the STPOPTS table.

Table 20: chg-sccpopts Parameters - Class = DATABASE

Parameter	Range	Description
subdfrn	off, on	S-Port Subscriber Differentiation option • off = Do not perform S-Port Subscriber Differentiation (Default) • on = Perform S-Port Subscriber Differentiation The S-Port Subscriber Differentiation feature must be enabled and turned on before this parameter can be specified.

Command example:

• `chg-sccpopts:subdfrn=on`

rtrv-sccpopts

Retrieve SCCP Options – The `rtrv-sccpopts` command is used to display the current value of one or more of the SCCP option indicators in the STPOPTS table.

Chapter

4

Feature Configuration

Topics:

This chapter provides procedures for configuring the Mobile Originated Short Message Service (MO SMS) features of the EAGLE 5 ISS which include:

- Mobile Originated Based GSM SMS Number Portability (MO-Based GSM SMS NP)
- Mobile Originated Based IS41 SMS Number Portability (MO-Based IS41 SMS NP)
- Mobile Originated SMS IS41-to-GSM Migration (MO SMS IS-41-to-GSM Migration)
- Mobile Originated SMS Additional Scubscriber Data (MO SMS ASD)
- Mobile Originated SMS Generic Routing Number (MO SMS GRN)
- Portability Check for Mobile Originated SMS (MNP SMS)
- Prepaid Short Message Service Intercept (PPSMS)
- Service Portability for MO SMS (S-Port)
- MTP Msgs for SCCP Apps
- Number Processing Plan for MO SMS (NPP)

Introduction

This chapter contains the following feature activation procedures:

- *MO-Based GSM SMS NP Feature Activation Procedure*
- *MO-Based IS41 SMS NP Feature Activation Procedure*
- *MO SMS IS41-to-GSM Migration Feature Activation Procedure*
- *Portability Check for MO SMS Activation Procedure* (MNP SMS)
- *Prepaid Short Message Service Intercept Activation Procedure* (PPSMS)
- *MO SMS ASD Activation Procedure*
- *MO SMS GRN Activation Procedure*
- *Service Portability Activation Procedure* (S-Port)
- *S-Port Subscriber Differentiation Activation Procedure*
- *MTP Routed Messages for SCCP Applications Activation Procedure*

Summary of Feature Activation

This table summarizes activation information about the features.

Table 21: Feature Activation Summary

Feature Name	Part Number	Temporary FAK Available?	Permanently-On?
MO-Based GSM SMS NP	893019401	No	Yes
MO-Based IS41 SMS NP	893019501	No	Yes
MO SMS IS-41-to-GSM Migration	893026201	No	No, the feature can be turned on or turned off with the `chg-ctrl-feat` command.
MNP SMS	893009301	Yes	No, the feature can be turned on or turned off with the `chg-ctrl-feat` command.
PPSMS	893006701	No	No, the feature can be turned on or turned off with `chg-ctrl-feat` command.
MO SMS ASD	893026701	No	No, the feature can be turned on or turned off with `chg-ctrl-feat` command.
MO SMS GRN	893026601	No	No, the feature can be turned on or turned off with `chg-ctrl-feat` command.

Feature Name	Part Number	Temporary FAK Available?	Permanently-On?
Service Portability	893034301	No	No, the feature can be turned on or turned off with `chg-ctrl-feat` command.
S-Port Subscriber Differentiation	893037901	No	Yes
MTP Msgs for SCCP Apps	893017401	No	No, the feature can be turned on or turned off with `chg-ctrl-feat` command.
MTP Routed GWS Stop Action	893035601	No	No, the feature can be turned on or turned off with `chg-ctrl-feat` command.

Feature Activation Considerations

- All MO SMS features are mutually exclusive with all features that require ELAP.
- MO-Based GSM SMS NP and MO-Based IS41 SMS NP can be enabled and turned on at the same time; however, an incoming MSU will be processed by either MO-Based GSM SMS NP or MO-Based IS41 SMS NP based on certain MSU characteristics.
- MO SMS IS-41-to-GSM Migration can be enabled and turned on independently of the MO-Based GSM SMS NP and MO-Based IS41 SMS NP features.
- MO-Based GSM SMS NP may co-exist with the MNP SMS and PPSMS features. MO-Based GSM SMS NP intercepts SMS messages after the MNP SMS and PPSMS features process the message.
- Feature activation procedures described in this chapter can be performed only if the Global Title Translation (GTT) feature is turned on.
- With the exception of PPSMS, the MO SMS features described in this chapter cannot be enabled if STPOPTS:ANSIGFLEX is enabled.

CAUTION:

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 features may overwrite other features or create changes in the database, confirm that you have a license and full technical support from Tekelec before turning on this or any feature. If you are not sure whether you have purchased a specific feature, contact your Tekelec Sales or Account Representative.

The MO SMS features require Service Module cards running the VSCCP application.

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

EPAP Entity Provisioning

It is recommended that EPAP entity (SP or RN) administration not be done until after the point code and/or subsystem number has been entered into the EAGLE 5 ISS MAP table.

- EPAP-administered entity data can possibly become out-of-sync with the EAGLE 5 ISS 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 (such as `SCCP did not route - DPC not in MAP tbl` or `SCCP did not route - SS not in MAP tbl`) is sent to the EAGLE 5 ISS maintenance terminal.

MO-Based GSM SMS NP Feature Activation Procedure

This procedure activates the MO-Based GSM SMS NP feature.

Note: The MO-Based GSM SMS NP feature must be enabled before the Service Action value `cdpnnp` can be specified for the MOSMSGCDPN NPP service. The MOSMSGCDPN NPP service must be provisioned before the MO-Based GSM SMS NP feature is turned on for the feature to be functional.

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

1. Enter the `enable-ctrl-feat` command to enable the MO-Based GSM SMS NP feature.

   `enable-ctrl-feat:partnum=893019401:fak=<Feature Access Key>`

2. Enter the the `chg-stpopts` command to set the default country code and, if desired, the default network destination code to convert the nature of address indicator (NAI) of MDNs to the international format (`nai=intl`).

   The parameters in this command are used for number conditioning.

   Command example:

   `chg-stpopts:defcc=49:defndc=177`

   where:
   defcc

   > The default country code.

   defndc

   > The default network destination code.

3. Verify the new country code and network destination code using the `rtrv-stpopts` command.

4. Enter the `rtrv-gsmsmsopts` command to view the values of the GSMSMSOPTS table options.

5. If desired, change the GSM SMS options in the database for the MO-Based GSM SMS NP feature.

   Command example:

   `chg-gsmsmsopts:mosmstype=sp:mosmsnai=intl:mosmssa=no`

   where:
   mosmstype

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

mosmsnai

Indicates how the called party number will be conditioned before lookup in the database.

mosmssa

Specifies whether the MO-based SMS sub-address is searched in the SMS called party (destination) address.

6. Verify the changes using the `rtrv-gsmsmsopts` command.

   This command displays all GSM SMS options from the database.

7. Provision NPP components for this feature. Refer to *Numbering Plan Processor (NPP) Overview* and *Provisioning NPP for MO SMS Features* for provisioning information and procedures. After provisioning NPP components for this feature, return to this procedure and continue with the next step.

8. Enter the `chg-ctrl-feat` command to turn on the MO-Based GSM SMS NP feature.

   `chg-ctrl-feat:partnum=893019401:status=ON`

The MO-Based GSM SMS NP feature is enabled, turned on, and operating in the system. The MO-Based GSM SMS NP feature cannot be turned off and cannot be disabled.

MO-Based IS41 SMS NP Feature Activation Procedure

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

Note: The MO-Based IS41 SMS NP feature must be enabled before the Service Action value `cdpnnp` can be specified for the MOSMSICDPN NPP service. The MOSMSICDPN NPP service must be provisioned before the MO-Based IS41 SMS NP feature is turned on for the feature to be functional.

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

1. Enter the `enable-ctrl-feat` command to enable the MO-Based IS41 SMS NP feature.

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

2. Enter the `ent-srvsel` command to assign the service selector with service feature `serv=smsmr`.

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

   Command example:

   `ent-srvsel:gtia=2:tt=10:serv=smsmr:snp=e164:snai=intl:ssn=255`

   where

   gtia

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

   tt

   Specifies the translation type

   serv

Specifies the service feature

snp

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

snai

Specifies the international Service Nature of Address Indicator

ssn

Defines the subsystem number

3. Enter the the `chg-stpopts` command to set the default country code and, if desired, the default network destination code to convert the nature of address indicator (NAI) of MDNs to the international format (`nai=intl`).

The parameters in this command are used for number conditioning.

Command example:

`chg-stpopts:defcc=49:defndc=177`

where:

defcc

The default country code.

defndc

The default network destination code.

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

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

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

Command example:

`chg-is41smsopts:mosmstype=sp:mosmsnai=intl`

where:
mosmstype

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

mosmsnai

Indicates how the called party number will be conditioned before lookup in the database.

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

This command displays all IS41 SMS options from the database.

8. Provision NPP components for this feature. Refer to *Numbering Plan Processor (NPP) Overview* and *Provisioning NPP for MO SMS Features* for provisioning information and procedures. After provisioning NPP components for this feature, return to this procedure and continue with the next step.

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

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

The MO-Based IS41 SMS NP feature is enabled, turned on, and operating in the system. The MO-Based IS41 SMS NP feature cannot be turned off and cannot be disabled.

MO SMS IS41-to-GSM Migration Feature Activation Procedure

This procedure is used to activate the MO SMS IS41-to-GSM Migration feature. This procedure assumes that GTT is enabled and turned on.

Note: The MO SMS IS41-to-GSM Migration feature must be enabled before the Service Action value `migrate` can be specified for the MOSMSICDPN NPP service. The MOSMSICDPN NPP service must be provisioned before the MO SMS IS41-to-GSM Migration feature is turned on for the feature to be functional.

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

1. Enter the `enable-ctrl-feat` command to enable the MO SMS IS41-to-GSM Migration feature.

   ```
   enable-ctrl-feat:partnum=893026201:fak=<Feature Access Key>
   ```

2. Enter the `ent-srvsel` command to assign the service selector with service feature `serv=smsmr`.

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

   Command example:

   ```
   ent-srvsel:gtia=2:tt=10:serv=smsmr:snp=e164:snai=intl:ssn=255
   ```

   where

   gtia

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

   tt

   Specifies the translation type

   serv

   Specifies the service feature

   snp

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

   snai

   Specifies the international Service Nature of Address Indicator

   ssn

   Defines the subsystem number

3. Enter the the `chg-stpopts` command to set the default country code and, if desired, the default network destination code to convert the nature of address indicator (NAI) of MDNs to the international format (`nai=intl`). The parameters in this command are used for number conditioning.

   Command example:

   ```
   chg-stpopts:defcc=49:defndc=177
   ```

where:

defcc

>   The default country code.

defndc

>   The default network destination code.

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

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

6. If desired, change the IS41 SMS options in the database for the MO SMS IS41-to-GSM Migration feature with the chg-is41smsopts command.

    Command example:

    `chg-is41smsopts:mosmsnai=nat:moigmpfx=is412gsm:modaparam=da`

    where:

    mosmsnai

    >   Indicates how the called party number will be conditioned before lookup in the database

    moigmpfx

    >   Specifies the MO SMS IS41-to-GSM Migration prefix

    modaparam

    >   Specifies whether the SMS_Destination_Address or SMS_Original_Destination_Address from the IS41 SMDPP message is used for conditioning, lookup, and modification

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

    This command displays all IS41 SMS options from the database.

8. Provision NPP components for this feature. Refer to *Numbering Plan Processor (NPP) Overview* and *Provisioning NPP for MO SMS Features* for provisioning information and procedures. After provisioning NPP components for this feature, return to this procedure and continue with the next step.

9. Enter the `chg-ctrl-feat` command to turn on the MO SMS IS41-to-GSM Migration feature.

    `chg-ctrl-feat:partnum=893026201:status=ON`

The MO SMS IS41-to-GSM Migration feature is enabled, turned on, and operating in the system. The MO SMS IS41-to-GSM Migration feature can be turned off, but cannot be disabled.

MO SMS ASD Activation Procedure

This procedure is used to activate the MO SMS ASD feature. This procedure assumes that GTT is enabled and turned on, and that the NT serial number has been entered and locked.

*   The MOSMSGCDPN and MOSMSGCGPN NPP services must be provisioned before the MO SMS ASD feature is turned on for the feature to be functional.

*   The MO SMS ASD feature must be enabled and turned on before the ASDLKUP and CGPNASDRQD Service Actions can execute. The ASDLKUP Service Action is used by the NPP Services:

MOSMSGCDPN, MOSMSGCGPN, MOSMSICDPN, MOSMSICGPN . The CGPNASDRQD Service Action is used by the NPP Services: MOSMSGCDPN and MOSMSICDPN.

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

1. Enter the `enable-ctrl-feat` command to enable the MO SMS ASD feature.

   `enable-ctrl-feat:partnum=893026701:fak=<Feature Access Key>`

2. Provision NPP components for this feature. Refer to *Numbering Plan Processor (NPP) Overview* and *Provisioning NPP for MO SMS Features* for provisioning information and procedures. After provisioning NPP components for this feature, return to this procedure and continue with the next step.

3. Enter the `chg-ctrl-feat` command to turn on the MO SMS ASD feature.

   `chg-ctrl-feat:partnum=893026701:status=ON`

The MO SMS ASD feature is now enabled, turned on, and operating in the system. The MO SMS ASD feature can be turned off, but cannot be disabled.

MO SMS GRN Activation Procedure

This procedure is used to activate the MO SMS GRN feature. This procedure assumes that GTT is enabled and turned on, and that the NT serial number has been entered and locked.

- The MOSMSGCDPN and MOSMSGCGPN NPP services must be provisioned before the MO SMS GRN feature is turned on for the feature to be functional.
- The MO SMS GRN feature must be enabled and turned on before the GRNLKUP and CGPNGRNRQD Service Actions can execute. The GRNLKUP Service Action is used by the NPP Services: MOSMSGCDPN, MOSMSGCGPN, MOSMSICDPN, MOSMSICGPN . The CGPNGRNRQD Service Action is used by the NPP Services: MOSMSGCDPN and MOSMSICDPN.

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

1. Enter the `enable-ctrl-feat` command to enable the MO SMS GRN feature.

   `enable-ctrl-feat:partnum=893026601:fak=<Feature Access Key>`

2. Provision NPP components for this feature. Refer to *Numbering Plan Processor (NPP) Overview* and *Provisioning NPP for MO SMS Features* for provisioning information and procedures. After provisioning NPP components for this feature, return to this procedure and continue with the next step.

3. Enter the `chg-ctrl-feat` command to turn on the MO SMS GRN feature.

   `chg-ctrl-feat:partnum=893026601:status=ON`

The MO SMS GRN feature is now enabled, turned on, and operating in the system. The MO SMS GRN feature can be turned off, but cannot be disabled.

Portability Check for MO SMS Activation Procedure

This procedure is used to activate the Portability Check for MO SMS feature. This procedure assumes that GTT is enabled and turned on, and that the NT serial number has been entered and locked.

Note: The Portability Check for MO SMS feature must be enabled before the Service Action value `fraudchk` can be specified for the MOSMSGCGPN NPP service. The MOSMSGCGPN NPP service must be provisioned before the Portability Check for MO SMS feature is turned on for the feature to be functional.

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

1. Enter the `enable-ctrl-feat` command to enable the Portability Check for MO SMS feature.

   `enable-ctrl-feat:partnum=893009301:fak=<Feature Access Key>`

2. Provision NPP components for this feature. Refer to *Numbering Plan Processor (NPP) Overview* and *Provisioning NPP for MO SMS Features* for provisioning information and procedures. After provisioning NPP components for this feature, return to this procedure and continue with the next step.

3. Enter the `chg-ctrl-feat` command to turn on the Portability Check for MO SMS feature.

   `chg-ctrl-feat:partnum=893009301:status=ON`

4. Enter the `ent-srvsel` command to assign the service selector with service feature `serv=smsmr`. This command assigns the service selectors required to specify the service entry for the Service Module card services.

   Command example:

   `ent-srvsel:gtii=4:tt=10:serv=smsmr:snp=e164:snai=intl:ssn=255`

   where
   :gtii

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

   :tt

   Specifies the translation type

   :serv

   Specifies the DSM service

   :snp

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

   :snai

   Specifies the service nature of address indicator

   :ssn

   Defines the subsystem number

5. Enter the `rtrv-gsmsmsopts` command to view the values of the GSMSMSOPTS table options.
6. Change the GSM SMS options in the database for the Portability Check for MO SMS feature.

Command example:

`chg-gsmsmsopts:mosmsdigmat=bestfit:mosmstcapseg=on`

where:

:mosmsdigmat

> Specifies the method used by Portability Check for MO SMS feature to find a Home SMSC match

:mosmstcapseg

> Specifies whether Mobile-Originated segmented TCAP messages are supported

7. Verify the changes using the `rtrv-gsmsmsopts` command.

   This command displays all GSM SMS options from the database.

8. Enter the `chg-stpopts` command to set the value for the default country code and default network destination code to convert the Nature of Address Indicator (NAI) of MDNs to the international format (nai=intl). The parameters in this command are used for number conditioning.

   Command example:

   chg-stpopts:defcc=49:defndc=177

   :defcc

   > Specifies the default country code

   defndc

   > Specifies the default network destination code

9. Verify the new values for the default country code and default network destination code using the `rtrv-stpopts` command.

The Portability Check for MO SMS feature is enabled, turned on, and operating in the system. The Portability Check for Mobile Originated SMS feature cannot be turned off if the HomeSMSC Match with Digits option is set to `MOSMSDIGMAT = BESTFIT` or if the TCAP Segmented SMS Support is set to `MOSMSTCAPSEG = ON`. The Portability Check for MO SMS feature cannot be disabled.

Prepaid Short Message Service Intercept Activation Procedure

This procedure is used to activate the Prepaid Short Message Service Intercept feature. This procedure assumes that GTT is enabled and turned on, and that the NT serial number has been entered and locked.

Note: The Prepaid Short Message Service Intercept feature must be enabled before the Service Action value `pprelay` can be specified for the MOSMSGCDPN NPP service. The MOSMSGCDPN and MOSMSGCGPN NPP services must be provisioned before the Prepaid Short Message Service Intercept feature is turned on for the feature to be functional.

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

1. Enter the `enable-ctrl-feat` command to enable the Prepaid Short Message Service Intercept feature.

   `enable-ctrl-feat:partnum=893006701:fak=<Feature Access Key>`

2. Provision NPP components for this feature. Refer to *Numbering Plan Processor (NPP) Overview* and *Provisioning NPP for MO SMS Features* for provisioning information and procedures. After provisioning NPP components for this feature, return to this procedure and continue with the next step.

3. Enter the `chg-ctrl-feat` command to turn on the Prepaid Short Message Service Intercept feature.

   `chg-ctrl-feat:partnum=893006701:status=ON`

4. Enter the `ent-srvsel` command to assign the service selector with service feature `serv=smsmr`.

   This command assigns the service selectors required to specify the service entry for the Service Module card services. The `serv=smsmr` parameter of the `ent-srvsel` command is used for PPSMS Service. This service can be assigned to ITU selectors only. The SNP parameter must be set to E.164 and all values of the SNAI parameter are supported. Refer to *EAGLE 5 ISS Service Selector Commands* for more information.

   Command example:

   `ent-srvsel:gtii=4:tt=0:np=e164:nai=intl:serv=smsmr:snp=e164:snai=intl:ssn=8`

   where
   :gtii

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

   :tt

   > Specifies the translation type

   :np

   > Specifies the numbering plan

   :nai

   > Specifies the nature of nddress indicator

   :serv

   > Specifies the DSM service

   :snp

   > Defines the service numbering plan

   :snai

   > Specifies the service nature of address indicator

   :ssn

   > Defines the subsystem number

5. Use the `chg-ppsopts` command to enter Prepaid Short Message Service Intercept options. This command updates the PPSOPTS table.

   Command example:

   `chg-ppsopts:ppt=1:ri=gt:pci=1-1-1:ssn=1`

   where:
   :ppt

   > Specifies the prepaid portability type

> **:ri**
>
> Specifies the routing indicator
>
> **:pci**
>
> Specifies the ITU international point code with subfields *zone-area-id*
>
> **:ssn**
>
> Specifies the subsystem number

6. Use the `ent-map` command to enter mated applications for use with SCCP network management and routing to mated nodes when outgoing RI = route-on-SSN.

   Command example:

   ```
   ent-map:pci=1-1-1:ssn=8:rc=10:mpci=3-3-3:mssn=8:materc=10:grp=smsc
   ```

   This example enters ITU international point code 1-1-1 and ITU international destination point code 3-3-3 as load shared mates. This entry is used only if the Prepaid Short Message Service Intercept RI is equal to the SSN in the PPSOPTS table.

7. Use the ent-mrn command to enter mated relay nodes for routing to the mated node when outgoing RI = route-on-GT.

   Command example:

   ent-mrn:pci=2-2-2:rc=10:pci1=3-3-3:rc1=10

   This example enters Prepaid Short Message Service ITU international point code 2-2-2 and node ITU international point code 3-3-3 as load shared mates. This entry is used only if the Prepaid Short Message Service Intercept RI is equal to the GT in the PPSOPTS table.

The Prepaid Short Message Service Intercept feature is now enabled, turned on, and operating in the system. The Prepaid Short Message Service Intercept feature can be turned off, but cannot be disabled.

Service Portability Activation Procedure

This procedure is used to enable and turn on the Service Portability (S-Port) feature in the EAGLE 5 ISS.

The Service Portability feature is optional and must be purchased from Tekelec. The feature must be purchased to receive the Feature Access Key (FAK) that is required to enable the feature. Contact your Tekelec Sales Representative or Account Representative to determine whether the 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.

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

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

Command example:

```
rtrv-ctrl-feat
```

The output shows the enabled features and the on/off status for each enabled feature in the EAGLE 5 ISS. If the `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 *Step 4* to turn on the S-Port feature. To enable and turn on the S-Port feature, continue to *Step 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.

S-Port Subscriber Differentiation Activation Procedure

This procedure is used to enable and turn on the S-Port Subscriber Differentiation feature and to provision the S-Port Subscriber Differentiation SUBDFRN option to permit S-Port Subscriber Differentiation processing of MSUs in the EAGLE 5 ISS.

- The S-Port Subscriber Differentiation feature is optional and must be purchased from Tekelec. The feature must be purchased to receive the Feature Access Key (FAK) that is required to enable the feature. Contact your Tekelec Sales Representative or Account Representative to determine whether the Service Portability feature has been purchased and for additional information.

- The Service Portability (S-Port) feature must be enabled before the S-Port Subscriber Differentiation feature can be enabled. Refer to *Service Portability Activation Procedure* to enable the Service Portability feature.

The S-Port Subscriber Differentiation feature is enabled using part number 893037901 and the Feature Access Key (FAK). The S-Port Subscriber Differentiation feature cannot be disabled after it is enabled and cannot be enabled with a temporary FAK. After the S-Port Subscriber Differentiation feature is enabled and turned on, the S-Port feature cannot be turned off.

Provisioning of the S-Port Subscriber Differentiation SUBDFRN option can be performed only after the S-Port Subscriber Differentiation feature is enabled and turned on.

Before S-Port Subscriber Differentiation processing of MSUs can occur, these conditions must be met:

- Service Portability must be enabled and turned on. Refer to *Service Portability Activation Procedure*.

- S-Port Subscriber Differentiation must be enabled (*Step 2*) and turned on (*Step 5*).

- S-Port Subscriber Differentiation SUBDFRN option must be set to `on` using the `chg-sccpopts` command (*Step 10*).

- A feature that uses Service Portability must be enabled and turned on. Refer to the feature activation procedure for the feature.

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

1. Display the status of features controlled by feature access keys. 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  EAGLE5 42.0.0
   The following features have been permanently enabled:
   Feature Name              Partnum     Status  Quantity
   HC-MIM SLK Capacity       893012707  on            64
   Service Portability       893034301  off         ----
   ;
   ```

   - If the Service Portability feature, displayed as `Service Portability`, does not appear in the `rtrv-ctrl-feat` output , this procedure cannot be performed. Perform *Service Portability Activation Procedure* to enable the Service Portability feature before continuing with this procedure.

- If the S-Port Subscriber Differentiation feature, displayed as `S-Port Sub Dfrntiation`, appears in the `rtrv-ctrl-feat` output with a status of `on`, go to *Step 8* to set the S-Port Subscriber Differentiation SUBDFRN option to `on`.

- If the S-Port Subscriber Differentiation feature, displayed as `S-Port Sub Dfrntiation`, appears in the `rtrv-ctrl-feat` output with a status of `off`, go to *Step 5* to turn on the S-Port Subscriber Differentiation feature.

- If the S-Port Subscriber Differentiation feature, displayed as `S-Port Sub Dfrntiation`, does not appear in the `rtrv-ctrl-feat` output , continue to the next step to enable the S-Port Subscriber Differentiation feature.

2. Enable the S-Port Subscriber Differentiation feature.

   Command example:

   `enable-ctrl-feat:partnum=893037901:fak=<feature access key>`

3. Verify that the S-Port Subscriber Differentiation feature, displayed as `S-Port Sub Dfrntiation`, is enabled with a status of `off`.

   Command example:

   `rtrv-ctrl-feat`

   Output example:

   ```
   rlghncxa03w 10-06-29 16:40:40 EST  EAGLE5 42.0.0
   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 Sub Dfrntiation   893037901  off        ----
   ```

4. If the S-Port Subscriber Differentiation feature is to be turned on, continue to the next step. Otherwise, go to *Step 12*.

5. Turn on the S-Port Subscriber Differentiation feature.

   Command example:

   `chg-ctrl-feat:partnum=893037901:status=on`

6. Verify that the S-Port Subscriber Differentiation feature, displayed as `S-Port Sub Dfrntiation`, is enabled with a status of `on`

   Command example:

   `rtrv-ctrl-feat`

   Output example:

   ```
   rlghncxa03w 10-06-29 16:40:40 EST  EAGLE5 42.0.0
   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 Sub Dfrntiation   893037901  on         ----
   ```

7. If the S-Port Subscriber Differentiation SUBDFRN option is to be set to `on`, continue to the next step. Otherwise, go to *Step 12*.

8. Determine whether the S-Port Subscriber Differentiation SUBDFRN option is `on`.

   Command example:

```
rtrv-sccpopts
```

Output example:

```
    tekelecstp 10-02-15 14:07:11 EST EAGLE 42.0.0
    SCCP OPTIONS
    ------------------------------
    CLASS1SEQ                  off
    CCLEN                        1
    ACLEN                        3
    INTLUNKNNAI                 no
    SUBDFRN                    off
    MOBRSCCPOPC                MTP
    DFLTGTTMODE               CdPA
```

9. If the S-Port Subscriber Differentiation SUBDFRN option is on, go to *Step 12*. Otherwise, continue to the next step to turn on the S-Port Subscriber Differentiation SUBDFRN option.

10. Set the S-Port Subscriber Differentiation SUBDFRN option to `on`.

Command example:

```
chg-sccpopts:subdfrn=on
```

11. Verify that the S-Port Subscriber Differentiation SUBDFRN option is `on`.

Command example:

```
rtrv-sccpopts
```

For S-Port Subscriber Differentiation processing of MSUs to occur:

- Service Portability must be enabled and turned on.

- S-Port Subscriber Differentiation must be enabled and turned on.

- S-Port Subscriber Differentiation SUBDFRN option must be set to `on`.

- A feature that uses Service Portability must be enabled and turned on.

12. Back up the database changes.

Command example:

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

This message is displayed with the active Maintenance and Administration Subsystem Processor (MASP) listed 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 S-Port Subscriber Differentiation feature cannot be turned off and cannot be disabled. To prevent message processing with S-Port Subscriber Differentiation after the feature is enabled and turned on and the SUBDFRN option is set to `on`, use the `chg-sccpopts` command to set the SUBDFRN option to `off`.

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 5 ISS.

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

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

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

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

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

   Command example:

   ```
   rtrv-ctrl-feat
   ```

   The output shows the enabled features and the on/off status for each enabled feature in the EAGLE 5 ISS.

   - If the MTP Msgs for SCCP Apps entry appears in the `rtrv-ctrl-feat` output with status = on, this procedure does not need to be performed.
   - If the MTP Msgs for SCCP Apps entry appears in the `rtrv-ctrl-feat` output with status = off, go to *Step 4* to turn on the MTP Msgs for SCCP Apps feature.
   - If the MTP Msgs for SCCP Apps entry does not appear in the rtrv-ctrl-feat output, continue with *Step 2*.

2. Enable the MTP Msgs for SCCP Apps feature.

   Command example:

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

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

   Command example:

   ```
   rtrv-ctrl-feat
   ```

   ```
      rlghncxa03w 09-06-29 16:40:40 EST   EAGLE5 41.1.0
      The following features have been permanently enabled:
      Feature Name              Partnum     Status   Quantity
      HC-MIM SLK Capacity       893012707   on             64
      MO-based 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.

Provisioning NPP for MO SMS Features

For detailed information about Numbering Plan Processor, refer to *Numbering Plan Processor (NPP) Overview*. For command specifics, refer to *Commands Manual*. NPP and the associated components for MO SMS features are described in *Numbering Plan Processor for MO SMS Features*.

NPP provisioning is performed in the following sequence:

1. Provision the FNAI mnemonic values required for filter matches on the NAI values for the service, using the `chg-npp-serv` command.

2. Provision the NPP Action Sets with the Conditioning Actions, Service Actions, Formatting Actions, and outgoing NAI value for the enabled MO SMS feature using the `ent-npp-as` command.

3. Provision the Service Rule Sets (Rules that specify the filter values and Action Sets) MO SMS feature with the `ent-npp-srs` command. Servive Rule Sets are Rules that specify the filter values and Action Sets.

4. Provision any delimiter values used in the outgoing digit string formatting using the `chg-npp-serv` command.

5. Change the Service Status to `on` to allow NPP processing for the specified service:
   `chg-npp-serv:srvn=<service name>:status=on`

MO SMS NPP Test Tool

The MO SMS NPP Test Tool sends GSM or IS41 messages to test MO SMS NPP provisioning and display information about all NPP filters, rules, and formatting applied to the messages. The GSM messages flow though NPP Services MOSMSGCDPN and MOSMSGCGPN. The IS41 messages flow though NPP Services MOSMSICDPN and MOSMSICGPN. The MO SMS NPP Test Tool is useful for debugging and tracing changes introduced by NPP to the incoming TCAP Called Party Number (CdPN) or Calling Party Number (CgPN) digits. An MO SMS NPP Test Tool message is not transmitted to the network. All test messages are stored in table TSTMSG.

The MO SMS NPP Test Tool provides the following capabilities:

• Define up to 10 GSM test messages (*Table 22: GSM Parameters for TSTMSG Table*)
• Define up to 10 IS41 test messages (*Table 23: IS41 Parameters for TSTMSG Table*)
• Invoke the feature with NPP to process the test message
• Generate a report of the actions taken and the results of the test

Differences between Test Messages and Actual MO SMS GSM/IS41 Message Flow:

• Test messages are executed from task Npp_Test.
• Test messages do not contribute to `rept-stat-sccp` counters displayed under SMSMR service.
• Test messages do not contribute to measurements.
• Test messages are not sent to the network.

Refer to *Commands Manual* and *MO SMS NPP Test Tool Commands* for descriptions of the commands, parameter values, and output examples.

Note: The specified test message must be set to `active=yes` before the test is invoked for the message.

Table 22: GSM Parameters for TSTMSG Table

Parameter	Range	Default
active	yes, no	no
cdpadgts	hexadecimal digit string of 1 to 15 digits	0123456789abcde
cdpagti	0-15	4 (GT with TT/NP/ES/NAI)
cdpagtnai	0-127	4 (International)
cdpndgts	hexadecimal digit string of 1 to 20 digits	0123456789abcde
cdpnnai	0-7	1 (International)
cdpnnp	0-15	1 (MAP_NUM_ISDN)
cgpadgts	hexadecimal digit string of 1 to 15 digits	0123456789abcde
cgpagti	0-15	4 (GT with TT/NP/ES/NAI)
cgpagtnai	0-127	4 (International)
cgpndgts	hexadecimal digit string of 1 to 21 digits	0123456789abcde
cgpnnai	0-7	1 (International)

Parameter	Range	Default
cgpnnp	0-15	1 (MAP_NUM_ISDN)

Table 23: IS41 Parameters for TSTMSG Table

Parameter	Range	Default
active	yes, no	no
cdpadgts	hexadecimal digit string of 1 to 15 digits	0123456789abcde
cdpagti	0-15	4 (GT with TT/NP/ES/NAI)
cdpagtnai	0-127	4 (International)
cdpndgts	hexadecimal digit string of 1 to 21 digits	0123456789abcde
cdpnes	0-15	1 (IS41_BCD_ECD)
cdpnnai	0-1	1 (International)
cdpnnp	0-15	2 (IS41_TELEPHONY_NUM)
cgpadgts	hexadecimal digit string of 1 to 15 digits	0123456789abcde
cgpagti	0-15	4 (GT with TT/NP/ES/NAI)
cgpagtnai	0-127	4 (International)
cgpndgts	hexadecimal digit string of 1 to 21 digits	0123456789abcde
cgpnes	0-15	1 (IS41_BCD_ECD)
cgpnnai	0-1	1 (International)
cgpnnp	0-15	2 (IS41_TELEPHONY_NUM)

The `tst-msg` command sends the message provisioned in table TSTMSG to the EAGLE 5 ISS Service Feature indicated by the `feat` parameter. The tst-msg format is:

```
tst-msg:loc=<loc>:prot=<gsm, is41, ttr>:msgn=<message_number>:feat=<mosmsnpp,
ttr>
```

loc   Location of the network card where the test message is sent

prot   Type of test message

msgn   Message number of test message within the PROT=type messages

feat   EAGLE 5 ISS Service Feature that processes the message on the network card. For `feat=mosmsnpp`, the only valid choice is `prot=gsm` or `prot=is41`.

Adding a Service Module Card

This procedure is used to add Service Module cards to the database to support GTT-related features and EPAP-related features.

EPAP-related features require Service Module cards running the VSCCP application. The following cards can be used as Service Module cards running the VSCCP application in the system:

- DSM 4G – a DSM card with 4 gigabytes of memory

- E5-SM4G - an EPM-based card with 4 gigabytes of memory

The system can contain a maximum of 32 (31+1) Service Module cards for EPAP-related features with EPAP running on a T1200 AS:

- The following Warning appears when more than 25 Service Module cards have been provisioned in the system and the `enable-ctrl-feat` command is entered to enable the first EPAP-related feature in the system:

  ```
  Warning: The Eagle must be connected to an EPAP T1200 or higher
  ```

- The following Caution appears when the `ent-card` commend is entered to add the 26th Service Module card to the database and any EPAP-related feature is enabled in the system:

  ```
  CAUTION: Please ensure EPAP Application Server is running on
           hardware supporting 32 SCCP cards e.g.: T1200.
           Re-enter command within 30 seconds to confirm change.
  ```

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

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

Note: Service Module cards can be inserted only in slots 01, 03, 05, 07, and 11 of the control shelf (1100).

Table 24: Service Module Card Locations

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

Location of the Service Module Card	Empty Card Location
Slot 17	Slot 18

Prerequisites

Before a Service Module card can be added, the prerequisites in *Table 25: System Prerequisites for Adding a Service Module Card* must be present in the system.

Table 25: System Prerequisites for Adding a Service Module Card

Prerequisite	Verification and Actions
The shelf to which the card is to be added must already be provisioned in the database.	Enter the `rtrv-shlf` command. If the shelf is not in the database, refer to the procedure for adding a shelf in *Database Administration Manual – System Management*.
The odd/even slots in which the card will be inserted must not have a card already assigned in the database.	Enter the `rtrv-card` command. If a slot has a card assigned to it, use the dlt-card command to remove the card from the database. Refer to the `dlt-card` command description in *Commands Manual*.
The GTT feature must be on.	Enter the `rtrv-feat` command to display the GTT feature status. If the GTT feature is on, the gtt=on entry appears in the output. If the gtt=off entry appears in the output, use the procedures in the *Database Administration Manual - GTT* to turn on and provision the GTT feature and any other GTT-related features and functions that will be used in the system.
To add more than 25 Service Module cards to the database, the EPAP that is connected to the EAGLE 5 ISS must be running on a T1200 AS.	Use visual inspection or contact the *Customer Care Center* for assistance to determine the EPAP hardware type.

Before an E5-SM4G Service Module card can be added, the prerequisite in *Table 26: Prerequisite for Adding an E5-SM4G Service Module Card* must be present in the system.

Table 26: Prerequisite for Adding an E5-SM4G Service Module Card

Prerequisite	Verification and Actions
Slots 09 and 10 in the shelf to which the E5-SM4G card will be added must contain either HIPR cards or HIPR2 cards.	Enter the `rept-stat-gpl:gpl=hipr` command and the `rept-stat-gpl:gpl=hipr2` command to list the installed HIPR cards and HIPR2 cards in the system. If the shelf does not contain HIPR cards or HIPR2 cards, refer to procedures in *Installation Manual - EAGLE 5 ISS* to install HIPR cards or HIPR2 cards in the shelf.

Refer to *Commands Manual* for complete descriptions of the commands that are used in this procedure. The complete descriptions include all valid parameter values and output examples.

1. Display the cards in the system by entering the `rtrv-card` command. Odd-even pairs of card locations that do not contain cards (are not listed in the output) and do not contain HMUX, HIPR, or HIPR2 cards can be used for Service Module cards.

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

;
```

2. Verify that the Service Module card to be added has been physically installed in the correct card location, and that the required cabling is installed to connect the card to the EPAP.

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

3. Perform this step only if the card being added will be the 26th Service Module card in the system.

   If the card is NOT the 26th Service Module card, continue to *Step 4*.

   Note: The same `ent-card` command must be entered twice within 30 seconds to complete the provisioning of the card.

   a) Enter the `ent-card` command the first time for the 26th card.

   ```
   ent-card:loc=<card location>:type=dsm:appl=vsccp
   ```

When the command executes the first time and any EPAP-related feature is enabled, the following caution appears :

```
CAUTION: Please ensure EPAP Application Server is running on
         hardware supporting 32 SCCP cards e.g.: T1200.
         Re-enter command within 30 seconds to confirm change.
```

b) Enter the same `ent-card` command the second time for the 26th card to complete the provisioning of the card.

c) Go to *Step 5*.

4. Add the Service Module card to the database, using the `ent-card` command.

   `ent-card:loc=<card location>:type=dsm:appl=vsccp`

5. For an E5-SM4G card, verify the temperature threshold settings by performing the "Changing the High-Capacity Card Temperature Alarm Thresholds" procedure in *Database Administration Manual - SS7*.

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

   `rtrv-card:loc=<card location>`

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

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

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

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

   For example, enter commands like these:

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

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

   where:

   :loc

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

   :port

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

   :ipaddr

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

   :submask

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

:duplex

Mode of operation of the interface

:speed

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

:mactype

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

:mcast

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

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

```
RLGHNCXA03W 09-08-24 21:14:37 GMT EAGLE 41.0.0
LOC  PORT IPADDR          SUBMASK        DUPLEX SPEED MACTYPE AUTO MCAST
1107 A    192.168.122.1 255.255.255.0 HALF   100   DIX     NO   YES
1107 B    192.168.123.1 255.255.255.0 HALF   10    DIX     NO   YES
```

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

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

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

Command examples:

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

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

where:

:host

Host name. Each VSCCP link must be specified separately.

:ipaddr

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

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

```
RLGHNCXA03W 09-08-24 21:19:37 GMT EAGLE 41.0.0
IPADDR          HOST
192.1.1.32      KC_HLR2
192.1.1.50      DN_MSC1
192.1.1.52      DN_MSC2
```

```
192.168.122.1   VSCCP_1107_A
192.168.123.1   VSCCP_1107_B
```

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

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

    For example:

    ```
    chg-ip-card:defrouter=192.168.122.250:domain=nc.tekelec.com:loc=<card
    location>
    ```

    where:

    :defrouter

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

    :domain

    > Domain name of domain server

    :loc

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

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

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

15. Allow the Service Module card that was added to operate in the system, using the `alw-card` command.

    ```
    alw-card:loc=<card location>
    ```

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

17. Test the presence of the EPAP hosts on the network using the `pass` command with the ping parameter. This command is invoked with a destination that is either a hostname or IP address.

    Command examples:

    `pass:loc=1107:cmd="ping 192.168.122.100".`

    `pass:loc=1107:cmd="ping 192.168.122.200".`

    `pass:loc=1107:cmd="ping 192.168.123.100".`

    `pass:loc=1107:cmd="ping 192.168.123.200".`

    where:

:loc

>   Card location or slot number in the EAGLE 5 ISS

:cmd

>   Command string passed to Service Module card for processing

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

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

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

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

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

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

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

19. Repeat this procedure for each Service Module card that needs to be added to the system.

The 1100 TPS/DSM for ITU NP Feature

When only DSM cards or a mixture of DSM cards and E5-SM4G cards (Service Module cards) are equipped in the system, all of the cards are normally rated at 850 transactions per second (TPS). The 1100 TPS/DSM for ITU NP feature increases the TPS rate for a Service Module card from 850 TPS to 1100 TPS.

The feature can be enabled when the equipped Service Module cards include DSM cards and one or more of the EPAP-related features listed in *Table 28: Feature Prerequisites* are enabled and turned on.

When the maximum number of Service Module cards is installed in the EAGLE 5 ISS, the maximum processing capacity of SCCP traffic for an EAGLE 5 ISS processing traffic for EPAP-related features is increased to 34,100 TPS.

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

The 1100 TPS/DSM for ITU NP feature must be enabled using the feature part number 893018001 and a feature access key (FAK). Based on the feature part number and the serial number of the EAGLE 5 ISS, the feature access key is site-specific.

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

After the 1100 TPS/DSM for ITU NP feature has been enabled, the feature must be turned on to begin operation in the system. The feature is an On/Off feature, it can be turned off again after it has been turned on.

System Prerequisites

Before the 1100 TPS/DSM for ITU NP feature can be enabled, the prerequisites listed in *Table 27: System Prerequisites* are required in the system.

Table 27: System Prerequisites

Prerequisite	Verification and Provisioning
For new installations, the system serial number must be verified and locked. The system is shipped with an unlocked serial number. The serial number can be changed if necessary and must be locked after the system is on-site. For systems that are being upgraded, the serial number has already been verified and locked.	Enter the `rtrv-serial-num` command to display the serial number and its lock status. If a serial number is displayed, verify that the serial number is correct for the system. The system serial number is shown on a label affixed to the control shelf (shelf 1100). If the displayed serial number is correct and locked, no action is necessary. If the displayed serial number is correct and not locked, enter the `ent-serial-num` command WITH the lock=yes parameter, and specify the serial number that is shown on the control shelf label. If no serial number is displayed, • Enter the `ent-serial-num` command WITHOUT the lock parameter, and specify the serial number that is shown on the control shelf label.

Prerequisite	Verification and Provisioning
	• Enter the `rtrv-serial-num` command and verify that the correct serial number was entered. • Enter the `ent-serial-num` command again WITH the correct serial number and the lock=yes parameter. If a serial number is displayed or entered and locked that does not match the number on the control shelf, contact the *Customer Care Center* for assistance.
The GTT feature must on in the system.	Enter the `rtrv-feat` command. If the GTT feature is on, the `gtt=on` entry appears in the output. If the `gtt=off` entry appears in the output, use the procedures in *Database Administration Manual – Global Title Translation* to turn on and provision the GTT feature and any related features and functions.

Feature Prerequisites

Before the 1100 TPS/DSM for ITU NP feature can be enabled, the prerequisites shown in *Table 28: Feature Prerequisites* are required in the system.

Table 28: Feature Prerequisites

Prerequisite	Verification and Provisioning
Service Module cards running the VSCCP application must be equipped. The cards can be all DSM cards, or a mixture of DSM cards and E5-SM4G cards. There must be at least one DSM card.	Enter the `rept-stat-gpl:gpl=vsccp` command and the `rept-stat-gpl:gpl=sccphc` command to list the Service Module cards in the system. If the number of cards is not sufficient, use the procedure *Adding a Service Module Card* to add Service Module cards.
The ANSIGFLEX system option cannot be set to Yes.	Enter the `rtrv-stpopts` command. Verify that the `ANSIGFLEX` entry does not appear in the command output or that the `ANSIGFLEX` entry shows a value of `no`.
The LNP feature cannot be on in the system.	Enter the `rtrv-ctrl-feat` command. If the LNP feature is on, shown with a quantity greater than zero for the `LNP ported TNs` entry

Prerequisite	Verification and Provisioning
	in the command output, the 1100 TPS/DSM for ITU NP feature cannot be enabled.
At least one of the following EPAP-related features must be enabled and turned on: • G-Port • A-Port • INP • AINPQ • IGM • EIR • IDP Relay • V-Flex • IAR (NP, ASD, GRN) • MO-based GSM SMS NP • MO-based IS41SMS NP • TIF (NP, ASD, GRN, Number Substitution)	Enter the `rtrv-ctrl-feat` command and verify that an entry for at least one of the listed EPAP-related features with Status `on` is present in the output. If no listed EPAP-related features are on, use the procedures in this manual or another Feature Manual for an EPAP-related feature that you will use in the system, to enable and turn on the EPAP-related feature.

This section provides the following procedures for the 1100 TPS/DSM for ITU NP feature:

- *Enable the 1100 TPS/DSM for ITU NP Feature*
- *Turn On the 1100 TPS/DSM for ITU NP Feature*
- *Turn Off the 1100 TPS/DSM for ITU NP Feature*

Refer to the *Commands Manual* for descriptions of the commands used in the procedures, including parameter names and valid values, rules for using the command correctly, and output examples.

Enable the 1100 TPS/DSM for ITU NP Feature

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

1. Enable the 1100 TPS/DSM for ITU NP feature with part number 893018001 and the feature access key.

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

2. Verify the change by entering the `rtrv-ctrl-feat` command with the 1100 TPS/DSM for ITU NP feature part number 893018001.

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

   ```
   rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
   The following features have been permanently enabled:
   Feature Name              Partnum    Status  Quantity
   HC-MIM SLK Capacity       893012707  on            64
   Prepaid SMS Intercept Ph1 893006701  on          ----
   1100 TPS/DSM for ITU NP   893018001  off         ----
   ;
   ```

3. Back up the 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.
```

Turn On the 1100 TPS/DSM for ITU NP Feature

This procedure is used to turn on the 1100 TPS/DSM for ITU NP feature, after it has been enabled or turned off.

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

1. Enter the chg-ctrl-feat command the first time and specify the 1100 TPS/DSM for ITU NP feature part number 893018001and the status=on parameter value.

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

   The following message is displayed:

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

2. Re-enter the command the second time within 30 seconds to turn on the 1100 TPS/DSM for ITU NP feature.

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

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

   rtrv-ctrl-feat:partnum=893018001

   ```
   rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
   The following features have been permanently enabled:
   Feature Name              Partnum    Status  Quantity
   HC-MIM SLK Capacity       893012707  on           64
   Prepaid SMS Intercept Ph1 893006701  on         ----
   1100 TPS/DSM for ITU NP   893018001  on         ----
   ;
   ```

4. 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.
   ```

Turn Off the 1100 TPS/DSM for ITU NP Feature

This procedure is used to turn off the 1100 TPS/DSM for ITU NP feature, after it has been enabled and turned on.

1. Enter the `chg-ctrl-feat` command the first time and specify the 1100 TPS/DSM for ITU NP feature part number 893018001 and the status=off parameter value.

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

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

2. Re-enter the command the second time within 30 seconds to turn off the 1100 TPS/DSM for ITU NP feature.

3. 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.
   ```

Activating the E5-SM4G Throughput Capacity Feature

The E5-SM4G Throughput Capacity feature quantities are used to increase the processing capacity of the E5-SM4G card and of system SCCP traffic for an EAGLE 5 ISS that contains E5-SM4G cards only (no DSM cards). The achievable TPS maximums are shown in *Table 29: Maximum E5-SM4G Card and System TPS Capacity*.

Table 29: Maximum E5-SM4G Card and System TPS Capacity

Feature Quantity Part Number	Maximum TPS Capacity per E5-SM4G Card	Maximum System TPS Capacity
893019101 - Feature Quantity 5000	3125	• 96,875 TPS with one or more EPAP-related features and 31+1 cards with EPAP running on T1200 AS
	5000	• 150,000 TPS with no EPAP-related or ELAP-related feature traffic and 31+1 cards • 120,000 TPS with G-Flex and the ANSIGFLEX STP option and 24+1 cards • 155,00 TPS with G-Flex and the ANSIGFLEX STP option and 31+1 cards with EPAP running on T1200 AS • 40,000 TPS with ELAP and 8+1 cards • 85,000 TPS with ELAP and 17+1 cards
893019102 - Feature Quantity 6800	6800	• 210,800 TPS with no EPAP-related or ELAP-related feature traffic and 31+1 cards

Feature Quantity Part Number	Maximum TPS Capacity per E5-SM4G Card	Maximum System TPS Capacity
		• 210,800 TPS with one or more EPAP-related features and 31+1 cards with EPAP running on T1200 AS • 54,400 TPS with ELAP and 8+1 cards • 115,600 TPS with ELAP and 17+1 cards

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

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

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

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

System Prerequisites

Before the E5-SM4G Throughput Capacity feature can be enabled, the prerequisites listed in *Table 30: System Prerequisites* are required in the system.

Table 30: System Prerequisites

Prerequisite	Verification and Provisioning
For new installations, the system serial number must be verified and locked. The system is shipped with an unlocked serial number. The serial number can be changed if necessary and must be locked after the system is on-site. For systems that are being upgraded, the serial number has already been verified and locked.	Enter the `rtrv-serial-num` command to display the serial number and its lock status. Verify that the displayed serial number is correct for the system. The serial number is shown on a label affixed to the control shelf (shelf 1100). If no serial number is displayed, or if the displayed serial number is not locked, refer to the `ent-serial-num` command description in *Commands Manual* for instructions to enter and lock the serial number.
The GTT feature must on in the system.	Enter the `rtrv-feat` command. If the GTT feature is on, the gtt=on entry appears in the output.

Prerequisite	Verification and Provisioning
	If the gtt=off entry appears in the output, use the procedures in *Database Administration Manual – Global Title Translation* to turn on and provision the GTT feature and any related features and functions.

E5-SM4G Throughput Capacity Feature Prerequisite

Before the E5-SM4G Throughput Capacity feature can be enabled, the prerequisite shown in *Table 31: E5-SM4G Throughput Capacity Feature Prerequisite* is required in the system.

Table 31: E5-SM4G Throughput Capacity Feature Prerequisite

Prerequisite	Verification and Provisioning
E5-SM4G cards running the VSCCP application must be equipped. The required number of cards depends on the desired total system TPS to be achieved by the cards. See *Table 29: Maximum E5-SM4G Card and System TPS Capacity*.	Enter the `rept-stat-gpl:gpl=sccphc` command to list the E5-SM4G cards in the system. If the number of cards is not sufficient, use the procedure in *Adding a Service Module Card* to add E5-SM4G cards.

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

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

Refer to *Commands Manual* for descriptions of the commands used in the procedure, including parameter names and valid values, rules for using the command correctly, and output examples.

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

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

   - If the `rtrv-ctrl-feat` output shows that the correct E5-SM4G Throughput Capacity quantity feature is enabled and its status is on, no further action is necessary.
   - If no E5-SM4G Throughput Capacity feature quantity is enabled or a higher quantity needs to be enabled, continue with step *Step 2*.

2. Enable the E5-SM4G Throughput Capacity quantity feature by entering the `enable-ctrl-feat` command with the correct part number and FAK for the desired quantity.

3. Verify the status of the E5-SM4G Throughput Capacity quantity feature by entering the `rtrv-ctrl-feat` command with the feature part number that was just enabled (893033501 or 893019102).

```
rtrv-ctrl-feat:partnum=893019102
```

```
    rlghncxa03w 09-08-29 16:40:40 EST  EAGLE5 41.1.0
    The following features have been permanently enabled:
    Feature Name               Partnum    Status  Quantity
    HC-MIM SLK Capacity        893012707  on            64
    E5-SM4G Throughput Cap     893019102  on          6800
;
```

4. Back up the 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.
```

Chapter

5

Measurements

Topics:

This chapter describes the measurements information available from the EAGLE 5 ISS for the MO SMS features.

MO SMS Measurements

Refer to *EAGLE 5 ISS Measurements* for information about measurement systems and reporting.

Refer to *EAGLE 5 ISS Commands Manual* for descriptions of commands used to generate, schedule, and transfer measurements reports.

Refer to *Database Administration Manual - System Management* for provisioning information and procedures for these measurement systems:

- OAM-based Measurements - MO SMS measurements are available using the File Transfer Area (FTA) feature and not directly by EAGLE 5 ISS terminals.
- Measurements Platform
- E5-OAM Integrated Measurements

Both System Total (SYSTOT) pegs and Service Switching Point (SSP) pegs are updated as described in *Table 32: Measurements Pegs for MO SMS Features* . The measurement pegs track events on the basis of system total and Service Switching Point (SSP).

Table 32: Measurements Pegs for MO SMS Features

Event Name	Description	Feature	Unit
GPNOCL	Number of non-call related messages relayed by G-Port; Number of MO Forward Short Messages (MO FSMs) relayed by Prepaid SMS Intercept to an IN platform	G-Port, Prepaid SMS Intercept	Peg count
GPNOCLGT	Number of non-call related messages that fell through to GTT; Number of messages subject to Prepaid SMS Intercept to processing that fell through to GTT	G-Port, Prepaid SMS Intercept	Peg count
SMSMOGERR	Total number of MO Forward Short Messages (MO FSMs) received that result in an error	MO-based GSM SMS NP, Service Portability	Peg count
SMSMOGRCV	Total number of MO Forward Short Messages (MO FSMs) received that result in a modification of the outgoing MO Forward Short Messages	MO-based GSM SMS NP, Service Portability	Peg count
SMSMOIERR	Total number of SMDPP messages received that result in an error	MO-based IS41 SMS NP, MO SMS IS41-to-GSM Migration, Service Portability	Peg count

Event Name	Description	Feature	Unit
SMSMOIRCV	Total number of SMDPP messages received that result in a modification of the outgoing SMDPP	MO-based IS41 SMS NP, MO SMS IS41-to-GSM Migration, Service Portability	Peg count
MOSMSSEGER	Total number of TC_CONTINUE messages with Component Portion discarded by the Portability Check for Mobile Originated SMS feature or the MO-Based GSM SMS NP feature	TCAP Segmented SMS Support Phase 1	Peg count
MOSMSSEGOK	Total number of TC_CONTINUE messages with Component Portion relayed successfully by the Portability Check for Mobile Originated SMS feature or the MO-Based GSM SMS NP feature	TCAP Segmented SMS Support Phase 1	Peg count

Chapter

6

Maintenance

Topics:

This chapter describes the maintenance information available from the EAGLE 5 ISS for the MO SMS features. The information includes status, alarms (UAMs), and information messages (UIMs).

Alarms

Refer to the *Unsolicited Alarm and Information Messages* manual for descriptions and corrective procedures for alarms related to EAGLE 5 ISS features and functions.

Refer to the *T1200 Integrated Application Platform Maintenance Manual* or *EPAP Alarms on T1200 Platform Manual* for descriptions and corrective procedures for MPS-related alarms.

UIMs

This section lists the Unsolicited Information Messages (UIMs) used to support the MO SMS features. Refer to *Unsolicited Alarm and Information Messages* manual for a complete description of all UIM text and formats.

Table 33: Unsolicited Information Messages

UIM	Text	Description	Action
1374	SMS B-party Address decode failed	An error was detected during decode of the SMS message destination address.	The message should be analyzed to determine the error, and the originating node should be contacted to send a corrected message.
1375	SMS Failed to modify TCAP MSU	The formatted outbound digit string length generated by MO SMS features for encoding the TCAP message exceeded system limits.	The message and outbound digits formatting should be analyzed to determine the error, and the originating node or the requested outbound digits formatting option should be modified to correct the encoding error.
1376	SMS Failed to modify B-party digits	During processing of the 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 modified to correct the encoding error.
1410	MOSMS: Migrated Subscriber with no entity	No entity is defined in the RTDB for the migrated subscriber. The subscriber is found to be migrated and the migration prefix must be the entity resulting from the RTDB Lookup.	Ensure that the subscriber has an entity in the RTDB or change the value for MOIGMPFX in Table IS41SMSOPTS.
1416	MAP Missing Mandatory Parameters	An MO SMS feature cannot decode the GSM MAP message because	Ensure that the message contains all mandatory parameters.

UIM	Text	Description	Action
		mandatory parameters (SM-RP-UI or SM-RP-OA) in the TCAP portion of the message are missing.	
1425	SMS A-party Address decode failed	Decoding of the SMS_OOA parameter fields of the IS41 SMDPP message failed. MSU encountered a decoding error.	Ensure that the SMDPP message contains a corrctly formatted SMS_OOA parameter.
1426	S-Port: Missing GRN for srvc prtd subs	Service Portability is to be applied and RTDB GRN is required to format outbound digits but is not provisioned for the DN.	Verify EPAP and Eagle provisioning to configure the GRN for the DN.

Maintenance Commands

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

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

Table 34: 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 (UAMs) 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 Mocule card/EPAP IP links.

Command	Description
rept-stat-db	Displays the status information for the EAGLE 5 ISS 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.
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.

Statistics are displayed under SMSMR Service Statistics for MO SMS IS41-to-GSM Migration, MO-Based GSM SMS NP, MO-Based IS41 SMS NP, and PPSMS features.

Refer to the *Commands Manual* for a complete description of the rept-stat-sccp command, including parameters and valid values, rules for using the command correctly, and output examples.

MO SMS-Related Feature Statistics

All `rept-stat-sccp` counters for MO SMS processing are displayed with the SMSMR Service. The `rept-stat-sccp` counters show the outcome of the cumulative processing of all Mo SMS-related features.

All of the `rept-stat-sccp` counters except the ERRORS counter are incremented. The ERRORS counter is pegged only by the features that respond to the incoming message. MO SMS-related features are message relay features.

MO SMS-related features are processed independently based on whether the feature is provisioned and turned on with an NPP service. Each feature keeps track of whether the message processing is SUCCESS, FAILURE or WARNINGS. At the end of all processing, `rept-stat-sccp` counters are derived by considering all feature outcome cumulatively. The counters are derived in the following order - first FAILURE, second WARNINGS, third SUCCESS. and last FALL THROUGH:

- FAILURE: The message had all information required for processing and was processed, but encountered delivery problems due to cross network routing failure, lack of routing information, or encoding failure. Failure errors do not mean that the message being processed is discarded. Because all MO SMS-related features are intercepting the message being translated by GTT, the messages fall back to GTT routing without modification when a failure to process has occurred.
- WARNINGS: This count will be incremented for the feature if a decoding failure, lack of information to process, parameter not provisioned, or processing failure is encountered.
- SUCCESS: The feature successfully processed the message. Message contents have been modified.
- FALL THROUGH: The message is good; none of the features changed the contents of the message.
- TOTAL: SUCCESS + FAILURE + WARNINGS + FALL THROUGH = TOTAL number of messages processed by the SMSMR service.

SMDPP or Forward Short Message Decoding and Pre-NPP Processing

Table 35: Service Status Counters-Message Decoding and Pre-NPP Processing

Service Status Completion	Description
WARNINGS	Could not decode Calling Party or Called Party parameters from the message. See x
FALL THROUGH	Message is not valid. IS41: Not an SMDPP message. GSM: Message is not MO-FSM. PDU type is not SMS_SUBMIT or SMS-COMMAND.
	NPP Service Status is OFF.
	SCCP message is not UDT Or non-segmented XUDT.

Table 36: rept-stat-sccp Counters Incremented During Decoding

	Missing CgPN	Missing CdPN	Decode Error in CgPN	Decode Error in CdPN
GSM	Missing mandatory parameter-WARNINGS	Missing mandatory parameter-WARNINGS	WARNINGS	WARNINGS
IS41	--	--	WARNINGS (An error)	WARNINGS (An error)

The following tables describe the counters that are incremented specifically for message decoding and for MO SMS-related features.

Prepaid SMS Intercept Phase 1 Feature Service Status Counters

Table 37: Service Status Counters-Prepaid SMS Intercept Phase 1

Service Completion Status	Description
SUCCESS	Message is for a Prepaid subscriber, and the message was processed
WARNINGS	Length of the MSISDN digits is less than 0 or greater than 21
	Length of the outbound DN digits is greater than 20
	MSU number conditioning failed because DEFCC or DEFNDC is not provisioned
	NPP processing failed
	Length of the conditioned digits is greater than 15
FAILURE	Failed to route to the Prepaid server
	Invalid Point Code is defined for IN Plat form
	No SSN is present in entity data and no CdPA SSN is present
	SCCP layer encode to Prepaid server failed
	In all of these cases, the message falls through to GTT without modification.
FALL THROUGH (Did not process)	Message is not from or to a Prepaid subscriber
	Message is from a Prepaid server.
	MSISDN is not found in RTDB
	MOSMSGCGPN or MOSMSGCDPN NPP service state is OFF
	PPSMS feature is not turned on

Portability Check for MO SMS Feature Service Status Counters

Table 38: Service Status Counters-Portability Check for MO SMS

Service Completion Status	Description
SUCCESS	FRAUD detected
WARNINGS	Length of the MSISDN digits is less than 0 or greater than 21
	Length of the outbound DN digits is greater than 20
	MSU number conditioning failed because DEFCC or DEFNDC is not provisioned
	NPP processing failed
	Length of the conditioned digits is greater than 15
FAILURE	Encoding and sending of NACK message failed. (TCAP length is zero; translated PC after GTT is in a different domain.)
	Encoding and sending ABORT message to SMSC failed. (TCAP portion length is zero during encoding.)
FALL THROUGH (Did not process)	MSISDN is not found in RTDB
	Subscriber is not FRAUD
	Destination is not HOME SMSC
	MOSMSGCGPN NPP service state is OFF
	Portability Check for MO SMS feature is not turned on

MO SMS IS41-to-GSM Migration Feature Service Status

Table 39: Service Status Counters-MO SMS IS41-to-GSM Migration

Service Completion Status	Description
SUCCESS	User found to have migrated, and message is modified
WARNINGS	MIGRATE failed because the IS41SMSOPTS MOIGMPFX option is not provisioned
	MIGRATE failed because the GSMOPTS IS412GSM option is not provisioned and the IS41SMSOPTS MOIGMPFX option is set to IS412GSM
	Subscriber is migrated base on NO ENTITY with DN PORT TYPE = 5 and the IS41SMSOPTS MOIGMPFX option is set to NE
	Length of the outbound DN digits is greater than 20
	MSU number conditioning failed because DEFCC or DEFNDC is not provisioned
	NPP Conditioning Action execution or Formatting Action execution failed

Service Completion Status	Description
	Length of the conditioned digits is greater than 15
FAILURE	Modified TCAP encoding failed The message falls through to GTT without being modified.
FALL THROUGH (Did not process)	DA/ODA not found in RTDB
	Called Party parameter is not found to have migrated
	Destination is not HOME SMSC
	The MOSMSICDPN NPP service state is OFF
	MO SMS IS41-to-GSM Migration feature is not turned on

Number Portability and Service Portability Service Status

Table 40: Service Status Counters-Number Portability and Service Portability

Service Completion Status	Description
SUCCESS	Number Portability or Service Portability was applied and the message was modified
WARNINGS	Length of the outbound DN digits is greater than 20 for GSM messages and 21 for IS41 messages
	MSU number conditioning failed because DEFCC or DEFNDC is not provisioned
	Decode of SM-RP-UI parameter failed. The length of the TP_DA parameter and valued do not conform with the GSM MAP protocol requirements.
	NPP Conditioning Action execution or Formatting Action execution failed
	Length of the conditioned digits is greater than 15
	Service Portability is applicable but GRN is not provisioned for the DN in the RTDB. Service Portability is applicable if the S-Port feature is turned on and any of the following conditions is true: • Subscriber is own-network IS41 subscriber and the SPORTTYPE configuration option value is IS41 or ALL • Subscriber is own-network GSM subscriber and the SPORTTYPE configuration option value is GSM or ALL
FAILURE	Modified TCAP encoding failed The message falls through to GTT without being modified.
FALL THROUGH (Did not process)	RTDB lookup was unsuccessful because DA/ODA were not found in the RTDB or an Entity was not found or validated

Service Completion Status	Description
	Called Party parameter is not ported out and Service Portability does not apply
	Destination is HOME SMSC
	The MOSMSICDPN or MOSMSGCDPN NPP service state is OFF
	The required Number Portability feature is not turned on

MO SMS B-Party Routing Feature Service Status Counters

Table 41: Service Status Counters-MO SMS B-Party Routing

Service Completion Status	Description
SUCCESS	Successfully routed MSU on B-Party Number
WARNINGS	Length of the outbound DN digits is greater than 20
FAILURE	Modified TCAP encoding failed The message falls through to GTT without being modified.
	SCRC_ERR_USER_ACTION_UDTS. UDTS generated.
	SCRC_ERR_USER_ACTION_DISCARD. MSU discarded.
	SCRC_ERR_NO_SSN_IN. MSG_OR_XLATION. Lack of routing information. Message falls through to GTT without being modified..
	SCRC_ERR_MSG_XING_DOMAIN. Delivery problems were encountered due to cross network. Message falls through to GTT without being modified..
	SCRC_ERR_CLG_PC_CONVERSION. Delivery problems were encountered due to cross network. Message falls through to GTT without being modified..
FALL THROUGH (Did not process)	SCRC_ERR_NO_XLATION. No rules were configured for the B-Party GTA..
	MO SMS B-Party Routing feature is not turned on

EAGLE 5 ISS Debug Commands

Chapter 6 of the *Commands Manual* contains descriptions of commands that can be used in assessing and modifying system status and operation. The debug commands are used only under the direction of Tekelec support personnel.

The `ent-trace` command traps A-Port MSUs (Message Signaling Units) based on the point code of the switch that generated the MSU (SSP), a particular DN and entity ID. For MDN and entity ID, the

comparison is based on the search key built from the CdPA GTAI (Global Title Address Information) after any conditioning. The existing GT SCCP trigger also applies to A-Port messages.

Status Reporting and Problem Identification

EAGLE 5 ISS commands can be used to obtain status and statistics for the EAGLE 5 ISS system, the EPAP systems, system devices including Service Module cards, EPAP-related features, local subsystems, and SCCP services.

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

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

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

Refer to the *EPAP Alarms on the T1200 Platform* manual for descriptions and recovery procedures for EPAP alarms.

Refer to the appropriate *Feature Manual* for information about the functions and operation of EPAP-related features.

Table 42: Status Reporting for EPAP-Related Features

Reports, Status, and Statistics	Command
EAGLE 5 ISS	
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 5 ISS)	
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`

Reports, Status, and Statistics	Command
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>`

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 5 ISS 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, it 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 craftsperson 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, it 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.

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

- **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.

Glossary

C

CdPA Called Party Address

The field in the SCCP portion of the MSU that contains the additional addressing information of the destination of the MSU. Gateway screening uses this additional information to determine if MSUs that contain the DPC in the routing label and the subsystem number in the called party address portion of the MSU are allowed in the network where the EAGLE 5 ISS is located.

CgPA Calling Party Address

The point code and subsystem number that originated the MSU. This point code and subsystem number are contained in the calling party address in the SCCP portion of the signaling information field of the MSU. Gateway screening uses this information to determine if MSUs that contain this point code and subsystem number area allowed in the network where the EAGLE 5 ISS is located.

D

DB Database

Daughter Board

Documentation Bulletin

DCB Device Control Block

DEFCC Default Country Code

DN Directory number

D

A DN can refer to any mobile or wireline subscriber number, and can include MSISDN, MDN, MIN, or the wireline Dialed Number.

DPC

Destination Point Code

DPC refers to the scheme in SS7 signaling to identify the receiving signaling point. In the SS7 network, the point codes are numeric addresses which uniquely identify each signaling point. This point code can be adjacent to the EAGLE 5 ISS, but does not have to be.

E

EPAP

EAGLE Provisioning Application Processor

EPAP-related features

Features that require EPAP connection and use the Real Time Database (RTDB) for lookup of subscriber information.

- ANSI Number Portability Query (AINPQ)
- ANSI-41 AnalyzedInformation Query – no EPAP/ELAP (ANSI41 AIQ)
- Anytime Interrogation Number Portability (ATI Number Portability, ATINP)
- AINPQ, INP, G-Port SRI Query for Prepaid, GSM MAP SRI Redirect, IGM, and ATINP Support for ROP
- A-Port Circular Route Prevention (A-Port CRP)
- Equipment Identity Register (EIR)
- G-Flex C7 Relay (G-Flex)
- G-Flex MAP Layer Routing (G-Flex MLR)
- G-Port SRI Query for Prepaid

E

- GSM MAP SRI Redirect to Serving HLR (GSM MAP SRI Redirect)
- GSM Number Portability (G-Port)
- IDP A-Party Blacklist
- IDP A-Party Routing
- IDP Relay Additional Subscriber Data (IDPR ASD)
- IDP Relay Generic Routing Number (IDPR GRN)
- IDP Service Key Routing (IDP SK Routing)
- IDP Screening for Prepaid
- INAP-based Number Portability (INP)
- Info Analyzed Relay Additional Subscriber Data (IAR ASD)
- Info Analyzed Relay Base (IAR Base)
- Info Analyzed Relay Generic Routing Number (IAR GRN)
- Info Analyzed Relay Number Portability (IAR NP)
- INP Circular Route Prevention (INP CRP)
- IS41 Mobile Number Portability (A-Port)
- IS41 GSM Migration (IGM)
- MNP Circular Route Prevention (MNPCRP)
- MO-based GSM SMS NP
- MO-based IS41 SMS NP
- MO SMS Generic Routing Number (MO SMS GRN)
- MO- SMS B-Party Routing
- MO SMS IS41-to-GSM Migration
- MT-based GSM SMS NP
- MT-based GSM MMS NP
- MT-based IS41 SMS NP
- MTP Routed Messages for SCCP Applications (MTP Msgs for SCCP Apps)

E

- MTP Routed Gateway Screening Stop Action (MTPRTD GWS Stop Action)
- Portability Check for MO SMS
- Prepaid IDP Query Relay (IDP Relay, IDPR)
- Prepaid SMS Intercept Phase 1 (PPSMS)
- Service Portability (S-Port)
- S-Port Subscriber Differentiation
- Triggerless ISUP Framework Additional Subscriber Data (TIF ASD)
- Triggerless ISUP Framework Generic Routing Number (TIF GRN)
- Triggerless ISUP Number Portability (TIF NP)
- Triggerless ISUP Framework Number Substitution (TIF NS)
- Triggerless ISUP Framework SCS Forwarding (TIF SCS Forwarding)
- Triggerless ISUP Framework Simple Number Substitution (TIF SNS)
- Voice Mail Router (V-Flex)

F

FAK   Feature Access Key

The feature access key allows the user to enable a controlled feature in the system by entering either a permanent feature access key or a temporary feature access key. The feature access key is supplied by Tekelec.

FSM   Finite State Machine

FTA   File Transfer Area

A special area that exists on each OAM hard disk, used as a staging

F

area to copy files to and from the
EAGLE 5 ISS using the Kermit
file-transfer protocol.

G

GMSC   Gateway MSC

GSM   Global System for Mobile
                                            Communications

GTA   Global Title Address

GTI   Global Title Indicator

GTT   Global Title Translation

                                            A feature of the signaling connection
                                            control part (SCCP) of the SS7
                                            protocol that the EAGLE 5 ISS uses
                                            to determine which service database
                                            to send the query message when an
                                            MSU enters the EAGLE 5 ISS and
                                            more information is needed to route
                                            the MSU. These service databases
                                            also verify calling card numbers and
                                            credit card numbers. The service
                                            databases are identified in the SS7
                                            network by a point code and a
                                            subsystem number.

H

HLR   Home Location Register

I

IN   Intelligent Network

                                            A network design that provides an
                                            open platform for developing,
                                            providing and managing services.

IP   Internet Protocol

I

IP specifies the format of packets, also called datagrams, and the addressing scheme. The network layer for the TCP/IP protocol suite widely used on Ethernet networks, defined in STD 5, RFC 791. IP is a connectionless, best-effort packet switching protocol. It provides packet routing, fragmentation and re-assembly through the data link layer.

ISS

Integrated Signaling System

L

Link

Signaling Link

Signaling Link

Carries signaling within a Link Set using a specific Association. A Link can belong to only one Link Set and one Association. There is generally one Link per Association in a Link Set.

LOCREQ

Location Request Message

A TDMA/CDMA MSC query to an HLR for retrieving subscription/location information about a subscriber to terminate a voice call.

M

MAP

Mobile Application Part

MNP SMS

Portability Check for Mobile Originated SMS

MO

Magneto Optical

Managed Object

Mobile Originated

M

Refers to a connection established by a mobile communication subscriber. Everything initiated by the mobile station is known as mobile originated.

MPS   Multi-Purpose Server

The Multi-Purpose Server provides database/reload functionality and a variety of high capacity/high speed offboard database functions for applications. The MPS resides in the General Purpose Frame.

Messages Per Second

A measure of a message processor's performance capacity. A message is any Diameter message (Request or Answer) which is received and processed by a message processor.

MSC   Mobile Switching Center

MSISDN   Mobile Station International Subscriber Directory Number

The MSISDN is the network specific subscriber number of a mobile communications subscriber. This is normally the phone number that is used to reach the subscriber.

MSU   Message Signal Unit

The SS7 message that is sent between signaling points in the SS7 network with the necessary information to get the message to its destination and allow the signaling points in the network to set up either a voice or data connection between themselves. The message contains the following information:

- The forward and backward sequence numbers assigned to

M

the message which indicate the position of the message in the traffic stream in relation to the other messages.

- The length indicator which indicates the number of bytes the message contains.

- The type of message and the priority of the message in the signaling information octet of the message.

- The routing information for the message, shown in the routing label of the message, with the identification of the node that sent message (originating point code), the identification of the node receiving the message (destination point code), and the signaling link selector which the EAGLE 5 ISS uses to pick which link set and signaling link to use to route the message.

MTP	Message Transfer Part
	The levels 1, 2, and 3 of the SS7 protocol that control all the functions necessary to route an SS7 MSU through the network
MTP Msgs for SCCP Apps	MTP Routed Messages for SCCP Applications feature
	A feature that supports MTP-routed SCCP message processing for features that normally do not MTP route messages. The feature supports both LOCREQ and SMSREQ messages.

N

NAI	Nature of Address Indicator

N

Standard method of identifying
users who request access to a
network.

Network Access Identifier

NP   Number Plan

NPDB   Number Portability Database

O

OAM   Operations, Administration, and
                                            Maintenance

                                            The application that operates the
                                            Maintenance and Administration
                                            Subsystem which controls the
                                            operation of the EAGLE 5 ISS.

OPS   Operator Provisioning System

own-network   Belonging to or assigned to this
                                             operator.

P

PDB   Provisioning Database

PDBA   Provisioning Database Application

                                            There are two Provisioning Database
                                            Applications (PDBAs), one in EPAP
                                            A on each EAGLE 5 ISS. They follow
                                            an Active/Standby model. These
                                            processes are responsible for
                                            updating and maintaining the
                                            Provisioning Database (PDB).

PDBI   Provisioning Database Interface

                                            The interface consists of the
                                            definition of provisioning messages
                                            only. The customer must write a
                                            client application that uses the PDBI

P

request/response messages to communicate with the PDBA.

PPP

Point-to-Point Protocol

PPSMS

Prepaid Short Message Service

Prepaid Short Message Service Intercept

R

RFC

Request for Comment

RFCs are standards-track documents, which are official specifications of the Internet protocol suite defined by the Internet Engineering Task Force (IETF) and its steering group the IESG.

RMTP

Reliable Multicast Transport Protocol

RN

Routing Number

RTDB

Real Time Database

S

SCCP

Signaling Connection Control Part

Service Module card

DSM card or E5-SM4G card that contains the Real Time Database (RTDB) downloaded from an EPAP or ELAP system.

Service Portability

See S-Port.

SMS

Short Message Service

S

SMSC	Short Message Service Center
SMSREQ	SMS Request Message
S-Port	Service Portability

A number portability extension which allows a subscriber to retain the same subscriber number when moving from one network type or service technology to another within the network of a single operator. Service Portability provides different routing number digits for formats that require routing numbers. Service Portability does not affect message flows.

SP   Signaling Point

A set of signaling equipment represented by a unique point code within an SS7 domain.

SSN   Subsystem Number

The subsystem number of a given point code. The subsystem number identifies the SCP application that should receive the message, or the subsystem number of the destination point code to be assigned to the LNP subsystem of the EAGLE 5 ISS.

A value of the routing indicator portion of the global title translation data commands indicating that no further global title translation is required for the specified entry.

Subsystem Number

Used to update the CdPA.

STP   Signal Transfer Point

The STP is a special high-speed switch for signaling messages in SS7

S

networks. The STP routes core INAP communication between the Service Switching Point (SSP) and the Service Control Point (SCP) over the network.

Subsystem Number

See SSN.

T

TC

Table Copy

Transaction Capabilities

TCAP

Transaction Capabilities Application Part

TCP

Transfer Control Protocol

TCP/IP

Transmission Control Protocol/Internet Protocol

Translation Type

See TT.

TT

Translation Type.

Resides in the Called Party Address (CdPA) field of the MSU and determines which service database is to receive query messages. The translation type indicates which Global Title Translation table determines the routing to a particular service database.

U

UAM

Unsolicited Alarm Message

A message sent to a user interface whenever there is a fault that is service-affecting or when a previous problem is corrected. Each message has a trouble code and text

U

associated with the trouble
condition.

UDP User Datagram Protocol

UDT Unitdata Transfer

UDTS Unitdata Transfer Service

An error response to a UDT
message.

V

VSCCP VxWorks Signaling Connection
Control Part

The application used by the Service
Module card to support
EPAP-related features and LNP
features. If an EPAP-related or LNP
feature is not turned on, and a
Service Module card is present, the
VSCCP application processes normal
GTT traffic.

X

XUDT Extended User Data

XUDTS Extended Unitdata Service message

An error response to an XUDT
message.