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## ***TIA/EIA-41-D Based Network Enhancements for CDMA Packet Data Service (C-PDS), Phase 1***

***Revision: 0***

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## Revision History

### Revision

### Date

Rev. 0

Initial Publication

June 2002

### Note

This specification is an extract of TIA TR-45.2 IS-880.

## CELLULAR RADIOTELECOMMUNICATIONS INTERSYSTEM OPERATIONS

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**CDMA Packet Data Service (C-PDS), Phase-1****CONTENTS**

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## EDITORIAL KEY

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- a. *TIA/EIA-41-D*, *TIA/EIA-124-D* or *TIA/EIA-664-A* totally new sections are identified via text with right hand margin "diffmarks", as:

A totally new section's text.

- b. *TIA/EIA-41-D*, *TIA/EIA-124-D* or *TIA/EIA-664-A* new inserted enhanced text is identified via text with "under-score" lines and right hand margin "diffmarks", as:

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. . existing text new enhanced text other standard's text existing text. . .

# FOREWORD

This Specification contains recommendations for supporting the wireless capability “Packet Data Services”. This Specifications builds upon:

- *TIA/EIA-41-D Cellular Radiotelecommunications Intersystem Operations; Telecommunications Industry Association; 1997.*
- *TIA/EIA-124-D Wireless Radio Telecommunications Intersystem Non-Signaling Data Communication DMH (Data Message Handler); December 2001.*
- *TIA/EIA-664-A Wireless Features Description; Telecommunications Industry Association; December 2000.*

# ASSUMPTIONS

The following items are basic understandings used during the development of this document:

- a. The Stage-2 and Stage-3 descriptions in this Specification supports the *IS-2000-A* radio interface (e.g., *IS-707* Service Option 33) and the *IS-2001-A* A-interface.
- b. The applicability of this Specification to *IS-2000* revisions prior to Release-A is not addressed (e.g., QoS applies only to Release-A).
- c. The applicability of 2G and 3G networks handoff to and from All-IP networks is not addressed.
- d. The applicability of this Specification to *IS-2001* revisions prior to Release-A is not addressed.
- e. Capabilities beyond *IS-2001-A* are required for this Specification. These include:
  - the ability to initiate an *IS-2000* "Mobile Station Registered Message",
  - Quality-of-Service parameters (Assured Mode) Packet Priority,
  - Status Request, and
  - Status Response.
- f. This Specification supports simultaneous circuit voice service and packet data service. Support for simultaneous circuit data service and packet data service is not addressed.

# REVISION HISTORY

Revision	Date	Remarks
1.0	June, 2000	Initial version



# 1. INTRODUCTION

---

## 1.1 OBJECTIVE

---

This Specification (IS) presents Stage-1 (new chapter *TIA/EIA-664-B*), Stage-2 (*TIA/EIA-41.1-D* and *TIA/EIA-41.3-D* enhancements), and Stage-3 (*TIA/EIA-41.5-D* and *TIA/EIA-41.6-D* enhancements) as well as *TIA/EIA-124-C* enhancement recommendations for supporting Packet Data Service use in the Wireless Radiotelephone Service.

## 1.2 SCOPE

---

This document specifies the wireless intersystem network operation enhancements required for supporting roaming subscribers with Packet Data Service.

## 1.3 ORGANIZATION

---

This document is organized as per *TIA/EIA-41-D* and *TIA/EIA-664-A*.

# 2. REFERENCES

---

## 2.1 Normative References

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TIA/EIA:

- *TIA/EIA-41*:
  - *ANSI/TIA/EIA-41-D Cellular Radiotelecommunications Intersystem Operations*; Telecommunications Industry Association; December 1997.
- *TIA/EIA-124*:
  - *TIA/EIA-124-C Wireless Radio Telecommunications Intersystem Non-Signaling Data Communication DMH (Data Message Handler)*; Telecommunications Industry Association; September 2000.
- *TIA/EIA-664*:
  - *TIA/EIA-664 Cellular Features Description*; Telecommunications Industry Association; January 1996.
- *IS-707*:
  - *TIA/EIA/IS-707-A-2 Data Service Options for Wideband Spread Spectrum Systems - Addendum 2*, Telecommunications Industry Association; June 2000.
- *IS-737*:
  - *TIA/EIA/IS-737 Enhancements for Circuit Mode Services*; May 1998.

- *IOS.*

- TIA/EIA/IS-2001-A *Inter-Operability Specification (IOS) for CDMA 2000 Access Network Interfaces*; June 2001.

- *CDMA:*

- TIA/EIA/IS-2000-A *cdma2000 Series*, March 2000, Telecommunications Industry Association, which includes:
  - \* C.S0001-A, *Introduction to cdma2000 Spread Spectrum Systems*,
  - \* C.S0002-A, *Physical Layer Standard for cdma2000 Spread Spectrum Systems*,
  - \* C.S0003-A, *Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems*,
  - \* C.S0004-A, *Link Signaling Access Control (LAC) Standard for cdma2000 Spread Spectrum Systems*,
  - \* C.S0005-A, *Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems*, and
  - \* C.S0006-A, *Analog Signaling Standard for cdma2000 Spread Spectrum Systems*.

*IETF:*

- RFC 1661 Simpson, *The Point to Point Protocol (PPP)*, Internet Engineering Task Force, 1994.
- RFC 1662 Simpson, *PPP in HDLC-like Framing*, Internet Engineering Task Force, 1994.
- RFC 1994 Simpson, *PPP Challenge Handshake Authentication Protocol*, Internet Engineering Task Force, 1996.
- RFC 2002 Perkins, *IPv4 Mobility*, Internet Engineering Task Force, 1995.

### 3. ***TIA/EIA-664-XXX* “CELLULAR FEATURE DESCRIPTIONS” MODIFICATIONS**

---

This section provides the Stage-1 feature description CDMA Packet Data Service (C-PDS) according to the structure of *TIA/EIA-664*.

#### 3.1 **Definitions**

---

(new for *TIA/EIA-664-001-B*, page 4)

##### **Active state (for C-PDS)**

---

The packet data session state that utilizes dedicated traffic channels on the RF resource.

##### **Authentication, Authorization and Accounting function (AAA)**

---

Any service that provides AAA functions for the CDMA packet data network. These are separate from current HLR services.

##### **Challenge Handshake Authentication Protocol (CHAP)**

---

CHAP is defined in *IETF* (RFC 1994).

In order to establish communications over a point-to-point link, each end of the Point-to-Point Protocol (PPP) link shall first send packets to configure the data link during the link establishment phase. After the link has been established, the PPP provides for an optional authentication phase before proceeding to the network-layer protocol phase.

CHAP is intended for use primarily by hosts and routers that connect to a PPP network server via switched circuits or dial-up lines, but CHAP may be applied to dedicated links as well. The PPP network server may use identification of the connecting host or router in the selection of options for network layer negotiations.

CHAP defines a PPP authentication protocol. The link establishment phase, authentication phase, and the Authentication-Protocol Configuration Option are defined in the PPP.

##### **CDMA Packet Data Service (C-PDS)**

---

Any data telecommunication service offered through a Packet Data Network.

##### **Dormant state (for C-PDS)**

---

The packet data session state that does not utilize a dedicated traffic channel on the RF resource.

---

**Mobile IP**

---

Mobile IP is defined in IETF (RFC 3012).

An IETF routing protocol that allows a MS to maintain a persistent address as it moves across IP networks. In Mobile IP, usual routing protocols deliver a packet to a Home Agent and the Mobile IP protocol arranges for the packets to be forwarded to a Foreign Agent or to the MS, depending on the Mobile IP style chosen by the MS.

---

**Packet Data Network (PDN)**

---

A public or private packet switched data network.

---

**Packet Data Service Node (PDSN)**

---

The network entity that supports the interconnection between the Radio Network and the Packet Data Network. The PDSN supports Simple IP and Mobile IP access mechanisms. Simple IP provides a service commensurate with usual laptop operating systems that support dial up IP service. Mobile IP provides a service allowing persistent address support.

---

**Packet Zone**

---

The coverage area of all cells using the same packet zone identifier. The wireless service provider may use different identifiers for the purpose of locating wireless users within the Radio Network coverage area.

---

**Password Authentication Protocol (PAP)**

---

PAP is defined in IETF (RFC 1334).

A password protocol in which the MS returns a password known to the home network over PPP to the PPP peer in the network. The PPP peer in the network (e.g., the PDSN) verifies the password using an AAA infrastructure.

---

**PDSN Service Area**

---

The coverage area of all cells connected to the same PDSN.

---

**Point-to-Point Protocol (PPP)**

---

PPP is defined in *IETF* (RFC 1661 and RFC 1662).

The PPP is designed for links which transport packets between two peers. These links provide full-duplex simultaneous bi-directional operation, and are assumed to deliver packets in sequential order. It is intended that PPPs provide a common solution for easy connection of a wide variety of hosts, bridges and routers.



The PPP encapsulation provides for multiplexing of different network-layer protocols simultaneously over the same link. The PPP encapsulation has been carefully designed to retain compatibility with most commonly used supporting hardware.

### **C-PDS Quality of Service (QoS)**

---

A CDMA Packet Data Service Radio Frequency (RF) attribute identifying a user's specific service control characteristics (e.g., admission control, state transition control, wireless network access control). These service characteristics shall define how data is sent and delivered across a radio network when there are issues of RF resource contention. C-PDS QoS currently has no relationship with IP types of QoS (e.g., differentiated service, RSVP, etc.).

### **Radio Network (RN)**

---

The set of network equipment and infrastructure that offers local access to wireless users and that terminates the radio link to the wireless users. The RN consists of Base Transceiver Stations (BTS), Base Station Controllers (BSC), Packet Control Functions (PCF), and Mobile Switching Centers (MSC).

### **Simple IP**

---

Simple IP is an access mechanism that allows the MS to negotiate PPP and then send and receive IP packets. The MS may move within one PDSN selection domain, maintaining the Simple IP session. Once outside that domain, a new Simple IP session with a new IP address needs to be initiated to receive IP service.

## 6 NETWORK SERVICES FEATURE DESCRIPTIONS

### ~~Short Message Service Feature Descriptions~~

(TIA/EIA-664-XXX-B page 239)

### 6.1 Short Message Service (SMS)

(TIA/EIA-664-XXX-B page 239)

NOTE: the remainder of this section is retained unmodified except for the section number change (i.e., "6" changed to "6.1").

### 6.2 CDMA Packet Data Service (C-PDS)

(new Chapter for TIA/EIA-664-XXX-B page 254)

C-PDS shall allow communication services to access private or public Packet Data Networks (PDNs) (e.g., Internet or Intranets) using an air interface provided by the wireless service provider. C-PDS shall also allow movement of a wireless user engaged in a Packet Data session.

C-PDS usage requires a wireless user to register separately with both the wireless service provider and the Packet Data network access provider, even though these providers may be the same.

C-PDSs are distinguished in two general categories of Quality of Service (QoS), as:

a. Non-Assured Services:

Services that are not particularly sensitive to minimum data rate, delay, or error rate.

b. Assured Services:

Services for which there is a sensitivity to some combination of guaranteed minimum data rate, delay, or data loss rate.

C-PDSs shall allow for the subscription to:

- a. Packet Data Service,
- b. Circuit Service or Packet Data Service (i.e., non-simultaneous), and
- c. Simultaneous Circuit Service and Packet Data Service.

When there is a packet data capable MS that supports simultaneous services, C-PDS may be supported with simultaneous voice or circuit bearer services. This implies that a user of a circuit service (voice or data) shall be able to establish, maintain, and or terminate a C-PDS while maintaining the circuit call. A user with an active Packet Data session shall be able to establish, receive, maintain, and or terminate a circuit service (voice or data) while maintaining the packet data session. A user with a dormant Packet Data session shall be able to establish,

receive, maintain, and or terminate a circuit service (voice or data) while maintaining the packet data session. A user with a circuit call shall be able to transition a simultaneous packet session between the dormant and active states as managed by the Radio Network (RN).

### Applicability to Telecommunications Services

C-PDS is a new telecommunications service and is independent of other telecommunications services such as voice and circuit data.

## 6.2.1 Normal Procedures With Successful Outcome

### Authorization

C-PDS may be generally available or may be provided after pre-arrangement with the wireless service provider. In addition, C-PDS may require subscription to a private or public PDN, independent of subscription to wireless service. This is done with existing Internet techniques. C-PDS has subscription options.

**Table 1.1a C-PDS Subscription Options**

Subscription Options		Values
Assured QoS Priority		Relative Level.
Non-Assured QoS Priority		Relative Level.
Packet/Circuit Service Support Level		Packet Data only.
		Packet Data or Circuit Service.
		Simultaneous Packet Data and Circuit Service.

### De-Authorization

C-PDS may be withdrawn at the subscriber's request or for administrative reasons.

### Registration

C-PDS shall be registered upon authorization. Included in the registration are QoS values that support the user's priority for both assured and non-assured services as selected by the user. All other QoS values defined in *IS-707* are negotiated over the air.

### De-Registration

C-PDS shall be de-registered upon de-authorization.

### Activation

C-PDS shall be activated upon authorization.

### De-Activation

---

C-PDS shall be de-activated upon de-authorization.

### Invocation

---

The MS user may invoke C-PDS at any time following successful registration with the wireless service provider and the preferred PDN. The appropriately authorized MS user shall be able to invoke:

- a. Packet Data Service,
- b. Circuit Service or Packet Data Service (i.e., non-simultaneous), or
- c. Simultaneous Circuit Service and Packet Data Service.

### Normal Operation With Successful Outcome

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The system should support the following:

- a. MS Originated C-PDS:  
A wireless user may originate a C-PDS at any time after being successfully registered with the wireless service provider and the preferred PDN.
- b. MS Terminated C-PDS:  
Data may be sent from the PDN to a wireless user at any time after registration with the wireless service provider and the PDN.
- c. Registration:  
Once a basic *TIA/EIA-41* registration is completed, the user shall originate a packet session and establish PPP and either Mobile IP or Simple IP.
- d. De-Registration:  
Users may de-register with the packet data network by closing their PPP session or, terminating their Mobile IP session by registering a lifetime of zero, independent of their registration on the *TIA/EIA-41* network.

### Call Detail Record

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Wireless service providers should record resource usage in call detail records for the Packet Data session. In addition, the PDN provider may generate a separate accounting for C-PDS resource usage.

## 6.2.2 Exception Procedures or Unsuccessful Outcome

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### Registration

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None identified.

### De-Registration

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None identified.

### Activation

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None identified.

### De-Activation

---

None identified.

### Invocation

---

Subscribers may not receive an indication that packet service is lost.

### Exceptions While Roaming

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Users shall only have access to services that are supported by the serving network.

### Exceptions During Intersystem Handoff

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If users are handed off to another network, they shall only receive their authorized packet services that are currently supported by the target network. If they are currently on a packet data session and the target system does not support packet data then the service would be lost. Simultaneous telecommunication services may not be supported by all systems. Mutually supported voice services should continue independent of packet service.

## 6.2.3 Alternate Procedures

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None identified.

## 6.2.4 Interactions With Other Wireless Services

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C-PDS is an independent bearer service. There may be some interaction with the voice or data bearer services depending upon the Base Station to Mobile Station radio link (air or  $U_m$  interface) used. Supplementary voice or data services may use the C-PDS bearer service to enhance their service offering.

Feature interaction with voice or data services is for further study.

# 1 NETWORK SERVICES

(TIA/EIA-664-803-1)

This section describes services used by the Radio Network (RN) and network operators. Subscribers may or may not be directly aware of the use of services that are independent of subscriber involvement.

The omitted existing text is retained without modification

## 1.3 C-PDS Network Perspective

(new for TIA/EIA-664-803-2)

C-PDS shall be supported with simultaneous voice or circuit bearer services. This implies that the network shall allow the user to establish, maintain, and or terminate a C-PDS session while maintaining a circuit call. The network shall allow the user with an active Packet Data session to establish, receive, maintain, and or terminate a circuit service (voice or data) while maintaining the Packet Data session. The network shall allow the user with a dormant Packet Data session to establish, receive, maintain, and or terminate a circuit service (voice or data) while maintaining the packet data session. The network shall support a circuit service while transiting between the dormant and active states as managed by the radio network.

C-PDS usage requires a wireless user to register with the Packet Data network. This is done either using the Mobile IP registration procedure or, in the case of Simple IP, Challenge Handshake Authentication Protocol (CHAP), Password Authentication Protocol (PAP) regular IP registration using the Point-to-Point Protocol (PPP). Re-registration is also required in case of Mobile IP when the wireless user moves out of one Packet Data Service Node (PDSN) service area to another. In addition, Packet Zone registration is required in order to keep track of the wireless user's current Packet Zone. Packet Zone registration is performed autonomously by the wireless MS and may be independent of the wireless network registration. All these registration procedures may require assignment of radio traffic channels to the wireless user. From the RN point of view there is no difference between a Packet Zone registration that requires assignment of a radio traffic channel and MS originated packet data transmission. In particular the Quality of Service (QoS) values shall be used to prioritize the request on the radio interface and interaction with other services shall be identified. The RN shall allow for QoS. The QoS subscription offering shall be used to prioritize the request in such areas as admission control, data burst allocation and MAC (Medium Access Control) state management.

The RN shall allow the user to de-register with the packet data network by closing the link layer connection and maintaining registration on the TIA/EIA-41 network.

The RN shall apply the existing TIA/EIA-41 MAP wireless authorization, subscription control and authentication operations. Serving systems may have the ability to register a MS with its HLR following hand-in from a neighboring system. This "registration after handoff" functionality shall apply in two cases:

- to mobile stations that have only a packet service option active at the time of handoff, and
- to mobile stations, which subsequent to the handoff, have all circuit services dropped while maintaining an active packet service option.

In this context, after handoff registration permits an earlier update of the location pointer in the MS' HLR for the purpose of more expeditious circuit mode service invocation subsequent to the handoff.

The RN shall deliver data to the MS when the MS is reachable. Whenever the MS is not reachable, the RN may buffer the data in order to deliver it when data delivery becomes possible or simply ignore the incoming data.

The RN shall allow movement of a wireless user in the Active State, with minimal delay or data loss. This includes the case where the MS is moving to an area served by a different BSC or MSC.

### Quality of Service (QoS) Priority

There are two subscription categories pertaining to Packet Data; Non Assured Mode - QoS and Assured Mode - QoS. Both categories support a form of QoS Priority with 16-levels, including 2-reserved levels. These values indicate a relative priority level, sequentially arranged low to high. These QoS Priority values shall be passed over the network, all other C-PDS QoS values shall be negotiated between the MS and the BS.

### Call Detail Record

The wireless service provider may record the following data elements in the Call Detail Record (CDR):

- a. Subscribed Quality of Service.
- b. Packet Data Service Option.
- c. Start and end time.
- d. Mobile Station Identity (IMSI, MIN, ESN).
- e. Serving BS and or MSC ID.
- f. MS originated or terminated indicator.
- g. Active connection time (in seconds).
- h. Packet Zone ID (initial Zone on call setup).

See *TIA/EIA-124* for the specific information to be included for data elements.

In addition, the Packet Data Service Provider may generate separate records for resource usage. Packet Data accounting does not use CDRs generated by the wireless network. Instead the PDSN shall collect accounting information and send it to the AAA function in the Packet Data network.

## Applicability to Telecommunications Services

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Packet Data Service is a new telecommunications service and is independent of other telecommunications services such as voice and circuit data.

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## 4. ***TIA/EIA-41-D Chapter 1*** **“Functional Overview” Modifications**

### **4 SYMBOLS AND ABBREVIATIONS**

(*TIA/EIA-41-D Chapter 1, page 1-14*)

ADD SERV	AddService INVOKE
addserv	AddService RETURN RESULT
AST	Add Service Timer
c2KHINVID	cdma2000HandoffInvokeIOSData parameter
c2KHRSPID	cdma2000HandoffResponseIOSData parameter
C-PDS	CDMA Packet Data Service
CDMAMSMCI	CDMAMSMMeasuredChannelIdentity parameter
DROP SERV	DropService INVOKE
dropserv	DropService RETURN RESULT
DST	Drop Service Timer
PDSN	PacketDataServingNode
PDSNADDR	PDSNAddress parameter
PDSNPTYPE	PDSNProtocolType parameter
QoS	Quality of Service
QoSPRI	QoS Priority parameter

## 5. TIA/EIA-41-D Chapter 3 “Automatic Roaming Information Flows” Modifications

### 8.x CDMA Packet Data Service (C-PDS)

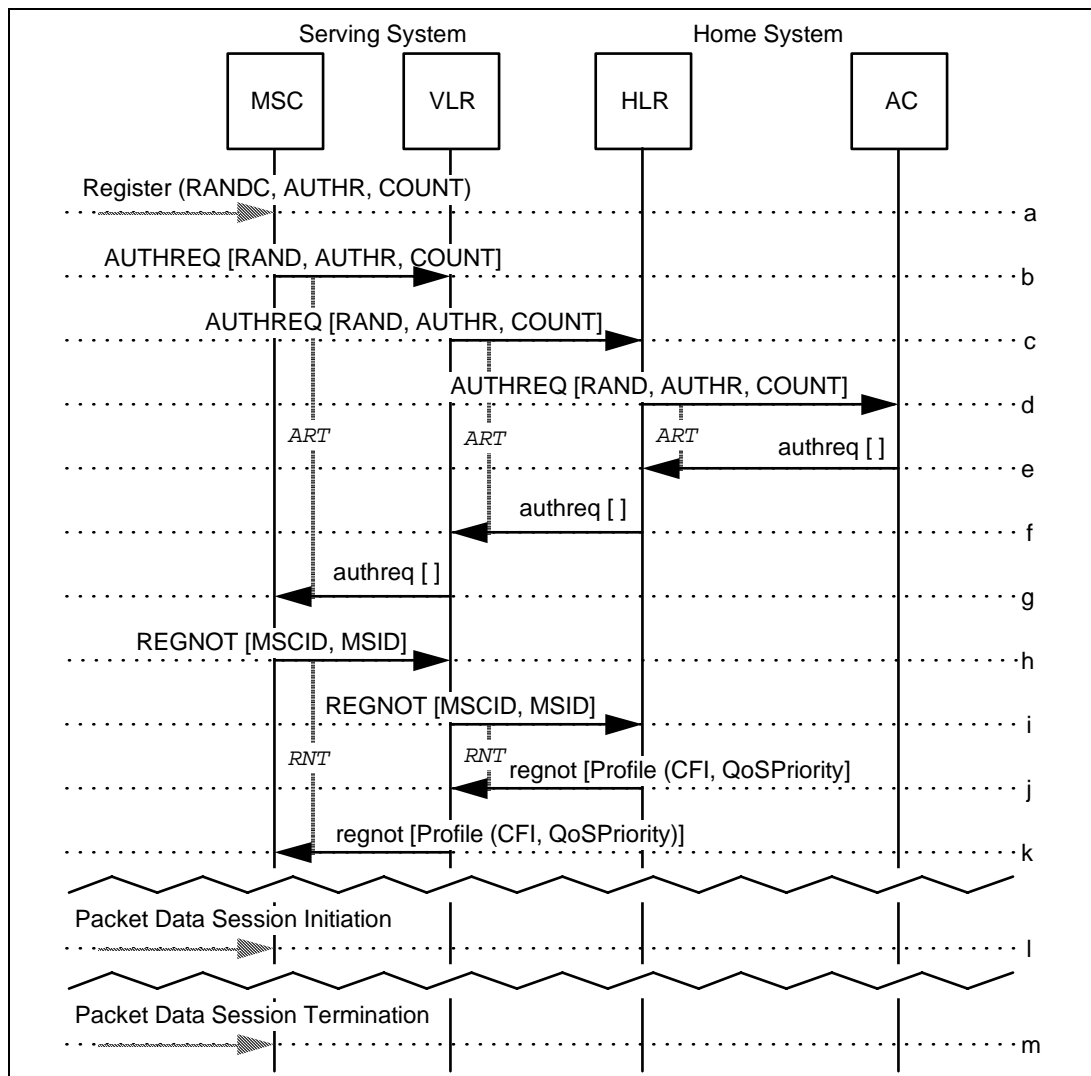
(new for TIA/EIA-41-D Chapter 3)

This section illustrates some typical scenarios related to CDMA Packet Data Service (C-PDS) operations.

#### 8.x.1 C-PDS Invocation from an Idle MS

(new for TIA/EIA-41-D Chapter 3)

This scenario shows registration with the wireless service provider when a packet capable MS first requests service in the system. It applies to both initial power up and dormant mode handoff of an idle MS.



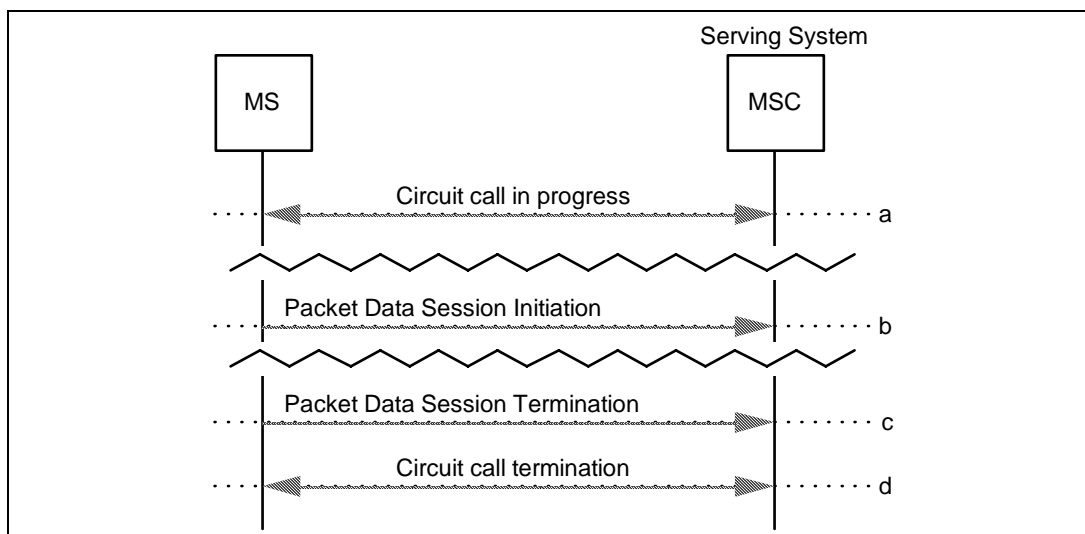
**Figure 8.x.1 C-PDS Invocation from an Idle MS**

- a. The MS requests registration at the Serving MSC, providing AUTHR and RANDC.
- b. The Serving MSC verifies RANDC and sends the appropriate value of RAND in an AUTHREQ to the VLR.
- c. The VLR has no record for the subscriber so it sends an AUTHREQ to the HLR including all received parameters.
- d. The HLR forwards the AUTHREQ to the AC. The AC executes CAVE to produce AUTHR. The AC verifies the AUTHR received from the MS matches its CAVE result.
- e. The AC sends an authreq to the HLR including encryption information.
- f. The HLR forwards the authreq to the VLR.
- g. The VLR forwards the authreq to the Serving MSC.
- h. The Serving MSC sends a REGNOT to the VLR to register the MS.
- i. The VLR forwards the REGNOT to the HLR.
- j. The HLR sends a regnot to the VLR with the subscriber profile including packet authorization and the QoSPriority parameter.
- k. The VLR forwards the regnot to the Serving MSC.
- l. The MS notifies the Serving MSC when a packet data session is initiated.
- m. The MS notifies the Serving MSC when the packet data session is terminated.

## 8.x.2 C-PDS Invocation During an Active Circuit Call

(new for TIA/EIA-41-D Chapter 3)

This scenario shows a packet data session initiated during an active voice call when handoff is not involved. The Serving System is notified of the start and end of the packet data session but no additional intersystem signaling is required.



**Figure 8.x.2 C-PDS Invocation During an Active Circuit Call**

- The MS is engaged in an active circuit switched call.
- The MS notifies the Serving MSC when a packet data session is initiated.
- The MS notifies the Serving MSC when the packet data session is terminated.
- The circuit switched call terminates normally.

8.x.3 C-PDS Invocation After Handoff

(new for TIA/EIA-41-D Chapter 3)

This scenario illustrates the initiation of a packet data session after a circuit call has been handed off.

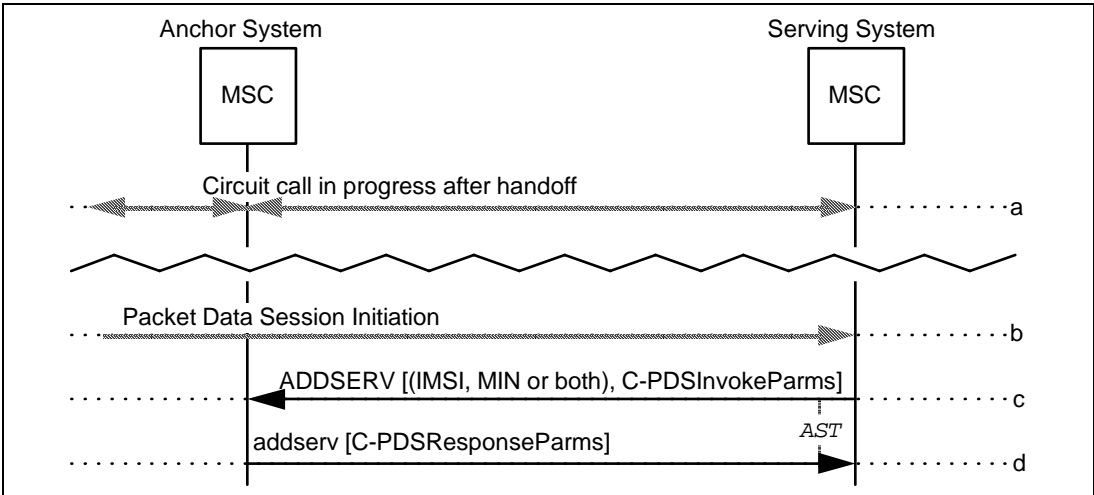


Figure 8.x.3 C-PDS Invocation After Handoff

- a. The MS is engaged in an active circuit switched call after a handoff has occurred.
- b. The MS notifies the Serving MSC when a packet data session is initiated.
- c. The Serving MSC sends an ADDSEV to the Anchor MSC requesting authorization for the packet data service.

Parameters	Usage	Type
C-PDSInvokeParms	CDMA Packet Data invoke operation parameters, as:	
[CDMAConnectionReferenceList]	Include to identify the requested packet data service and associated service option to Service Option Connection Identifier (SOCI) value(s).	R
[CDMAServiceOptionList]	Include to identify the requested service's additional service information.	O

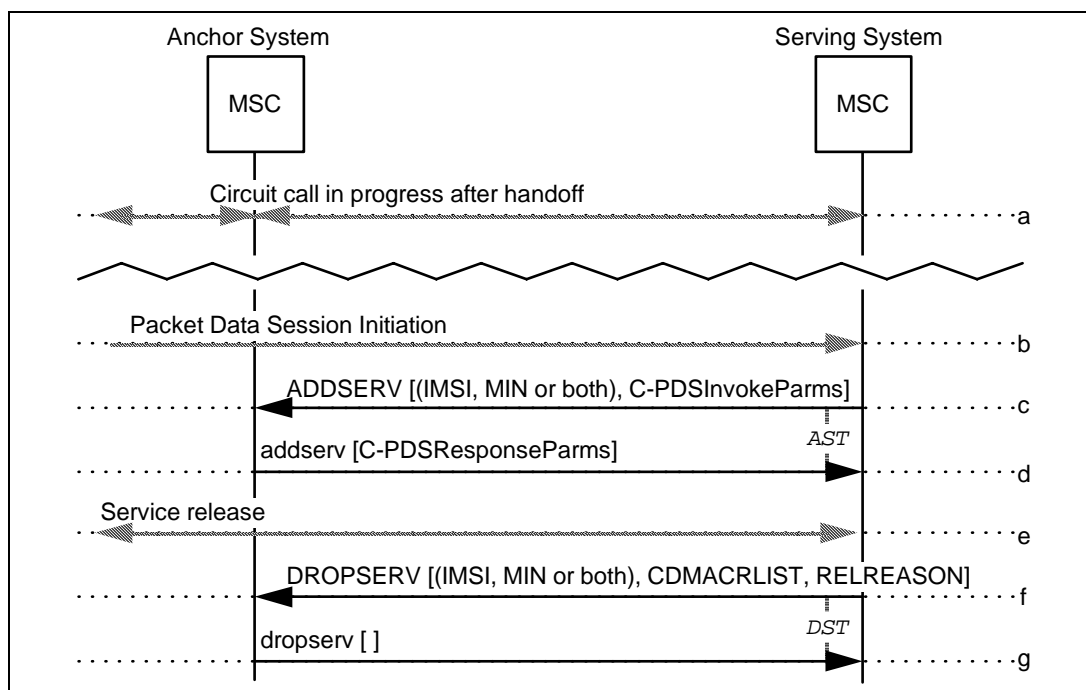
- d. The Anchor MSC authorizes the packet data session initiation, assigns necessary facilities, and returns an `addserv`. The `CDMAConnectionReferenceList` indicates the granted service.

Parameters	Usage	Type
C-PDSResponseParms	CDMA Packet Data response operation parameters, as:	
[CDMAConnectionReferenceList]	Include to identify the granted Packet Data Service and associated service option to Service Option Connection Identifier (SOC) value(s).	R
[CDMAServiceOptionList]	Include to identify the granted service's additional service information.	O
[QoSPriority]	Include to indicate priority information for radio interface Quality of Service.	R

#### 8.x.4 Post Handoff Recovery on Unsuccessful Packet Data Session Initiation

(new for TIA/EIA-41-D Chapter 3)

This scenario illustrates system recovery and clean up when a user attempts to initiate a packet data session after a circuit call has been handed off and the packet data session is not established.



**Figure 8.x.4 Post Handoff Recovery on Unsuccessful Packet Data Session Initiation**

- a-d Same as Section 8.x.3, Steps a-d.
- e. In this scenario, a Service Release is received from the BSC indicating the requested packet data session was not established, the SOC value of the requested service is included in the Service Release.

- f. The Serving MSC sends a DROPSEV to the Anchor MSC indicating the packet service identified in the CDMACRLIST parameter has ended.

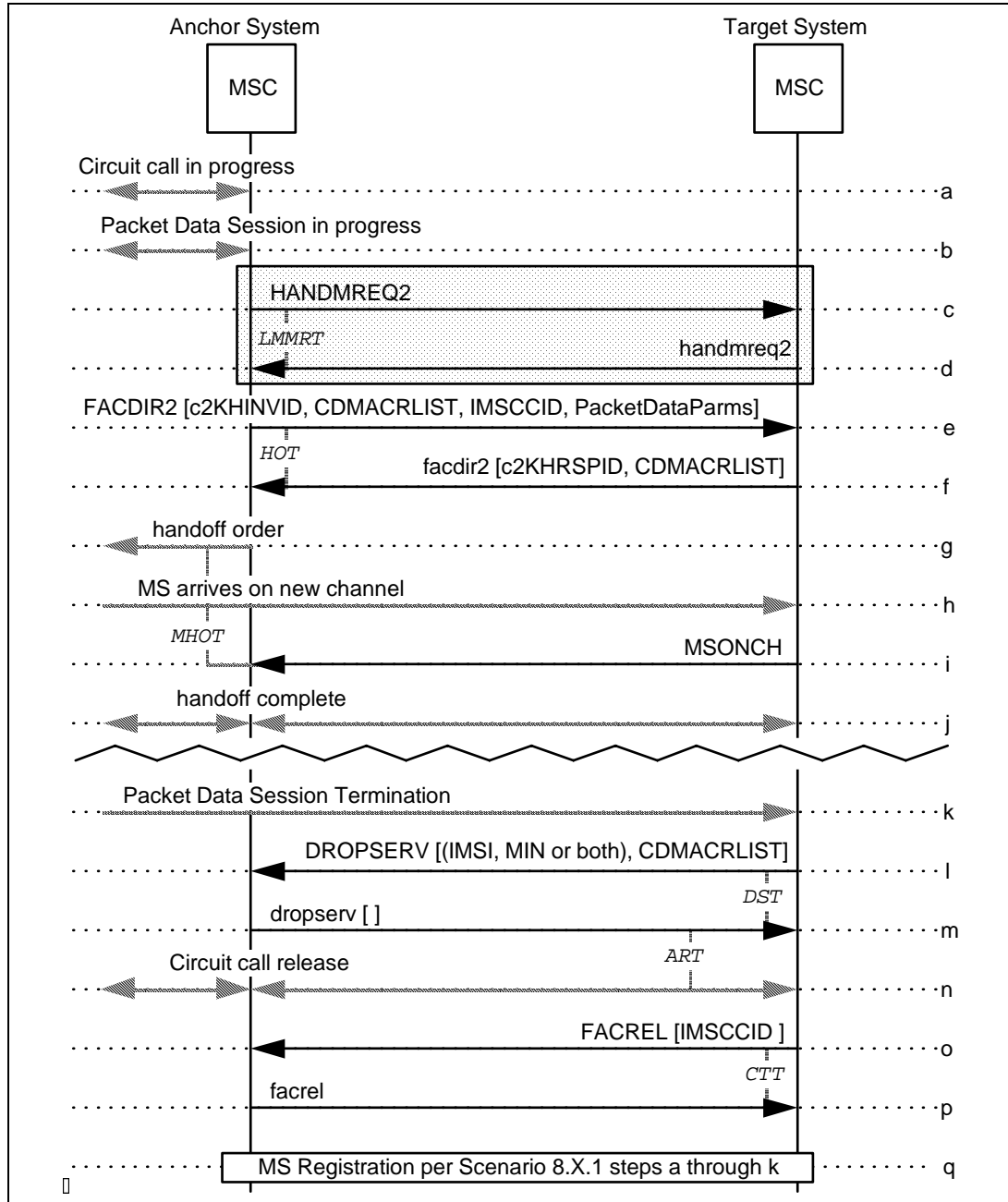
Parameters	Usage	Type
IMSI	Served MS's IMSI, include if available.	O
MIN	Served MS's MIN, include if available.	O
CDMAConnectionReferenceList	Include to identify the service(s) to be released, associated service option, and Service Option Connection Identifier (SOI) values(s).	R
ReleaseReason	Include to indicate the reason for releasing the service(s).	R

- g. The Anchor MSC acknowledges the packet data session termination by returning a dropserv. Both MSCs release any remaining resources for the packet data session.

## 8.x.5 Simultaneous Circuit and C-PDS Handoff - Packet Releases First

(new for TIA/EIA-41-D Chapter 3)

This scenario illustrates hard handoff when both a circuit call and packet data session are active. In this scenario, the packet data session ends before the circuit call.



**Figure 8.x.5 Simultaneous Circuit and C-PDS Handoff - Packet Releases First**

a. The MS is engaged in an active circuit switched call.



- b. The MS is also engaged in an active packet data session.
- c. The Anchor MSC elects, based on its internal algorithm, to determine if a handoff to an adjacent candidate MSC is appropriate. The Anchor MSC may send a HANDMREQ2 to the candidate MSC (the Anchor MSC may send several handoff measurement requests to different candidate Target MSCs).
- d. The candidate Target MSC performs location measurements in accordance with the MSC's internal algorithm and returns the results to the Anchor MSC in a handmreq2.
- e. The Anchor MSC determines that the MS should be handed off to the candidate (now Target) MSC and that the Target MSC is not already on the call path. It sends a FACDIR2 to the Target MSC, directing the Target MSC to initiate a Handoff-Forward task. If the Anchor MSC counts tandem segments, then increment the Segment Counter by one in the BillingID parameter.

Parameters	Usage	Type
CDMA2000HandoffInvoke IOData	Include to indicate the desired services (both circuit and packet).	R
CDMAConnectionReferenc eList	Include to identify the circuit and packet data services and associated service options to Service Option Connection Identifier (SOCI) value(s) for the services involved in the handoff.	R
InterMSCCircuitID	Include to identify the circuit required for voice service.	R
PacketDataParms	CDMA Packet Data operation parameters, as:	
[PDSNAddress]	Include to identify the address of the PDSN currently connected to the PCF.	R
[PDSNProtocolType]	Include to identify the Link Layer protocol used at the MS and the PDSN.	R
[QoSPriority]	Include to indicate priority information for radio interface Quality of Service.	R

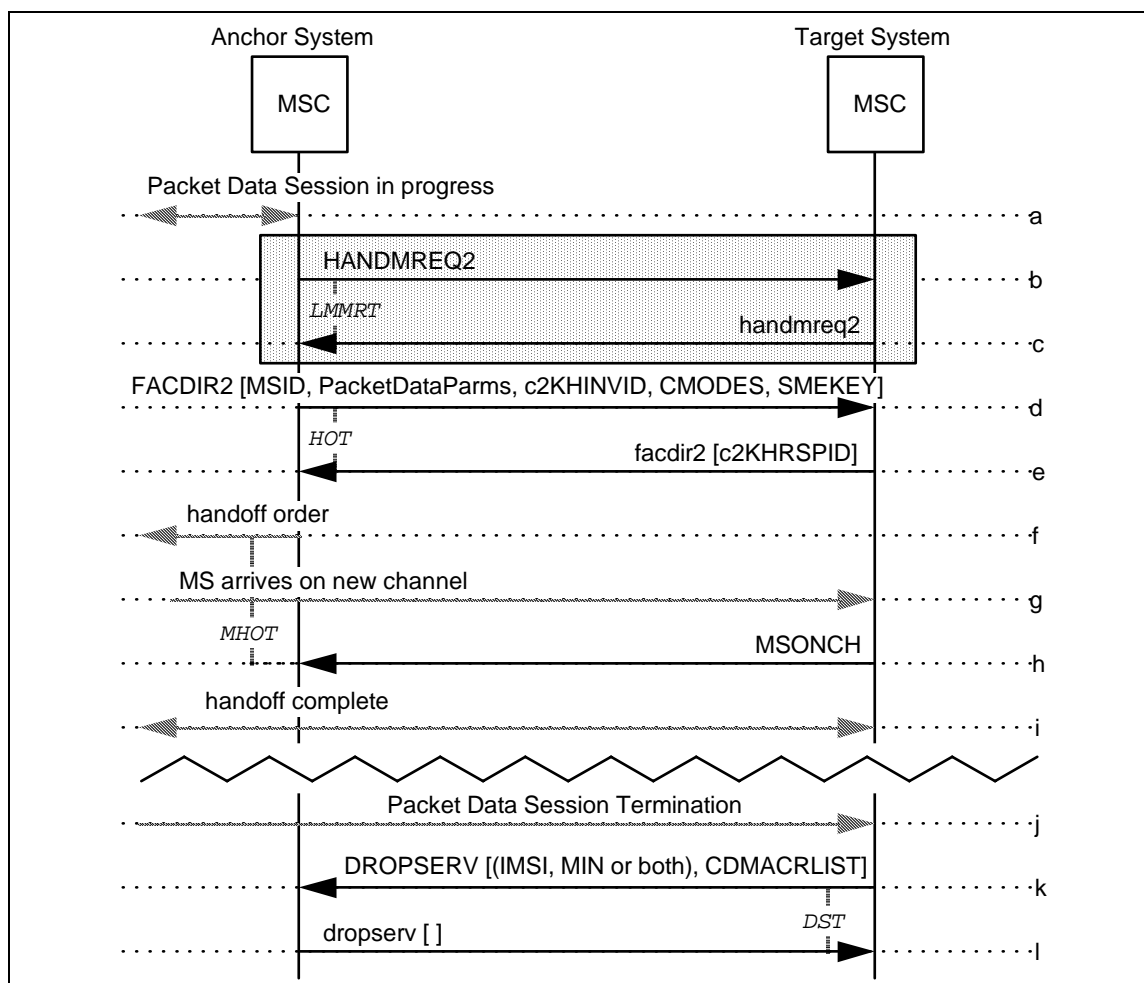
- f. The necessary facilities are available on the designated target cell; therefore, the Target MSC increases the Segment Counter in the received BillingID parameter by one and uses the new BillingID for the new call segment. The Target MSC returns a facdir2 to the requesting MSC including the CDMACRLIST parameter to identify the list of Service Option Connection Identifier (SOCI) values that can be supported and initiates a Handoff-Forward task.
- g. On receipt of the facdir2, the Anchor MSC sends a Mobile Handoff Order to the MS.
- h. The MS is received on the designated target channel.
- i. The Target MSC sends a MSONCH to the Anchor MSC, informing the requesting system that the Target MSC has successfully completed the Handoff-Forward task. Since both circuit and packet data services were specified in the cdma2000HandoffInvokeIOSData parameter, the Target MSC establishes a circuit between the target channel and the Anchor MSC.

- j. The Anchor MSC, on receipt of the MSONCH, completes the handoff process. The InterMSC trunk should be connected at this time if it has not already been connected.
- k. The MS notifies the Target (new Serving) MSC when the packet service in the CDMACRLIST parameter is terminated.
- l. The Target (new Serving) MSC sends a DROPSEV to the Anchor MSC indicating the packet service in the CDMACRLIST parameter has been terminated.
- m. The Anchor MSC acknowledges the packet data session termination by returning a dropserv. Both MSCs release any remaining resources for the packet data session.
- n. The circuit call is released.
- o. The Target (new Serving) MSC determines the inter-MSC trunk used for the call should be released and no other services are active for the MS; therefore, it sends a FACREL to the Anchor MSC. The last Segment Counter is sent to the Anchor MSC in the BillingID parameter.
- p. The Anchor MSC marks the inter-MSC trunk as idle and returns a facrel to the Target (new Serving) MSC.
- q. The MS registers in the new system.

#### 8.x.6 Successful Intersystem Hard Handoff of an Active Packet Data Session

(new for TIA/EIA-41-D Chapter 3)

This scenario describes successful intersystem hard handoff of an active packet session. The MS is authentication capable and has been authenticated for access within the Anchor System. No circuit call is in progress for the MS at the time of the handoff. This scenario applies when either the Target System does not support optional registration after handoff or when such a registration fails.



**Figure 8.x.6 Successful Intersystem Hard Handoff of an Active Packet Data Session**

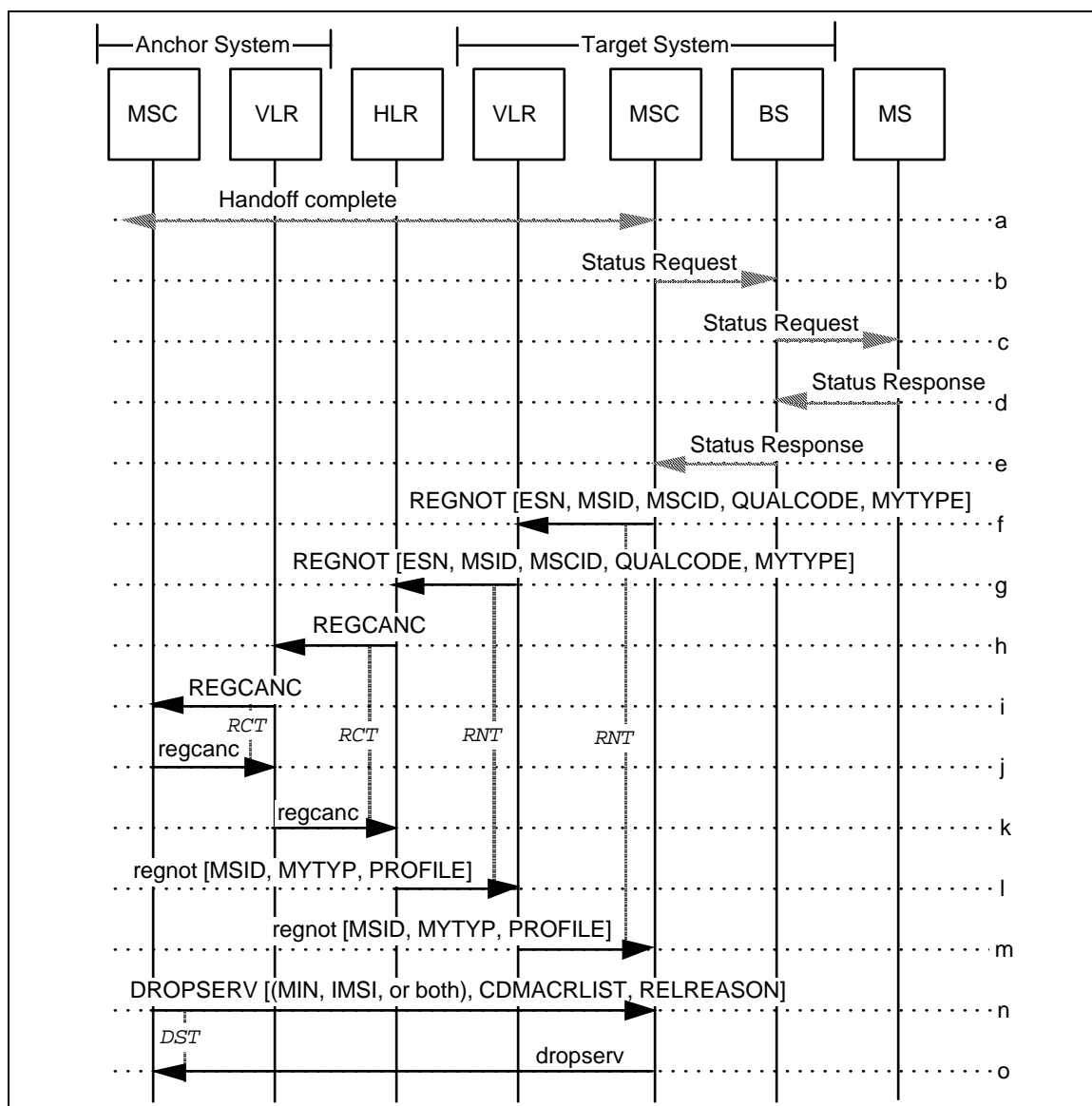
- a. An active packet data session involving the served MS is in progress.
- b. Based on its internal algorithm, the Anchor MSC determines if a handoff to an adjacent candidate MSC is appropriate. The Anchor MSC may send a HANDMREQ2 to the candidate Target MSC (the Anchor MSC may send several handoff measurement requests to different candidate Target MSCs).
- c. The candidate Target MSC performs location measurements in accordance with the MSC's internal algorithm and returns the results to the Anchor MSC in a handmreq2.
- d. The Anchor MSC determines that the MS should be handed off to the Target MSC. It sends a FACDIR2 to the Target MSC, directing the Target MSC to allocate radio resources for the MS to support the active packet data session. The session is identified to the Target MSC by the MSID parameter (no intersystem circuit is utilized between the Anchor and the Target MSC for the handoff). QoSPriority and other packet data-related parameters are transferred to the Target MSC in the FACDIR2. The Anchor MSC also includes the SignalingMessageEncryptionKey and ConfidentialityModes parameters in the FACDIR2.

- e. The Target MSC allocates the requested radio resources per the received QoS values. The Target MSC then returns a *facdir2* to the requesting Anchor MSC.
- f. On receipt of the *facdir2*, the Anchor MSC sends a handoff order to the served MS.
- g. The MS tunes to the designated traffic channel.
- h. When the MS is received on the designated traffic channel, the Target MSC sends a *MSONCH* to the requesting Anchor MSC, informing the requesting Anchor MSC that the handoff has been successfully performed.
- i. The Anchor MSC, upon receipt of the *MSONCH*, completes the handoff process. Since only packet data service is in use, no intersystem circuit is used.  
In parallel with Steps 'i' and following, connectivity to the Packet Data Network is established and packet data service continues.
- j. The MS notifies the Target (new Serving) MSC when the packet session is terminated.
- k. The Target (new Serving) MSC sends a *DROPSERV* to the Anchor (previous Serving) MSC indicating the packet session has ended.
- l. The Anchor (previous Serving) MSC acknowledges the session termination by returning a *dropserv*. Both MSCs release any remaining resources for the session.

### 8.x.7 Successful Intersystem Hard Handoff of an Active Packet Data Session with Re-Registration

(new for *TIA/EIA-41-D* Chapter 3)

This scenario describes successful intersystem hard handoff of an active packet session. The MS is authentication capable and has been authenticated for access within the Anchor System. No circuit call is in progress for the MS at the time of the handoff. In this scenario the Target MSC uses the optional re-registration functionality to register the MS with the HLR immediately following the successful completion of the handoff.



**Figure 8.x.7 Successful Intersystem Hard Handoff of an Active Packet Data Session with Re-Registration**

- The Anchor MSC completes the handoff, as it is for packet data, no intersystem circuit is used.
  - The Target MSC initiates a Status Request message to the Base Station (BS) to request specific MS information (e.g., Slot Cycle index for usage in communication between the MSC and the MS).
- Steps b-e may be done in parallel with Steps f-m.
- The Target BS sends a Status Request message to the MS to request MS specific information.
  - The MS returns the requested specific information to the Target BS via a Status Response message.
  - The Target BS forwards to the Target MSC the received Status Response message containing the requested MS specific information.

- f. The Target (now Serving) MSC determines that no concurrent services exist, the Target (now Serving) MSC initiates the registration process by sending a REGNOT to the Target (now Serving) VLR.
- g-m. The Registration and Registration Cancellation processes occur as described in Section 5.1.1 "Initial MS Registration in a New Serving System".
- n. The Anchor MSC sends a DROPSEV towards the Serving MSC to release all resources associated with the packet data session in the Anchor MSC and the handoff chain. The ReleaseReason parameter is set to value *Anchor MSC was removed from the packet data session*.
- o. The Serving MSC acknowledges with a dropserv. All resources in the handoff chain have been cleared. The packet data session remains active at the Serving MSC.

### 8.x.8 Successful Intersystem Hard Handoff of an Active packet Data Session – Authentication Failure Prior to After-Handoff Registration

(new for TIA/EIA-41-D Chapter 3)

This scenario describes successful intersystem hard handoff of an active packet session. No circuit call is in progress for the MS at the time of the handoff. In this scenario the Target MSC uses the optional re-registration functionality to register the MS with the HLR immediately following the successful completion of the handoff. Prior to registration, authentication is attempted because positive indication that the MS was authenticated for access in the previous Serving MSC was not received. The authentication attempt results in failure; thus, the MS is immediately released from the traffic channel and the Target MSC notifies the previous Serving MSC of the termination of the packet session.



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*EIA-41-D*, scenario 5.4.4, steps c-p. The authentication attempt results in failure, as indicated by the presence of the DenyAccess parameter in the asreport.

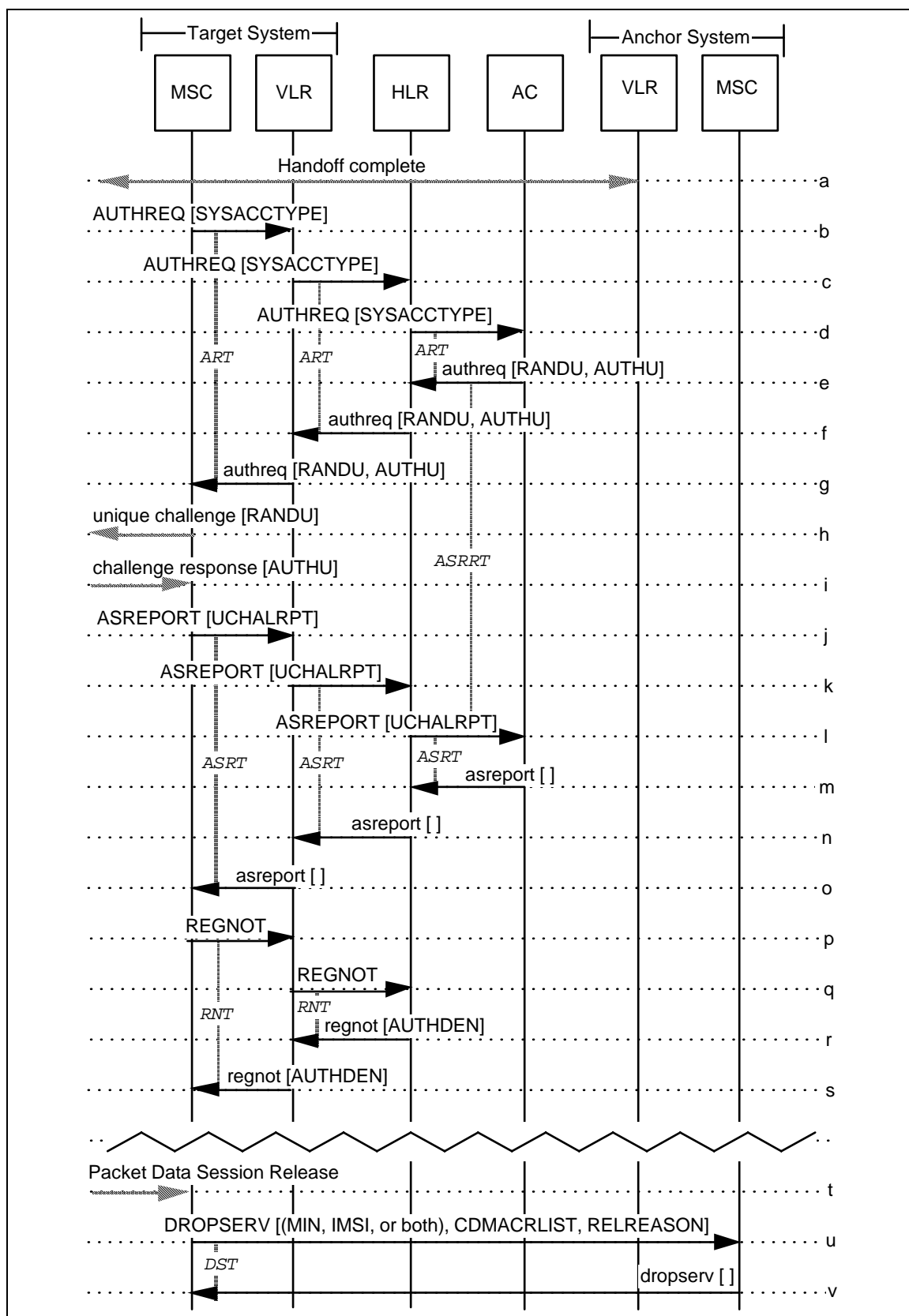
- p. The Target (new Serving) MSC immediately releases the MS from the traffic channel.
- q. The Target (new Serving) MSC sends a DROPSERV to the Anchor (previous Serving) MSC indicating the packet session has been terminated (the ReleaseReason parameter is set to value *SessionOverClearBackward*).
- r. The Anchor (previous Serving) MSC acknowledges the session termination by returning a dropserv. Both MSCs release any remaining resources for the session.



### 8.x.9 Successful Intersystem Hard Handoff of an Active packet Data Session – Registration Failure After Handoff

(new for TIA/EIA-41-D Chapter 3)

This scenario describes successful intersystem hard handoff of an active packet session. No circuit call is in progress for the MS at the time of the handoff. In this scenario the Target MSC uses the optional re-registration functionality to register the MS with the HLR immediately following the successful completion of the handoff. Prior to registration, authentication is attempted because positive indication that the MS was authenticated for access in the previous Serving MSC was not received. The attempt to authenticate is successful, but the after-handoff registration results in failure; thus, the signaling relationship between the previous Serving (“Anchor”) MSC and the Target MSC is maintained for the duration of the packet session.



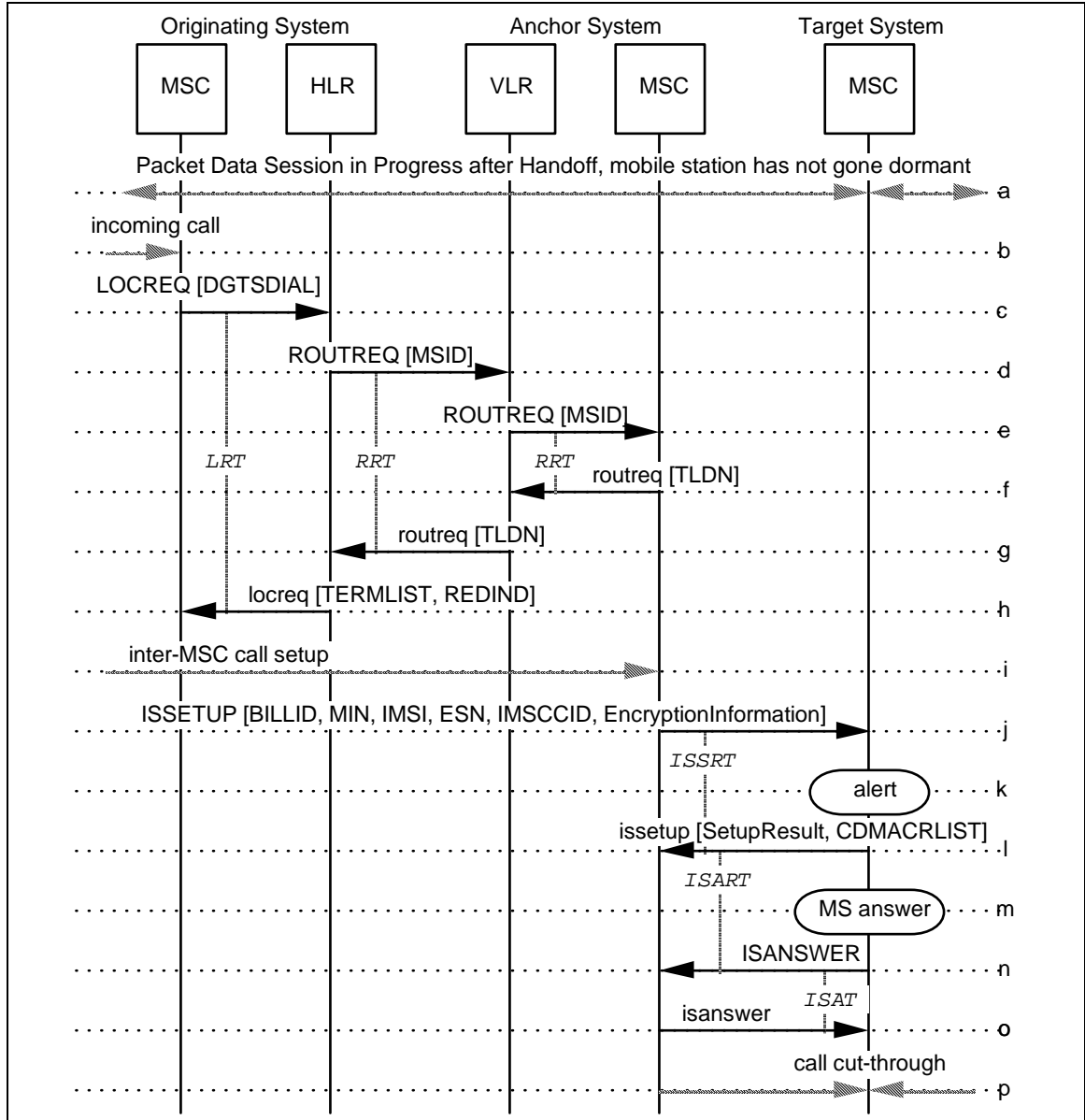
**Figure 8.x.9 Successful Intersystem Hard Handoff of an Active packet Data Session – Registration Failure After Handoff**

- a. The intersystem handoff is completed; as the handoff is of packet data only, no intersystem circuit is used.
- b-o. The target MSC determines that no concurrent services exist. Per provisioning, the Target MSC initiates the after-handoff registration functionality. First, authentication is attempted because positive indication that the MS was authenticated for access in the previous Serving MSC was not received (i.e., SMEKEY was absent from the FACDIR2). Same as *TIA-EIA-41-D*, scenario 5.4.4, steps c-p.
- p-s. The target MSC initiates HLR registration on behalf of the MS. The registration attempt results in failure, as indicated by the presence of the AUTHDEN parameter in the regnot. Same as *TIA-EIA-41-D*, scenario 4.26.3, steps a-d. The packet session continues to be supported through the handoff chain.
- t. Some time later, the MS notifies the Target (new Serving) MSC when the packet session is terminated.
- u. The Target (new Serving) MSC sends a DROPSEV to the Anchor (previous Serving) MSC indicating the packet session has ended (the ReleaseReason parameter is set to value *SessionOverClearBackward*).
- v. The Anchor (previous Serving) MSC acknowledges the session termination by returning a dropserv. Both MSCs release any remaining resources for the session.

## 8.x.10 C-PDS Hard Handoff with Subsequent Circuit Termination

(new for TIA/EIA-41-D Chapter 3)

This scenario illustrates a hard handoff of packet data services when no circuit call is involved. As soon as the MS goes idle (e.g., packet data session termination), the MS would autonomously register in the new system per scenario 8.x.1. This scenario applies when either the Target (now Serving) System does not support optional registration after handoff or when such registration fails.



**Figure 8.x.10 C-PDS Hard Handoff with Subsequent Circuit Termination**

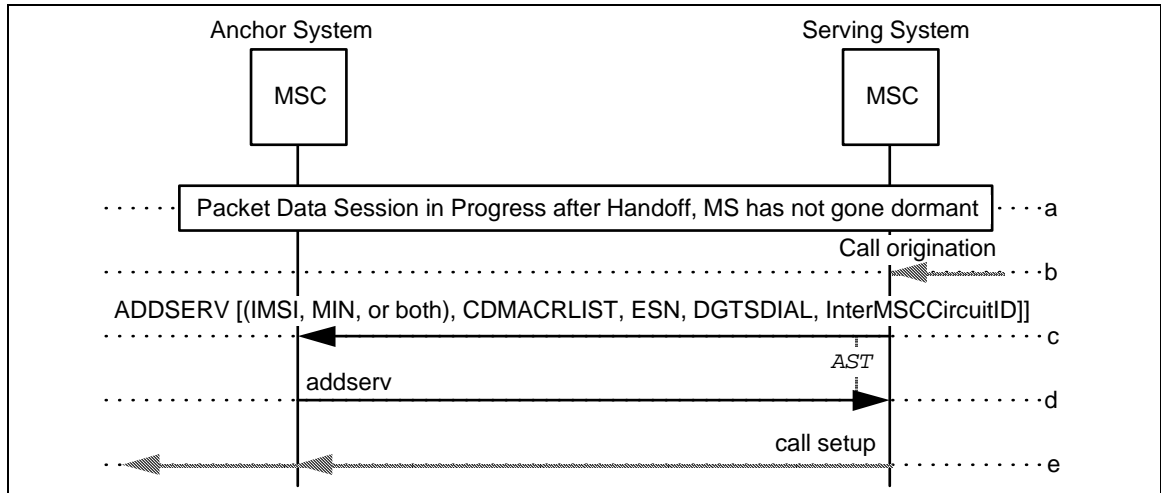
- a. The MS is engaged in an active packet data session. The MS has handed off to another system and is still registered at the Anchor MSC.
- b. An incoming circuit call arrives for the MS at the Originating MSC.

- c. The Originating MSC sends a LOCREQ to the HLR to request routing information for the MS.
- d. The HLR sends a ROUTREQ to the VLR where the MS is registered, requesting routing information.
- e. The VLR forwards the ROUTREQ to the Anchor MSC.
- f. The Anchor MSC assigns a TLDN for the MS, and returns the routing information to the VLR in a routreq.
- g. The VLR forwards the routreq to the HLR.
- h. The HLR sends the routing information to the Originating MSC in a locreq.
- i. The Originating MSC sets up the call to the Anchor MSC.
- j. The Anchor MSC sends an ISSETUP to the Target (now Serving) MSC to perform call setup actions. The ISSETUP contains the circuit ID of the intersystem trunk facility.
- k. The Target (now Serving) MSC connects the path and alerts the MS.
- l. The Target (now Serving) MSC sends an issetup to the Anchor MSC.
- m. The MS answers the alert.
- n. The Target (now Serving) MSC sends an ISANSWER to the Anchor MSC.
- o. The Anchor MSC send an isanswer to the Target (now Serving) MSC.
- p. The call is cut through to the MS.

### 8.x.11 C-PDS Hard Handoff with Subsequent Circuit Origination

(new for TIA/EIA-41-D Chapter 3)

This scenario illustrates a hard handoff of packet data services when no circuit call is involved. In this scenario, the subscriber initiates a circuit call after the handoff. This scenario applies when either the Serving System does not support optional registration after handoff or when such registration fails.



**Figure 8.x.11 C-PDS Hard Handoff with Subsequent Circuit Origination**

- a. The MS is engaged in an active packet data session. The MS has handed off to another system and is still registered at the Anchor MSC.
- b. The MS originates a call.
- c. The Serving MSC sends an ADDSERV to the Anchor MSC requesting the establishment of a circuit for the outgoing call.

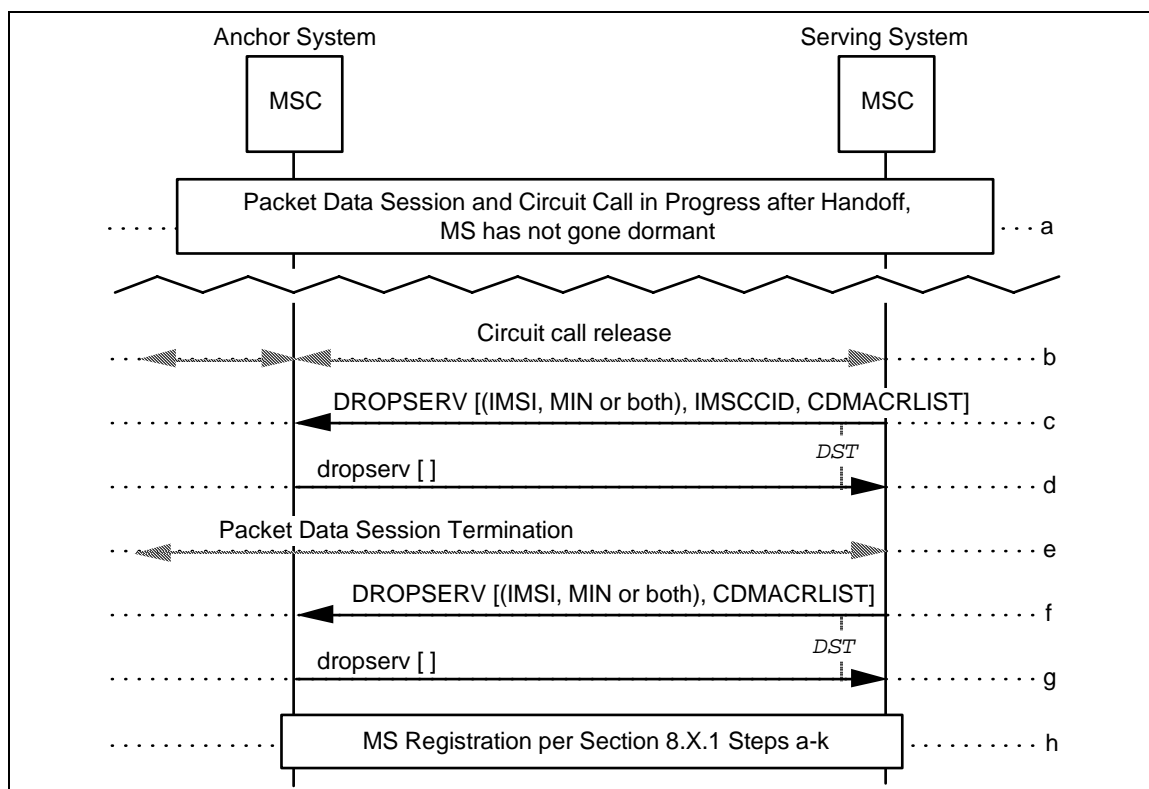
Parameters	Usage	Type
IMSI	Served MS IMSI, include if available.	O
MIN	Served MS MIN, include if available.	O
ESN	Served MS ESN.	R
CDMACRLIST	Include to identify the granted services, the associated service options, and the Service Option Connection Identifier (SOIC) value(s).	R
DigitsDialed	Include the user specified digits that identify the service being requested.	R
InterMSCCircuitID	This parameter specifies the trunk for the service.	R

- d. The Anchor MSC authorizes the call, which may include authentication if the MS supports authentication, allocates the appropriate resources, and connects the appropriate facilities. The Anchor MSC then sends an addserv to the Serving MSC acknowledging the origination attempt.
- e. The Serving MSC sets up the call to the Anchor MSC. The Anchor MSC extends the call toward the dialed digits.

## 8.x.12 Simultaneous Circuit and C-PDS Handoff - Voice Releases First

(new for TIA/EIA-41-D Chapter 3)

This scenario illustrates hard handoff when both a circuit call and packet data session are active. In this scenario, the circuit call ends before the packet data session. This scenario applies when either the Serving System does not support optional registration after handoff or when such registration fails.



**Figure 8.x.12 Simultaneous Circuit and C-PDS Handoff - Voice Releases First**

- a. The MS is engaged in an active packet data session and an active circuit call. The MS has handed off to another system.
- b. The circuit call is released.
- c. The Serving MSC determines the inter-MSC trunk used for the call should be released while maintaining the signaling association for the packet data session; therefore, it sends a DROPSERV to the Anchor MSC. The CDMAConnectionReferenceList parameter indicates the voice service should be dropped. The InterMSCCircuitID parameter identifies the circuit to be released. The last Segment Counter is sent to the Anchor MSC in the BillingID parameter.
- d. The Anchor MSC marks the inter-MSC trunk as idle and returns a dropserv to the Serving MSC.
- e. The MS notifies the Serving MSC when the packet data session is terminated.

- f. The Serving MSC sends a DROPSERV to the Anchor MSC. The CDMAConnectionReferenceList parameter indicates the packet data session has been terminated.
- g. The Anchor MSC acknowledges the packet data session termination by returning a dropserv. Both MSCs release any remaining resources for the packet data session.
- h. The MS registers in the new Serving System.

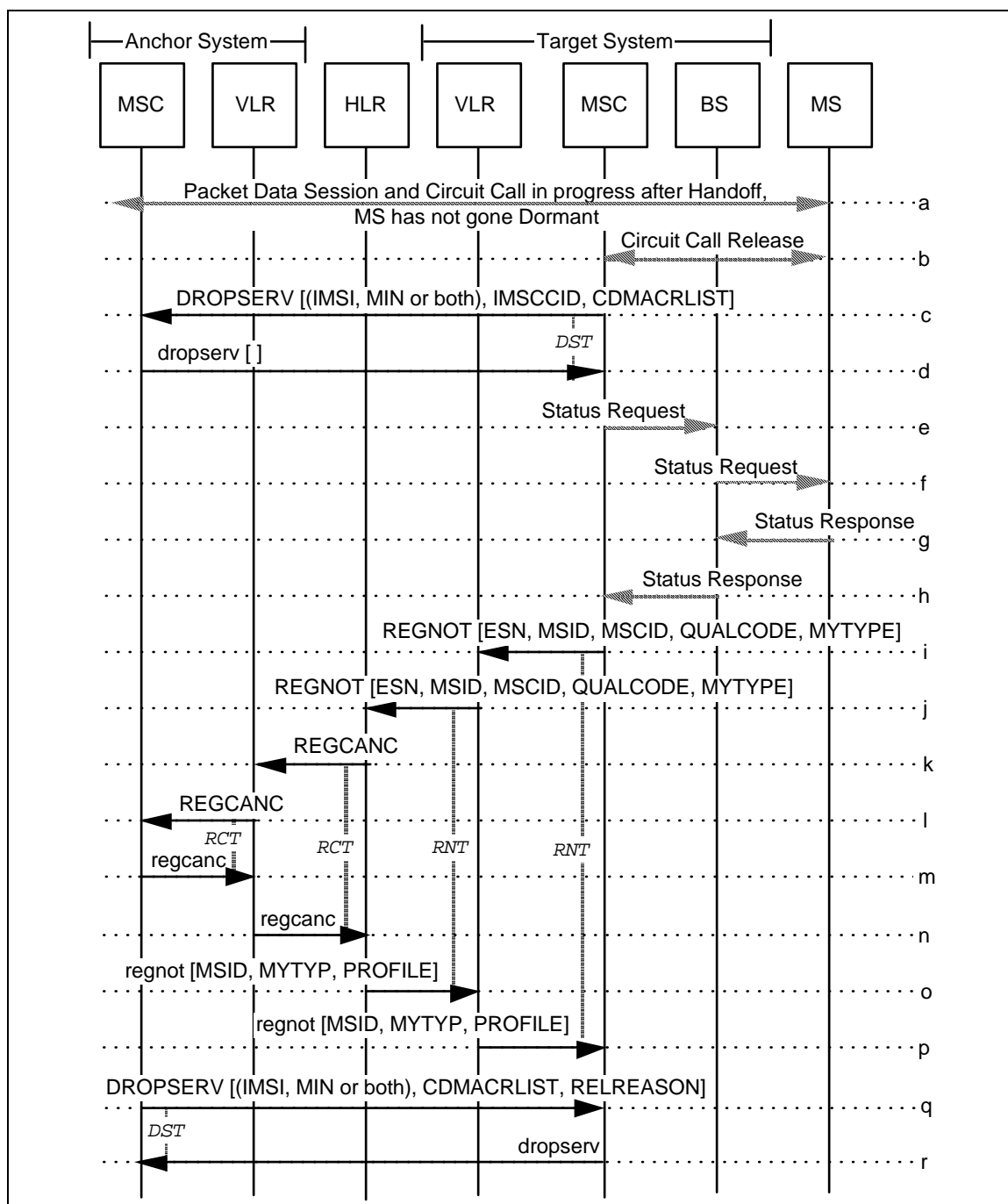
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### 8.x.13 Simultaneous Circuit and C-PDS Handoff - Voice Releases First - With Re-Registration

(new for TIA/EIA-41-D Chapter 3)

This scenario illustrates hard handoff with concurrent services active (e.g., a circuit call and a packet data session). In this scenario, the circuit call ends before the packet data session. In this scenario the Target (now Serving) System uses the optional re-registration functionality to register the MS with the HLR immediately following the successful completion of the handoff.



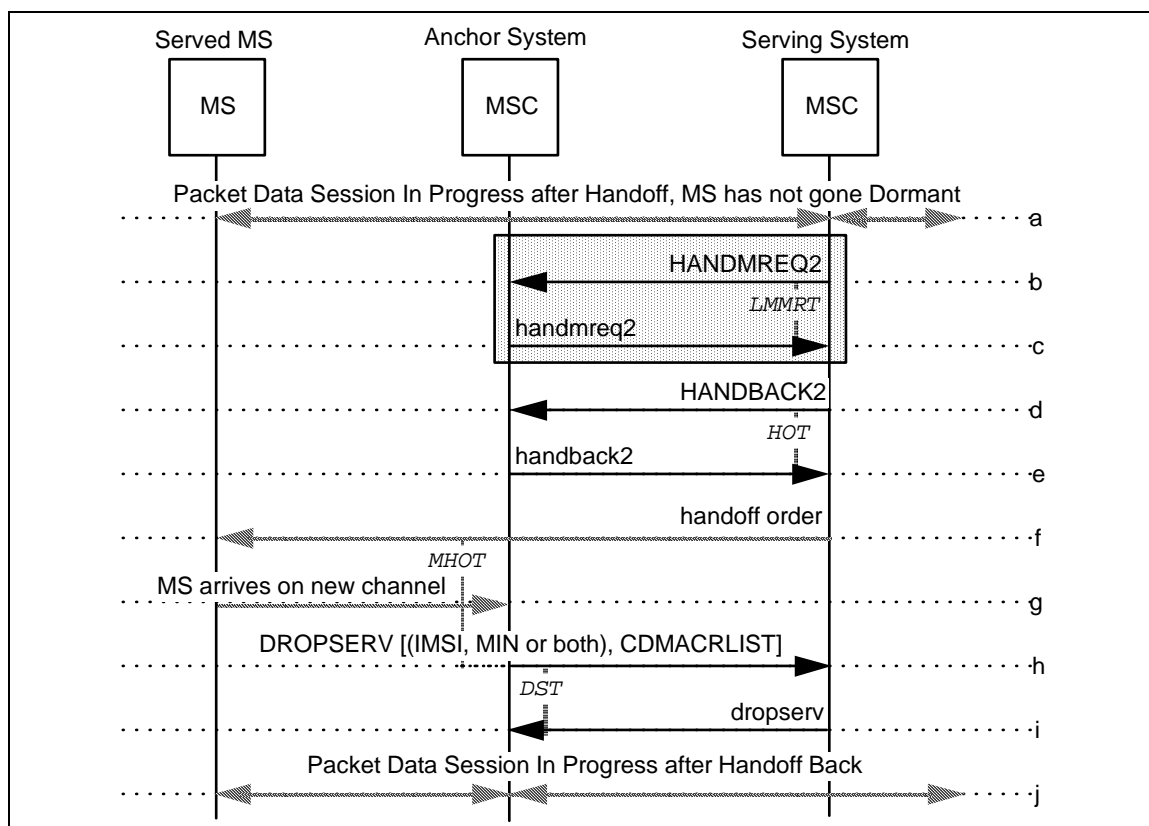
**Figure 8.x.13 Simultaneous Circuit and C-PDS Handoff - Voice Releases First - With Re-Registration**

- a. The MS is engaged in an active packet data session and an active circuit call. The MS has handed off to another system.
- b. The circuit call is released.
- c. The Serving MSC determines the inter-MSC trunk used for the call should be released while maintaining the signaling association for the packet data session; therefore, it sends a DROPSERV to the Anchor MSC. The CDMAConnectionReferenceList parameter indicates the voice service should be dropped. The InterMSCCircuitID parameter identifies the circuit to be released. The last Segment Counter is sent to the Anchor MSC in the BillingID parameter.
- d. The Anchor MSC marks the inter-MSC trunk as idle and returns a dropserv to the Serving MSC.
- e. The Serving MSC initiates a Status Request message to the BS to get specific MS information for later usage in the MSC. Steps e-h may be done in parallel with Steps i-p.
- f. A Status Request message is sent to the MS from the BS to request for MS specific information.
- g. The MS specific information is received in the BS via a Status Response message from the MS.
- h. A Status Response message is sent from the BSC to the MSC containing the requested MS specific information.
- i. The Serving MSC initiates the registration process by sending a REGNOT to the VLR.
- j-p The Registration and Registration Cancellation processes occur as described in Section 5.1.1 "Initial MS Registration in a New Serving System".
- q. The Anchor MSC sends a DROPSERV towards the Serving MSC to release all resources associated with the packet data session in the Anchor MSC and the handoff chain. The ReleaseReason parameter is set to value *Anchor MSC was removed from the packet data session*.
- r. The Serving MSC acknowledges with a dropserv. All resources in the handoff chain have been cleared. The packet data session remains active at the Serving MSC.

#### **8.x.14 C-PDS HandoffBack**

(new for TIA/EIA-41-D Chapter 3)

This scenario illustrates a successful handoff back of a packet data session. This scenario applies when either the Serving System does not support optional registration after handoff or when such registration fails.



**Figure 8.x.14 C-PDS HandoffBack**

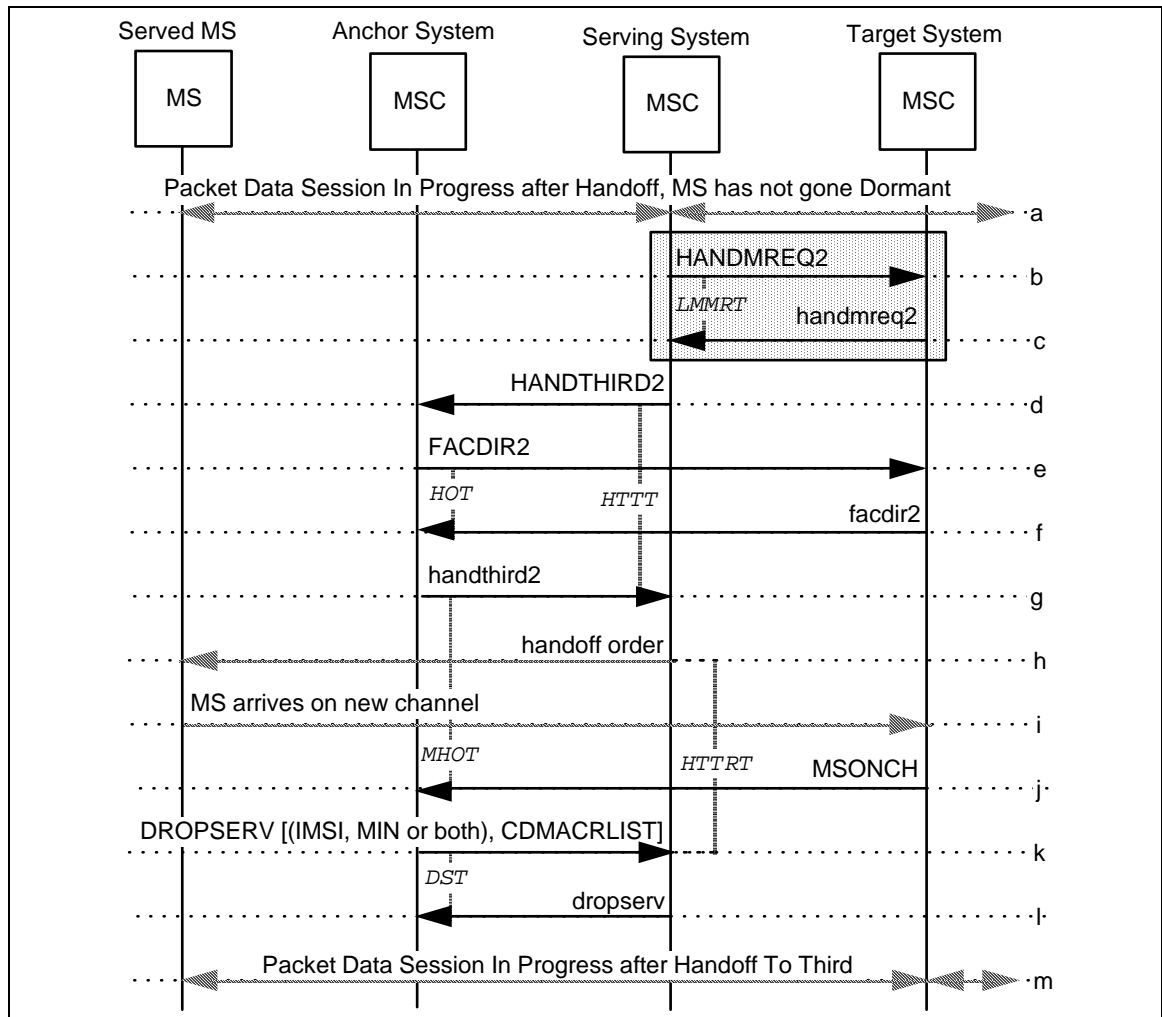
- a. The MS is engaged in an active packet data session. The MS has handed off to another system and is still registered at the Anchor MSC.
- b. The Serving MSC elects, based on its internal algorithm, to determine if a handoff to an adjacent candidate target [Anchor] MSC is appropriate. The Serving MSC may send a HANDMREQ2 to the candidate MSC (the Serving MSC may send several handoff measurement requests to different candidate MSCs).
- c. The candidate target [Anchor] MSC performs location measurements in accordance with the MSC's internal algorithm and returns the results to the Serving MSC in a handmreq2.
- d. The Serving MSC determines that the packet data session should be handed off to the candidate (now target [Anchor]) MSC and that the target [Anchor] MSC is already on the call path. The Serving MSC sends a HANDBACK2 to the target [Anchor] MSC, directing the target [Anchor] MSC to initiate a Handoff-Back task.
- e. The necessary resources are available on the designated target cell; therefore, the target [Anchor] MSC increases the Segment Counter in the received BillingID parameter by one and uses the new BillingID for the new call segment. The target [Anchor] MSC returns a handback2 to the requesting Serving MSC and initiates a Handoff-Back task.
- f. On receipt of the handback2, the Serving MSC sends a Mobile Handoff Order to the MS.
- g. The MS is received on the designated target channel.

- h. The target [Anchor] MSC sends a DROPSERV to the Serving MSC indicating it has been removed from the handoff chain.
- i. The Serving MSC returns a dropserv to the Anchor [now Serving] MSC.
- j. The Handoff Back is complete.

### 8.x.15 C-PDS HandoffToThird

(new for TIA/EIA-41-D Chapter 3)

This scenario illustrates a successful handoff to third of a packet data session.



**Figure 8.x.15 C-PDS HandoffToThird**

- a. The MS is engaged in an active packet data session. The MS has handed off to another system and not yet gone dormant, the MS is still registered at the Anchor MSC.
- b. The Serving MSC elects, based on its internal algorithm, to determine if a handoff to an adjacent candidate MSC is appropriate. The Serving MSC may send a HANDMREQ2 to the candidate MSC (the Serving MSC may send several handoff measurement requests to different candidate MSCs).

- c. The candidate MSC performs location measurements in accordance with the MSC's internal algorithm and returns the results to the Serving MSC in a `handmreq2`.
- d. The Serving MSC determines that the packet data session should be handed off to the candidate (now Target) MSC and that path minimization may be possible. It sends a `HANDTHIRD2` to the MSC which had previously handed off the call to the Serving MSC (i.e., Anchor MSC), requesting that MSC to perform a handoff with path minimization. The current Segment Counter is sent in the `BillingID` parameter.
- e. The Target MSC is known to the Anchor MSC and the necessary resources are available; therefore, the Anchor MSC attempts to perform the handoff with path minimization. It sends a `FACDIR2` to the Target MSC. If the Anchor MSC counts new tandem segments, then increment the Segment Counter by one in the received `BillingID` parameter.
- f. The necessary resources are available on the designated target cell; therefore, the Target MSC increases the Segment Counter in the received `BillingID` parameter by one and uses the new `BillingID` for the new call segment. The Target MSC returns a `facdir2` to the requesting MSC and initiates a Handoff-Forward task.
- g. The Anchor MSC, having accepted the request to perform the handoff with path minimization and found the resources on the target system available, returns the parameters of the selected channel to the Serving MSC in a `handthird2`.
- h. The Serving MSC, on receipt of the `handthird2`, sends a Handoff Order to the MS.
- i. The MS is received on the designated target channel.
- j. The Target MSC sends an `MSONCH` to the initiator of the Handoff-Forward task, the Anchor MSC, informing the requesting system that the Target MSC has successfully completed the Handoff-Forward task.
- k. The Anchor MSC sends a `DROPSERV` to the previous Serving MSC indicating it has been removed from the handoff chain.
- l. The previous Serving MSC returns a `dropserv` to the Anchor MSC.
- m. The Handoff to Third is complete.

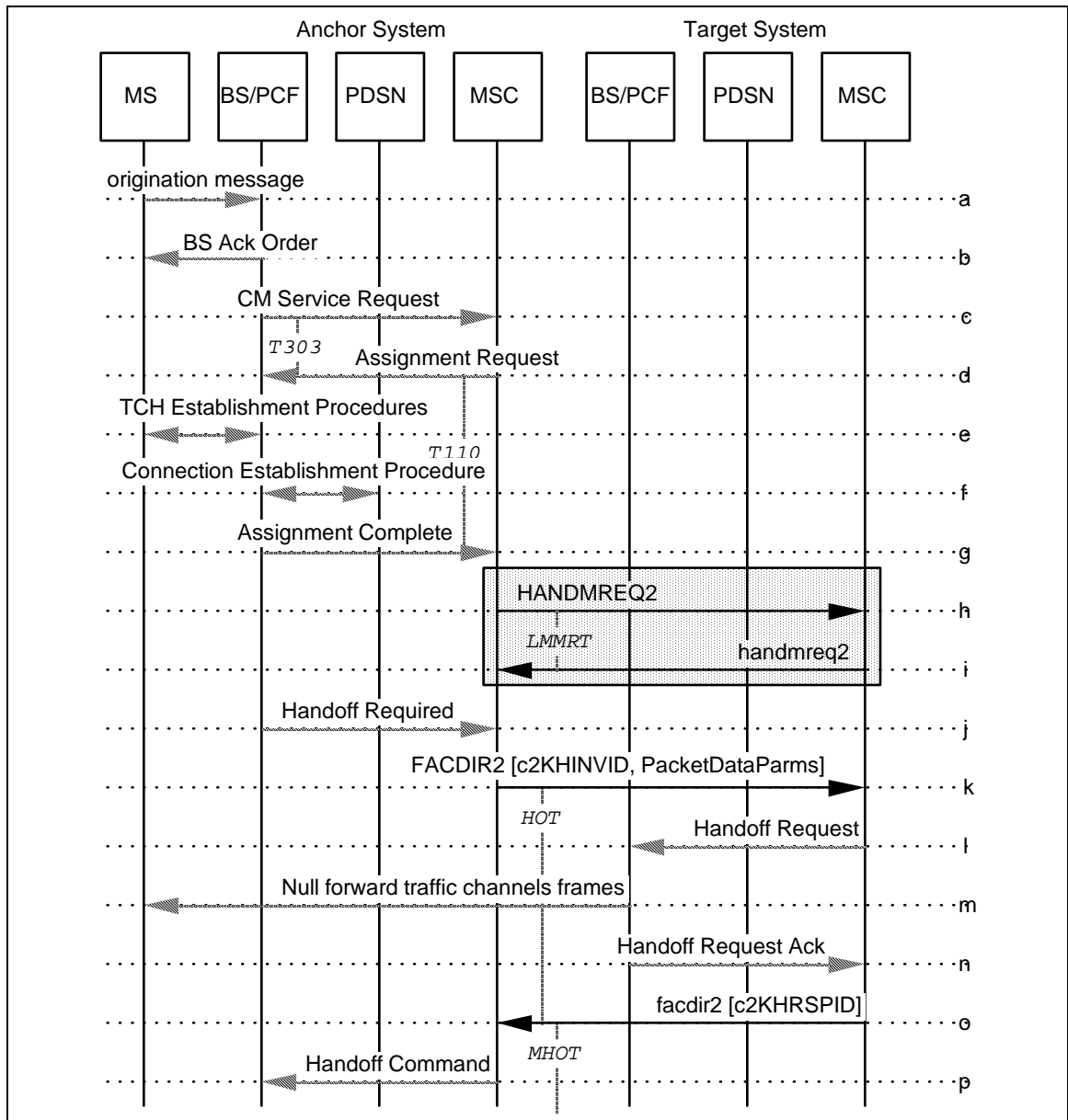
## Annex B TIA/EIA-41-D Chapter 3 "Supplementary Message Flows"

(new for TIA/EIA-41-D Chapter 3, page 3-416)

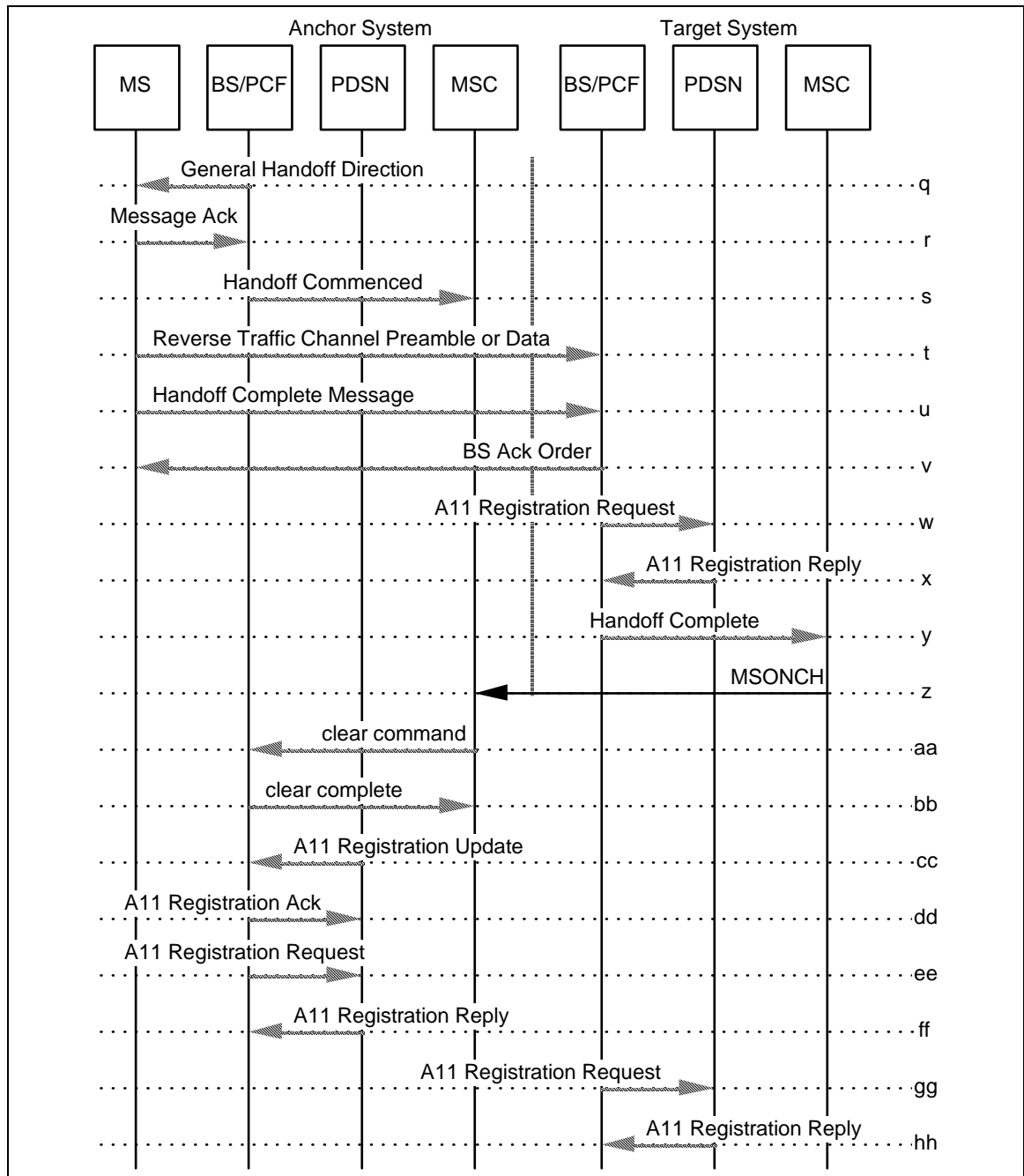
### Annex B.1 C-PDS Hard Handoff Including A-Interface and Packet Data Network Information Flows

(new for TIA/EIA-41-D Chapter 3, page 3-416)

This scenario illustrates a hard handoff of an active packet data session when no circuit call is involved. As soon as the MS goes idle (e.g., packet data session termination), the MS would autonomously register in the new system per scenario 8.x.1. A-Interface and Packet Data Network information flows are included to illustrate the association with a new PDSN after handoff.



**Figure Annex B.1 C-PDS Handoff Including A-Interface and Packet Data Network Information Flows**



**Figure Annex B.1 C-PDS Handoff Including A-Interface and Packet Data Network Information Flows (concluded)**

- The MS initiates a packet origination.
- The BS acknowledges the origination.
- The BS sends the CM Service Request to the MSC.

- d. The MSC sends an Assignment Request to the BS to request assignment of radio resources. For packet data service the terrestrial circuit between the MSC and BS is not required.
- e. When the connection is established, the BS interacts with the MS to establish the radio connection.
- f. The BS interacts with the PCF (A9 Setup A8 message) and PDSN (A10 and or A11 connection) to establish the Packet Data connection. A lifetime timer is set for the A10 connection.
- g. After the radio link is established, the BS sends an Assignment Complete message to the MSC.
- h. The Anchor (now serving) MSC elects, based on its internal algorithm, to determine if a handoff to an adjacent candidate MSC is appropriate. The Anchor (now serving) MSC may send a HANDMREQ2 to the Target (now candidate) MSC (the Anchor [now serving] MSC may send several handoff measurement requests to different candidate MSCs).
- i. The Target (now candidate) MSC performs location measurements in accordance with the MSC's internal algorithm and returns the results to the Anchor (now serving) MSC in a handmreq2.
- j. Upon detection of the condition that a hard handoff is required, the Anchor (now serving) BS sends a Handoff Required message to the Anchor (now serving) MSC with a preferred list of target cells.
- k. The Anchor (now serving) MSC determines that the packet data session should be handed off to the Target (previously candidate) MSC and that the Target MSC is not already on the call path. The Anchor (now serving) sends a FACDIR2 to the Target MSC, directing the Target MSC to initiate a Handoff-Forward task. The QoSPriority and CDMA2000HandoffInvokeIOSData parameters are included to indicate the desired packet service. The InterMSCCircuitID parameter is set to Null since no circuit is required. If the Anchor (now serving) MSC counts tandem segments, then increment the Segment Counter by one in the BillingID parameter.
- l. The Target MSC initiates the handoff by sending a Handoff Request message to the Target BS/PCF.
- m. On receipt of the Handoff Request, the Target BS allocates radio resources and transmits null TCH data on the forward traffic channel for the MS.
- n. The Target BS returns a Handoff Request Ack message to the Target MSC with appropriate RF channel information to allow the MS to be instructed to tune to the new RF channel and waits for the MS to arrive on the channel.
- o. The necessary resources are available on the designated target cell; therefore, the Target MSC increases the Segment Counter in the received BillingID parameter by one and uses the new BillingID for the new call segment. The CDMA2000HandoffResponseIOSData is set to indicated the assigned packet resources. The PDSNADDR parameter indicates the current PDSN IP address. The PDSNPTYPE parameter indicates the protocol type. The Target MSC returns a facdir2 to the requesting Anchor (now serving) MSC and initiates a Handoff-Forward task.
- p. On receipt of the facdir2, the Anchor (now serving) MSC sends a Mobile Handoff Command to the MS.



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- q. Upon receipt of the Handoff Command, the Anchor (now serving) BS instructs the MS to handoff.
  - r. The MS acknowledges the handoff instructions.
  - s. Upon receipt of the ack, the Anchor (now serving) BS sends a Handoff Commenced message to the Anchor (now serving) MSC.
  - t. The MS starts sending reverse TCH frames or preamble data to the Target BS.
  - u. Upon synchronization of the traffic channel, the MS sends a Handoff Complete message to the Target BS.
  - v. The Target BS acknowledges the handoff complete message with a BS Ack Order.
  - w. The Target PCF recognizes that no A10 connection associated with the MS is available. It selects a Target PDSN for and initiates establishment of the A10 connection with the A11 Registration Request message. The lifetime timer is set for the A10 connection.
  - x. The A11 Registration Request is validated and the Target PDSN accepts the connection by returning an A11 Registration Reply with an accept indication.
  - y. The Target BS detects that the MS has successfully accessed the Target BS and sends the Handoff Complete message to the Target (now serving) MSC.
  - z. The Target (now serving) MSC sends a MSONCH to the Anchor (previously serving) MSC, informing the requesting system that the Target (now serving) MSC has successfully completed the Handoff-Forward task. Since only packet service was specified in the received CDMA2000InvokeIOSData parameter, the Target (now serving) MSC does not establish a circuit between the target channel and the Anchor MSC; however, a signaling association is maintained between the two MSCs.
  - aa. The Anchor MSC, on receipt of the MSONCH, initiates release of the MSC resources used in the handoff. Since only packet data service was specified, no inter-MSC trunk is required. The Anchor MSC then sends a Clear Command to the Anchor BS informing it of the handoff success.
  - bb. The Anchor BS sends a Clear Complete message to the Anchor MSC acknowledging the successful handoff.
  - cc. Upon expire of the Lifetime timer, the Anchor (previously the original serving) PDSN initiates closure of its A10 connection with an A11 Registration Update sent to the Anchor (previously the original serving) BS.
  - dd. The Anchor PCF responds with an A11 Registration Ack message.
  - ee. The Anchor PCF sends an A11 Registration Request message with the Lifetime timer set to 0 and accounting related information to the Anchor PDSN.
  - ff. The Anchor PDSN stores the accounting related information for further processing and returns the Registration Reply message. The Anchor PCF closes the A10 connection for the MS.
  - gg. The Target (now serving) PCF sends an A11 Registration Request message to the Target (now serving) PDSN before expire of the Lifetime timer to refresh the A10 connection to the MS. The message also includes accounting information.

- hh. The Target (now serving) PDSN validates the registration request and returns an A11 Registration Reply with an accept indication and a configured lifetime value.

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## 6. Protocol Modifications

### 5.1 SS7-BASED DATA TRANSFER SERVICE

(TIA/EIA-41-D Chapter 5, page 5-6)

#### 5.1.1 Message Transfer Part

(TIA/EIA-41-D Chapter 5, page 5-6)

Note: the existing omitted text is retained without modification.

**Table 1 MTP Message Priority Values for TIA/EIA-41 Operations**

TIA/EIA-41 Operation	MTP Message Priority
...	...
AddService	<u>0</u>
DropService	<u>1</u>
...	...

Note: the remainder of this section is retained without modification.

### 6.1 TIA/EIA-41-D Chapter 5 “Signaling Protocol” Modifications

(TIA/EIA-41-D Chapter 5, page 5-1)

The omitted portion of this section is retained without modification.

### 6.4 MAP OPERATIONS

(TIA/EIA-41-D Chapter 5, page 5-27)

The omitted portion of this section is retained without modification.

#### 6.4.1.2 Operation Specifiers

(TIA/EIA-41-D Chapter 5, page 5-25)

The following table lists the TIA/EIA-41 MAP Operation Specifiers.

**Table 8 (concluded)**

Operation Name	Operation Specifier								Decimal
	H	G	F	E	D	C	B	A	
...					...				...
AddService	<u>0</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>99</u>
DropService	<u>0</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>100</u>
...					...				...

6.4.2      **Operation Definitions**

(TIA/EIA-41-D Chapter 5, page 5-27)

The following table summarizes the operations defined for the *TIA/EIA-41* MAP:

**Table 10      Summary of MAP Operations**

Operation	Reference
...	...
<u>AddService</u>	<u>6.4.2.ar</u>
<u>DropService</u>	<u>6.4.2.as</u>
...	...

**6.4.2.ar AddService**(new for *TIA/EIA-41-D* Chapter 5)

The AddService (ADDSESV) operation is used by a Serving MSC to request the Anchor MSC to authorize an additional service (e.g., packet data) for the MS.

The following table lists the valid combinations of invoking and responding FEs.

**Table ar1 FE Combinations for ADDSESV**

	INVOKING FE	RESPONDING FE
Case 1	Serving MSC	Anchor MSC
Case 2	Serving MSC	Tandem MSC
Case 3	Tandem MSC	Tandem MSC
Case 4	Tandem MSC	Anchor MSC

The AddService operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

**Table ar2 AddService INVOKE Parameters**

AddService INVOKE Parameters				Timer: AST
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.3.2.1	
Length	variable octets	M	6.3.2.1	
Contents				
CDMAConnectionReferenceList		M	6.5.2.aq <i>IS-737</i>	a
CDMAServiceOptionList		O	6.5.2.g <i>TSB76</i>	b
Digits (Dialed)		O	6.5.2.58	d, e
InterMSCCircuitID		O	6.5.2.72	f
IMSI		O	6.5.2.bu <i>IS-751</i>	c
MobileIdentificationNumber		O	6.5.2.81	c

**Notes:**

- Included to convey the requested service option and assigned Service Option Connection Identifier (SOCl) value. The SOCl value shall be used in any subsequent DROPSESV operation referencing this connection.
- Include, if available, to indicate additional services (for service configuration) related to the requested service. Services not supported by the tandem MSC and Anchor MSC will be filtered.
- Include if available. At least one of these parameters should be present.
- The Digits parameter is sent non-encrypted.
- Include if the new service requires a new circuit, to indicate the dialed digits received from the MS.

- f. Include if the new service requires a new circuit, to indicate the IMSCCID of the new circuit.

The AddService operation success is reported with a TCAP RETURN RESULT (LAST). This is carried by a TCAP RESPONSE package. The Parameter Set is encoded as follows:

**Table ar3 AddService RETURN RESULT Parameters**

AddService RETURN RESULT Parameters				
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
CDMAConnectionReferenceList		O	6.5.2.aq <i>IS-737</i>	a
CDMAServiceOptionList		O	6.5.2.g <i>TSB76</i>	b
QoSPriority		O	6.5.2.ge	c
ReasonList		O	6.5.2.aw <i>IS-737</i>	d
SpecialHandling		O	6.5.2.bt <i>J-STD-034</i>	e

Notes:

- a. Included to convey the granted service option and assigned Service Option Connection Identifier (SOCI) value.
- b. Include to indicate the authorized service options for service negotiation. Services not supported by the Anchor MSC and Tandem MSC shall be filtered.
- c. Include for CDMA packet mode handoff to indicate priority information for radio interface Quality of Service.
- d. Include to indicate reasons for add service request failure.
- e. Include if any fields in this parameter are non-zero.

## 6.4.2.as DropService

(new for TIA/EIA-41-D Chapter 5)

The DropService(DROPSERV) operation is used after handoff by an MSC to inform another MSC that one or more services for the MS have terminated. If there was a circuit mode service terminated, the inter-system trunk should be released.

The following table lists the valid combinations of invoking and responding FEs.

**Table as1 FE Combinations for DROPSERV**

	INVOKING FE	RESPONDING FE
Case 1	Serving MSC	Anchor MSC
Case 2	Anchor MSC	Serving MSC
Case 3	Serving MSC	Tandem MSC
Case 4	Anchor MSC	Tandem MSC
Case 5	Tandem MSC	Tandem MSC
Case 6	Tandem MSC	Anchor MSC
Case 7	Tandem MSC	Serving MSC

The DropService operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

**Table as2 DropService INVOKE Parameters**

DropService INVOKE Parameters				Timer: DST
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.3.2.1	
Length	variable octets	M	6.3.2.1	
Contents				
BillingID		O	6.5.2.16	a
CDMAConnectionReferenceList		O	6.5.2.aq IS-737	b
InterMSCCircuitID		O	6.5.2.72	c
IMSI		O	6.5.2.bu IS-751	d
MobileIdentificationNumber		O	6.5.2.81	d
ReleaseReason		O	6.5.2.111	e

Notes:

- a. Include for reporting the number of segments toward the Anchor MSC.
- b. Include to indicate the service being dropped.
- c. Include if available to indicate the IMSCCID of the dropped service.
- d. Include if available. At least one of these parameters should be present.
- e. Include to indicate the reason for releasing the service (e.g., call or session release cause).

The DropService operation success is reported with a TCAP RETURN RESULT (LAST). This is carried by a TCAP RESPONSE package. The Parameter Set is encoded as follows:

**Table as3 DropService RETURN RESULT Parameters**

DropService RETURN RESULT Parameters				
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
BillingID		O	6.5.2.16	a

Notes:

- a. Include for reporting the number of segments toward the Anchor MSC.



### 6.4.2.12 FacilitiesDirective2

(TIA/EIA-41-D Chapter 5, page 5-44)

(TIA/EIA-41-D Miscellaneous 10.9b [cdma2000], page 2)

The FacilitiesDirective2 operation is used to request that the Target MSC initiate the Handoff-Forward task. This operation differs from the FacilitiesDirective operation in its addition of support for CDMA and NAMPS MSs.

The FacilitiesDirective2 operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

**Table 33 FacilitiesDirective2 INVOKE Parameters**

FacilitiesDirective2 INVOKE Parameters				Timer: HOT
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
BillingID		M	6.5.2.16	
...		...	...	...
InterMSCCircuitID		M	6.5.2.72	<u>zz</u>
...		...	...	...
<u>CDMA2000HandoffInvokeIOSData</u>		<u>O</u>	<u>6.5.2.gm</u>	<u>xx</u>
CDMACallMode		O	6.5.2.29	c, d, e
CDMAChannelData (Serving)		O	6.5.2.30	c, <u>dd</u> , <u>ll</u>
<u>CDMAConnectionReferenceList</u>		<u>O</u>	<u>6.5.2.aq</u> <u>IS-737</u>	c, t, <u>aa</u>
CDMAMobileProtocolRevision		O	6.5.2.34	c
<u>CDMAMSMeasuredChannelIdentity</u>		<u>O</u>	<u>6.5.2.gh</u>	<u>nn</u>
CDMAPrivateLongCodeMask		O	6.5.2.36	f
CDMAServiceConfigurationRecord		O	6.5.2.e <u>TSB76</u>	c, s, <u>ll</u>
CDMAServiceOptionList		O	6.5.2.g <u>TSB76</u>	c, y
CDMAServingOneWayDelay		O	6.5.2.38	a, c
CDMAStationClassMark		O	6.5.2.41	c, <u>ww</u>
<u>CDMAStationClassMark2</u>		<u>O</u>	<u>6.5.2.h</u> <u>TSB76</u>	c, <u>mm</u>
CDMATargetMAHOList		O	6.5.2.43	g
CDMATargetMeasurementList		O	6.5.2.45	h
...		...	...	...
<u>PDSNAddress</u>		<u>O</u>	<u>6.5.2.gf</u>	<u>gg</u>
<u>PDSNProtocolType</u>		<u>O</u>	<u>6.5.2.gg</u>	<u>hh</u>
<u>QoSPriority</u>		<u>O</u>	<u>6.5.2.ge</u>	<u>ff</u>
...		...	...	...
VoicePrivacyMask		O	6.5.2.167	q

## Notes:

- a. For CDMA, the ServingCellID and CDMA ServingOneWayDelay parameters correspond to the active set member having the shortest signal path to the MS (time reference cell).
- • •
- c. Include if CDMA handoff.
- d. Include to indicate the acceptable call mode if other than AMPS (i.e., CDMA or NAMPS).
- e. The values in these parameters shall not contain conflicting information.
- f. This parameter shall be provided if the MS supports CDMA and is authorized to have Voice Privacy and the CDMA PrivateLongCodeMask (CDMA PLCM) parameter is available.
- g. Include for the CDMA MAHO case.
- h. Include for the CDMA non-MAHO case.
- • •
- q. This parameter shall be provided if the MS supports TDMA and is authorized to have Voice Privacy and the VoicePrivacyMask (VPMASK) parameter is available.
- • •
- s. Include to indicate a requested service configuration other than the one agreed upon by the Serving and Target Systems.
- t. Include to indicate state information for the requested service option(s) connection reference.
- • •
- y. Include to indicate the authorized service options.
- • •
- aa Include to convey the requested service option and assigned Service Option Connection Identifier (SOCID). Required for IOS 4.1 or later.
- dd. The Long Code Mask field should be set to the long code mask in use at the Serving MSC.
- ff. Include for CDMA packet mode handoff to indicate priority information for radio interface Quality of Service.
- gg. Include for CDMA packet mode handoff to specify the IP address of the PDSN currently connected to the Packet Control Function.
- hh. Include for CDMA packet mode handoff to identify the Link Layer protocol used at the MS and at the PDSN.
- ll. Include if the Serving MSC and or the Target MSC support only an A-interface prior to IOS v4.1. This information will be ignored if the same information is received within the cdma2000HandoffInvokeIOSData parameter.
- mm. Include to indicate information for the current band in use.

nn. Include to indicate the band class and frequency that has been measured by the MS in preparation for hard handoff.

ww. Ignore if CDMAStationClassMark2 is also received and recognized.

xx. If the Serving MSC and the Target MSC support TIA/EIA/IS-2001-A (IOS v4.1) or later, include to convey required cdma2000 handoff invoke information (e.g., IS-2000 Channel Identity, IS-2000 Mobile Capabilities, IS-2000 Service Configuration Record [see IOS]).

zz. Include this mandatory parameter with a pseudo value (e.g., H<sub>16</sub>FFFF) on CDMA packet data only sessions.

The FacilitiesDirective2 operation success is reported with a TCAP RETURN RESULT (LAST). This is carried by a TCAP CONVERSATION WITH PERMISSION package. The Parameter Set is encoded as follows:

**Table 34 FacilitiesDirective2 RETURN RESULT Parameters**

FacilitiesDirective2 RETURN RESULT Parameters				
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
	<u>CDMA2000HandoffResponseIOSData</u>	<u>O</u>	<u>6.5.2.gn</u>	<u>yy</u>
	CDMAChannelData (Target)	O	6.5.2.30	a, <u>t</u>
	CDMACodeChannelList	O	6.5.2.33	a, <u>t</u>
	CDMAConnectionReferenceList	O	6.5.2.aq <u>IS-737</u>	a, i, l, <u>zz</u>
	CDMASearchWindow	O	6.5.2.37	a, <u>t</u>
	CDMAServiceConfigurationRecord	O	6.5.2.e <u>TSB76</u>	a, h, <u>t</u>
	...	...	...	...
	TDMAVoiceCoder (Target)	O	6.5.2.ba	k

Notes:

- a. Include if target is a CDMA channel.
- ...
- h. If the CDMAServiceConfigurationRecord parameter was is not received in the invoke, include to indicate a granted service configuration other than the one agreed upon by the Serving and Target Systems.
- i. Include to indicate state information for the granted service option(s) connection reference.
- ...
- k. Include to indicate the granted Voice Coder if applicable. If not included the MS shall continue using the current Voice Coder.
- l. Include appropriate granted privacy parameters, if available and if allowed for the user.

- t. Include if the Serving MSC and or the Target MSC support only an A-interface prior to IOS v4.1. This information will be ignored if the same information is received within the cdma2000HandoffResponseIOSData parameter.

Note: "yy" added for cdma2000 handoff support.

- yy. If the Serving MSC and the Target MSC support TIA/EIA/IS-2001-A (IOS v4.1) or later, include to convey required cdma2000 IOS handoff response information (e.g., IS-95 Channel Identity, IS-2000 Channel Identity, IS-2000 Service Configuration Record, IS-2000 Non-Negotiable Service Configuration Record, Extended Handoff Direction Parameters, Hard Handoff Parameters [see IOS]).
- zz. Include to convey the granted service option and assigned Service Option Connection Identifier (SOCI). Required for IOS v4.1 or later.

### 6.4.2.17 HandoffBack2

(TIA/EIA-41-D Chapter 5, page 5-55)

The HandoffBack2 operation is used by the Serving MSC to request that the Target MSC initiate the Handoff-Back task. This task is used to handoff a call to a Target MSC to which the Serving MSC is already connected, for the call in question, via an inter-MSC trunk. This operation differs from the HandoffBack operation in its addition of support for CDMA and NAMPS MSs.

The HandoffBack2 operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

**Table 43 HandoffBack2 INVOKE Parameters**

HandoffBack2 INVOKE Parameters				Timer: HOT
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
...		...	...	...
InterMSCCircuitID		M	6.5.2.72	<u>zz</u>
...		...	...	...
<u>CDMA2000HandoffInvokeIOSData</u>		<u>O</u>	<u>6.5.2.gm</u>	<u>xx</u>
CDMACallMode		O	6.5.2.29	c, d, e
CDMAChannelData (Serving)		O	6.5.2.30	<u>c, dd, mm</u>
<u>CDMAConnectionReferenceList</u>		<u>O</u>	<u>6.5.2.aq</u> <u>/S-737</u>	<u>c, t, aa</u>
<u>CDMAMSMMeasuredChannelIdentity</u>		<u>O</u>	<u>6.5.2.gh</u>	<u>oo</u>
CDMAMobileProtocolRevision		O	6.5.2.34	c
CDMAPrivateLongCodeMask		O	6.5.2.36	f
CDMAServiceConfigurationRecord		O	6.5.2.e	c, s, <u>mm</u>
CDMAServiceOptionList		O	6.5.2.g <u>TSB76</u>	c, x
CDMAServingOneWayDelay		O	6.5.2.38	a, c
CDMAStationClassMark		O	6.5.2.41	<u>c, ww</u>
<u>CDMAStationClassMark2</u>		<u>O</u>	<u>6.5.2.h</u> <u>TSB76</u>	<u>c, nn</u>
CDMATargetMAHOList		O	6.5.2.43	g
CDMATargetMeasurementList		O	6.5.2.45	h
ChannelData (Serving)		O	6.5.2.47	l
ConfidentialityModes (Desired)		O	6.5.2.50	j
...		...	...	...
<u>PDSNAddress</u>		<u>O</u>	<u>6.5.2.gf</u>	<u>hh</u>
<u>PDSNProtocolType</u>		<u>O</u>	<u>6.5.2.gg</u>	<u>ii</u>
<u>QoSPriority</u>		<u>O</u>	<u>6.5.2.ge</u>	<u>jj</u>
...		...	...	...

## Notes:

• • •

- c. Include if CDMA handoff.
- d. Include to indicate the acceptable call mode of other than AMPS (i.e., CDMA or NAMPS).
- e. The values in these parameters shall not contain conflicting information.
- f. This parameter shall be provided if the MS supports CDMA and is authorized to have Voice Privacy and the CDMAPrivateLongCodeMask (CDMAPLCM) parameter is available.
- g. Include for the CDMA MAHO case.
- h. Include for the CDMA non-MAHO case.

• • •

- j. Include if MS supports Signaling Message Encryption or Voice Privacy. The parameter shall be carried forward in any subsequent handoff. If one parameter is present, they all must be present.

• • •

- l. Include if the call is in the awaiting answer or alerting state.

• • •

- s. Include to indicate a requested service configuration other than the one agreed upon by the Serving and Target Systems.

- t. Include to indicate state information for the requested service option(s) connection reference.

• • •

- x. Include to indicate the authorized service options.

• • •

- aa Include to convey the requested service option and assigned Service Option Connection Identifier (SOCI). Required for IOS 4.1 or later.

- dd. The Long Code Mask field should be set to the long code mask in use at the Serving MSC.

• • •

- hh. Include for CDMA packet mode handoff to specify the IP address of the PDSN currently connected to the Packet Control Function.

- ii. Include for CDMA packet mode handoff to identify the Link Layer protocol used at the MS and at the PDSN.

- jj. Include for CDMA packet mode handoff to indicate priority information for radio interface Quality of Service.

- mm. Include if the Serving MSC and or the Target MSC support only an A-interface prior to IOS version 4.1. This information will be ignored if the same information is received within the cdma2000HandoffInvokeIOSData parameter.

- nn. Include to indicate information for the current band is use.
- oo. Include to indicate the band class and frequency that has been measured by the MS in preparation for hard handoff.
- ww. Ignore if CDMAStationClassMark2 is also received and recognized.
- xx. If the Serving MSC and the Target MSC support TIA/EIA/IS-2001-A (IOS v4.1) or later, include to convey required cdma2000 handoff invoke information (e.g., IS-2000 Channel Identity, IS-2000 Mobile Capabilities, IS-2000 Service Configuration Record [see IOS]).
- zz. Include this mandatory parameter with a pseudo value (e.g., H<sub>16</sub>FFFF) on CDMA packet data only sessions.

The HandoffBack2 operation success is reported with a TCAP RETURN RESULT (LAST). This is carried by a TCAP RESPONSE package. The Parameter Set is encoded as follows:

**Table 44 HandoffBack2 RETURN RESULT Parameters**

HandoffBack2 RETURN RESULT Parameters				
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
	<u>CDMA2000HandoffResponseIOSData</u>	<u>O</u>	<u>6.5.2.gn</u>	<u>yy</u>
	CDMAChannelData (Target)	O	6.5.2.30	<u>a, t</u>
	CDMACodeChannelList	O	6.5.2.33	<u>a, t</u>
	CDMAConnectionReferenceList	O	6.5.2.aq	<u>a, i, l, zz</u>
	CDMASearchWindow	O	6.5.2.37	<u>a, t</u>
	CDMAServiceConfigurationRecord	O	6.5.2.e	<u>a, h, t</u>
	• • •	• • •	• • •	• • •

Notes:

- a. Include if target is a CDMA channel.
- • •
- h. If the CDMAServiceConfigurationRecord parameter was received in the INVOKE, include to indicate a granted service configuration other than the one agreed upon by the Serving and Target Systems.
- i. Include to indicate state information for the granted service option(s) connection reference.
- • •
- l. Include appropriate granted privacy parameters, if available and if allowed for the user.
- m. Include if target is on a cdma2000 Dedicated Control Channel.
- t. Include if the Serving MSC and or the Target MSC support only an A-interface prior to IOS v4.1. This information will be ignored if the same

information is received within the cdma2000HandoffResponseIOSData parameter.

yy. If the Serving MSC and the Target MSC support TIA/EIA/IS-2001 (IOS v4.1) or later, include to convey required cdma2000 IOS handoff response information (e.g., IS-95 Channel Identity, IS-2000 Channel Identity, IS-2000 Service Configuration Record, IS-2000 Non-Negotiable Service Configuration Record, Extended Handoff Direction Parameters, Hard Handoff Parameters [see IOS]).

zz. Include to convey the granted service option and assigned Service Option Connection Identifier (SOCI). Required for IOS 4.1 or later.



### 6.4.2.21 HandoffToThird2

(TIA/EIA-41-D Chapter 5, page 5-63)

The HandoffToThird2 operation is used by the Serving MSC (non-Anchor) to initiate a handoff with path minimization. This operation differs from the HandoffToThird operation in its support of dual-mode, CDMA and NAMPS MSs.

The HandoffToThird2 operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

**Table 51 HandoffToThird2 INVOKE Parameters**

HandoffToThird2 INVOKE Parameters				Timer: HTTP
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
...		...	...	...
InterMSCCircuitID		M	6.5.2.72	<u>zz</u>
...		...	...	...
<u>CDMA2000HandoffInvokeIOSData</u>		<u>O</u>	<u>6.5.2.gm</u>	<u>xx</u>
CDMACallMode		O	6.5.2.29	c, d, e
CDMAChannelData (Serving)		O	6.5.2.30	<u>c, dd, mm</u>
<u>CDMAConnectionReferenceList</u>		<u>O</u>	<u>6.5.2.ag</u> <u>IS-737</u>	<u>c, s, z</u>
<u>CDMAMSMeasuredChannelIdentity</u>		<u>O</u>	<u>6.5.2.gh</u>	<u>oo</u>
CDMA MobileProtocolRevision		O	6.5.2.34	c
CDMA PrivateLongCodeMask		O	6.5.2.36	f
CDMA ServiceConfigurationRecord		O	6.5.2.e	c, r, <u>mm</u>
CDMA ServiceOptionList		O	6.5.2.g	c, x
CDMA ServingOneWayDelay		O	6.5.2.38	a, c
CDMA StationClassMark		O	6.5.2.41	<u>c, ww</u>
<u>CDMA StationClassMark2</u>		<u>O</u>	<u>6.5.2.h</u> <u>TSB76</u>	<u>c, nn</u>
CDMA TargetMAHOList		O	6.5.2.43	g
CDMA TargetMeasurementList		O	6.5.2.45	h
ChannelData (Serving)		O	6.5.2.47	i
ConfidentialityModes (Desired)		O	6.5.2.50	j
<u>DataKey</u>		<u>O</u>	<u>6.5.2.at</u> <u>IS-737</u>	<u>ab</u> z
<u>DataPrivacyParameters</u>		<u>O</u>	<u>6.5.2.au</u> <u>IS-737</u>	<u>v</u>
...		...	...	...
<u>PDSNAddress</u>		<u>O</u>	<u>6.5.2.gf</u>	<u>hh</u>
<u>PDSNProtocolType</u>		<u>O</u>	<u>6.5.2.gg</u>	<u>ii</u>
<u>QoSPriority</u>		<u>O</u>	<u>6.5.2.ge</u>	<u>jj</u>
...		...	...	...

## Notes:

- a. For CDMA, the ServingCellID and CDMA ServingOneWayDelay parameters correspond to the active set member having the shortest signal path to the MS (time reference cell).
- ...
- c. Include if CDMA handoff.
- d. Include to indicate the acceptable call modes if other than AMPS (i.e., CDMA or NAMPS).
- e. The values in these parameters shall not contain conflicting information.
- f. This parameter shall be provided if the MS supports CDMA and is authorized to have Voice Privacy and the CDMA PrivateLongCodeMask (CDMA PLCM) parameter is available.
- g. Include for the CDMA MAHO case.
- h. Include for the CDMA non-MAHO case.
- i. Include if an AMPS or NAMPS channel is in use.
- j. Include if MS supports Signaling Message Encryption, Voice Privacy or Data Privacy. The parameter shall be carried forward in any subsequent handoff. If one parameter is present, they all must be present. The parameter shall be carried forward in any subsequent handoff. If one parameter is present, they all must be present.
- ...
- r. Include to indicate a requested service configuration other than the one agreed upon by the Serving and target Systems.
- s. Include to indicate state information for the requested service option(s) connection reference.
- ...
- v. Include to indicate last known value of DP Data field ~~filed~~. Do not include if contained in CDMA ConnectionReferenceList.
- ...
- x. Include to indicate the authorized service options.
- ...
- z. Include to convey the requested service option and assigned Service Option Connection Identifier (SOCI). Required for IOS 4.1 or later.  
~~Include for CDMA data privacy, if applicable and if authorized for the user.~~
- dd. The Long Code Mask field should be set to the long code mask in use at the Serving MSC.
- ...

- 1
- 2 hh. Include for CDMA packet mode handoff to specify the IP address of the
- 3 PDSN currently connected to the Packet Control Function.
- 4
- 5 ii. Include for CDMA packet mode handoff to identify the Link Layer
- 6 protocol used at the MS and at the PDSN.
- 7
- 8 jj. Include for CDMA packet mode handoff to indicate priority information
- 9 for radio interface Quality of Service.
- 10
- 11 mm. Include if the Serving MSC and or the Target MSC support only an A-
- 12 interface prior to IOS v4.1. This information will be ignored if the same
- 13 information is received within the cdma2000HandoffInvokeIOSData
- 14 parameter.
- 15 nn. Include to indicate information for the current band is use.
- 16
- 17 oo. Include to indicate the band class and frequency that has been measured
- 18 by the MS in preparation for hard handoff.
- 19
- 20 ww. Ignore if CDMAStationClassMark2 is also received and recognized.
- 21
- 22 xx. If the Serving MSC and the Target MSC support TIA/EIA/IS-2001-A (IOS
- 23 v4.1) or later, include to convey required cdma2000 handoff invoke
- 24 information (e.g., IS-2000 Channel Identity, IS-2000 Mobile Capabilities,
- 25 IS-2000 Service Configuration Record [see IOS]).
- 26
- 27 zz. Include this mandatory parameter with a pseudo value (e.g., H<sub>16</sub>FFFF) on
- 28 CDMA packet data only sessions.
- 29
- 30 ab. Include for CDMA data privacy if applicable and if authorized for the
- 31 user.
- 32
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The HandoffToThird2 operation success is reported with a TCAP RETURN RESULT (LAST). This is carried by a TCAP RESPONSE package. The Parameter Set is encoded as follows:

**Table 52 HandoffToThird2 RETURN RESULT Parameters**

HandoffToThird2 RETURN RESULT Parameters				
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
	<u>CDMA2000HandoffResponseIOSData</u>	<u>O</u>	<u>6.5.2.gn</u>	<u>yy</u>
	CDMAChannelData (Target)	O	6.5.2.30	<u>a, t</u>
	CDMACodeChannelList	O	6.5.2.33	<u>a, t, n</u>
	CDMAConnectionReferenceList	O	<u>6.5.2.ag</u> <u>IS-737</u>	<u>a, i, k, zz</u>
	CDMASearchWindow	O	6.5.2.37	<u>a, t</u>
	CDMAServiceConfigurationRecord	O	6.5.2.e	<u>a, h, t</u>
	...	...	...	...

Notes:

- a. Include if target is a CDMA channel.
- ...
- h. Include to indicate a granted service configuration other than the one agreed upon by the Serving and target Systems.
- i. Include to indicate state information for the granted service option(s) connection reference.
- ...
- k. Include appropriate requested privacy parameters, if available and if allowed for the user.
- ~~n. For cdma2000 mobiles, the CDMACodeChannelList is used for the Fundamental Channel.~~
- t. Include if the Serving MSC and or the Target MSC support only an A-interface prior to IOS v4.1. This information will be ignored if the same information is received within the cdma2000HandoffInvokeIOSData parameter.
- yy. If the Serving MSC and the Target MSC support TIA/EIA/IS-2001-A (IOS v4.1) or later, include to convey required cdma2000 IOS handoff response information (e.g., IS-95 Channel Identity, IS-2000 Channel Identity, IS-2000 Non-Negotiable Service Configuration Record, IS-2000 Service Configuration Record, Extended Handoff Direction Parameters, Hard Handoff Parameters [see IOS]).
- zz. Include to convey the granted service option and assigned Service Option Connection Identifier (SOCl). Required for IOS 4.1 or later.

### 6.4.2.26 InterSystemSetup

(TIA/EIA-41-D Chapter 5, page 5-76)

The InterSystemSetup operation is used by a Serving MSC to request a Border MSC to perform call setup actions; i.e., connect the voice channel in which the MS confirmation has been received to the intersystem trunk facility specified by the Serving MSC.

The InterSystemSetup operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

**Table 61 InterSystemSetup INVOKE Parameters**

InterSystemSetup INVOKE Parameters				Timer: ISSRT
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.3.2.1	
Length	variable octets	M	6.3.2.1	
Contents				
BillingID (Anchor MSC)		M	6.5.2.16	
ElectronicSerialNumber		M	6.5.2.63	
InterMSCCircuitID		M	6.5.2.72	
<del>MobileIdentificationNumber</del>		<del>M</del>	<del>6.5.2.84</del> (IS-751)	
AlertCode		O	6.5.2.3	a, g
CallingPartyNumberString1		O	6.5.2.23	b, g
CallingPartyNumberString2		O	6.5.2.24	b, g
CallingPartySubAddress		O	6.5.2.25	b, g
CDMAPrivateLongCodeMask		O	6.5.2.36	a
CDMAServiceOption		O	6.5.2.f	e, g
CDMAServiceOptionList		O	6.5.2.g	f, g
DisplayText		O	6.5.2.bx (IS-771)	a, c, g
DisplayText2		O	6.5.2.ec (misc 10.0)	a, c, g
IMSI		O	6.5.2.bu (IS-751)	d
MobileIdentificationNumber		O	6.5.2.81 (IS-751)	d
RedirectingNumberString		O	6.5.2.108	b, g
RedirectingSubAddress		O	6.5.2.109	b, g
SignalingMessageEncryptionKey		O	6.5.2.120	a
VoicePrivacyMask		O	6.5.2.166	a

**Notes:**

- a. Include if available.
- b. Include if available and the MS is authorized for CNIP.
- c. Include only one of these mutually exclusive parameters.
- d. Include if available. At least one parameter should be present.

- e. Include to specify requested CDMA service information.
- f. Include to indicate the authorized service options.
- g. Only included for circuit mode service add-on after intersystem handoff.

The InterSystemSetup operation success is reported with a TCAP RETURN RESULT (LAST). This is carried by a TCAP RESPONSE ~~QUERY WITH PERMISSION~~ package. The Parameter Set is encoded as follows:

**Table 62 InterSystemSetup RETURN RESULT Parameters**

InterSystemSetup RETURN RESULT Parameters				
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.3.2.2	
Length	variable octets	M	6.3.2.2	
Contents				
<u>CDMAConnectionReferenceList</u>		<u>O</u>	<u>6.5.2.aq</u>	<u>a</u>
<u>CDMAServiceOption</u>		<u>O</u>	<u>6.5.2.f</u> <u>TSB76</u>	<u>b</u>
SetupResult		O	6.5.2.118	<u>c a</u>
...		...	...	...

Notes:

- a. Include to convey the granted service option(s) and the assigned Service Option Connection Identifier (SOCI), if not previously reported. Include only for IOS-v4.1 or later. Only the CDMAConnectionReference information parameters for the granted service(s) are included.
- b. Include to identify the final negotiated CDMA service option information, if not previously reported.
- c. Include to report the result of the operation.

## 6.5 MAP PARAMETERS

(TIA/EIA-41-D Chapter 5, page 5-119)

The omitted portion of this section is retained without modification.

### 6.5.1.2 Parameter Identifiers

(TIA/EIA-41-D Chapter 5, page 5-119)

The following table lists the *IS-41* MAP Parameter Identifiers.

The omitted portion of this section is retained without modification.

**Table 112 IS-41 MAP Parameter Identifiers**

Parameter Identifier Name	Parameter Identifier Code H G F E D C B A	Reference
...	...	...
<u>CDMA2000HandoffInvoke</u> <u>IOSData</u>	<u>1 0 0 1 1 1 1 1</u> <u>1 0 0 0 0 0 1 0</u> <u>0 1 1 0 0 1 0 0</u>	<u>6.5.2.gm</u>
<u>CDMA2000HandoffResponse</u> <u>IOSData</u>	<u>1 0 0 1 1 1 1 1</u> <u>1 0 0 0 0 0 1 0</u> <u>0 1 1 0 0 1 0 1</u>	<u>6.5.2.gn</u>
...	...	...
<u>CDMAMSMMeasuredChannel</u> <u>Identity</u>	<u>1 0 0 1 1 1 1 1</u> <u>1 0 0 0 0 0 1 0</u> <u>0 1 0 1 1 1 1 1</u>	<u>6.5.2.gh</u>
...	...	...
<u>CDMAConnectionReference</u> <u>Information</u>	<u>1 0 1 1 1 1 1 1</u> <u>1 0 0 0 0 0 0 1</u> <u>0 1 0 1 0 0 1 1</u>	<u>6.5.2.ap</u> <u>(IS-737)</u>
<u>CDMAConnectionReference</u> <u>List</u>	<u>1 0 1 1 1 1 1 1</u> <u>1 0 0 0 0 0 0 1</u> <u>0 1 0 1 0 1 0 0</u>	<u>6.5.2.aq</u> <u>(IS-737)</u>
...	...	...

Parameter Identifier Name	Parameter Identifier Code								Reference
	H	G	F	E	D	C	B	A	
<u>CDMAServiceConfiguration</u> <u>Record</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>6.5.2.e</u> <u>(TSB76)</u>
...	...	...	...	...	...	...	...	...	...
<u>CDMAServiceOptionConnection</u> <u>Identifier</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>6.5.2.gr</u>
...	...	...	...	...	...	...	...	...	...
<u>IMSI</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>6.5.2.bu</u> <u>(IS-751)</u>
...	...	...	...	...	...	...	...	...	...
<u>PDSNAddress</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>6.5.2.gf</u>
...	...	...	...	...	...	...	...	...	...
<u>PDSNProtocolType</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>6.5.2.gg</u>
...	...	...	...	...	...	...	...	...	...
<u>QoSPriority</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>6.5.2.ge</u> <u>(Misc. 10.9)</u>



## 6.5.2 Parameter Definitions

(TIA/EIA-41-D Chapter 5, page 5-153)

*The omitted existing text is retained without modification*

### 6.5.2.20 CallingFeaturesIndicator

(TIA/EIA-41-D Chapter 5, page 5-153)

(IS-837; AH, page 20)

(IS-838; USCF, page 28)

The CallingFeaturesIndicator (CFI) parameter defines the authorization and activity states of the MS's features.

The minimum length of this parameter is 2 octets.

Field		Value				Type	Reference		Notes
Identifier		CallingFeaturesIndicator IMPLICIT OCTET STRING				M	6.5.1.2		
Length		variable octets				M	6.5.1.1		
Contents									
H	G	F	E	D	C	B	A	octet	Notes
CW-FA		CFNA-FA		CFB-FA		CFU-FA		1	a
CT-FA		VP-FA		CD-FA		3WC-FA		2	a
CNIROver-FA		CNIR-FA		CNIP2-FA		CNIP1-FA		3	a
<u>USCFvm-FA</u> <u>(IS-838)</u>		<u>AH-FA</u> <u>(IS-837)</u>		<u>DP-FA</u> <u>(IS-737)</u>		PCW-FA		4	a, <del>b</del>
<u>CCS-FA</u> <u>(IS-880)</u>		<u>CPDS-FA</u> <u>(IS-880)</u>		<u>USCFnr-FA</u> <u>(IS-838)</u>		<u>USCFms-FA</u> <u>(IS-838)</u>		5	a, <del>b</del>
<u>Reserved</u>						<u>TDMA EPE-FA</u>		6	a, b
...								n	c

**Figure 27 CallingFeaturesIndicator parameter**

Notes:

- a. CFU-FA, CFB-FA, etc., denotes the FeatureActivity status for the designated feature, where the FeatureActivity encoding is defined in Table 125.
  - **CFU-FA** = Call Forwarding–Unconditional: FeatureActivity.
  - **CFB-FA** = Call Forwarding–Busy: FeatureActivity.
  - **CFNA-FA** = Call Forwarding–No Answer: FeatureActivity.
  - **CW-** = Call Waiting: FeatureActivity.
  - **3WC-** = Three-Way Calling: FeatureActivity.
  - **CD-FA** = Call Delivery: FeatureActivity (not interpreted on reception by IS-41-C or later).
  - **VP-FA** = Voice Privacy: FeatureActivity.

- **CT-FA** = Call Transfer: FeatureActivity.
  - **CNIP1-FA** = One number (network-provided only) Calling Number Identification Presentation: FeatureActivity. CNIP2-FA takes precedence over CNIP1-FA.
  - **CNIP2-FA** = Two number (network-provided and user-provided) Calling Number Identification Presentation: FeatureActivity. CNIP2-FA takes precedence over CNIP1-FA.
  - **CNIR-FA** = Calling Number Identification Restriction: FeatureActivity. An *Authorized and Activated* value for CNIR-FA indicates that Calling Number Identification Presentation is restricted.
  - **CNIROver-FA** = Calling Number Identification Restriction Override: FeatureActivity. An *Authorized and activated* value for CNIROver indicates that Calling Number Identification Restriction is overridden.
  - **PCW-FA** = Priority Call Waiting: FeatureActivity.
  - **DP-FA** = Data Privacy: FeatureActivity. (Note: part of *IS-737*.)
  - **AH-FA** = Answer Hold Data Privacy: FeatureActivity. (Note: part of *IS-837*.)
  - **USCFvm-FA** = User Selective Call Forwarding USCF divert to voice mail: FeatureActivity. (Note: part of *IS-838*.)
  - **USCFms-FA** = User Selective Call Forwarding USCF divert to mobile station provided DN: FeatureActivity. Note: part of *IS-838*.)
  - **USCFnr-FA** = User Selective Call Forwarding USCF divert to network registered DN: FeatureActivity. Note: part of *IS-838*.)
  - **CPDS-FA** = CDMA-Packet Data Service: FeatureActivity. (Note: part of *IS-880*.) Applicable CDMAServiceOptionList values (e.g., Service Option-33) may also be used for authorization.
  - **CCS-FA** = CDMA-Concurrent Service (e.g., both circuit and packet services simultaneously): FeatureActivity. (Note: ignore this field if CPDS is not authorized and active, part of *IS-880*.)
  - **TDMA EPE-FA** = TDMA Enhanced Privacy and Encryption: FeatureActivity.
- b. Reserved bits shall be ignored on receipt and set to zero on sending.
- c. Ignore extra octets, if received. Send only defined (or significant) octets.

Table 125      CallingFeaturesIndicator value

<i>FeatureActivity</i>				
Bits	H	G		
	or F	E		
	or D	C		
	or B	A	Value	Meaning
	0	0	0	Not used.
	0	1	1	<b>Not authorized.</b>
	1	0	2	<b>Authorized but de-activated.</b>
	1	1	3	<b>Authorized and activated.</b>

6.5.2.gm    CDMA2000HandoffInvokeIOSData

(new for TIA/EIA-41-D Chapter 5, page 5-44)

The CDMA2000HandoffInvokeIOSData (c2KHINVID) parameter contains cdma2000 IOS A1 element information required to support cdma2000 IOS handoff invoke operations (e.g., IS-2000 Channel Identity, IS-2000 Mobile Capabilities, IS-2000 Service Configuration Record, PDSN IP Address, Protocol Type, Quality of Service Parameter, Service Option List, Source RNC to Target RNC Transparent Container, Slot Cycle Index, Access Network ID, IS-2000 Channel Identity 3x [see IOS]). Note: each A1 element included in this parameter shall contain the element's A1 identifier and A1 element length fields.

Field		Value					Type	Reference	Notes
Identifier		CDMA2000HandoffInvokeIOSData IMPLICIT OCTET STRING					M	6.5.1.2	
Length		variable octets					M	6.5.1.1	
Contents									
H	G	F	E	D	C	B	A	octet	Notes
MSB  IOS A1 Element Handoff Invoke Information   <									

Figure 6.5.2.gm      CDMA2000HandoffInvokeIOSData parameter

## Notes:

- a. This field carries the information of all *IOS* A1 data elements required to support cdma2000 handoff invoke operations. Each A1 element included in this parameter shall contain the element's A1 identifier and A1 element length fields<sup>1</sup>. The A1 element field information in this parameter has precedence over the same A1 field duplicated in other parameters sent in the same operation. This parameter includes all required handoff invoke A1 elements with the exception of the following A1 elements:
- Message Type,
  - Channel Type,
  - Encryption Information,
  - Cell Identifier List (Target),
  - Circuit Identity Code Extension,
  - *IS-95* Channel Identity,
  - Mobile Identity (IMSI),
  - Mobile Identity (ESN),
  - Downlink Radio Environment,
  - Service Option,
  - CDMA Serving One Way Delay,
  - *IS-95* MS Measured Channel Identity, and
  - Response Request.

---

<sup>1</sup> For IOS ~~response~~ A1 elements without a length field, the A1 element length field must be appropriately inserted on sending and deleted on reception.

**6.5.2.gn CDMA2000HandoffResponseIOSData**(new for *TIA/EIA-41-D* Chapter 5, page 5-44)

The CDMA2000HandoffResponseIOSData (c2KHRSPID) parameter contains cdma2000 IOS A1 element information required to support cdma2000 IOS handoff response operations (e.g., IS-95 Channel Identity, IS-2000 Channel Identity, IS-2000 Non-Negotiable Service Configuration Record, Cause, Extended Handoff Direction Parameters, Hard Handoff Parameters, IS-2000 Service Configuration Record, target RNC to source RNC Transparent Container, IS-2000 Channel Identity 3x, Service Option List [see *IOS*]). Note: each A1 element included in this parameter shall contain the element's A1 identifier and A1 element length fields.

Field		Value				Type	Reference		Notes
Identifier		CDMA2000HandoffResponseIOS-Data IMPLICIT OCTET STRING				M	6.5.1.2		
Length		variable octets				M	6.5.1.1		
Contents									
H	G	F	E	D	C	B	A	octet	Notes
MSB  IOS A1 Element Handoff Response Information   									

**Figure 6.5.2.gn CDMA2000HandoffResponseIOSData parameter**

Notes:

- a. This field carries the information of all *IOS* A1 data elements required to support cdma2000 handoff response operations. Each A1 element included in this parameter shall contain the element's A1 identifier and A1 element length fields<sup>1</sup>. The A1 element field information in this parameter has precedence over the same A1 field duplicated in other parameters sent in the same operation. This parameter includes all required handoff response A1 elements with the exception of the following Handoff Request Ack A1 element:
  - Message Type.

<sup>1</sup> For IOS response A1 elements without a length field (i.e., Hard Handoff Parameters), the A1 element length field must be appropriately inserted on sending and deleted on reception.

6.5.2.29 CDMA\_CallMode

(new for TIA/EIA-41-D Chapter 5, page 5-163)

The CDMA\_CallMode (CDMAMODE) parameter identifies certain characteristics of a multi-mode CDMA and NAMPS MS.

Field	Value	Type	Reference	Notes					
Identifier	CDMA_CallMode IMPLICIT OCTET STRING	M	6.5.1.2						
Length	variable octets	M	6.5.1.1						
Contents									
H	G	F	E	D	C	B	A	octet	Notes
Reserved					Call Mode			4	a
MSB  Call Mode  LSB								1	a
								2	
...								n	

Figure 36 CDMA\_CallMode parameter

Notes:

- a. Reserved bits shall be ignored on receipt and set to zero on sending.

**Table 128      CDMA\_CallMode value**

<i>Call Mode (octet 1, bit A)</i>	
<b>Value</b>	<b>Meaning</b>
<b>0</b>	CDMA 800 MHz channel (Band Class 0) not acceptable.
<b>1</b>	CDMA 800 MHz channel (Band Class 0) acceptable.
<i>Call Mode (octet 1, bit B)</i>	
<b>Value</b>	<b>Meaning</b>
<b>0</b>	AMPS 800 MHz channel not acceptable.
<b>1</b>	AMPS 800 MHz channel acceptable.
<i>Call Mode (octet 1, bit C)</i>	
<b>Value</b>	<b>Meaning</b>
<b>0</b>	NAMPS 800 MHz channel not acceptable.
<b>1</b>	NAMPS 800 MHz channel acceptable.
<i>Call Mode (octet 1, bit D)</i>	
<b>Value</b>	<b>Meaning</b>
<b>0</b>	<u>CDMA 1900 MHz channel (Band Class 1) not acceptable.</u>
<b>1</b>	<u>CDMA 1900 MHz channel (Band Class 1) acceptable.</u>
<i>Call Mode (octet 1, bit E)</i>	
<b>Value</b>	<b>Meaning</b>
<b>0</b>	<u>TACS channel (Band Class 2) not acceptable.</u>
<b>1</b>	<u>TACS channel (Band Class 2) acceptable.</u>
<i>Call Mode (octet 1, bit F)</i>	
<b>Value</b>	<b>Meaning</b>
<b>0</b>	<u>JTACS channel (Band Class 3) not acceptable.</u>
<b>1</b>	<u>JTACS channel (Band Class 3) acceptable.</u>
<i>Call Mode (octet 1, bit G)</i>	
<b>Value</b>	<b>Meaning</b>
<b>0</b>	<u>Korean PCS channel (Band Class 4) not acceptable.</u>
<b>1</b>	<u>Korean PCS channel (Band Class 4) acceptable.</u>
<i>Call Mode (octet 1, bit H)</i>	
<b>Value</b>	<b>Meaning</b>
<b>0</b>	<u>450 MHz channel (Band Class 5) not acceptable.</u>
<b>1</b>	<u>450 MHz channel (Band Class 5) acceptable.</u>
<i>Call Mode (octet 2, bit A)</i>	
<b>Value</b>	<b>Meaning</b>
<b>0</b>	<u>2 GHz channel (Band Class 6) not acceptable.</u>
<b>1</b>	<u>2 GHz channel (Band Class 6) acceptable.</u>

**Table 128** **CDMACallMode value** (concluded)

<u>Call Mode (octet 2, bit B)</u>	
<u>Value</u>	<u>Meaning</u>
<u>0</u>	<u>700 MHz channel (Band Class 7) not acceptable.</u>
<u>1</u>	<u>700 MHz channel (Band Class 7) acceptable.</u>
<u>Call Mode (octet 2, bit C)</u>	
<u>Value</u>	<u>Meaning</u>
<u>0</u>	<u>1800 MHz channel (Band Class 8) not acceptable.</u>
<u>1</u>	<u>1800 MHz channel (Band Class 8) acceptable.</u>
<u>Call Mode (octet 2, bit D)</u>	
<u>Value</u>	<u>Meaning</u>
<u>0</u>	<u>900 MHz channel (Band Class 9) not acceptable.</u>
<u>1</u>	<u>900 MHz channel (Band Class 9) acceptable.</u>
<u>Call Mode (octet 2, bit E)</u>	
<u>Value</u>	<u>Meaning</u>
<u>0</u>	<u>Secondary 800 MHz channel (Band Class 10) not acceptable.</u>
<u>1</u>	<u>Secondary 800 MHz channel (Band Class 10) acceptable.</u>
<u>Call Mode (octet 2, bits F, G, H)</u>	
<u>Value</u>	<u>Meaning</u>
<u>x, x, x</u>	<u>Reserved</u>

<u>Call Mode (octet 1, bits A-C)</u>									
<del>Bits</del>	<del>H</del>	<del>G</del>	<del>F</del>	<del>E</del>	<del>D</del>	<del>C</del>	<del>B</del>	<del>A</del>	<del>Value</del>
									<del>Meaning</del>
								0	<del>CDMA channel not acceptable.</del>
								1	<del>CDMA channel acceptable.</del>
								0	<del>AMPS channel not acceptable.</del>
								1	<del>AMPS channel acceptable.</del>
								0	<del>NAMPS channel not acceptable.</del>
								1	<del>NAMPS channel acceptable.</del>



Note: the following text is from *TIA/EIA/IS-737*

### 6.5.2.ap CDMAConnectionReferenceInformation

(new for *TIA/EIA-41-D* Chapter 5, page 5-167)  
(*TIA/EIA/IS-737*, page 5-54)

The CDMAConnectionReferenceInformation (CDMACRINFO) parameter specifies the active Service Option, its Connection Reference, State Information, and optionally, Data Privacy information.

Field	Value	Type	Reference	Notes
Identifier	CDMAConnectionReference Information IMPLICIT SEQUENCE	M	6.5.1.2	
Length	variable	M	6.5.1.1	
Contents				
CDMAConnectionReference		M	6.5.2.bb	<u>d</u>
CDMAServiceOption		M	6.5.2.f	
CDMAState		O	6.5.2.ad	a
DataPrivacyParameter		O	6.5.2.au	b
<u>CDMAServiceOptionConnectionIdentifier</u>		<u>O</u>	<u>6.5.2.gr</u>	<u>e</u>
...				c

**Figure 6.5.2.ap CDMAConnectionReferenceInformation parameter**

Notes:

- Include if Service Option Control has been invoked (See *IS-95* or *TSB74* as appropriate).
- Include if the data privacy is requested.
- Ignore unexpected parameters, if received.
- Include with Length set to zero if unknown.
- Include to identify the requested service options required for IOS v4.1 or later.

Note: the following text is from *TIA/EIA-41-E* V&V PN-3590 file.

### 6.5.2.gh CDMAMSMMeasuredChannelIdentity

(new for *TIA/EIA-41-D* Chapter 5, page 5-167)

The CDMAMSMMeasuredChannelIdentity (CDMAMSMCI) parameter indicates the band class and frequency that has been measured by the MS in preparation for hard handoff.

Field	Value	Type	Reference	Notes					
Identifier	CDMAMSMMeasuredChannel Identity IMPLICIT OCTET STRING	M	6.5.1.2						
Length	<u>2 or more octets</u>	M	6.5.1.1						
Contents									
H	G	F	E	D	C	B	A	octet	Notes
Band Class					MSB			1	a
ARFCN					LSB			2	b
• • •								n	c

**Figure gh CDMAMSMMeasuredChannelIdentity parameter**

Notes:

- This field conveys the band class received from the MS in the Candidate Frequency Search Report message.

~~The BS shall copy the band class from the Candidate Frequency Search Report message received from the MS into this field when this element is included in the Handoff Required Message. The MSC shall copy this value to the corresponding field in this same element in the Handoff Request message.~~

- ARFCN (~~Absolute~~ Actual Radio Frequency Channel Number). This field is set to the CDMA channel number, in the specified CDMA band class, corresponding to the CDMA frequency assignment for the candidate frequency.

~~The BS shall set this field to the CDMA channel number in the specified CDMA band class corresponding to the CDMA frequency assignment for the candidate frequency.~~

- Ignore extra octets, if received. Send only defined (or significant) octets.

6.5.2.gr CDMAServiceOptionConnectionIdentifier

(new for TIA/EIA-41-D Chapter 5, page 5-170)

The CDMAServiceOptionConnectionIdentifier (C\_SOCI) parameter contains the requested or granted service option connection identifier.

Field		Value					Type	Reference	Notes
Identifier		CDMAServiceOptionConnection Identifier IMPLICIT OCTET STRING					M	6.5.1.2	
Length		variable octets					M	6.5.1.1	
Contents									
H	G	F	E	D	C	B	A	octet	Notes
Service Option Connection Identifier								1	a
• • •								<i>n</i>	b

Figure grCDMAServiceOptionConnectionIdentifier parameter

Notes:

- a. This field carries the Service Option Connection Identifier (SOCI) field, see *IOS*.
- b. Ignore extra octets, if received. Send only defined (or significant) octets.

Note: the following text is from *TIA/EIA-41-E* V&V PN-3590 file.

**6.5.2.e CDMAServiceConfigurationRecord**

(new for *TIA/EIA-41-D* Chapter 5, page 5-170)  
(*TIA/EIA/TSB76*, page 40)

The CDMAServiceConfigurationRecord (CDMASERCONF) parameter identifies common attributes used by the MS and the BS to build and interpret traffic channel frames.

The minimum length of this parameter is 7 octets.

Field		Value					Type	Reference	Notes
Identifier		CDMAServiceConfigurationRecord IMPLICIT OCTET STRING					M	6.5.1.2	
Length		variable octets					M	6.5.1.1	
Contents									
H	G	F	E	D	C	B	A	octet	Notes
MSB   									

**Figure e CDMAServiceConfigurationRecord parameter**

Notes:

- a. This field carries the *CDMA* Service Configuration Record. The bit-layout is the same as that of Service Configuration Record in the *CDMA* air interface specification. The contents may vary depending on the version of the air interface supported.

**6.5.2.72 InterMSCCircuitID**

(TIA/EIA-41-D Chapter 5, page 5-204)

The InterMSCCircuitID (IMSCCID) parameter is used to identify a specific trunk in a dedicated trunk group between two MSCs. This number consists of a trunk group number and member number.

Field		Value					Type	Reference		Notes
Identifier		InterMSCCircuitID IMPLICIT OCTET STRING					M	6.5.1.2		
Length		2 octets					M	6.5.1.1		
Contents										
H	G	F	E	D	C	B	A	octet	Notes	
Trunk Group Number (G)								1	<u>a</u>	
Trunk Member Number (M)								2	<u>a</u>	

**Figure 80 InterMSCCircuitID parameter****Notes:**

- a. An InterMSCCircuitID with pseudo value determined via bilateral agreement (e.g., H<sub>16</sub>FFFF) may be valid during or after handoff of a data service.

**6.5.2.gf PDSNAddress**

(new for TIA/EIA-41-D Chapter 5, page 5-230)

The PDSNAddress (PDSNADDR) parameter specifies the IP Address of the Packet Data Serving Node (PDSN) currently connected to the Packet Control Function (PCF).

Field		Value				Type	Reference		Notes
Identifier		PDSNAddress IMPLICIT OCTET STRING				M	6.5.1.2		
Length		3 or more octets				M	6.5.1.1		
Contents									
H	G	F	E	D	C	B	A	octet	Notes
MSB   PDSN Address  									

**Figure gf PDSNAddress parameter****Notes:**

- a. See *IOS* Handoff Request message for the definition of this field.

**6.5.2.gg PDSNProtocolType**(new for *TIA/EIA-41-D* Chapter 5, page 5-230)

The PDSNProtocolType (PDSNPTYPE) parameter identifies the Link Layer protocol used at the MS and at the Packet Data Serving Node (PDSN).

Field		Value				Type	Reference		Notes
Identifier		PDSNProtocolType IMPLICIT OCTET STRING				M	6.5.1.2		
Length		2 or more octets				M	6.5.1.1		
Contents									
H	G	F	E	D	C	B	A	octet	Notes
MSB   <									

**Figure gg PDSNProtocolType parameter**

Notes:

- a. See *IOS* Handoff Request message for the definition of this field.

**6.5.2.97 Profile**(new for *TIA/EIA-41-D* Chapter 5, page 5-234)  
(*TIA/EIA-41-D* Miscellaneous 10.9, page 110)

The Profile is a collection of the subscriber's calling profile information. This information is a list of optional parameters. The Profile macro has been defined solely for editorial convenience, and does not affect the encoding in any way.

PROFILE			
	Type	Reference	Notes
Contents			
...	...	...	...
<u>QoS</u> Priority	<u>O</u>	<u>6.5.2.ge</u>	<u>z</u>
...	...	...	...

**Figure 105 Profile Macro**

Notes:

- z. Include if packet data services are applicable to indicate relative priority for purposes of radio resource allocation.

6.5.2.ge QoSPriority

(new for TIA/EIA-41-D Chapter 5, page 5-236)  
(TIA/EIA-41-D Miscellaneous 10.9, page 110)

The QoSPriority (QoSPRI) parameter indicates the relative priority with which to treat a MS subscriber's requests for radio resources related to CDMA packet data services. The priority level is applicable to user administration, Media Access Control (MAC) state transition control, and burst allocation.

Field		Value				Type	Reference	Notes	
Identifier		QoSPriority IMPLICIT OCTET STRING				M	6.5.1.2		
Length		variable octets				M	6.5.1.1		
Contents									
H	G	F	E	D	C	B	A	octet	Notes
Assured Priority				Non-Assured Priority				1	a
				...				n	a b

Figure ge QoSPriority parameter

- Notes:
- a. ~~Reserved bits shall be ignored on receipt and set to zero on sending.~~
  - b. ~~Ignore extra octets, if received. Send only defined (or significant) octets.~~

**Table ge**      **QoSPriority value**

<i>Non-Assured Priority (octet 1, bits A-D)</i>										
Bits	H	G	F	E	D	C	B	A	Value	Meaning
					0	0	0	0	0	<b>Priority Level 0.</b> This is the lowest priority.
					0	0	0	1	1	<b>Priority Level 1.</b>
					0	0	1	0	2	<b>Priority Level 2.</b>
					0	0	1	1	3	<b>Priority Level 3.</b>
					0	1	0	0	4	<b>Priority Level 4.</b>
					0	1	0	1	5	<b>Priority Level 5.</b>
					0	1	1	0	6	<b>Priority Level 6.</b>
					0	1	1	1	7	<b>Priority Level 7.</b>
					1	0	0	0	8	<b>Priority Level 8.</b>
					1	0	0	1	9	<b>Priority Level 9.</b>
					1	0	1	0	10	<b>Priority Level 10.</b>
					1	0	1	1	11	<b>Priority Level 11.</b>
					1	1	0	0	12	<b>Priority Level 12.</b>
					1	1	0	1	13	<b>Priority Level 13.</b>
					1	1	1	0	14	Reserved. Treat as Priority Level 14.
					1	1	1	1	15	Reserved. Treat as Priority Level 15.
<i>Assured Priority (octet 1, bits E-H)</i>										
Bits	H	G	F	E	D	C	B	A	Value	Meaning
	0	0	0	0					0	<b>Priority Level 0.</b> This is the lowest priority.
	0	0	0	1					1	<b>Priority Level 1.</b>
	0	0	1	0					2	<b>Priority Level 2.</b>
	0	0	1	1					3	<b>Priority Level 3.</b>
	0	1	0	0					4	<b>Priority Level 4.</b>
	0	1	0	1					5	<b>Priority Level 5.</b>
	0	1	1	0					6	<b>Priority Level 6.</b>
	0	1	1	1					7	<b>Priority Level 7.</b>
	1	0	0	0					8	<b>Priority Level 8.</b>
	1	0	0	1					9	<b>Priority Level 9.</b>
	1	0	1	0					10	<b>Priority Level 10.</b>
	1	0	1	1					11	<b>Priority Level 11.</b>
	1	1	0	0					12	<b>Priority Level 12.</b>
	1	1	0	1					13	<b>Priority Level 13.</b>
	1	1	1	0					14	Reserved. Treat as Priority Level 14.
	1	1	1	1					15	Reserved. Treat as Priority Level 15.



### 6.5.2.111 ReleaseReason

(TIA/EIA-41-D Chapter 5, page 5-246)

The ReleaseReason (RELREASON) parameter is used to indicate the reason for requesting that allocated resources be released (i.e., via the invocation of the FacilitiesRelease operation).

Field		Value					Type	Reference		Notes
Identifier		QoSPriority IMPLICIT Unsigned Enumerated					M	6.5.1.2		
Length		1 octet					M	6.5.1.1		
Contents										
H	G	F	E	D	C	B	A	octet	Notes	
Release Reason								1		

**Figure 119 ReleaseReason parameter**

**Table 119 Release Reason value**

Release Reason (octet 1)										Value	Meaning
Bits	H	G	F	E	D	C	B	A			
					0	0	0	0		0	Unspecified.
	0	0	0	0	0	0	0	1		1	CallOverClearForward.
	0	0	0	0	0	0	1	0		2	CallOverClearBackward.
	0	0	0	0	0	0	1	1		3	HandoffSuccessful.
	0	0	0	0	0	1	0	0		4	HandoffAbort-call over.
	0	0	0	0	0	1	0	1		5	HandoffAbort-not received.
	0	0	0	0	0	1	1	0		6	AbnormalMobileTermination.
	0	0	0	0	0	1	1	1		7	AbnormalSwitchTermination.
	0	0	0	0	1	0	0	0		8	SpecialFeaturesRelease.
	0	0	0	0	1	0	0	1		9	SessionOverClearForward.
	0	0	0	0	1	0	1	0		10	SessionOverClearBackward.
	0	0	0	0	1	0	1	1		11	CclearAllServicesForward.
	0	0	0	0	1	1	0	0		12	ClearAllServicesBackward.
	0	0	0	0	1	1	0	1		13	Anchor MSC was removed from the packet data session.
	0	0	0	0	1	1	0	1		13	Keep MS on traffic channel.
	0	0	0	0	1	1	1	0		14	Reserved. Treat the same as value 0, Unspecified.
	1	1	0	1	1	1	1	1		223	
	1	1	1	0	0	0	0	0		224	Reserved for TIA/EIA-41 protocol extension. If unknown, treat the same as value 0, Unspecified.
	1	1	1	1	1	1	1	1		225	

## ANNEX-A IOS Version-4.1 (A1 to TIA/EIA-41 Mapping)

(new for TIA/EIA-41.5-D, page 5-336)

The following tables are for informative use only and do **not** reflect the mapping intended for IS-2000 handoff operation. The tables were used to identify TIA/EIA-41D deficiencies with respect to IS-2000 handoff support.

As a result of this investigation, it was determined that two new TIA/EIA-41 parameters will be required in order to convey IS-2000 information during handoffs. The two new parameters were named CDMA2000HandoffInvokeIOSData and CDMA2000HandoffResponseIOSData. Please refer to sections 6.5.2.gm and 6.5.2.gn for further details

**Table Annex-A.1 IOS Version-4.1 IS-2000 Channel Identity**  
(Handoff Required, Handoff Request) to (FACDIR2, HANDBACK2, HANDTHIRD2)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
IS-2000 Channel Identity	OTD	none	none	Not needed at the Target BS. Set to "zero (0)".

Channel Count	none	none	Need this information to simplify processing at the Target MSC, eliminates the need to parse the entire element in order to calculate the channel count.
Frame Offset	CDMA Channel Data	Frame Offset	Presently supported in TIA/EIA-41.
Physical Channel Type (Note-1)	none	none	Need Physical Channel Type data for each channel type.
Pilot Gating Rate (Note-1)	none	none	TR-45.4 indicates this field should be supported.
QOF Mask (Note-1)	none	none	Not needed at the Target BS.
Walsh Code Channel Index	CDMA CodeChannel	CDMA Code Channel	Ignored at Target BS.
Pilot PN Code	none	none	Not needed at the Target BS.
Freq. Included	none	none	Always set to "one (1)".
ARFCN (Note-1)	CDMAChannel Data	CDMA Channel Number	Note: need to transport a CDMA Channel Number for each channel type (maximum of two).

Note-1: these fields are required to uniquely identify each channel [maximum of two channels].

**Table Annex-A.2 IOS Version-4.1 IS-2000 Mobile Capabilities**  
 (Handoff Required, Handoff Request) to (FACDIR2, HANDBACK2, HANDTHIRD2)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
IS-2000 Mobile Capabilities	QPCH Supported	none	none	Needs to be supported.
	Enhanced RC CFG Supported	none	none	Needs to be supported.
	OTD Supported	none	none	Needs to be supported.
	FCH Supported	none	none	This field is set to one (1) if FCH Information Content is present.
	DCCH Supported	none	none	This field is set to one (1) if DCCH Information Content is present.  The Target MSC sets this field to one (1) in Handoff Request if cdma2000 DcchMobileCapabilities is received.
	Geo Location Type	none	none	Not needed at the Target BS.
	Geo Location Included	none	none	Not needed at the Target BS.
	FCH Information Bit Exact Length	none	none	Needs to be supported. This field corresponds to the information length in octets.
	FCH Information Bit-Exact Length – Fill Bits	none	none	TR-45.4 indicates this entire field is needed by the Target MSC to populate the corresponding field in the Handoff Request message.
	FCH Information Content	none	none	TR-45.4 indicates this entire field is needed by the Target BS

**Table Annex-A.2 IOS Version-4.1 IS-2000 Mobile Capabilities**  
(Handoff Required, Handoff Request) to (FACDIR2, HANDBACK2, HANDTHIRD2)  
(concluded)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
IS-2000 Mobile Capabilities	DCCH Information Bit Exact Length	none	none	Needs to be supported. This field corresponds to the information length in octets.
	DCCH Information Bit-Exact Length – Fill Bits	none	none	TR-45.4 indicates this entire field is needed by the Target MSC to populate the corresponding field in the Handoff Request message.
	DCCH Information Content	none	none	TR-45.4 indicates this entire field is needed by the Target BS.

**Table Annex-A.3 IOS Version-4.1: IS-2000 Service Configuration Record**  
(Handoff Required, Handoff Request) to (FACDIR2, HANDBACK2, HANDTHIRD2)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
IS-2000 Service Configuration Record	Bit Exact Length	none	none	This field may be computed from TIA/EIA-41 parameter length field, however, it would simplify call processing if received at the MSC in a separate field.
	Bit-Exact Length – Fill Bits	none	none	TR-45.4 indicates this field needs to be supported. It is needed by the Target MSC to populate the corresponding field in the Handoff Request message.
	IS-2000 Service Configuration Record Content	none	none	TR-45.4 indicates this entire field is needed at the target BS.

**Table Annex-A.4 IOS Version-4.1: Cell Identifier List**  
(Handoff Required, Handoff Request) to (FACDIR2, HANDBACK2, HANDTHIRD2)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
Cell Identifier List	Cell Identification Discriminator	none	none	TR-45.4 indicates this field does not need to be supported.
	Cell Identification	CDMATarget MAHOList or CDMATarget Measurement List	CDMATarget MAHO Information or CDMATarget Measurement Information	TR-45.4 indicates multiple target cell ID's need to be supported. Currently multiple target cell ID's could be included for 3G operation. Note: currently multiple target cell ID's are supported in TIA/EIA-41.

**Table Annex-A.5 IOS Version-4.1: IS-2000 Channel Identity**  
(Handoff Request Ack, Handoff Command) to (facdir2, handback2, handthird2)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
IS-2000 Channel Identity	OTD	none	none	TR-45.4 indicates this field does need to be supported at the source BS. <i>New TIA/EIA-41 param., see CDMA2000HandoffResponse IOSData.</i>
	Channel Count	none	none	TR-45.4 indicates this field does need to be supported at the source MSC to simplify processing, eliminates the need to calculate the channel count.
	Frame Offset	CDMA Channel Data	Frame Offset	
	Physical Channel Type (note 1)	none	none	Need to send the physical channel type for each allocated channel.
	Pilot Gating Rate (note 1)	none	none	TR-45.4 indicates this field does need to be supported at the source BS.

Note-1: these fields are required to uniquely identify each allocated channel [maximum of two channel types, maximum of six channels per channel type].

**Table Annex-A.5 IOS Version-4.1: IS-2000 Channel Identity**  
 (Handoff Request Ack, Handoff Command) to (facdir2, handback2, handthird2)  
 (concluded)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
IS-2000 Channel Identity	QOF Mask (note 1)	none	none	TR-45.4 indicates this field does need to be supported at the source BS. <i>New TIA/EIA-41 param., see CDMA2000HandoffResponse IOSData.</i>
	Walsh Code Channel Index (note 1)	CDMA CodeChannel List	CDMA Code Channel	The existing CDMACodeChannel parameter does not accommodate the larger WalschCodeChannelIndex that could be received over the A1 interface. Also, CDMACodeChannelList could be used to carry info for multiple channels, however, it currently does not support the larger CDMACodeChannel length.
	Pilot PN Code (note 1)	none	none	The existing parameter is inadequate in that it does not support multiple target channels.
	Freq. Included	none	none	TR-45.4 indicates the source MSC always sets <del>set</del> this to '1', no need to transport.
	ARFCN (note 1)	CDMAChannel Data	CDMA Channel Number	Need to transport a CDMA Channel Number for each allocated channel.

Note-1: these fields are required to uniquely identify each allocated channel [maximum of two channel types, maximum of six channels per channel type].

**Table Annex-A.6 IOS Version-4.1: IS-2000 Service Configuration Record**  
(Handoff Request Ack, Handoff Command) to (facdir2, handback2, handthird2)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
IS-2000 Service Configuration Record	Bit Exact Length	none	none	This field may be computed from TIA/EIA-41 parameter length field, however, it would simplify call processing if received at the MSC in a separate field.
	Bit-Exact Length – Fill Bits	none	none	TR-45.4 indicates this is needed by the source MSC to populate the corresponding field in the Handoff Command message.
	IS-2000 Service Configuration Record Content	none	none	TR-45.4 indicates this entire field is needed by the source MSC, including the “Fill Bits”.

**Table Annex-A.7 IOS Version-4.1: IS-2000 Non-Negotiable Service Configuration Record**  
(Handoff Request Ack, Handoff Command) to (facdir2, handback2, handthird2)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
IS-2000 Non-Negotiable Service Configuration Record	Bit Exact Length	none	none	This field may be computed from TIA/EIA-41 parameter length field, however, it would simplify call processing if received at the MSC in a separate field.
	Bit-Exact Length – Fill Bits	none	none	TR-45.4 indicates this is needed by the source MSC to populate the corresponding field in the HandoffCommand message.
	IS-2000 Non-Negotiable Service Configuration Record Content	none	none	TR-45.4 indicates this entire field is needed at the source MSC (similar to the <i>IS-2000 Service ConfigurationRecord</i> ).



**Table Annex-A.8 IOS Version-4.1: Hard Handoff Parameters**  
 (Handoff Request Ack, Handoff Command) to (facdir2, handback2, handthird2)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
Hard Handoff Parameters	Band Class	CDMABand Class	Band Class	Presently supported in TIA/EIA-41.
	Number of Preamble Frames	CDMAChannel Data	Number Preamble	Presently supported in TIA/EIA-41.
	Reset L2	none	none	TR-45. indicates this field is needed at the source BS.
	Reset FPC	none	none	TR-45. indicates this field is needed at the source BS.
	Encryption Mode	Confidentially Modes	Signaling Message Encryption (SE)	Presently supported in TIA/EIA-41. TR-45.4 indicates this field is needed at the source BS.
	Private LCM	CDMAPrivate LongCode Mask	CDMAPrivate LongCode Mask	Presently supported in TIA/EIA-41.
	Nom_Pwr_Ext	CDMAChannel Data	NP_EXT	Presently supported in TIA/EIA-41.
	Normal_Power	CDMAChannel Data	Normal Power	Presently supported in TIA/EIA-41.
	FPC Subchannel Information	none	none	Needs to be supported.
	FPC Subchan Info Included	none	none	TR-45.4 indicates this field needs to be passed to the Source MSC to indicate if the FPC Subchannel Information contains valid information.
	Power Control Step	none	none	Needs to be supported.
	Power Control Step Included	none	none	TR-45.4 indicates this field needs to be passed to the Source MSC to indicate if the Power Control Step contains valid information.

**Table Annex-A.9 IOS Version-4.1: Cell Identifier List**  
(Handoff Request Ack, Handoff Command) to (facdir2, handback2, handthird2)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
Cell Identifier List	Cell Identification Discriminator	none	none	TR-45.4 indicates this field does not need to be supported.
	Cell Identification	CDMA Code Channel List	CDMA Code Channel Information	TR-45.4 indicates this field does need to be supported.

**Table Annex-A.10 IOS Version-4.1: Extended Handoff Direction Parameters**  
(Handoff Request Ack, Handoff Command) to (facdir2, handback2, handthird2)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
Extended Handoff Direction Parameters	Search Window A Size	CDMA Search Parameters	CDMA Search Window	Presently supported in TIA/EIA-41.
	Search Window N Size	none	none	TR-45.4 indicates this field is currently used in the Handoff Request Ack message but is ignored in the Handoff Command message*.
	Search Window R Size	none	none	TR-45.4 indicates this field is currently used in the Handoff Request Ack message but is ignored in the Handoff Command message*.
	Add Pilot Threshold High Order Bits	none	none	Used if received at the source BS.
	Add Pilot Threshold Low Order Bits	none	none	Used if received at the source BS.
	Drop Pilot Threshold	none	none	Used if received at the source BS.
	Compare Threshold	none	none	Used if received at the source BS.
	Drop Timer Value	none	none	Used if received at the source BS.

\* Note: TR-45.4 recommends this information be supported by TIA/EIA-41, at which point the information will no longer be ignored in the Handoff Command message.

**Table Annex-A.10 IOS Version-4.1: Extended Handoff Direction Parameters**  
 (Handoff Request Ack, Handoff Command) to (facdir2, handback2, handthird2) (concluded)

A1 Element	A1 Field	ANSI-41-D Parameter	ANSI-41-D Parm. Field	Notes
Extended Handoff Direction Parameters	Neighbor Max Age	none	none	TR-45.4 indicates this field is currently used in the Handoff Request Ack message but is ignored in the Handoff Command message*.
	SOFT_SLOPE	none	none	Used if received at the source BS.
	ADD_INTERCEPT	none	none	Used if received at the source BS.
	DROP_INTERCEPT	none	none	Used if received at the source BS.
	Target BS P_REV	CDMA ChannelData	CDMA Channel Data	Presently supported in TIA/EIA-41.

\* Note: TR-45.4 recommends this information be supported by TIA/EIA-41, at which point the information will no longer be ignored in the Handoff Command message.

## 7. TIA/EIA-41-D Chapter 6 “Signaling Procedures” Modifications

The omitted portion of this section is retained without modification.

### 3.3.5 MS Termination Alerting

(TIA/EIA-41-D, page 6-29)

Upon request the MSC shall do the following:

1 IF the indicated MS is idle:

The omitted portion of this section is retained without modification.

2 ELSEIF the indicated MS is busy:

~~2 ELSE (the indicated MS is busy):~~

The omitted portion of this section is retained without modification.

3 ELSEIF the indicated MS is engaged in an active packet session:

~~3 ENDIF.~~

~~4 Return to the calling task.~~

3-1 IF the *Terminating Resource Available* trigger has been armed for the MS:

3-1-1 Execute the "MSC Check of Serial Trigger Limit" task (see *IS-771*, Section 6.x).

3-1-2 Execute the "MSC Initiating a Facility Selected An Available" task (see *IS-771*, Section 4.E.1).

3-2 ENDIF.

3-3 IF the RoutingDigits parameter is received:

3-3-1 Analyze the routing digits to select an internal trunk group (such as a service monitor, scrambling device).

3-4 ENDIF.

3-5 Execute the "MSC CNIP Terminating Call Invocation" task (see 5.8.4).

3-6 Execute the "MSC CNAP Terminating Call Invocation" task (see *IS-764*, Section 5.X.2).

3-7 Include the appropriate MS identifier (MIN or IMSI) in the alerting command.

3-8 IF the AlertCode parameter was received:

3-8-1 Include the AlertCode parameter in the MS alerting command to control the pitch and cadence of the alerting.

3-9 ELSE

3-9-1 Include the system default AlertCode parameter in the MS alerting command to control the pitch and cadence of the alerting.

3-10 ENDIF.

**Present Call PIC**

3-11 IF the MSC is the Serving MSC:

3-11-1 Order the MS to alert.

3-12 ELSEIF the MSC is the Anchor MSC:

3-12-1 Execute the "MSC Initiation of an InterSystemSetup" task (see 4.27.1).

3-13 ENDIF.

4 ENDIF.

**T.Alerting PIC**

5 GOTO Await Answer.

6 Return to the calling task.

## 4.12 Facilities Directive2 (Handoff Forward)

(TIA/EIA-41-D, page 6-124)

The handoff forward using the FacilitiesDirective2 operation is described in this section.

### 4.12.1 Serving MSC Initiating a Facilities Directive2

(new for TIA/EIA-41-D, page 6-124)

When a Serving MSC determines that it needs to handoff a call to a Target MSC, it shall do the following:

1 IF handoff is allowed (e.g., InterSwitchCount value at the Serving MSC is less than or equal to ~~that~~ MAXHANDOFF, see 2.1):

1-1 IF the Serving MSC is also the Anchor MSC.

1-1-1 IF the MS being handed off is alerting:

1-1-1-1 IF the Target MSC is known to support handoff while alerting:

1-1-1-1-1 Include the HandoffState parameter set to *Terminator is handing off*.

1-1-1-2 ELSE:

1-1-1-2-1 Optionally, attempt to select another target according to internal algorithms.

1-1-1-2-2 Exit this task.

1-1-1-3 ENDIF.

1-1-2 ELSEIF the MS is awaiting an answer AND IF answer supervision is provided for handed-off MSs:

1-1-2-1 IF the Target MSC is known to support handoff while awaiting an answer:

1-1-2-1-1 Include the HandoffState parameter set to *Originator is handing off*.

1-1-2-2 ELSE:

1-1-2-2-1 Optionally ~~Optionality~~, attempt to select another target according to internal algorithms.

1-1-2-2-2 Exit this task.

1-1-2-3       ENDIF.

1-1-3       ENDIF.

1-2       ENDIF.

1-3       IF resources are available to support the handoff ~~an inter-MSC trunk is available to the Target MSC:~~

1-3-1       IF an inter-MSC trunk is required:

1-3-1-1       Allocate an inter-MSC trunk:

1-3-2       ENDIF.

Deleted for diet.

~~1-3-2       IF the Signaling MessageEncryptionKey (SMEKEY) parameter:~~

~~1-3-2-1       Include the SignalingMessageEncryptionKey (SMEKEY) parameter.~~

~~1-3-2-2       Include the ConfidentialityModes (CMODES-desired) parameter set according to the MS's Signaling Message Encryption mode.~~

~~1-3-3       ENDIF.~~

1-3-4       IF the subscriber is authorized to have Voice Privacy:

~~1-3-4-1       IF the MS supports TDMA:~~

~~1-3-4-1-1       IF the VoicePrivacyMask (VPMASK) is available.~~

~~1-3-4-1-1-1       Include the VoicePrivacyMask (VPMASK) parameter.~~

~~1-3-4-1-2       ENDIF.~~

~~1-3-4-2       ENDIF.~~

~~1-3-4-3       IF the MS supports CDMA:~~

~~1-3-4-3-1       IF the CDMAPrivateLongCodeMask (CDMAPLCM) is available:~~

~~1-3-4-3-1-1       Include the CDMAPrivateLongCodeMask (CDMAAPLCM) parameter.~~

~~1-3-4-3-1-2       Include the CDMAChannelData parameter with the Long Code Mask field set to the long code mask in use at the Serving MSC.~~

~~1-3-4-3-2       ENDIF.~~

~~1-3-4-4       ENDIF.~~

~~1-3-4-5       IF ConfidentialityModes (CMODES-desired) parameter has not been received:~~

~~1-3-4-5-1       Include the ConfidentialityModes (CMODES-desired) parameter.~~

~~1-3-4-6       ENDIF.~~

1-3-4-7       Set the Voice Privacy field of the ConfidentialityModes (CMODES-desired) parameter according to the MS's preferred Voice Privacy mode.

1-3-5       ENDIF.

1-3-6       IF the subscriber is authorized to have Data Privacy:

1-3-6-1 IF the MS supports TerminalType (TERMTYP) CDMA:

1-3-6-1-1 IF the DataPrivacyParameters (DATAPP) is applicable:

1-3-6-1-1-a IF the CDMAServiceOption parameter in the CDMAConnectionReference Information parameter contains a data service option:

1-3-6-1-1-a-1 Include the DataPrivacyParameters (DATAPP) in the CDMAConnectionReferenceInformation parameter set according to the requested Data Privacy information.

1-3-6-1-1-b ELSE (data service is not contained in CDMAServiceOption parameter):

1-3-6-1-1-b-1 Include the DataPrivacyParameters (DATAPP) set to the last known value of Data Privacy Data.

1-3-6-1-1-c ENDIF.

1-3-6-1-1-d Include the DataKey (DKEY) parameter and the RandomVariable (RAND) parameter.

~~Deleted for diet.~~

~~1-3-6-1-1-e IF ConfidentialityModes (CMODES-desired) parameter is not received:~~

~~1-3-6-1-1-e-1 Include the ConfidentialityModes (CMODES-desired) parameter.~~

~~1-3-6-1-1-f ENDIF.~~

1-3-6-1-1-g Set the Data Privacy field of the ConfidentialityModes (CMODES-desired) parameter according to the MS's preferred Data Privacy mode.

1-3-6-1-2 ENDIF.

1-3-6-2 ENDIF.

1-3-7 ENDIF.

1-3-8 IF the Serving MSC is the Anchor MSC:

1-3-8-1 Include the InterSwitchCount parameter set to 1.

1-3-8-2 IF this is the first handoff segment:

1-3-8-2-1 Include the BillingID parameter with the value of the Segment Counter field set to 0 (associated with the air segment on this MSC).

1-3-8-3 ELSE (this is not the first handoff segment):

1-3-8-3-1 Include the BillingID parameter with the value of the Segment Counter field set to the value of the stored BillingID parameter.

1-3-8-4 ENDIF.

1-3-9 ELSE (the Serving MSC is not the Anchor MSC):

1-3-9-1 Include the InterSwitchCount parameter set to the value of the stored InterSwitchCount incremented by 1.

1-3-9-2 Include the BillingID parameter with the value of the Segment Counter field set to the value of the stored BillingID parameter.

1-3-10       ENDIF.

1-3-11       IF the Serving MSC counts tandem segments:

1-3-11-1       IF the value of the BillingID parameter Segment Counter field is not FF<sub>16</sub>:

1-3-11-1-1       Increment the value of the BillingID parameter Segment Counter field by 1 (the value to be associated with the tandem segment being created).

1-3-11-2       ENDIF.

1-3-12       ENDIF.

Added for diet.

1-3-13       Include all appropriate parameters (see Chapter 5).

Deleted for diet.

~~1-3-13       CASE the currently assigned traffic channel mode OF:~~

~~1-3-14       AMPS:~~

~~1-3-14-1       Include the ChannelData parameter.~~

~~1-3-14-2       Include the TargetCellID parameter.~~

~~1-3-15       NAMPS:~~

~~1-3-15-1       Include the NAMPSCallMode parameter.~~

~~1-3-15-2       Include the ChannelData parameter.~~

~~1-3-15-3       Include the NAMPSChannelData parameter.~~

~~1-3-15-4       Include the TargetCellID parameter.~~

~~1-3-16       CDMA:~~

~~1-3-16-1       Include the CDMACallMode parameter.~~

~~1-3-16-2       Include the CDMAChannelData parameter.~~

~~1-3-16-3a      Include the CDMAConnectionReferenceList parameter set to the requested service option information.~~

~~1-3-16-3       Include the CDMA MobileProtocolRevision parameter.~~

~~1-3-16-4       Include the CDMA ServingOneWayDelay parameter.~~

~~1-3-16-5       IF the current service configuration is not the default service configuration:~~

~~1-3-16-5-1      Include the CDMAServiceConfigurationRecord.~~

~~1-3-16-6       ENDIF.~~

~~1-3-16-7       Include the CDMAServiceOptionList.~~

~~1-3-16-8       Include the CDMAStationClassMark parameter.~~

~~1-3-16-9       Include the MSLocation parameter.~~

~~1-3-16-10      IF the handoff was mobile assisted:~~

~~1-3-16-10-1     Include the CDMA TargetMAHOList parameter including one or more CDMA TargetMAHOInformation parameters.~~

~~1-3-16-11      ELSE (handoff was not mobile assisted):~~

~~1-3-16-11-1     Include the CDMA TargetMeasurementList parameter including one or more CDMA TargetMeasurementInformation parameters.~~

~~1-3-16-12      ENDIF.~~



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~~1-3-17~~ ~~TDMA:~~  
~~1-3-17-1~~ ~~Include the TDMACallMode parameter.~~  
~~1-3-17-2~~ ~~Include the TDMAChannelData parameter.~~  
~~1-3-17-3~~ ~~Include the TargetCellID parameter.~~  
~~1-3-17-4~~ ~~IF applicable:~~  
~~1-3-17-4-1~~ ~~Include the TDMABandwidth parameter.~~  
~~1-3-17-4-2~~ ~~Include the TDMABurstIndicator.~~  
~~1-3-17-4-3~~ ~~Include the TDMAServiceCode.~~  
~~1-3-17-4-4~~ ~~Include the TDMATerminalCapability.~~  
~~1-3-17-5~~ ~~ENDIF.~~  
~~1-3-18~~ ~~ENDCASE.~~  
~~1-3-19~~ ~~Include the ElectronicSerialNumber parameter set to identify the MS.~~  
~~1-3-20~~ ~~Include the MobileIdentificationNumber parameter set to identify the MS.~~  
~~1-3-21~~ ~~Include the ServingCellID parameter set to the cell currently serving the MS.~~  
~~1-3-22~~ ~~IF the MS is currently in a circuit mode data call:~~  
~~1-3-22-1~~ ~~Include the ISLPIInformation parameter set to Serving MSC ISLP information.~~  
~~1-3-23~~ ~~ENDIF.~~  
1-3-24 Send a FacilitiesDirective2 INVOKE to the Target MSC.  
1-3-25 Start the Handoff Order Timer (HOT).  
1-3-26 WAIT for the Facilities Directive2 response:  
1-3-27 WHEN a RETURN RESULT is received:  
1-3-27-1 Stop timer (HOT).  
1-3-27-2 IF the message can be processed:  
1-3-27-2-1 IF required:  
1-3-27-2-1-1 Order the MS to conform to the Target MSC's selected traffic channel and associated transmission modes (e.g., as indicated by the parameters ChannelData, NAMPSCChannelData, TDMAChannelData, CDMAChannelData).  
1-3-27-2-2 ENDIF.  
1-3-27-2-3 IF the ConfidentialityModes (CMODES-Actual) parameter is provided:  
1-3-27-2-3-1 Order the MS to handoff with Voice Privacy, Data Privacy and Signaling Message Encryption modes enabled as requested.  
1-3-27-2-4 ELSE:  
1-3-27-2-4-1 Order the MS to handoff with Voice Privacy, Data Privacy and Signaling Message Encryption disabled.  
1-3-27-2-5 ENDIF.  
1-3-27-2-6 Start the Mobile Handoff Order Timer (MHOT).  
1-3-27-2-7 WAIT for the MS to get on channel:  
1-3-27-2-8 WHEN a MobileOnChannel INVOKE is received:

1-3-27-2-8-1	Stop timer (MHOT).	1
<u>1-3-27-2-8-2</u>	<u>IF a circuit service is being handed off:</u>	2
1-3-27-2-8-2-1	Connect the call path to the inter-MSC trunk.	3
<u>1-3-27-2-8-a</u>	<u>ENDIF.</u>	4
1-3-27-2-8-3	IF the MS being handed off is alerting AND IF the HandoffState parameter was received AND IF its value is <i>Terminator is handing off</i> :	5
1-3-27-2-8-3-1	Execute the “MSC Awaiting InterSystemAnswer” task (see 4.24.1).	6
1-3-27-2-8-3-2	IF the handoff trunk is still seized:	7
1-3-27-2-8-3-2-1	Provide answer supervision to the incoming call leg.	8
1-3-27-2-8-3-3	ENDIF.	9
1-3-27-2-8-4	ELSEIF the MS is awaiting an answer AND IF answer supervision is provided for handed-off MSs AND IF the HandoffState parameter was received AND IF its value is <i>Originator is handing off</i> :	10
1-3-27-2-8-4-1	Start an alerting timer (if its not already started).	11
1-3-27-2-8-4-2	WAIT for originating leg to answer:	12
1-3-27-2-8-4-3	WHEN the originating leg answers:	13
1-3-27-2-8-4-3-1	Stop the alerting timer.	14
1-3-27-2-8-4-3-2	GOTO the “MSC Initiating InterSystemAnswer” task (see 4.24.2).	15
1-3-27-2-8-4-4	WHEN a FacilitiesRelease INVOKE is received (see 4.13.2):	16
1-3-27-2-8-4-4-1	Stop the alerting timer.	17
<u>1-3-27-2-8-4-4-x</u>	<u>Execute the “MSC Receiving FacilitiesRelease INVOKE” task (see 4.13.2).</u>	18
1-3-27-2-8-4-4-2	Exit this task.	19
<u>1-3-27-2-8-4-a</u>	<u>WHEN a DropService INVOKE is received (see 4.y.y.2):</u>	20
<u>1-3-27-2-8-4-a-1</u>	<u>IF the circuit services were dropped:</u>	21
<u>1-3-27-2-8-4-a-1-1</u>	<u>Stop the alerting timer if running.</u>	22
<u>1-3-27-2-8-4-a-1-2</u>	<u>Execute the “MSC Receiving Drop Service INVOKE” task (see 4.y.y.2).</u>	23
<u>1-3-27-2-8-4-a-1-3</u>	<u>Exit this task.</u>	24
<u>1-3-27-2-8-4-a-2</u>	<u>ELSE:</u>	25
<u>1-3-27-2-8-4-a-2-1</u>	<u>Spawn the “MSC Receiving Drop Service INVOKE” task (see 4.y.y.2).</u>	26
<u>1-3-27-2-8-4-a-2-2</u>	<u>Remain in this state.</u>	27
<u>1-3-27-2-8-4-a-3</u>	<u>ENDIF.</u>	28
1-3-27-2-8-4-5	WHEN the alerting timer expires:	29
<u>1-3-27-2-8-4-5-1</u>	<u>IF both packet data and circuit voice services were being handed off:</u>	30

1-3-27-2-8-4-5-1-1      Execute the “MSC Initiation of DropService” task (see 4.y.y.1) to release the circuit voice service.

1-3-27-2-8-4-5-2      ENDIF.

1-3-27-2-8-4-5-3      IF only a circuit service was being handed off:

1-3-27-2-8-4-5-3-1      Execute the “MSC Initiation of Facilities Release” task (see 4.13.1).

1-3-27-2-8-4-5-4      ENDIF.

1-3-27-2-8-4-5-25      Exit this task.

(HandoffBack is allowed here and the HandoffState parameter should be received.)

~~1-3-27-2-8-4-5-36      (HandoffBack is allowed here and the HandoffState parameter should be received.)~~

1-3-27-2-8-4-6      ENDWAIT.

1-3-27-2-8-5      ENDIF.

1-3-27-2-9      WHEN the (MHOT) timer expires:

1-3-27-2-9-1      IF a packet data service was being handed off OR IF multiple services were being handed off:

1-3-27-2-9-1-1      Execute the “MSC Initiation of DropService” task (see 4.y.y.1) to release all active services.

1-3-27-2-9-2      ENDIF.

1-3-27-2-9-3      IF only a circuit service was being handed off:

1-3-27-2-9-3-1      Execute the “MSC Initiation of Facilities Release” task (see 4.13.1) to release the associated inter-MSC facilities.

1-3-27-2-9-4      ENDIF.

1-3-27-2-9-52      Execute “Local Recovery Procedures” task (see 3.5.1).

1-3-27-2-10      WHEN a FacilitiesRelease INVOKE is received for the inter-MSC facilities (call abandonment, see 4.13.2):

1-3-27-2-10-1      Stop timer (MHOT).

1-3-27-2-10-2      Execute the “MSC receiving Facilities Release INVOKE” task (see 4.13.2).

~~1-3-27-2-10-2      Execute the “MSC Initiation of Facilities Release” task (see 4.13.1) to release the associated inter-MSC facilities toward the Target MSC.~~

1-3-27-2-10-3      Execute “Local Recovery Procedures” task (see 3.5.1).

1-3-27-2-11      WHEN a DropService INVOKE is received for the inter-MSC facilities:

1-3-27-2-11-1      IF all active services were dropped (call abandonment, see 4.y.y.2):

1-3-27-2-11-1-1      Stop timer (MHOT).

1-3-27-2-11-1-2      Execute the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).

1-3-27-2-11-1-3      Execute “Local Recovery Procedures” task (see 3.5.1).

1-3-27-2-11-2      ELSE:

1-3-27-2-11-2-1 Spawn the “MSC Receiving Drop Service INVOKE” task (see 4.y.y.2).

1-3-27-2-11-2-2 Remain in this state.

1-3-27-2-11-3 ENDIF.

1-3-27-2-142 ENDWAIT.

1-3-27-3 ELSE (the message can not be processed):

1-3-27-3-1 IF a packet data service was being handed off OR IF multiple services were being handed off:

1-3-27-3-1-1 Execute the “MSC Initiation of DropService” task (see 4.y.y.1) to release all active services.

1-3-27-3-2 ENDIF.

1-3-27-3-3 IF only a circuit service was being handed off:

1-3-27-3-3-1 Execute the “MSC Initiation of Facilities Release” task (see 4.13.1) to release the associated inter-MSC facilities.

1-3-27-3-4 ENDIF.

1-3-27-3-52 Execute “Local Recovery Procedures” task (see 3.5.1).

1-3-27-4 ENDIF.

1-3-28 WHEN a FacilitiesRelease INVOKE is received for the inter-MSC facilities (call abandonment, see 4.13.2):

1-3-28-1 Stop timer (HOT).

1-3-28-2 Execute the “MSC Receiving a Facilities Release INVOKE” task (see 4.y.y.2).

~~1-3-28-3 Spawn the “MSC Initiation of Facilities Release” task (see 4.13.1) to release the associated inter-MSC facilities toward the Target MSC.~~

~~1-3-28-3 Remain in this state (to wait for a response).~~

1-3-a WHEN a DropService INVOKE is received:

1-3-a-1 IF all active services were dropped (call abandonment, see 4.y.y.2):

1-3-a-1-1 Stop timer (HOT).

1-3-a-1-2 Execute the “MSC Receiving of DropService INVOKE” task (see 4.y.y.2).

1-3-a-2 ELSE:

1-3-a-2-1 Spawn the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).

1-3-a-2-2 Remain in this state.

1-3-a-3 ENDIF.

1-3-29 WHEN a RETURN ERROR or REJECT is received:

1-3-29-1 Stop timer (HOT).

1-3-29-2 IF a packet data service was being handed off OR IF multiple services were being handed off:

1-3-29-2-1 Execute the “MSC Initiation of DropService” task (see 4.y.y.1) to release all active services.

1-3-29-3 ENDIF.

1-3-29-4 IF only a circuit service was being handed off:

1-3-29-~~24~~-1 Execute the “MSC Initiation of Facilities Release” task (see 4.13.1) to release the associated inter-MSC facilities.

1-3-29-5        ENDIF.

1-3-29-~~36~~        Execute “Local Recovery Procedures” task (see 3.5.1).

1-3-30        WHEN the (HOT) timer expires:

1-3-30-1        IF a packet data service was being handed off OR IF multiple services were being handed off:

1-3-30-1-1        Execute the “MSC Initiation of DropService” task (see 4.y.y.1) to release all active services.

1-3-30-2        ENDIF.

1-3-30-3        IF only a circuit service was being handed off:

1-3-~~30~~-3-1        Execute the “MSC Initiation of Facilities Release” task (see 4.13.1) to release the associated inter-MSC facilities.

1-3-30-4        ENDIF.

1-3-30-5        Execute “Local Recovery Procedures” task (see 3.5.1).

1-3-31        ENDWAIT.

1-4        ELSE (handoff is not allowed):

1-4-1        Attempt to select another target according to internal algorithms.

1-5        ENDIF.

2        ENDIF.

3        Exit this task.

## 4.12.2 Target MSC Receiving a FacilitiesDirective2 INVOKE

(new for TIA/EIA-41-D, page 6-124)

When the Target MSC receives a FacilitiesDirective2 INVOKE, the MSC shall do the following:

1 IF the received message can be processed:

1-1 IF InterSwitchCount value at the Target MSC is greater than or equal to MAXHANDOFF (see 2.1):

1-1-1 Send a RETURN ERROR with Error Code *OperationSequenceProblem*.

1-2 ENDIF.

1-3 Identify the target traffic channel and associated transmission modes based upon the received ChannelData, NAMPSChannelData, TDMACHannelData, and CDMACHannelData, parameters.

1-4 IF traffic channels are available on any of the designated cell(s):

1-4-1 IF the Segment Counter field value in the received BillingID parameter is FF<sub>16</sub> (indicating *Unspecified*):

1-4-1-1 Do not change the value.

1-4-2 ELSE:

1-4-2-1 Increment the Segment Counter field value in the received BillingID parameter by 1 (to be associated with the air segment being created).

1-4-3 ENDIF.

1-4-4 Use the updated BillingID parameter for the new call segment.

- 1-4-5 IF ISLPInformation was included,
- 1-4-5-1 Include the ISLPInformation parameter set to Target MSC ISLP information.
- 1-4-6 ENDIF.
- 1-4-7 CASE the target traffic channel mode OF:

Deleted for diet.

- ~~1-4-8 AMPS:~~
- ~~1-4-8-1 Include the ChannelData parameter.~~
- ~~1-4-9 NAMPS:~~
- ~~1-4-9-1 Include the ChannelData parameter.~~
- ~~1-4-9-2 Include the NAMPSChannelData parameter.~~
- 1-4-10 CDMA:

Deleted for diet.

- ~~1-4-10-1 Include the CDMAChannelData parameter.~~
- ~~1-4-10-2 Include the CDMACodeChannelList parameter including CDMACodeChannelInformation parameters including a TargetCellID parameter and a CDMACodeChannel parameter.~~
- ~~1-4-10-3a Include the CDMAConnectionReferenceList parameter set to the granted service option information.~~
- ~~1-4-10-3 Include the CDMASearchWindow parameter.~~
- ~~1-4-10-4 IF the CDMAServiceConfigurationRecord parameter was received in the FacilitiesDirective2 INVOKE:~~
- ~~1-4-10-4-1 Include the CDMAServiceConfigurationRecord parameter.~~
- ~~1-4-10-5 ENDIF.~~
- ~~1-4-10-5a Include the ConfidentialityModes (CMODES-Actual) parameter.~~
- 1-4-10-6 Set the actual Signaling Message Encryption field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the SignalingMessageEncryptionKey (SMEKEY) parameter and the Target MSC preferences.
- 1-4-10-7 Set the actual Voice Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the CDMAPrivateLongCodeMask (CDMAPLCM) parameter, the desired state (as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).
- 1-4-10-8 Set the actual Data Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the DataPrivacyParameters (DATAPP) parameter, the desired state (as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).

- 1-4-11 TDMA:

Deleted for diet.

- ~~1-4-11-1 Include the TDMACHannelData parameter.~~
- ~~1-4-11-2 Include the ConfidentialityModes (CMODES-Actual) parameter.~~
- ~~1-4-11-3 IF applicable:~~

~~1-4-11-3-1 Include the TDMA Burst Indicator parameter.~~

~~1-4-11-3-2 Include the TDMA Voice Coder parameter.~~

~~1-4-11-4 ENDIF.~~

1-4-11-5 Set the actual Signaling Message Encryption field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the SignalingMessageEncryptionKey (SMEKEY) parameter and the Target MSC preferences.

1-4-11-6 Set the actual Voice Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the VoicePrivacyMask (VPMASK), the desired state (as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).

1-4-12 ENDCASE.

Added for diet.
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1-4-a Include all appropriate parameters (see Chapter 5).

1-4-13 Send a RETURN RESULT.

1-4-14 Execute the "Target MSC Handoff Forward" task (see 4.12.3).

1-5 ELSE (there are no traffic channels available on the designated cell(s)):

1-5-1 Send a RETURN ERROR with Error Code *ResourceShortage*.

1-6 ENDIF.

2 ELSE (the received message cannot be processed):

2-1 Send a RETURN ERROR with the proper Error Code value (see the following table).

3 ENDIF.

4 Exit this task.

Table 4.12.2t Target MSC FacilitiesDirective2 Response.

<b>Problem Detection and Recommended Response from a Target MSC to a Serving MSC</b>	
<b>RETURN ERROR Error Code</b>	<b>PROBLEM DEFINITION</b>
<b><i>UnrecognizedMIN</i></b>	The supplied MobileIdentificationNumber parameter is not recognized as an MS authorized for handoff.
<b><i>OperationSequenceProblem</i></b>	The supplied InterSwitchCount parameter value exceeds the defined MAXHANDOFF threshold value.
<b><i>ResourceShortage</i></b>	A required Target MSC resource (e.g., voice/traffic channel, internal memory record, MSC is fully occupied) is temporarily not available (e.g., congestion).
<b><i>OperationNotSupported</i></b>	The requested MAP operation is recognized, but not supported by the receiving Target MSC or the requesting functional entity is not authorized. <i>Note: It is recommended that a Target MSC <u>support</u> <del>supports</del> FacilitiesDirective2 transactions.</i>
<b><i>TrunkUnavailable</i></b>	The supplied InterMSCCircuitID parameter value is valid, but this trunk circuit is presently <i>Active, Locally Blocked</i> or <i>Locally and Remotely Blocked</i> .
<b><i>ParameterError</i></b>	A <u>supplied parameter has an encoding problem</u> (e.g., TDMACChannelData parameter was supplied, but the supplied ChannelData parameter was not zero length).
<b><i>SystemFailure</i></b>	A required resource (e.g., data base access, functional entity) is not presently accessible due to a failure. Human intervention may be required for resolution.
<b><i>UnrecognizedParameterValue</i></b>	Supplied parameter (e.g., CDMACallMode, NAMPSCallMode, TDMACallMode, TargetCellID, InterMSCCircuitID, ChannelData, ServingCellID, CDMAStationClassMark, StationClassMark, BillingID, CDMACChannelData, NAMPSChannelData, TDMACChannelData) value is unrecognized or has nonstandard values or the Target MSC does not support the requested value (e.g., mode, target cell, inter-MSC trunk circuit, channel number). <i>Note: <u>An IMSCCID with a pseudo value may be valid during or after handoff of a data service.</u></i>
<b><i>MissingParameter</i></b>	An optional parameter (e.g., CDMACallMode, NAMPSCallMode, TDMACallMode, CDMACChannelData, NAMPSChannelData, TDMACChannelData) required by the Target MSC was expected, but not received. The supplied ChannelData parameter was of zero length, but the Target MSC expected TDMACChannelData parameter was not received.
<b><i>UnrecognizedIMSI</i></b>	The supplied IMSI parameter is not recognized as an MS authorized for handoff.



### 4.12.3 Target MSC Handoff Forward

(new for TIA/EIA-41-D, page 6-124)

Upon request, the Target MSC shall do the following:

- 1 Start the Mobile Arrival Timer (MAT).
- 2 WAIT for MS arrival on designated traffic channel:
- 3 WHEN the MS is received on the designated traffic channel:
  - 3-1 Stop timer (MAT).
  - 3-2 IF the MS is currently in a circuit mode data call:
    - 3-2-1 Enable the ISLP (if not previously previously enabled).
  - 3-3 ENDIF.
  - 3-x IF a circuit service is being handed off:
    - 3-x-1 Complete the path between the traffic channel(s) and the inter-MSC trunk.
    - 3-y ENDIF.
  - 3-3 Send a MobileOnChannel INVOKE to the Serving MSC.
  - 3-4 IF the HandoffState parameter was received:
    - 3-4-1 IF its value is *Terminator is handing off*:
      - 3-4-1-1 Continue to alert the MS.
      - 3-4-1-2 Start an alerting timer.
      - 3-4-1-3 WAIT for MS to answer:
      - 3-4-1-4 WHEN the MS answers:
        - 3-4-1-4-1 Stop the alerting timer.
        - 3-4-1-4-2 GOTO the “MSC Initiating InterSystemAnswer” task (see 4.24.2).
      - 3-4-1-5 WHEN radio contact with the MS is lost:
        - 3-4-1-5-1 Stop the alerting timer.
        - 3-4-1-5-2 Include the ReleaseReason parameter indicating *clear forward*.
        - 3-4-1-5-3 IF a packet data service was being handed off OR IF multiple services were being handed off:
          - 3-4-1-5-3-1 Execute the “MSC Initiation of DropService” task (see 4.y.y.1) to release all active services.
        - 3-4-1-5-4 ENDIF.
        - 3-4-1-5-5 IF only a circuit service was being handed off:
          - 3-4-1-5-5-1 Execute the “MSC Initiation of Facilities Release” task (see 4.13.1).
        - 3-4-1-5-6 ENDIF.
        - 3-4-1-5-47 Exit this task.
      - 3-4-1-6 WHEN a FacilitiesRelease INVOKE is received (see 4.13.2):
        - 3-4-1-6-1 Stop the alerting timer.
        - 3-4-1-6-x Execute the “MSC Receiving Facilities Release INVOKE” task (see 4.13.2).
        - 3-4-1-6-2 Exit this task.
        - 3-4-1-a WHEN a DropService INVOKE is received (see 4.y.y.2):

3-4-1-a-1 IF the circuit mode service was dropped:  
3-4-1-a-1-1 Stop the alerting timer.  
3-4-1-a-1-x Execute the “MSC Receiving a DropService INVOKE”  
task (see 4.y.y.2).  
3-4-1-a-1-2 Exit this task.  
3-4-1-a-2 ELSE:  
3-4-1-a-2-1 Spawn the “MSC Receiving a DropService INVOKE”  
task (see 4.y.y.2).  
3-4-1-a-2-2 Remain in this state.  
3-4-1-a-3 ENDIF.  
3-4-1-7 WHEN the alerting timer expires:  
3-4-1-7-1 IF both packet data and circuit voice services were being  
handed off:  
3-4-1-7-1-1 Execute the “MSC Initiation of DropService” task (see  
4.y.y.1) to release the circuit voice service.  
3-4-1-7-2 ENDIF.  
3-4-1-7-3 IF only a circuit service was being handed off:  
3-4-1-7-3-1 Execute the “MSC Initiation of Facilities Release” task  
(see 4.13.1).  
3-4-1-7-4 ENDIF.  
3-4-1-7-2~~5~~ Exit this task.  
3-4-1-8 (Further handoffs are not supported here.)  
3-4-1-9 (Handoff back is allowed here and the HandoffState parameter  
should be included.)  
3-4-1-10 ENDWAIT.  
3-4-2 ELSEIF the value is *Originator is handing off* AND IF answer  
supervision is provided for handed-off MSs:  
3-4-2-1 Execute the “MSC Awaiting InterSystemAnswer” task (see  
4.24.1).  
3-4-2-2 (Do desired answer supervision tasks.)  
3-4-3 ENDIF.  
3-5 ENDIF.  
3-A IF CDMA AND the present service configuration indicates that a voice  
service option is not present:  
3-A-1 IF the MSC is configured to support after-handoff registration for  
packet data-only handoffs:  
3-A-1-1 IF the SignalingMessageEncryptionKey parameter was not  
received:  
3-A-1-1-1 Set the SystemAccessType parameter to value *Unspecified*.  
3-A-1-1-2 Invoke the “MSC Initiating an Authentication Request” task  
(see 4.4.1).  
3-A-1-1-3 IF the DenyAccess parameter is received:  
3-A-1-1-3-1 Drop the active packet session.  
3-A-1-1-3-2 Include the CDMAConnectionReferenceList parameter  
set to indicate that the packet data service has ended.

3-A-1-1-3-3      Include the ReleaseReason parameter set to the value SessionOverClearBackward.  
 3-A-1-1-3-4      Spawn the “MSC Initiating a Drop Service INVOKE” task (see 4.y.y.1) towards the previous serving MSC.  
 3-A-1-1-3-5      GOTO ContinueHandoffProcessing.  
 3-A-1-1-4      ENDIF.  
 3-A-1-2      ENDIF.  
 3-A-1-3      Consider the type of access performed by the MS to be Call Origination.  
 3-A-1-4      Spawn the “MSC Initiating MS Registration” task (see 4.38.1).  
 3-A-2      ENDIF.  
 3-B      ENDIF.  
**ContinueHandoffProcessing:**  
 4      WHEN a FacilitiesRelease INVOKE is received for the inter-MSC facilities (see 4.13.2):  
     4-1      Stop timer (MAT).  
     4-2      Execute the “MSC Receiving Facilities ReleaseINVOKE” task (see 4.13.2).  
     a      WHEN a DropService INVOKE is received (see 4.y.y.2):  
         a-1      IF the circuit mode service was dropped:  
             a-1-1      Stop timer (MAT).  
             a-1-2      Execute the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).  
             a-2      ELSE:  
                 a-2-1      Spawn the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).  
                 a-2-1      Remain in this state.  
             a-3      ENDIF.  
     5      WHEN the (MAT) timer expires:  
         5-1      Execute “Local Recovery Procedures” task (see 3.5.1).  
         5-2      Release the reserved traffic channel(s); however, do not send a FacilitiesRelease INVOKE.  
     6      ENDWAIT.  
     7      Exit this task.

## 4.17      **HANDOFFBACK2 (Shoe Lace Prevention)**

(TIA/EIA-41-D, page 6-148)

TheHandoffBack2 operation is used to prevent *shoe lacing* when an MS moves from one system to another and back again.

#### 4.17.1 Serving MSC Initiating a Handoff Back 2

(new for TIA/EIA-41-D, page 6-148)

Deleted for diet.

- ~~1 IF the SignalingMessageEncryptionKey (SMEKEY) is available:~~
- ~~1-1 Include the SignalingMessageEncryptionKey (SMEKEY) parameter.~~
- ~~1-2 Include the ConfidentialityModes (CMODES desired) parameter set according to the MS's Signaling Message Encryption mode.~~
- ~~2 ENDIF.~~

3 IF the MS supports TDMA:

3-1 IF the MS is authorized to have Voice Privacy:

3-1-1 IF the VoicePrivacyMask (VPMASK) is available for the MS:

Deleted for diet.

- ~~3-1-1-1 Include the VoicePrivacyMask (VPMASK) parameter.~~
- ~~3-1-1-2 IF ConfidentialityModes (CMODES desired) parameter is not received:~~
- ~~3-1-1-2-1 Include the ConfidentialityModes (CMODES desired) parameter.~~
- ~~3-1-1-3 ENDIF.~~
- 3-1-1-4 Set the Voice Privacy field of the ConfidentialityModes (CMODES-desired) parameter according to the MS's preferred Voice Privacy mode.
- 3-1-2 ENDIF.
- 3-2 ENDIF.
- 4 ENDIF.
- 5 IF the MS supports CDMA:

Deleted for diet.

- ~~5-1 IF the subscriber is authorized to have Voice Privacy:~~
- ~~5-1-1 IF the CDMAPrivateLongCodeMask (CDMAPLCM) is available:~~
- ~~5-1-1-1 Include the CDMAPrivateLongCodeMask (CDMAPLCM) parameter.~~
- ~~5-1-1-2 IF ConfidentialityModes (CMODES desired) parameter has not been received:~~
- ~~5-1-1-2-1 Include the ConfidentialityModes (CMODES desired) parameter.~~
- ~~5-1-1-3 ENDIF.~~
- ~~5-1-1-4 Set the Voice Privacy field of the ConfidentialityModes (CMODES desired) parameter according to the MS's preferred Voice Privacy mode.~~
- ~~5-1-1-5 Include the CDMAChannelData parameter with the Long Code Mask field set to the long code mask in use at the Serving MSC.~~
- ~~5-1-2 ENDIF.~~
- ~~5-2 ENDIF.~~
- 5-1 IF the CDMAPrivateLongCodeMask (CDMAPLCM) is available:

5-1-1 Set the Voice Privacy field of the ConfidentialityModes (CMODES-desired) parameter according to the MS's preferred Voice Privacy mode.

5-1-2 Include the CDMAChannelData parameter with the Long Code Mask field set to the long code mask in use at the Serving MSC.

5-2 ENDIF.

5-3 IF the subscriber is authorized to have Data Privacy:

~~5-3-1 IF the MS supports CDMA:~~

5-3-1-1 IF the DataPrivacyParameters (DATAPP) is applicable:

5-3-1-1-1 IF the CDMAServiceOption parameter in the CDMAConnectionReferenceInformation parameter contains a data service option:

5-3-1-1-1-1 Include the DataPrivacyParameters (DATAPP) in the CDMAConnectionReferenceInformation parameter set according to the requested Data Privacy information.

5-3-1-1-2 ELSE (data) service is not contained in CDMAServiceOption parameter:

5-3-1-1-2-1 Include the DataPrivacyParameters (DATAPP) set to the last known value of Data Privacy Data.

5-3-1-1-3 ENDIF.

Deleted for diet.

~~5-3-1-1-4 Include the DataKey (DKEY) parameter and the RandomVariable (RAND) parameter.~~

~~5-3-1-1-5 IF ConfidentialityModes (CMODES desired) parameter is not received:~~

~~5-3-1-1-5-1 Include the ConfidentialityModes (CMODES desired) parameter.~~

~~5-3-1-1-6 ENDIF.~~

5-3-1-1-7 Set the Data Privacy field of the ConfidentialityModes (CMODES-desired) parameter according to the MS's preferred Data Privacy mode.

5-3-1-2 ENDIF.

~~5-3-2 ENDIF.~~

5-4 ENDIF.

6 ENDIF.

Deleted for diet.

~~7 CASE (currently assigned traffic channel mode) OF:~~

~~8 AMPS:~~

~~8-1 Include the ChannelData parameter.~~

~~8-2 Include the TargetCellID parameter.~~

~~9 NAMPS:~~

~~9-1 Include the NAMPSCallMode parameter.~~

~~9-2 Include the ChannelData parameter.~~

~~9-3 Include the NAMPSChannelData parameter.~~

~~9-4 Include the TargetCellID parameter.~~

~~10 CDMA:~~  
~~10 1 Include the CDMACallMode parameter.~~  
~~10 2 Include the CDMAChannelData parameter.~~  
~~10 2a Include the CDMAConnectionReferenceList parameter set to the requested service option information.~~  
~~10 3 Include the CDMA MobileProtocolRevision parameter.~~  
~~10 4 Include the CDMA ServingOneWayDelay parameter.~~  
~~10 4 1 IF the current service configuration is not the default service configuration,~~  
~~10 4 1 1 Include the CDMA ServiceConfigurationRecord.~~  
~~10 4 2 ENDIF.~~  
~~10 4 3 Include the CDMA ServiceOptionList.~~  
~~10 5 Include the CDMA StationClassMark parameter.~~  
~~10 6 Include the MS Location parameter.~~  
~~10 7 IF the handoff was mobile assisted:~~  
~~10 7 1 Include the CDMA TargetMAHOList parameter including one or more CDMA TargetMAHO Information parameters.~~  
~~10 8 ELSE (handoff was not mobile assisted):~~  
~~10 8 1 Include the CDMA TargetMeasurementList parameter including one or more CDMA TargetMeasurement Information parameters.~~  
~~10 9 ENDIF.~~  
~~11 TDMA:~~  
~~11 1 Include the TargetCellID parameter.~~  
~~11 2 IF applicable:~~  
~~11 2 1 Include the TDMA Bandwidth parameter.~~  
~~11 2 2 Include the TDMA BurstIndicator parameter.~~  
~~11 2 3 Include the TDMA ServiceCode.~~  
~~11 2 4 Include the TDMA TerminalCapability.~~  
~~11 3 ENDIF.~~  
~~11 4 Include the TDMA CallMode parameter.~~  
~~11 5 Include the TDMA ChannelData parameter.~~  
~~12 ENDCASE.~~  
~~13 Include the BillingID parameter.~~  
~~14 Include the InterMSCCircuitID parameter.~~  
~~15 Include the MobileIdentificationNumber parameter.~~  
~~16 Include the ServingCellID parameter.~~  
xx Include all appropriate parameters, see Chapter 5.  
17 Start the Handoff Order Timer (HOT).  
18 Send a HANDBACK2 INVOKE to the Target MSC.  
19 WAIT for a handback2 response:  
20 WHEN a RETURN RESULT is received:  
20-1 Stop timer (HOT).  
20-2 IF the message can be processed:

20-2-1 IF required:

20-2-1-1 Order the MS to conform to the Target MSC's selected traffic channel and associated transmission modes (e.g., as indicated by the parameters ChannelData, NAMPSChannelData, TDMAChannelData, CDMACHannelData).

20-2-2 ENDIF.

20-2-3 IF the ConfidentialityModes (CMODES-Actual) parameter is received:

20-2-3-1 Order the MS to handoff with the Voice Privacy, Data Privacy and Signaling Message Encryption modes as requested.

20-2-4 ELSE:

20-2-4-1 Order the MS to handoff with Voice Privacy, Data Privacy and Signaling Message Encryption disabled.

20-2-5 ENDIF.

20-2-6 Start the Mobile Handoff Timer (MHOT).

20-2-7 WAIT for handoff order response:

20-2-8 WHEN a FacilitiesRelease INVOKE is received from the Target MSC (handoff complete) (see 4.13.2):

20-2-8-1 Stop timer (MHOT).

20-2-8-2 Execute the "MSC Receiving Facilities Release" task (see 4.13.2).

20-2-a WHEN a DropService INVOKE is received from the Target MSC (handoff complete) (see 4.y.y.2):

20-2-a-1 IF all active services were dropped (handoff complete) (see 4.y.y.2):

20-2-a-1-1 Stop timer (MHOT).

20-2-a-1-2 Execute the "MSC Receiving a DropService INVOKE" task (see 4.y.y.2).

20-2-a-2 ELSE:

20-2-a-2-1 Spawn the "MSC Receiving a DropService INVOKE" task (see 4.y.y.2).

20-2-a-2-2 Remain in this state.

20-2-a-3 ENDIF.

20-2-9 WHEN the timer (MHOT) expires:

20-2-9-1 Execute "Local Recovery Procedures" task (see 3.5.1).

20-2-9-2 IF necessary AND IF a packet session is active for the MS:

20-2-9-2-a Execute "MSC Initiation of DropService" task (see 4.y.y.1) to release all active services.

20-2-9-x ELSEIF necessary:

20-2-9-x-1 Execute "MSC Initiation of FacilitiesRelease" task (see 4.13.1).

20-2-9-3 ENDIF.

20-2-10 ENDWAIT.

20-3 ELSE (the message cannot be processed):

20-3-1 Execute "Local Recovery Procedures" task (see 3.5.1).

20-4 ENDIF.

- 21 WHEN a FacilitiesRelease INVOKE is received from the Target MSC (call abandonment, see 4.13.2):
- 21-1 Stop timer (HOT).
- 21-2 Execute the “MSC Receiving Facilities Release INVOKE” task (see 4.13.2).
- a WHEN a DropService INVOKE is received from the Target MSC:
- a-1 IF all active services were dropped (call abandonment, see 4.y.y.2):
- a-1-1 Stop timer (HOT).
- a-1-2 Execute the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).
- a-2 ELSE:
- a-2-1 Spawn the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).
- a-2-2 Remain in this state.
- a-3 ENDIF.
- 22 WHEN a RETURN ERROR or REJECT is received:
- 22-1 Stop the timer (HOT).
- 22-2 Execute “Local Recovery Procedures” task (see 3.5.1).
- 23 WHEN the timer HOT expires:
- 23-1 Execute “Local Recovery Procedures” task (see 3.5.1).
- 24 ENDWAIT.
- 25 Exit this task.

#### 4.17.2 Target MSC Receiving a HandoffBack2 INVOKE

(new for TIA/EIA-41-D, page 6-148)

Upon receipt of a HandoffBack2 INVOKE, the Target MSC shall do the following:

- 1 IF the received message can be processed:
- 1-1 IF traffic channels are available on any of the designated cell(s):
- 1-1-1 CASE (target traffic channel) OF:

Deleted for diet.

1-1-2 ~~AMPS:~~

1-1-2-1 ~~Include the ChannelData parameter.~~

Note the NAMPSCallMode parameter is not in the HandoffBack2 protocol.

1-1-3 NAMPS:

1-1-3-1 Include the NAMPSCallMode parameter.

1-1-3-2 Include the ChannelData parameter.

1-1-3-3 Include the NAMPSChannelData parameter.

Deleted for diet.

1-1-4 ~~CDMA:~~

1-1-4-1 ~~Include the CDMAChannelData parameter.~~



~~1-1-4-2 Include the CDMACodeChannelList parameter including CDMACodeChannelInformation parameters including a TargetCellID parameter and a CDMACodeChannel parameter.~~

~~1-1-4-3a Include the CDMAConnectionReferenceList parameter set to the granted service option information.~~

~~1-1-4-3 Include the CDMASearchWindow parameter.~~

~~1-1-4-4 IF the CDMAServiceConfigurationRecord parameter was received in the HandoffBack2 INVOKE:~~

~~1-1-4-4-1 Include the CDMAServiceConfigurationRecord parameter.~~

~~1-1-4-5 ENDIF.~~

~~1-1-4-6 Include the ConfidentialityModes (CMODES-Actual) parameter.~~

1-1-4-7 Set the actual Signaling Message Encryption field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the SignalingMessageEncryptionKey (SMEKEY) parameter and the Target MSC preferences.

1-1-4-8 Set the actual Voice Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the CDMAPrivateLongCodeMask (CDMAPLCM) parameter, the desired state (as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).

1-1-4-9 Set the actual Data Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the DataPrivacyParameters (DATAPP) parameter, the desired state (as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).

1-1-5 TDMA:

Deleted for diet.

~~1-1-5-1 IF applicable:~~

~~1-1-5-1-1 Include the TDMABurstIndicator parameter.~~

~~1-1-5-1-2 Include the TDMAVoiceCoder parameter.~~

~~1-1-5-2 ENDIF.~~

~~1-1-5-3 Include the TDMAChannelData parameter.~~

~~1-1-5-4 Include the ConfidentialityModes (CMODES-Actual) parameter.~~

1-1-5-5 Set the actual Signaling Message Encryption field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the SignalingMessageEncryptionKey (SMEKEY) parameter and the Target MSC preferences.

1-1-5-6 Set the actual Voice Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the VoicePrivacyMask (VPMASK) parameter, the desired state (as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).

1-1-6 ENDCASE.

Added for diet.

1-1-a Include all appropriate parameters (see Chapter 5).

1-1-7 Send a RETURN RESULT.

- 1-1-8 Execute the “Target MSC Handoff Back~~2~~” task (see 4.1~~7~~6.3).
- 1-2 ELSE (there are no traffic channels available on the designated cell(s)):
  - 1-2-1 Send a RETURN ERROR with Error Code *ResourceShortage*.
  - 1-3 ENDIF.
- 2 ELSE (the received message cannot be processed):
  - 2-1 Send a RETURN ERROR with a proper Error Code value (see the following table) to the requesting MSC.
  - 3 ENDIF.
- 4 Exit this task.

Table 4.17.2t Target MSC HandoffBack2 Response.

Problem Detection and Recommended Response from a Target MSC to a Serving MSC	
RETURN ERROR Error Code	PROBLEM DEFINITION
<b><i>UnrecognizedMIN</i></b>	The supplied MobileIdentificationNumber parameter is not <u>associated to a circuit mode call or an active packet session for the MIN presently active with a Target MS call on</u> the supplied InterMSCCircuitID <u>trunk circuit</u> .
<b><i>Unrecognized ESN</i></b>	<u>The supplied Mobile Identification Number parameter and or IMSI parameter is presently associated to a circuit mode call or active packet session for the supplied InterMSCCircuitID, but the supplied ESN parameter is not valid for the MIN and or IMSI.</u>
<b><i>OperationSequenceProblem</i></b>	The supplied InterMSCCircuitID parameter value is valid, but this trunk circuit is presently not active with a call.
<b><i>ResourceShortage</i></b>	A required Target MSC resource (e.g., traffic channel, internal memory record, MSC is fully occupied) is temporarily not available (e.g., congestion).
<b><i>OperationNotSupported</i></b>	The requested TIA/EIA-41 MAP operation is recognized, but not supported by the Target MSC or the requesting functional entity is not authorized.  <i>Note: It is recommended that a Target MSC <u>support</u> <del>supports</del> HandoffBack2 transactions.</i>
<b><i>ParameterError</i></b>	A supplied parameter has an encoding problem (e.g., the supplied MobileIdentificationNumber parameter digit values do not meet the BCD specification).  A TDMACHannelData parameter was supplied, but the supplied ChannelData parameter was not zero length, or two or more mutually exclusive optional parameters have been supplied (e.g., both TDMACHannelData and NAMPSChannelData).
<b><i>SystemFailure</i></b>	A required resource (e.g., data base access, functional entity) is not presently accessible due to a failure. Human intervention may be required for resolution.
<b><i>UnrecognizedParameterValue</i></b>	A supplied parameter value is unrecognized or has nonstandard values (e.g., the InterMSCCircuitID does not match any circuit on the receiving Target (Tandem) MSC; or MSCID (Target), CDMACallMode, NAMPSCallMode TDMACallMode, TargetCellID, InterMSCCircuitID, ChannelData, ServingCellID, CDMASessionClassMark, StationClassMark, BillingID, CDMACHannelData, NAMPSChannelData, TDMACHannelData value is unrecognized) or the received NAMPSChannelData parameter value was not supported by the received ChannelData parameter value.  <u><i>Note: An IMSCCID with a pseudo value may be valid during or after handoff of a data service.</i></u>
<b><i>MissingParameter</i></b>	An optional parameter (e.g., CDMACallMode, NAMPSCallMode, TDMACallMode, CDMACHannelData, NAMPSChannelData, TDMACHannelData, BillingID) required by the Target (Tandem) MSC was expected, but not received.  The supplied ChannelData parameter was of zero length, but the Target MSC expected TDMACHannelData parameter was not received.  Both mutually dependent parameters were expected, but only one was received (e.g., VoicePrivacyMask (VPMASK) or SignalingMessageEncryptionKey was present, but the ConfidentialityModes (CMODES-desired) parameter was not).

<b>UnrecognizedIMSI</b>	The supplied IMSI parameter is not <u>associated to a circuit mode call or an active packet session for the IMSI presently active with a Target MSC call on the supplied InterMSCCircuitID trunk circuit.</u>
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### 4.17.3 Target MSC HandoffBack2

(new for TIA/EIA-41-D, page 6-148)

After returning a HandoffBack2 RETURN RESULT, or a HandoffToThird2 RETURN RESULT to the serving system, the Target MSC performs the following:

- 1 IF the BillingID parameter is not received:
  - 1-1 Set the Segment Counter field to FF<sub>16</sub>.
- 2 ELSEIF the value of the Segment Counter field of the BillingID parameter is FF<sub>16</sub> (indicating *Unspecified*):
  - 2-1 Do not change the value.
- 3 ELSE:
  - 3-1 Increment the Segment Counter field value of the BillingID parameter by 1 (to be associated with the air segment being created).
- 4 ENDIF.
- 5 Include the updated BillingID parameter for the new air time segment.
- 6 Start the Mobile Arrival Timer (MAT).
- 7 WAIT for MS to arrive to the designated channel:
- 8 WHEN the MS is received on the designated channel:
  - 8-1 Stop timer (MAT).
  - 8-2 Include the ReleaseReason parameter set to *HandoffSuccessful*.
  - 8-a IF a packet data service is being handed off OR if multiple services are being handed off:
    - 8-a-1 Spawn the “MSC Initiating a DropService” task (see 4.y.y.1) toward the Serving MSC to release any resources for the active services.
  - 8-b ENDIF.
  - 8-3 IF only a circuit service was being handed off:
    - 8-3-1 Spawn ~~Execute the an~~ “MSC Initiating a FacilitiesRelease” task (see 4.13.1) toward the Serving MSC.
  - 8-4 ENDIF.
  - 8-5 IF a circuit service was being handed off:
    - 8-5-1 Connect the traffic channels to the call path.
  - 8-6 ENDIF.
- 9 WHEN the timer (MAT) expires:
  - 9-1 Execute “Local Recovery Procedures” task (see 3.5.1).
  - 9-2 Release the reserved traffic channel; however, do not send a FacilitiesRelease INVOKE or a DropService INVOKE to the Serving MSC.
- 10 WHEN a FacilitiesRelease INVOKE is received (call abandonment or facility handback release, see 4.13.2):
  - 10-1 Stop timer (MAT).

10-2 Execute the “MSC Receiving a FacilitiesRelease INVOKE” task (see 4.13.2).

x WHEN a DropService INVOKE is received:

x-1 IF all active services were dropped (call abandonment or facility handback release, see 4.y.y.2)

x-1-1 Stop timer (MAT).

x-1-2 Execute the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).

x-2 ELSE:

x-2-1 Spawn the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).

x-2-2 Remain in this state.

x-3 ENDIF.

a ENDWAIT.

11 Exit this task.

The omitted portion of this section is retained without modification.

## 4.21 Handoff-to-Third2 (Path Minimization)

(TIA/EIA-41-D, page 6-166)

Path minimization is a technique to determine the optimal trunking for call handoff between the Anchor MSC and a Target MSC. Path minimization uses the HandoffToThird2 operation to determine if a more optimal trunking path is available between the Target MSC and any of the current Tandem MSCs or the Anchor MSC.

### 4.21.1 Serving MSC Initiating a Handoff-To-Third2

(TIA/EIA-41-D, page 6-166)

When the Serving MSC determines that handoff with path minimization is to be performed, it shall do the following:

1 Include the BillingID parameter with the value of the Segment Counter field set to the value of the stored BillingID parameter.

2 IF the Serving MSC counts tandem segments:

2-1 IF the value of the BillingID parameter Segment Counter field is not FF<sub>16</sub>:

2-1-1 Increment the value of the BillingID parameter Segment Counter field by 1 (the value to be associated with the tandem segment being created).

2-2 ENDIF.

3 ENDIF.

Deleted per diet.

~~4 IF the SignalingMessageEncryptionKey (SMEKEY) is available:~~

~~4-1 Include the SignalingMessageEncryptionKey (SMEKEY) parameter.~~

~~4-2 Include the ConfidentialityModes (CMODES desired) parameter set according to the MS's Signaling Message Encryption mode.~~

~~5 ENDIF.~~

6 IF the subscriber is authorized to have Voice Privacy:

6-1 IF the MS supports TDMA:

6-1-1 IF the VoicePrivacyMask (VPMASK) is available:

~~Deleted per diet.~~

~~6-1-1-1 Include the VoicePrivacyMask (VPMASK) parameter.~~

~~6-1-1-2 IF ConfidentialityModes (CMODES-desired) parameter is not received:~~

~~6-1-1-2-1 Include the ConfidentialityModes (CMODES-desired) parameter.~~

~~6-1-1-3 ENDIF.~~

6-1-1-4 Set the Voice Privacy field of the ConfidentialityModes (CMODES-desired) parameter according to the MS's preferred Voice Privacy mode.

6-1-2 ENDIF.

6-2 ENDIF.

6-3 IF the MS supports CDMA:

6-3-1 IF the CDMAPrivateLongCodeMask (CDMAPLCM) is available:

~~Deleted per diet.~~

~~6-3-1-1 Include the CDMAPrivateLongCodeMask (CDMAPLCM) parameter.~~

~~6-3-1-2 IF ConfidentialityModes (CMODES-desired) parameter is not received:~~

~~6-3-1-2-1 Include the ConfidentialityModes (CMODES-desired) parameter.~~

~~6-3-1-3 ENDIF.~~

6-3-1-4 Set the Voice Privacy field of the ConfidentialityModes (CMODES-desired) parameter according to the MS's preferred Voice Privacy mode.

6-3-1-5 Include the CDMAChannelData parameter with the Long Code Mask field set to the long code mask in use at the Serving MSC.

6-3-2 ENDIF.

6-4 ENDIF.

7 ENDIF.

8 IF the subscriber is authorized to have Data Privacy:

8-1 IF the MS supports CDMA:

8-1-1 IF the DataPrivacyParameters (DATAPP) is applicable:

8-1-1-a IF the CDMA Service Option parameter in the CDMAConnectionReferenceInformation parameter contains a data service option.

8-1-1-a-1 Include the DataPrivacyParameters (DATAPP) in the CDMAConnectionReferenceInformation parameter set according to the requested Data Privacy information.

8-1-1-b ELSE (data service is contained not in CDMA Service Option parameter):

8-1-1-b-1 Include the DataPrivacyParameters (DATAPP) set to the last known value of Data Privacy Data.

8-1-1-c ENDIF.

8-1-1-d Include the DataKey (DKEY) parameter and the RandomVariable (RAND) parameter.

8-1-1-e IF ConfidentialityModes (CMODES-desired) parameter is not received:

8-1-1-e-1 Include the ConfidentialityModes (CMODES-desired) parameter.

8-1-1-f ENDIF.

8-1-1-g Set the Data Privacy field of the ConfidentialityModes (CMODES-desired) parameter according to the MS's preferred Data Privacy mode.

8-1-2 ENDIF.

8-2 ENDIF.

9 ENDIF.

Deleted per diet.

~~10 CASE the currently assigned traffic channel mode OF:~~

~~11 AMPS:~~

~~11-1 Include the ChannelData parameter.~~

~~12 NAMPS:~~

~~12-1 Include the NAMPSCallMode parameter.~~

~~12-2 Include the ChannelData parameter.~~

~~12-3 Include the NAMPSChannelData parameter.~~

~~13 CDMA:~~

~~13-1 Include the CDMACallMode parameter.~~

~~13-2 Include the CDMAChannelData parameter.~~

~~13-2b Include the CDMAConnectionReferenceList parameter set to the requested service option information.~~

~~13-3 Include the CDMA MobileProtocolRevision parameter.~~

~~13-4 Include the CDMA ServingOneWayDelay parameter.~~

~~13-4 IF the current service configuration is not the default service configuration:~~

~~13-4-1 Include the CDMAServiceConfigurationRecord.~~

~~13-5 ENDIF.~~

~~13-6 Include the CDMAServiceOptionList.~~

~~13-7 Include the CDMAStationClassMark parameter.~~

~~13-8 Include the MSLocation parameter.~~

~~13-9 IF the handoff was mobile assisted:~~

~~13-9-1 Include the CDMA TargetMAHOList parameter including one or more CDMA TargetMAHOInformation parameters.~~

~~13-9 ELSE (handoff was not mobile assisted):~~

~~13-9-1 Include the CDMA TargetMeasurementList parameter including one or more CDMA TargetMeasurementInformation parameters.~~

~~13-10 ENDIF.~~  
~~14 TDMA:~~  
~~14-1 IF applicable:~~  
~~14-2 Include the TDMABandwidth parameter.~~  
~~(renumber as necessary)~~  
~~14-2-1 Include the TDMABurstIndicator parameter.~~  
~~14-2-2 Include the TDMAServiceCode.~~  
~~14-2-3 Include the TDMATerminalCapability.~~  
~~14-3 ENDIF.~~  
~~14-4 Include the TDMACallMode parameter.~~  
~~14-5 Include the TDMAChannelData parameter.~~  
~~15 ENDCASE.~~  
~~16 Include the ElectronicSerialNumber parameter.~~  
~~17 Include the InterMSCCircuitID parameter.~~  
~~18 Include the InterSwitchCount (Serving) parameter.~~  
~~19 Include the MobileIdentificationNumber parameter.~~  
~~20 Include the MSCID (Target) parameter.~~  
~~21 Include the ServingCellID parameter.~~  
~~22 Include the StationClassMark parameter.~~  
~~23 Include the TargetCellID parameter.~~  
~~24 IF the MS is currently in a circuit mode data call:~~  
~~24-1 Include the ISLPInformation parameter set to Serving MSC ISLP information.~~  
~~25 ENDIF.~~

Added for diet.
-----------------

~~10 Include all appropriate parameters (see Chapter 5).~~  
~~26 Send a HandoffToThird2 INVOKE toward the Anchor MSC.~~  
~~27 Start the Handoff-To-Third Timer (HTTT).~~  
~~28 WAIT for the handthird2 response:~~  
~~29 WHEN a RETURN RESULT is received:~~  
~~29-1 Stop timer (HTTT).~~  
~~29-2 IF the message can be processed:~~  
~~29-2-1 IF required:~~  
~~29-2-1-1 Order the MS to conform to the Target MSC's selected traffic channel and associated transmission modes (e.g., as indicated by the parameters ChannelData, NAMPSChannelData, TDMAChannelData, CDMACHannelData).~~  
~~29-2-2 ENDIF.~~  
~~29-2-3 IF the ConfidentialityModes (CMODES-Actual) parameter is provided:~~  
~~29-2-3-1 Send the MS a Handoff Order and indicate the Voice Privacy, Data Privacy and Signaling Message Encryption modes as requested.~~



29-2-4 ELSE:

29-2-4-1 Send the MS a Handoff Order and indicate that Voice Privacy, Data Privacy and Signaling Message Encryption are disabled.

29-2-5 ENDIF.

29-2-6 Start the Handoff-To-Third Result Timer (HTTTRT).

29-2-7 WAIT for the handoff order response:

29-2-8 WHEN a FacilitiesRelease INVOKE is received (handoff complete, see 4.13.2):

29-2-8-1 Stop timer (HTTTRT).

29-2-8-a Execute the “MSC Receiving a FacilitiesRelease INVOKE” task (see 4.13.2).

29-2-8-2 Exit this task.

29-2-a WHEN a DropService INVOKE is received:

29-2-a-1 IF all active services were dropped (handoff complete, see 4.y.y.2):

29-2-a-1-1 Stop timer (HTTTRT).

29-2-a-1-2 Execute the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).

29-2-a-1-3 Exit this task.

29-2-a-2 ELSE:

29-2-a-2-1 Spawn the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).

29-2-a-2-2 Remain in this state.

29-2-a-3 ENDIF.

29-2-9 WHEN the (HTTTRT) timer expires:

29-2-9-1 Execute “Local Recovery Procedures” task (see 3.5.1).

29-2-9-2 IF necessary AND IF a packet session is active for the MS:

29-2-9-2-1 Execute the “MSC Initiation of DropService” task (see 4.y.y.1).

29-2-9-3 ELSEIF necessary:

29-2-9-3-1 Execute the “MSC Initiation of FacilitiesRelease” task (see 4.13.1).

29-2-9-4 ENDIF.

29-2-10 ENDWAIT.

29-3 ENDIF.

30 WHEN a FacilitiesRelease INVOKE is received for the inter-MSC facilities (call abandonment, see 4.13.2):

30-1 Stop timer (HTTT).

30-2 Execute the “MSC Receiving Facilities Release INVOKE” task (see 4.13.2):

a WHEN a DropService INVOKE is received:

a-1 IF all active services were dropped (call abandonment, see 4.y.y.2):

a-1-1 Stop timer (HTTT).

a-1-2 Execute the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).

a-2 ELSE:

a-2-1 Spawn the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).

a-2-2 Remain in this state.

a-3 ENDIF.

31 WHEN a RETURN ERROR or REJECT is received:

31-1 Stop timer (HTTT).

31-2 Execute “Local Recovery Procedures” task (see 3.5.1).

31-3 Optionally, the Serving MSC may execute the “Serving MSC Initiating a Facilities Directive2” task (see 4.12.1).

32 WHEN the (HTTT) timer expires:

32-1 Execute “Local Recovery Procedures” task (see 3.5.1).

32-2 Optionally, the Serving MSC may execute the “Serving MSC Initiating a Facilities Directive2” task (see 4.12.1).

33 ENDWAIT.

34 Exit this task.

#### 4.21.2 Tandem MSC Receiving a HandoffToThird2 INVOKE

(TIA/EIA-41-D, page 6-166)

When a Tandem MSC receives a HandoffToThird2 INVOKE, the MSC shall do the following:

1 IF the Tandem MSC is the Target MSC:

1-1 IF traffic channels are available on the designated cells:

1-1-1 CASE the target traffic channel mode OF:

~~Deleted per diet.~~

~~1-1-2 AMPS:~~

~~1-1-2-1 Include the ChannelData parameter.~~

~~1-1-3 NAMPS:~~

~~1-1-3-1 Include the ChannelData parameter.~~

~~1-1-3-2 Include the NAMPSChannelData parameter.~~

1-1-4 CDMA:

~~Deleted per diet.~~

~~1-1-4-1 Include the CDMAChannelData parameter.~~

~~1-1-4-2 Include the CDMACodeChannelList parameter including CDMACodeChannelInformation parameters including a TargetCellID parameter and a CDMACodeChannel parameter.~~

~~1-1-4-3a Include the CDMAConnectionReferenceList parameter set to the granted service option information.~~

~~1-1-4-3 Include the CDMASearchWindow parameter.~~

~~1-1-4-4 IF the CDMAServiceConfigurationRecord parameter was received in the HandoffToThird2 INVOKE:~~

~~1-1-4-4-1 Include the CDMAServiceConfigurationRecord parameter.~~

~~1-1-4-5 ENDIF.~~

~~1-1-4-6 Include the ConfidentialityModes (CMODES-Actual) parameter.~~

1-1-4-7 Set the actual Signaling Message Encryption field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the SignalingMessageEncryptionKey (SMEKEY) parameter and the Target MSC preferences.

1-1-4-8 Set the actual Voice Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the CDMAPrivateLongCodeMask (CDMAPLCM) parameter, the desired state (as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).

1-1-4-9 Set the actual Data Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the DataPrivacyParameters (DATAPP) parameter, the desired state (as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).

1-1-5 TDMA:

Deleted per diet.

~~1-1-5-1 Include the TDMAChannelData parameter.~~

~~1-1-5-2 IF applicable:~~

~~1-1-5-2-1 Include the TDMAVoiceCoder parameter.~~

~~1-1-5-3 ENDIF.~~

~~1-1-5-4 Include the ConfidentialityModes (CMODES-Actual) parameter.~~

1-1-5-5 Set the actual Signaling Message Encryption field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the SignalingMessageEncryptionKey (SMEKEY) parameter and the Target MSC preferences.

1-1-5-6 Set the actual Voice Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the VoicePrivacyMask (VPMASK), the desired state (as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).

1-1-6 ENDCASE.

Added for diet.

1-1-a Include all appropriate parameters (see Chapter 5).

1-1-7 Send a RETURN RESULT toward the Serving MSC.

1-1-8 Execute the "Target MSC Handoff Back2" task (see 4.17.3).

1-1-9 Exit this task.

1-2 ELSE (there are no traffic channels available on the designated cell(s)):

1-2-1 Send a RETURN ERROR with Error Code *ResourceShortage*.

1-2-2 Exit this task.

1-3 ENDIF.

2 ELSE (the Tandem MSC is not the Target MSC):

2-1 IF the Tandem MSC is provisioned to perform path minimization:

2-1-1 Store the VoicePrivacyMask (VPMASK) or  
CDMAPrivateLongCodeMask (CDMAPLCM),

SignalingMessageEncryptionKey (SMEKEY),  
 DataPrivacyParameters, and ConfidentialityModes (CMODES-  
 desired) parameters for later Path Minimization use.

2-1-2 Include the relevant parameters, adjusted as necessary.

2-1-3 Relay the InterMSCCircuitID parameter adjusted as necessary.

2-1-4 Send the HandoffToThird2 INVOKE toward the Anchor MSC.

2-1-5 Start the Tandem Handoff-To-Third Timer (THTTT).

2-1-6 WAIT for a handthird response:

2-1-7 WHEN a RETURN RESULT is received:

2-1-7-1 Stop timer (THTTT).

2-1-7-2 IF the message can be processed:

2-1-7-2-1 Relay all received parameters.

2-1-7-2-2 Send the HandoffToThird2 ~~HANDTHIRD2~~ RETURN  
 RESULT message toward the Serving MSC.

2-1-7-3 ELSE (message cannot be processed):

2-1-7-3-1 GOTO HandoffToThird Second Chance.

2-1-7-4 ENDIF.

2-1-7-5 Exit this task.

2-1-8 WHEN a FacilitiesRelease INVOKE is received ~~from the Serving  
 MSC~~ (see 4.13.2):

2-1-8-1 Stop timer (THTTT).

2-1-8-a Execute the “MSC Receiving Facilities Release INVOKE” task  
 (see 4.13.2):

2-1-8-2 Exit this task.

2-1-a WHEN a DropService INVOKE is received:

2-1-a-1 IF all active services were dropped:

2-1-a-1-1 Stop timer (THTTT).

2-1-a-1-2 Execute the “MSC Receiving a DropService INVOKE” task  
 (see 4.y.y.2).

2-1-a-1-3 Exit this task.

2-1-a-2 ELSE:

2-1-a-2-1 Spawn the “MSC Receiving a DropService INVOKE” task  
 (see 4.y.y.2).

2-1-a-2-2 Remain in this state.

2-1-a-3 ENDIF.

2-1-9 WHEN a RETURN ERROR or REJECT is received:

2-1-9-1 Stop timer (THTTT).

2-1-9-2 GOTO HandoffToThird Second Chance.

2-1-10 WHEN the timer (THTTT) expires:

**HandoffToThird Second Chance:**

2-1-10-1 IF the difference between the InterSwitchCount value received in  
 the message and the value stored in the MSC is greater than  
 TANDEMDEPTH (see 2.1):

2-1-10-1-1 IF the Target MSC is not known to the Tandem MSC:

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1
2      2-1-10-1-1-1      Send a RETURN ERROR with Error Code
3                          UnrecognizedParameterValue toward the Serving MSC.
4
5      2-1-10-1-2      ELSE (Target MSC is known the current MSC):
6
7      2-1-10-1-2-1      Execute the “MSC Initiating a FacilitiesDirective2 for
8                          Path Minimization” task (see 4.210.4).
9
10     2-1-10-1-2-2      IF a path minimization is unsuccessful:
11
12     2-1-10-1-2-2-1      Send a RETURN ERROR with Error Code
13                          TrunkUnavailable toward the Serving MSC.
14
15     2-1-10-1-2-3      ELSE (path minimization successful):
16
17     2-1-10-1-2-3-1      Relay the relevant received parameters.
18
19     2-1-10-1-2-3-2      Send a RETURN RESULT toward the Serving
20                          MSC.
21
22     2-1-10-1-2-4      ENDIF.
23
24     2-1-10-1-3      ENDIF.
25
26     2-1-10-2      ELSE:
27
28     2-1-10-2-1      Send a RETURN ERROR with Error Code TrunkUnavailable
29                      toward the Serving MSC.
30
31     2-1-10-3      ENDIF.
32
33     2-1-11      ENDWAIT.
34
35     2-2      ENDIF.
36
37     3      ENDIF.
38
39     4      Exit this task.
40
41
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Table 4.21.2t Tandem MSC HandoffToThird2 Response.

Problem Detection and Recommended Response from a Tandem MSC toward the Serving MSC	
RETURN ERROR Error Code	PROBLEM DEFINITION
<b>UnrecognizedMIN</b>	The supplied MobileIdentificationNumber parameter is not <u>associated to a circuit mode call or an active packet session for the MIN presently active with an Tandem MSC call on</u> the supplied InterMSCCircuitID <u>trunk circuit</u> .
<b>UnrecognizedESN</b>	The supplied MobileIdentificationNumber parameter <u>and or IMSI parameter is presently associated to a circuit mode call or active packet session for active with an Tandem MSC call on</u> the supplied InterMSCCircuitID <u>trunk circuit</u> , but the supplied ElectronicSerialNumber parameter is not valid for the MIN <u>and or IMSI</u> .
<b>OperationSequenceProblem</b>	The supplied InterMSCCircuitID parameter value is valid, but this trunk circuit is presently not active with a call. <del>The supplied InterSwitchCount parameter value exceeds the defined TANDEMDEPTH threshold value.</del>
<b>ResourceShortage</b>	A required Tandem MSC resource (e.g., traffic channel, internal memory record, MSC is fully occupied) is temporarily not available (e.g., congestion).
<b>OperationNotSupported</b>	The requested <del>IS-41 MAP</del> operation is recognized, but not supported by the Tandem MSC or the requesting functional entity is not authorized. <i>Note: It is recommended that a Tandem MSC <u>support</u> <del>supports</del> HandoffToThird2 transactions.</i>
<b>TrunkUnavailable</b>	A path minimization attempt has been made, but a Tandem MSC intersystem handoff trunk does not exist to the Target MSC, or the TandemHandoffToThird Timer (THTTT) expired, or other path minimization failures. <del>The supplied InterSwitchCount parameter value exceeds the defined TANDEMDEPTH threshold value.</del>
<b>ParameterError</b>	A supplied parameter has an encoding problem (e.g., the supplied MobileIdentificationNumber parameter digit values do not meet the BCD specification). Two or more mutually exclusive optional parameters have been supplied (e.g., both TDMACHannelData and ChannelData or TDMACHannelData and NAMPSChannelData).
<b>SystemFailure</b>	A required resource (e.g., data base access, functional entity) is not presently accessible due to a failure. Human intervention may be required for resolution.
<b>UnrecognizedParameterValue</b>	A supplied parameter value is unrecognized or has nonstandard values (e.g., the InterMSCCircuitID does not match any circuit on the receiving Tandem MSC; or MSCID (Target), CDMACallMode, NAMPSCallMode, TDMACallMode, TargetCellID, InterMSCCircuitID, ChannelData, ServingCellID, CDMASessionClassMark, StationClassMark, BillingID, CDMACHannelData, NAMPSChannelData, TDMACHannelData <u>value is unrecognized</u> ). The supplied parameter's value is valid, but is not supported by the Tandem MSC (e.g., CDMACallMode, NAMPSCallMode, TDMACallMode, InterSwitchCount). <i>Note: <u>An IMSCCID with a pseudo value may be valid during or after handoff of a data service.</u></i>
<b>MissingParameter</b>	An optional parameter (e.g., CDMACallMode, NAMPSCallMode, TDMACallMode, CDMACHannelData, NAMPSChannelData, TDMACHannelData, BillingID) required by the Tandem MSC was expected, but not received. At least one mutually exclusive parameter was expected, but neither were received (e.g., TDMACHannelData or ChannelData). Both mutually dependent parameters were expected, but only one was received (e.g., NAMPSChannelData present, but not ChannelData or VoicePrivacyMask (VPMASK) or SignalingMessageEncryptionKey present, but not ConfidentialityModes (CMODES-desired).

<b>UnrecognizedIMSI</b>	The supplied IMSI parameter is not <u>associated to a circuit mode call or an active packet session for the IMSI presently active with a Tandem MSC call on the supplied InterMSCCircuitID <del>trunk circuit</del></u> .
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### 4.21.3 Anchor MSC Receiving a HandoffToThird2 INVOKE

(TIA/EIA-41-D, page 6-166)

When the Anchor MSC receives a HANDTHIRD2 INVOKE, the MSC shall do the following:

1 IF the Anchor MSC is the Target MSC:

1-1 IF traffic channels are available on any of the designated cell(s):

1-1-1 CASE the target traffic channel mode OF:

~~Deleted per diet.~~

~~1-1-2 AMPS:~~

~~1-1-2-1 Include the ChannelData parameter.~~

~~1-1-3 NAMPS:~~

~~1-1-3-1 Include the ChannelData parameter.~~

~~1-1-3-2 Include the NAMPSCChannelData parameter.~~

1-1-4 CDMA:

~~Deleted per diet.~~

~~1-1-4-1 Include the CDMACHannelData parameter.~~

~~1-1-4-2 Include the CDMACodeChannelList parameter including CDMACodeChannelInformation parameters including a TargetCellID parameter and a CDMACodeChannel parameter.~~

~~1-1-4-3a Include the CDMAConnectionReferenceList parameter set to the granted service option information.~~

~~1-1-4-3 Include the CDMASearchWindow parameter.~~

~~1-1-4-4 IF the CDMAServiceConfigurationRecord parameter was received in the HandoffToThird2 INVOKE:~~

~~1-1-4-4-1 Include the CDMAServiceConfigurationRecord parameter.~~

~~1-1-4-5 ENDIF.~~

~~1-1-4-6 Include the ConfidentialityModes (CMODES-Actual) parameter.~~

1-1-4-7 Set the actual Signaling Message Encryption field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the SignalingMessageEncryptionKey (SMEKEY) parameter and the Target MSC preferences.

1-1-4-8 Set the actual Voice Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the CDMAPrivateLongCodeMask (CDMAPLCM) parameter, the desired state (as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).

1-1-4-9 Set the actual Data Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the DataPrivacyParameters (DATAPP) parameter, the desired state

(as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).

1-1-5 TDMA:

Deleted per diet.

~~1-1-5-1 Include the TDMAChannelData parameter.~~

~~1-1-5-2 IF applicable:~~

~~1-1-5-2-1 Include the TDMAVoiceCoder parameter.~~

~~1-1-5-3 ENDIF.~~

~~1-1-5-4 Include the ConfidentialityModes (CMODES-Actual) parameter.~~

1-1-5-5 Set the actual Signaling Message Encryption field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the SignalingMessageEncryptionKey (SMEKEY) parameter and the Target MSC preferences.

1-1-5-6 Set the actual Voice Privacy field of the ConfidentialityModes (CMODES-Actual) parameter based on the presence of the VoicePrivacyMask (VPMASK), the desired state (as indicated by the ConfidentialityModes (CMODES-desired) parameter), and the capabilities of the allocated channel(s).

1-1-6 ENDCASE.

Added for diet.

1-1-a Include all appropriate parameters (see Chapter 5).

1-1-7 Send a RETURN RESULT toward the Serving MSC.

1-1-8 Exit this task and enter the “Target MSC Handoff Back 2” task (see 4.17.32).

1-2 ELSE (there are no traffic channels available on the designated cell(s)):

1-2-1 Send a RETURN ERROR with Error Code *ResourceShortage* toward the Serving MSC.

1-2-2 Exit this task.

1-3 ENDIF.

2 ELSE (the Anchor MSC is not the Target MSC):

2-1 IF the Target MSC is known to the Anchor MSC and the Anchor MSC is provisioned to do path minimization:

2-1-1 Execute the “MSC Initiating a FacilitiesDirective<sub>2</sub> for Path Minimization” task (see 2.21.44.20.4).

2-1-2 IF a path minimization is unsuccessful:

2-1-2-1 Send a RETURN ERROR with Error Code *TrunkUnavailable* toward the Serving MSC.

2-1-3 ELSE (path minimization successful):

2-1-3-1 Relay the relevant received parameters.

2-1-3-2 Send a RETURN RESULT toward the Serving MSC.

2-1-4 ENDIF.

2-2 ELSE:

2-2-1 Send a RETURN ERROR with Error Code *TrunkUnavailable* toward the Serving MSC.

2-3 ENDIF.



1  
2  
3     3    ENDIF.  
4     4    Exit this task.  
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Table 4.21.3t Anchor MSC HandoffToThird2 Response.

Problem Detection and Recommended Response from an Anchor MSC toward the Serving MSC	
RETURN ERROR Error Code	PROBLEM DEFINITION
<b>UnrecognizedMIN</b>	The supplied MobileIdentificationNumber parameter is not <u>associated to a circuit mode call or an active packet session for the MIN presently active with an Anchor MSC call on</u> the supplied InterMSCCircuitID <u>trunk circuit</u> .
<b>UnrecognizedESN</b>	The supplied MobileIdentificationNumber parameter <u>and or IMSI parameter</u> is presently <u>associated to a circuit mode call or active packet session for active with an Tandem MSC call on</u> the supplied InterMSCCircuitID <u>trunk circuit</u> , but the supplied ElectronicSerialNumber parameter is not valid for the MIN <u>and or IMSI</u> .
<b>OperationSequenceProblem</b> ;	The supplied InterMSCCircuitID parameter value is valid, but this trunk circuit is presently not active with a call. <del>The supplied InterSwitchCount parameter value exceeds the defined TANDEMDEPTH threshold value.</del>
<b>ResourceShortage</b>	A required Anchor MSC resource (e.g., traffic channel, internal memory record, Anchor MSC is fully occupied) is temporarily not available (e.g., congestion).
<b>OperationNotSupported</b>	The requested <del>IS-41-MAP</del> operation is recognized, but not supported by the Anchor MSC or the requesting functional entity is not authorized. <i>Note: It is recommended that an Anchor MSC <u>support</u> <del>supports</del> HandoffToThird2 transactions.</i>
<b>TrunkUnavailable</b>	A path minimization attempt has been made, but an Anchor MSC intersystem handoff trunk does not exist to the Target MSC, or the Tandem Handoff-To-Third Timer (THTTT) expired, or other path minimization failures. <u>The supplied InterSwitchCount parameter value exceeds the defined TANDEMDEPTH threshold value.</u>
<b>ParameterError</b>	A supplied parameter has an encoding problem (e.g., the supplied MobileIdentificationNumber parameter digit values do not meet the BCD specification). Two or more mutually exclusive optional parameters have been supplied (e.g., both TDMACHannelData and ChannelData or TDMACHannelData and NAMPSChannelData).
<b>SystemFailure</b>	A required resource (e.g., data base access, functional entity) is not presently accessible due to a failure. Human intervention may be required for resolution.

<b>UnrecognizedParameterValue</b>	<p>A supplied parameter value is unrecognized or has nonstandard values (e.g., the InterMSCCircuitID does not match any circuit on the receiving Anchor MSC; or MSCID (Target), CDMACallMode, NAMPSCallMode, TDMACallMode, TargetCellID, InterMSCCircuitID, ChannelData, ServingCellID, CDMAStationClassMark StationClassMark, BillingID, CDMAChannelData, NAMPSChannelData, TDMACChannelData <u>value is unrecognized.</u>).</p> <p>The supplied parameters value is valid, but is not supported by the Anchor MSC (e.g., CDMACallMode, NAMPSCallMode, TDMACallMode, InterSwitchCount).</p> <p><u>Note: An IMSCCID with a pseudo value may be valid during or after handoff of a data service.</u></p> <p style="text-align: right;"><u>(continued)</u></p>
<b>MissingParameter</b>	<p>An optional parameter (e.g., CDMACallMode, NAMPSCallMode, TDMACallMode, TDMACChannelData, BillingID) required by the <u>Tandem</u> MSC was expected, but not received.</p> <p>At least one mutually exclusive parameter was expected, but neither were received (e.g., TDMACChannelData or ChannelData).</p> <p>Both mutually dependent parameters were expected, but only one was received (e.g., NAMPSChannelData present, but not ChannelData or VoicePrivacyMask (VPMASK) or SignalingMessageEncryptionKey present, but not ConfidentialityModes (CMODES-desired)).</p>
<b>UnrecognizedIMSI</b>	<p>The supplied IMSI parameter is not <u>associated to a circuit mode call or an active packet session for the IMSI presently active with a Tandem MSC call on</u> the supplied InterMSCCircuitID <u>trunk circuit</u>.</p>

#### 4.21.4 MSC Initiating a FacilitiesDirective2 for Path Minimization

(TIA/EIA-41-D, page 6-166)

When an MSC has selected a target MSC for an MS handoff and path minimization is known to be possible, it shall do the following:

1 IF resources are available to support the handoff ~~an inter-MSC trunk is available:~~

1-1 IF an inter-MSC trunk is required:

1-1-1 Allocate an inter-MSC trunk to the Target MSC.

1-a ENDIF.

1-2 Relay the ChannelData, NAMPSChannelData, CDMAChannelData, and TDMACChannelData parameters (as received in the HandoffToThird2 INVOKE).

1-3 Relay the received VoicePrivacyMask (VPMASK) or CDMAPrivateLongCodeMask (CDMAPLCM), DataPrivacyParameters (DATAPP), SignalingMessageEncryptionKey (SMEKEY), TerminalType (TERMTYP) and ConfidentialityModes (CMODES-desired) parameters (as received in the HandoffToThird2 INVOKE).

1-4 Include the InterSwitchCount parameter set to the value of the InterSwitchCount stored at the MSC incremented by 1.

1-5 IF the current MSC counts tandem segments:

- 1-5-1 IF the value of the BillingID parameter Segment Counter field is not FF<sub>16</sub>:
- 1-5-1-1 Include the BillingID parameter with the value of the BillingID parameter Segment Counter field incremented by 1 (the value to be associated with the tandem segment being created).
- 1-5-2 ELSE:
- 1-5-2-1 Include the BillingID parameter with the value of the Segment Counter field set to the value that was received in the HandoffToThird2 INVOKE.
- 1-5-3 ENDIF.
- 1-6 ELSE:
- 1-6-1 Include the BillingID parameter with the value of the Segment Counter field set to the value that was received in the HandoffToThird2 INVOKE.
- 1-7 ENDIF.

Deleted per diet.

- ~~1-8 Include the ElectronicSerialNumber parameter.~~
- ~~1-9 Include the InterMSCCircuitID parameter.~~
- ~~1-10 Include the MobileIdentificationNumber parameter.~~
- ~~1-11 Include the MSCID (Target) parameter.~~
- ~~1-12 Include the ServingCellID parameter.~~
- ~~1-13 IF the MS is currently in a circuit mode data call:~~
- ~~1-13-1 Include the ISLPInformation parameter set to Anchor MSC ISLP information.~~
- ~~1-14 ENDIF.~~
- ~~1-15 Include the StationClassMark parameter.~~
- ~~1-16 Include the TargetCellID parameter.~~

Added for diet.

- 1-8 Include all appropriate parameters (see Chapter 5).
- 1-17 Send a FACDIR2 INVOKE to the Target MSC.
- 1-18 Start the Handoff Order Timer (HOT).
- 1-19 WAIT for facility directive response:
- 1-20 WHEN a RETURN RESULT is received:
- 1-20-1 Stop timer (HOT).
- 1-20-2 IF the message can be processed:
- 1-20-2-1 Relay the received ChannelData, NAMPSChannelData, CDMAChannelData, and TDMAChannelData parameters.
- 1-20-2-2 Relay the ConfidentialityModes (CMODES-Actual) parameter.
- 1-20-2-3 Send a HandoffToThird2 RETURN RESULT toward the Serving MSC.
- 1-20-2-4 Start the Mobile Handoff Order Timer (MHOT).
- 1-20-2-5 WAIT for the MS to get on channel:
- 1-20-2-6 WHEN a FacilitiesRelease INVOKE is received for the inter-MSC facilities (call clearing abandonment, see 4.13.2):

1-20-2-6-1 Stop timer (MHOT).

1-20-2-6-2 Spawn the “MSC Initiation of FacilitiesRelease INVOKE” task (see 4.13.1) toward the Target MSC to release the associated inter-MSC facilities.

1-20-2-6-3 Execute the “MSC Receiving a FacilitiesRelease INVOKE” task (see 4.13.2).

1-20-2-a WHEN a DropService INVOKE is received (service clearing, see 4.y.y.2):

1-20-2-a-1 IF all active services were dropped:

1-20-2-a-1-1 Stop timer (MHOT).

1-20-2-a-1-2 Spawn the “MSC Initiation of DropService INVOKE” task (see 4.y.y.1) toward the Target MSC to release all active services.

1-20-2-a-1-3 Execute the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).

1-20-2-a-1-2 Exit this task.

1-20-2-a-2 ELSE:

1-20-2-a-2-1 Spawn the “MSC Initiation of DropService INVOKE” task (see 4.y.y.1) toward the Target MSC to release the indicated service(s).

1-20-2-a-2-2 Execute the “MSC Receiving a DropService INVOKE” task (see 4.y.y.2).

1-20-2-a-2-3 Remain in this state.

1-20-2-a-3 ENDIF.

1-20-2-7 WHEN an MobileOnChannel INVOKE is received from the Target MSC (handoff complete):

1-20-2-7-1 Stop timer (MHOT).

1-20-2-7-2 IF the MS is currently in a circuit mode data call:

1-20-2-7-2-1 Enable the ISLP (if not previously enabled).

1-20-2-7-3 ENDIF.

1-20-2-7-2 IF a circuit service is being handed off:

1-20-2-7-2-1 Connect the call path to the inter-MSC trunk to the Target MSC.

1-20-2-7-3 ENDIF.

1-20-2-7-4 IF a packet data service was being handed off OR IF multiple services were being handed off:

1-20-2-7-4-1 Execute the “MSC Initiation of a DropService” task (see 4.y.y.1) toward the Serving MSC to release any resources for all active services.

1-20-2-7-5 ENDIF.

1-20-2-7-6 IF only a circuit service was being handed off:

1-20-2-7-~~36~~-1 Execute the “MSC Initiation of Facilities Release” task (see 4.13.1) to release the associated inter-MSC facilities toward the Serving MSC.

1-20-2-7-7 ENDIF.

1-20-2-8 WHEN the (MHOT) timer expires:

1-20-2-8-1 IF a packet data service was being handed off OR IF multiple services were being handed off:

1-20-2-8-1-1 Execute the “MSC Initiation of a DropService” task (see 4.y.y.1) toward the Target MSC to release any resources for the active services.

1-20-2-8-2 ENDIF.

1-20-2-8-3 IF only a circuit service was being handed off:

1-20-2-8-3-1 Execute the “MSC Initiation of Facilities Release” task (see 4.13.1) to release the associated inter-MSC facilities toward the Target MSC.

1-20-2-8-4 ENDIF.

1-20-2-8-5 Execute “Local Recovery Procedures” task (see 3.5.1).

1-20-2-9 ENDWAIT.

1-20-3 ELSE (the message cannot be processed):

1-20-3-1 Send a RETURN ERROR with Error Code *TrunkUnavailable* toward the Serving MSC.

1-20-3-2 Execute “Local Recovery Procedures” task (see 3.5.1).

1-20-3-3 Exit this task.

1-20-4 ENDIF.

1-21 WHEN a RETURN ERROR or REJECT is received:

1-21-1 Stop timer (HOT).

1-21-2 Send a RETURN ERROR with Error Code *TrunkUnavailable* toward the Serving MSC.

1-21-3 Execute “Local Recovery Procedures” task (see 3.5.1).

1-21-4 Exit this task.

1-22 WHEN a FacilitiesRelease INVOKE is received ~~from the Serving MSC~~ (call clearing abandonment, see 4.13.2):

1-22-1 Stop timer (HOT).

1-22-x Spawn the “MSC Initiation of Facilities Release” task (see 4.13.1) to release the associated inter-MSC facilities toward the Target MSC.

1-22-y Execute the “MSC Receiving a FacilitiesRelease INVOKE” task (see 4.13.2).

1-22-2 Exit this task.

1-a WHEN a DropService INVOKE is received:

1-a-1 IF all active services were dropped (service clearing, see 4.y.y.2):

1-a-1-1 Stop timer (HTTRT).

1-a-1-2 Spawn the “MSC Initiation of DropService” task (see 4.y.y.1) toward the Target MSC to release all active services.

1-a-1-3 Execute the “MSC Receiving a Drop Service INVOKE” task (see 4.y.y.2).

1-a-1-4 Exit this task.

1-a-2 ELSE:

1-a-2-1 Spawn the “MSC Initiation of DropService” task (see 4.y.y.1) toward the Target MSC to release the indicated service(s).

1-a-2-2 Spawn the “MSC Receiving a Drop Service INVOKE” task (see 4.y.y.2).

1-a-2-3        Remain in this state.

1-a-3        ENDIF.

1-23    WHEN the timer (HOT) expires:

1-23-1        Send a RETURN ERROR with Error Code *TrunkUnavailable* toward the Serving MSC.

1-23-2        Execute “Local Recovery Procedures” task (see 3.5.1).

1-24    ENDWAIT.

2    ELSE (an inter-MSC trunk is not available):

2-1        Send a RETURN ERROR with Error Code *TrunkUnavailable* toward the Serving MSC.

3    ENDIF.

4    Exit this task.

The omitted portion of this section is retained without modification.

## 4.24    Intersystem Answer

(TIA/EIA-41-D, page 6-173)

### 4.24.1    MSC Awaiting InterSystemAnswer

(TIA/EIA-41-D, page 6-173)

When the MSC determines that it should wait for an InterSystemAnswer message, it shall do the following:

- 1    Start the InterSystemAnswer Response Timer (ISART).
- 2    WAIT for an InterSystemAnswer INVOKE:
- 3    WHEN the Anchor MSC receives an InterSystemAnswer INVOKE ~~is received from the border system:~~
- 3-1    Stop the timer (ISART).
- 3-2    Send an InterSystemAnswer RETURN RESULT to the Border MSC.

Modifications from "Miscellaneous Enhancements" tracking document, Rev-10.
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- 3-3    Connect the call path in both directions.
- NOTE: After the call has been established, a subsequent handoff to the visited (Anchor) MSC should be treated as a Handoff Back.
- w    WHEN the Serving (or Target) MSC receives an InterSystemAnswer INVOKE:
- w-1    Stop the timer (ISART).
- w-2    Provide answer supervision to the MS.
- w-3    Send an InterSystemAnswer RETURN RESULT.
- 4    WHEN a FacilitiesRelease INVOKE is received (see 4.13.2):
- 4-1    Stop the timer (ISART).
- 4-2    Execute the “MSC Receiving a Facilities Release” INVOKE task (see 4.13.2).
- x    WHEN a DropService INVOKE is received (see 4.y.y.2):
- x-1    Stop the timer (ISART).

- x-2      Execute the “MSC Receiving a Drop Service” INVOKE task (see 4.y.y.2).
- 5      WHEN the (ISART) timer expires:
- 5-1      Include the ReleaseReason parameter indicating *clear forward*.
- 5-2      Execute the “Initiating MSC Initiating a Facilities Release” task (see 4.13.1).
- 5-3      Execute “Local Recovery Procedures” task (see 3.5.1).
- 6      ENDWAIT.
- 7      Exit this task.

**Table 33                      MSC Awaiting InterSystemAnswer Response**

Problem Detection and Recommended Response from <u>an Anchor MSC toward the</u> Serving MSC	
RETURN ERROR Error Code	PROBLEM DEFINITION
<b><i>UnrecognizedMIN</i></b>	The supplied MobileIdentificationNumber parameter is not the MIN presently active with call on the supplied InterMSCCircuitID parameter trunk circuit.
<b><i>OperationSequenceProblem</i></b>	The supplied InterMSCCircuitID parameter value is valid, but the trunk circuit is presently not active with a call.
<b><i>ResourceShortage</i></b>	A required MSC resource is temporarily not available.
<b><i>OperationNotSupported</i></b>	The requested <u>TIA/EIA-41</u> MAP operation is recognized, but not supported by the receiving MSC or the requesting functional entity is not authorized. <i>Note: It is recommended that an MSC support DropService transactions.</i>
<b><i>SystemFailure</i></b>	A required resource (e.g., data base access, functional entity) is not presently accessible due to a failure. Human intervention may be required for resolution.
<b><i>UnrecognizedParameterValue</i></b>	Supplied parameter value is unrecognized or has nonstandard values (e.g., CDMAConnectionReferenceList has an unrecognized value). <i>Note: Include the Parameter Identifier in question as the FaultyParameter parameter.</i>
<b><i>UnrecognizedIMSI</i></b>	The supplied InternationalMobileStationIdentity parameter is not the <u>IMSI presently active with a call on the supplied InterMSCCircuitID parameter trunk Circuit.</u>



## 4.24.2 Anchor or Serving MSC Initiating InterSystemAnswer

(TIA/EIA-41-D, page 6-173)

When the MSC determines that it should send an InterSystemAnswer message, it shall do the following:

~~1 Start an alerting timer.~~

~~2 WAIT for the MS to answer:~~

~~3 WHEN the MS answers:~~

1 Send an InterSystemAnswer INVOKE to the Serving MSC.

2 Start the InterSystemAnswer (ISAT) timer.

3 WAIT for an intersystem answer response:

4 WHEN a RETURN RESULT is received:

4-1 Stop (ISAT) timer.

5 WHEN a RETURN ERROR or REJECT is received:

5-1 Stop (ISAT) timer.

5-2 IF a packet session is active:

5-2-1 Execute the “MSC Initiation of Drop Service” task (see 4.y.y.1) to release the circuit mode services.

5-3 ELSE:

5-3-1 Execute the “MSC Initiation of Facilities Release” task (see 4.13.1).

5-4 ENDIF.

~~3-5-2 Release associated inter MSC trunk facility (See 4.3).~~

6 WHEN a FacilitiesRelease INVOKE is received (see 4.13.2):

6-1 Stop (ISAT) timer.

6-2 Execute the “MSC Receiving Facilities Release” INVOKE task (see 4.13.2).

~~3-6-2 Release associated inter MSC trunk facility (See 4.3).~~

x WHEN a DropService INVOKE is received (see 4.y.y.2):

x-1 IF the circuit mode service is being dropped:

x-1-1 Stop (ISAT) timer.

x-2 ENDIF.

x-3 Execute the “MSC Receiving a Drop Service” INVOKE task (see 4.y.y.2).

7 WHEN timer (ISAT) expires:

7-1 Perform Local Recovery Procedures (see 3.5.1).

7-2 IF a packet session is active:

7-2-1 Execute the “MSC Initiation of Drop Service” task (see 4.y.y.1) to release the circuit mode services.

7-3 ELSE:

7-3-1 Execute the “MSC Initiation of Facilities Release” task (see 4.13.1).

7-4 ENDIF.

~~3-7-2 Release associated inter MSC trunk facility (See 4.3).~~

~~3-8 ENDWAIT.~~

~~4 WHEN a FacilitiesRelease INVOKE is received (see 4.13.2):~~

~~4-1 Stop the alerting timer.~~

- ~~4-2 Release associated inter-MSC trunk facility (See 4.3).~~
- ~~5 WHEN the alerting timer expires:~~
- ~~5-1 Include the ReleaseReason parameter indicating *clear forward*.~~
- ~~5-2 Execute the “Initiating MSC Initiating a Facilities Release” task (see 4.13.1).~~
- ~~5-3 Perform Local Recovery Procedures (see 3.5.1).~~
- ~~8 ENDWAIT.~~
- ~~9 Exit this task.~~

#### **4.24.3 Tandem MSC Receiving an InterSystemAnswer INVOKE**

(new for TIA/EIA-41-D, page 6-175)

When the Tandem MSC receives an InterSystemAnswer INVOKE, it shall perform the following:

- 1 IF the received message can be processed:
- 1-1 Set the InterMSCCircuitID parameter to the ID of the next intersystem trunk segment.
- 1-2 Relay all other received parameters.
- 1-3 Start the InterSystemAnswer Timer (IAST).
- 1-4 Send an InterSystemAnswer INVOKE toward the MSC supporting the next handoff segment.
- 1-5 WAIT for an Intersystem Answer response:
- 1-6 WHEN a RETURN RESULT is received:
  - 1-6-1 Stop the timer (ISAT).
  - 1-6-2 Send an InterSystemAnswer RETURN RESULT toward the Serving MSC.
- 1-7 WHEN a RETURN ERROR is received:
  - 1-7-1 Stop the timer (ISAT).
  - 1-7-2 Relay the received Error Code.
  - 1-7-3 Relay the FaultyParameter parameter, if received.
  - 1-7-4 Send a RETURN ERROR toward the Serving MSC.
- 1-8 WHEN a REJECT is received:
  - 1-8-1 Stop the timer (ISAT).
  - 1-8-2 Send a RETURN ERROR with the Error Code set to *SystemFailure* toward the Serving MSC.
- 1-9 WHEN the timer (ISAT) expires:
  - (The initiating functional entity timer should also have expired so no notification is necessary.)
  - 1-10 ENDWAIT.
- 2 ELSE (the received message cannot be processed):
- 2-1 Send a RETURN ERROR with a proper Error Code value toward the Serving MSC.

3    ~~ENDIF.~~

4    ~~Exit this task.~~

**Table 4.24.3      Tandem MSC InterSystemAnswer Response**

<b><u>Problem Detection and Recommended Response from an Anchor MSC toward the Serving MSC</u></b>	
<b><u>RETURN ERROR</u></b> <b><u>Error Code</u></b>	<b><u>PROBLEM DEFINITION</u></b>
<b><u>UnrecognizedMIN</u></b>	The supplied MobileIdentificationNumber parameter is not the MIN presently active with call on the supplied InterMSCCircuitID parameter trunk circuit.
<b><u>OperationSequenceProblem</u></b>	The supplied InterMSCCircuitID parameter value is valid, but the trunk circuit is presently not active with a call.
<b><u>ResourceShortage</u></b>	A required MSC resource is temporarily not available.
<b><u>OperationNotSupported</u></b>	The requested TIA/EIA-41 MAP operation is recognized, but not supported by the receiving MSC or the requesting functional entity is not authorized. <i>Note: It is recommended that an MSC support DropService transactions.</i>
<b><u>SystemFailure</u></b>	A required resource (e.g., data base access, functional entity) is not presently accessible due to a failure. Human intervention may be required for resolution.
<b><u>UnrecognizedParameterValue</u></b>	Supplied parameter value is unrecognized or has nonstandard values (e.g., CDMAConnectionReferenceList has an unrecognized value). <i>Note: Include the Parameter Identifier in question as the FaultyParameter parameter.</i>
<b><u>UnrecognizedIMSI</u></b>	The supplied InternationalMobileStationIdentity parameter is not the IMSI presently active with a call on the supplied InterMSCCircuitID parameter trunk Circuit.

## 4.27      Intersystem Setup

(TIA/EIA-41-D, page 6-185)

### 4.27.1    MSC Initiating an Intersystem Setup

(TIA/EIA-41-D, page 6-185)

When an MSC determines that it needs to perform call setup actions with a bordering MSC, it shall perform the following:

- 1    Select an intersystem trunk.

Modifications from "Miscellaneous Enhancements" tracking document, Rev-10.

- ~~2    IF the call path cannot be successfully connected to the intersystem trunk:~~
  - ~~2-1    Release the intersystem trunk.~~
  - ~~2-2    Execute "Local Recovery Procedures" task (see 3.5.1).~~
  - ~~2-3    Exit this task.~~

- 3 ~~ENDIF.~~
- 4 IF the MSC counts tandem segments:
- 4-1 Set the Segment Counter field in the BillingID parameter to 1 (to reflect no air segments and one tandem segment).
- 5 ELSE:
- 5-1 Set the Segment Counter field in the BillingID parameter to 0 (to reflect no air or tandem segments).
- 6 Include the BillingID parameter.
- 7 ENDIF.

Modifications from "Miscellaneous Enhancements" tracking document, Rev-10.

- 8 Include the MS's ElectronicSerialNumber parameter, the IMSI parameter (if available), and the MobileIdentificationNumber- parameter (if available).
- 8 ~~Include the MS's ElectronicSerialNumber and MobileIdentificationNumber parameters.~~
- 9 Include the InterMSCCircuitID parameter of the intersystem setup trunk facility.
- 10 IF the SignalingMessageEncryptionKey (SMEKEY) is available:
- 10-1 Include the SignalingMessageEncryptionKey (SMEKEY) parameter.
- 11 ENDIF.
- 12 IF the MS is authorized to have Voice Privacy:12-1 IF the CDMAPrivateLongCodeMask (CDMAPLCM) is available:
- 12-1-1 Include the CDMAPrivateLongCodeMask (CDMAPLCM) parameter.
- 12-2 ELSEIF the VoicePrivacyMask (VPMASK) is available:
- 12-2-1 Include the VoicePrivacyMask (VPMASK) parameter.
- 12-3 ENDIF.
- 13 ENDIF.

Modifications from "IS-751" tracking document, Rev-10. Statement renumbering is required beyond this point.

- a IF the DataPrivacyParameters (DATAPP) is applicable:
- a-1 Include the DataKey parameter.
- b ENDIF.
- c IF the incoming call is a circuit-mode data call:
- c-1 Include the ISLPInformation parameter set to Serving MSC ISLP information.
- d ENDIF.
- e IF Service Negotiation needs to be done after channel assignment traffic channel (e.g., due to non-availability of resources at the Serving System for the requested service):
- e-1 Include the ChangeServiceAttributes (CHGSRVAT) parameter with the ServiceNegotiate field set to *Service Negotiation Required*.
- f ELSE:
- f-1 Include the ChangeServiceAttributes (CHGSRVAT) parameter with the ServiceNegotiate field set to *Service Negotiation Not Required*.

g    ENDIF.

The following change was addressed in the integrated text of 3.3.5; there is no need to also query here.

~~IS-771 adds Steps a to b; these Steps are moved here because IS-778 removed the base text from Section 3.3.5 that IS-771 modified; this is part of Select Facility PIC processing.~~

~~a    IF the *Terminating Resource Available* trigger has been armed for the MS:~~

~~a 1    Execute the “MSC Check of Serial Trigger Limit” task (see 6.X).~~

~~a 2    Execute the “MSC Initiating a Facility Selected And Available” task (see 4.E.1).~~

~~a 3    IF the DisplayText parameter is received:~~

~~a 3-1    Include the DisplayText parameter.~~

~~a 4    ENDIF.~~

~~b    ENDIF.~~

14    Start the Intersystem Setup Timer (ISSRT).

15    Send an InterSystemSetup INVOKE to the bordering MSC.

16    WAIT for an intersystem setup response.

17    WHEN a RETURN RESULT is received:

17-1    Stop timer (ISSRT).

17-2    IF the message can be processed, AND IF the SetupResult parameter set to *Successful*:

Modifications from "Miscellaneous Enhancements" tracking document, Rev-10.

17-x-1    Connect the backward call path to the intersystem trunk:

17-x-2    IF the backward call path cannot be successfully connected to the intersystem trunk:

17-x-2-1    Release the intersystem trunk.

17-x-2-2    Execute “Local Recovery Procedures” task (see 3.5.1).

17-x-2-3    Exit this task.

17-x-3    ENDIF.

17-2-1    Execute the “MSC Awaiting InterSystemAnswer” task (see 4.24.1).

17-3    ELSE:

17-3-1    Release the intersystem trunk.

17-3-2    Execute “Local Recovery Procedures” task (see 3.5.1).

17-4    ENDIF.

18    WHEN a RETURN ERROR or REJECT is received:

18-1    Stop timer (ISSRT).

18-2    Release the intersystem trunk.

18-3    Execute “Local Recovery Procedures” task (see 3.5.1).

19    WHEN the timer (ISSRT) expires:

19-1    Release the intersystem trunk.

19-2    Execute “Local Recovery Procedures” task (see 3.5.1).

- 20 ENDWAIT.  
21 Exit this task.

#### 4.27.2 MSC Receiving InterSystemSetup INVOKE

(TIA/EIA-41-D, page 6-186)

When an MSC receives an InterSystemSetup INVOKE, it shall perform the following:

- 1 IF the received message cannot be processed:
  - 1-1 Release the MS from the voice channel.
  - 1-2 Send an InterSystemSetup RETURN ERROR with a proper Error Code value to the requesting MSC.
  - 1-3 Execute "Local Recovery Procedures" task (see 3.5.1).
- x ELSEIF the MSC is a Tandem MSC:
  - x-1 IF a suitable intersystem trunk toward the next MSC is available:
    - x-1-1 Reserve that intersystem trunk.
    - x-1-2 Include the InterMSCCircuitID parameter of that intersystem trunk.
    - x-1-3 Include the BillingID parameter with the value of the SegmentCounter field set to the value of the stored BillingID parameter.
    - x-1-4 Relay all other received parameters.
    - x-1-5 Start the Intersystem Setup Timer (ISSRT).
    - x-1-6 Send an InterSystemSetup INVOKE to the next MSC.
    - x-1-7 WAIT for an intersystem setup response.
    - x-1-8 WHEN a RETURN RESULT is received:
      - x-1-8-1 Stop timer (ISSRT).
      - x-1-8-2 IF the message can be processed AND IF the SetupResult parameter set to *Successful*:
        - x-1-8-2-1 Connect the backward call path to the intersystem trunk:
          - x-1-8-2-2 IF the backward call path cannot be successfully connected to the intersystem trunk:
            - x-1-8-2-2-1 Release the intersystem trunk.
            - x-1-8-2-2-2 Include the SetupResult parameter set to *Unsuccessful*.
            - x-1-8-2-2-3 Send an InterSystemSetup RETURN RESULT.
            - x-1-8-2-2-4 Execute "Local Recovery Procedures" task (see 3.5.1).
            - x-1-8-2-2-5 Exit this task.
          - x-1-8-2-3 ENDIF.
          - x-1-8-2-4 Relay all parameters.
          - x-1-8-2-5 Send an InterSystemSetup RETURN RESULT.
        - x-1-8-3 ELSE:
          - x-1-8-3-1 Release the intersystem trunk.
          - x-1-8-3-2 Include the SetupResult parameter set to *Unsuccessful*.
          - x-1-8-3-3 Send an InterSystemSetup RETURN RESULT.
          - x-1-8-3-4 Execute "Local Recovery Procedures" task (see 3.5.1).
          - x-1-8-4 ENDIF.

- x-1-9 WHEN a RETURN ERROR is received:
- x-1-9-1 Stop timer (ISSRT).
- x-1-9-2 Release the intersystem trunk.
- x-1-9-3 Relay all parameters.
- x-1-9-4 Send a RETURN ERROR.
- x-1-9-5 Execute "Local Recovery Procedures" task (see 3.5.1).
- x-1-10 WHEN a REJECT is received:
- x-1-10-1 Stop timer (ISSRT).
- x-1-10-2 Release the intersystem trunk.
- x-1-10-3 Send a RETURN ERROR with Error Code indicating *SystemFailure*.
- x-1-10-4 Execute "Local Recovery Procedures" task (see 3.5.1).
- x-1-11 WHEN the timer (ISSRT) expires:
- x-1-10-1 Release the intersystem trunk.
- x-1-10-2 Execute "Local Recovery Procedures" task (see 3.5.1).
- x-1-12 ENDWAIT.
- x-2 ELSE:
- x-2-1 Send a RETURN ERROR with Error Code indicating *ResourceShortage*.
- x-2-2 Execute "Local Recovery Procedures" task (see 3.5.1).
- x-3 ENDIF.
- 2 ELSEIF the voice path between the voice channel and the intersystem trunk cannot be successfully completed:
- 2-1 Release the MS from the voice channel.
- 2-2 Include the SetupResult parameter set to *Unsuccessful*.
- 2-3 Send an InterSystemSetup RETURN RESULT.
- 2-4 Execute "Local Recovery Procedures" task (see 3.5.1).
- 3 ELSEIF the MS cannot be successfully alerted:
- 3-1 Disconnect the voice path.
- 3-2 Release the MS from the voice channel.
- 3-3 Include the SetupResult parameter set to *Unsuccessful*.
- 3-4 Send an InterSystemSetup RETURN RESULT.
- 3-5 Execute "Local Recovery Procedures" task (see 3.5.1).
- 4 ELSE (both voice path completion and MS alert are successful):
- 4-1 Include the InterSwitchCount parameter set appropriately to 1.
- 4-2 Include the SetupResult parameter set to *Successful*.

Modifications from "IS-737".
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- 4-x IF the ServiceNegotiate field of the ChangeServiceAttributes (CHGSRVAT) parameter is equal to *Service Negotiation Required*:
- 4-x-1 Initiate Service Negotiation with the MS with the service that was included in the InterSystemPage2 INVOKE.
- 4-x-2 IF the negotiated service is different from the service that was included in the InterSystemPage2 INVOKE:

4-x-2-1      Execute “Serving MSC Initiation of Change Service” task (see  
                          4.x.x.1) with the negotiated service as the requested service.  
4-x-3      ENDIF.  
4-y      ENDIF.  
 4-3      Send an InterSystemSetup RETURN RESULT.  
 4-4      IF Voice Privacy is desired AND IF the system supports Voice Privacy:  
 4-4-1      Order the MS to enable Voice Privacy.  
 4-5      ENDIF.  
 4-6      IF Signaling Message Encryption is desired AND IF the system supports  
             Signaling Message Encryption:  
 4-6-1      Order the MS to enable Signaling Message Encryption.  
 4-7      ENDIF.

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5    ENDIF.

6    Exit this task.

**Table 36      ~~Border~~ MSC InterSystemSetup Response**

<b>Problem Detection and Recommended Response from <u>a</u> Border MSC toward the Visited MSC</b>	
<b>RETURN ERROR Error Code</b>	<b>Problem Definition</b>
<b><i>UnrecognizedMIN</i></b>	The supplied MobileIdentificationNumber parameter is not recognized as an authorized MS.
<b><i>OperationSequenceProblem</i></b>	<u>A circuit between the MSC and the INVOKING is already established for the MS. The supplied InterSwitchCount parameter value exceeds the defined MAXHANDOFF threshold value.</u>
<b><i>ResourceShortage</i></b>	A required MSC resource is temporarily not available.
<b><i>OperationNotSupported</i></b>	The requested MAP operation is recognized, but not supported by the receiving MSC or the requesting functional entity is not authorized. It is recommended that an MSC support InterSystemSetup transactions.
<b><i>TrunkUnavailable</i></b>	The supplied InterMSCCircuitID parameter value is valid, but this trunk circuit is presently <i>Active, Locally Blocked, or Locally and Remotely Blocked</i> .
<b><i>ParameterError</i></b>	<u>A supplied parameter has an encoding problem (e.g., the supplied MobileIdentificationNumber parameter digits do not meet the BCD specification).</u> <del>An unexpected parameter was received.</del> Include the <i>Parameter Identifier</i> in question as the FaultyParameter parameter.
<b><i>SystemFailure</i></b>	A required resource (e.g., data base access, functional entity) is not presently accessible due to a failure. Human intervention may be required for resolution.
<b><i>Unrecognized-ParameterValue</i></b>	<u>Supplied parameter value is unrecognized or has nonstandard values or the MSC does not support the requested value. Parameter value No effect, Not applicable, Not specified, Not used, Reserved, or Unknown.</u> Use default value, if specified, otherwise ignore the parameter. <u>Include the <i>Parameter Identifier</i> in question as the FaultyParameter parameter.</u>
<b><i>MissingParameter</i></b>	An optional parameter required by the MSC was expected, but not received. Include the <i>Parameter Identifier</i> in question as the FaultyParameter parameter.
<b><i>UnrecognizedIMSI</i></b>	The supplied IMSI parameter is not recognized as an authorized MS.

## 4.37 REGISTRATION CANCELLATION

(TIA/EIA-41-D, page 6-226)

The omitted portion of this section is retained without modification.

### 4.37.4 MSC Receiving RegistrationCancellation INVOKE

(TIA/EIA-41-D, page 6-230)

When an MSC receives a RegistrationCancellation INVOKE it shall perform the following:

- 1 IF the received message can be processed:
  - 1-1 IF the CancellationType parameter is received:
    - 1-1-1 IF the CancellationType is *Discontinue*:
      - 1-1-1-x IF the indicated MS is involved in a packet data session:
        - 1-1-1-x-1 Spawn the "MSC Initiating a Drop Service INVOKE" task (see 4.y.y.1).
        - 1-1-1-y ENDIF.
      - 1-1-1-1 IF the indicated MS is involved in a call or service operation anchored by this MSC:
        - 1-1-1-1-1 The ~~MSCServing System~~ shall discontinue the call or service operation currently in progress.
      - 1-1-1-2 ENDIF.
      - 1-1-1-3 IF the *SMS Delivery Pending Flag* is set for the indicated MS:
        - 1-1-1-3-1 Include the SMS\_MessageWaitingIndicator parameter.
      - 1-1-1-4 ENDIF.
      - 1-1-1-5 Remove the record of the indicated MS including the *SMS Delivery Pending Flag*.
    - 1-1-2 ELSEIF the CancellationType is *ReportInCall*:
      - 1-1-2-1 IF the indicated MS is involved in a call or service operation anchored by this MSC:
        - 1-1-2-1-1 Include CancellationDenied parameter set to *Busy*.  
(Do not communicate the *SMS Delivery Pending Flag* state.
      - 1-1-2-2 ELSE:
        - 1-1-2-2-1 IF the *SMS Delivery Pending Flag* is set for the indicated MS:
          - 1-1-2-2-1-1 Include the SMS\_MessageWaitingIndicator parameter.
        - 1-1-2-2-2 ENDIF.
        - 1-1-2-2-3 Remove the record of the indicated MS including the *SMS Delivery Pending Flag*.
      - 1-1-2-3 ENDIF.
    - 1-1-3 ELSEIF the indicated MS is involved in a call or service operation anchored by this MSC:
      - 1-1-1-x1 IF the indicated MS is involved in a packet data session AND the MSC opts to release its resources associated with the packet data session in progress:

1-1-1-x1-1      Include the ReleaseReason parameter set to the value *Anchor MSC was removed from the packet data session.*

1-1-1-x1-2      Spawn the "MSC Initiating a Drop Service INVOKE" task (see 4.y.y.1).

1-1-1-y1      ENDIF.

1-1-3-1      The ~~MSC-Serving System~~ may optionally discontinue the call or service operation currently in progress.

1-1-3-2      IF the *SMS Delivery Pending Flag* is set for the indicated MS:

1-1-3-2-1      Include the SMS\_MessageWaitingIndicator parameter.

1-1-3-3      ENDIF.

1-1-3-4      Remove the record of the indicated MS including the *SMS Delivery Pending Flag*.

1-1-4      ENDIF.

1-2      ELSE (CancellationType parameter was not included):

1-2-1      IF the indicated MS is involved in a call or service operation anchored by this MSC:

1-1-1-x2      IF the indicated MS is involved in a packet data session AND the MSC opts to release its resources associated with the packet data session in progress:

1-1-1-x2-1      Include the ReleaseReason parameter set to the value *Anchor MSC was removed from the packet data session.*

1-1-1-x2-2      Spawn the "MSC Initiating a Drop Service INVOKE" task (see 4.y.y.1).

1-1-1-y2      ENDIF.

1-2-1-1      The ~~MSC-Serving System~~ may optionally discontinue the call or service operation currently in progress.

1-2-2      ENDIF.

1-2-3      IF the *SMS Delivery Pending Flag* is set for the indicated MS:

1-2-3-1      Include the SMS\_MessageWaitingIndicator parameter.

1-2-4      ENDIF.

1-2-5      Remove the record of the indicated MS including the *SMS Delivery Pending Flag*.

1-3      ENDIF.

1-4      Send a RETURN RESULT to the requesting VLR.

2      ELSE (the received message cannot be processed):

2-1      Send a RETURN ERROR with a proper Error Code value (see the following table) to the requesting VLR.

3      ENDIF.

4      Exit this task.

The omitted remainder of this section is retained without modification.
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## 4.38 REGISTRATION NOTIFICATION

(TIA/EIA-41-D, page 6-233)

### 4.38.1 MSC Initiating MS Registration

(TIA/EIA-41-D, page 6-233)

When an MSC determines that a roaming Mobile Station (MS) is now within its service area (though autonomous registration, call origination, call termination (e.g., a page response following a call to the roamer access number), packet data service only handoff when the MSC supports after handoff, registration, or other mechanism, except for detection by a call handoff) this new Serving MSC shall start the registration notification process by doing the following:

- 1 Include the QualificationInformationCode parameter set according to the information needed from the VLR.
- 2 Include the SystemAccessType parameter set to the type of access performed by the MS.
- 3 IF the access occurred in a border cell:
  - 3-1 Include the BorderCellAccess parameter with a value of *Border cell access*.
  - 3-2 The MSC should include the ReceivedSignalQuality parameter set to the signal strength of the received access.
  - 3-3 The MSC should include the ControlChannelData parameter set to the Control Channel Identification information.
  - 3-4 The MSC should include the SystemAccessData parameter set to the cell site information.[]
- 4 ENDIF.
- 5 IF the MSC is authentication capable:
  - 5-1 Include the SystemCapabilities (SYSCAP) parameter set to indicate the authentication-related capabilities of this system.
- 6 IF authentication parameters were requested (i.e., AUTH=1 in the Overhead Message Train), but were not received from the MS on the system access:
  - 6-1 Include the ReportType (RPTTYP) parameter indicating *Missing authentication parameters*.
- 7 ENDIF.
- 8 Include the ElectronicSerialNumber parameter set to identify the MS.
- 9 Include the MobileIdentificationNumber parameter set to identify the MS.
- 10 Include the MSCID parameter set to the identity of the MSC.
- 11 Include the SystemMyTypeCode parameter set to the MSC's manufacturer.
- 12 Include the TerminalType (TERMTYP) parameter as declared by the MS.
- 13 IF the MSC is sending the message to an SS7 network:
  - 13-1 Include the PC\_SSN parameter with the Type set to *Serving MSC* and the PC and SSN fields set to the MSC's point code and subsystem number.
- 14 ENDIF.
- 15 IF the MS and MSC are SMS capable:
  - 15-1 Include the SMS\_Address parameter set to be used to route SMS messages to the MS.

16 ENDIF.

17 IF the MSC supports local SPINI operation:

17-1 Include the TransactionCapability parameter indicating local SPINI operation supported.

18 ENDIF.

19 IF the MS is intentionally inaccessible for normal Call Delivery for periods of time (e.g., using a slotted mode, paging frame class, or sleep mode):

19-1 Include the AvailabilityType parameter set to AvailabilityType: *Unspecified mobile inactivity type*.

20 ENDIF.

21 Send a RegistrationNotification INVOKE to the MSC's associated VLR.

22 Start the Registration Notification Timer (RNT).

23 WAIT for a Registration Notification response:

24 WHEN a RETURN RESULT is received:

24-1 Stop timer (RNT).

24-2 IF the message can be processed:

24-2-1 IF the message contained an AuthorizationDenied parameter:

24-2-1-1 IF the indicated MS is involved in a call or service operation anchored by this MSC:

24-2-1-1-1 The Serving System may optionally discontinue the call or service operation currently in progress.

24-2-1-x ELSEIF only a packet data session is active for the indicated MS AND this MSC supports after handoff registration:

24-2-1-x-1 IF the indicated MS has been handed in to this MSC:

24-2-1-x-1-1 Maintain the active packet data session.

24-2-1-x-2 ENDIF.

24-2-1-2 ENDIF.

24-2-1-3 IF a record exists for the indicated MS:

24-2-1-3-1 Clear the subscriber's profile.

24-2-1-4 ENDIF.

24-2-2 ELSE:

24-2-2-1 Update the MS's service profile and qualification information with the received parameters.

24-2-2-2 IF the SMS\_MessageWaitingIndicator parameter was received:

24-2-2-2-1 Set the *SMS Delivery Pending Flag* for this MS.

24-2-2-3 ENDIF.

24-2-2-4 Execute the "MSC MWN Status Change Invocation" task (see 5.13.9).

24-2-2-x IF only a packet data session is active for the indicated MS AND this MSC supports after-handoff registration:

24-2-2-x-1 IF the indicated MS has been handed in to this MSC:

24-2-2-x-1-1 Inform the MS (by way of the CDMA Mobile Station Registered Message) that it has been registered in the current serving system.

24-2-2-x-2 ENDIF.

24-2-2-y      ENDIF.

24-2-2-5      IF the indicated MS is involved in a call or service operation anchored by this MSC:

24-2-2-5-1      IF the service profile parameters do not authorize the current call or service operation:

24-2-2-5-1-1      The Serving System may optionally discontinue the call or service operation currently in progress.

24-2-2-5-2      ENDIF.

24-2-2-6      ENDIF.

24-2-3      ENDIF.

24-3      ELSE (the message cannot be processed):

24-3-1      Execute "Local Recovery Procedures" task (see 3.5.1).

24-4      ENDIF.

25      WHEN a RETURN ERROR OR REJECT is received:

25-1      Stop timer (RNT).

25-2      Execute "Local Recovery Procedures" task (see 3.5.1).

26      WHEN timer (RNT) expires:

26-1      Execute "Local Recovery Procedures" task (see 3.5.1).

27      ENDWAIT.

28      Exit this task.

## 4.W.W ADDSERVICE

(new for TIA/EIA-41-D, page 6-42)

### 4.w.w.1 Target (New Serving) MSC Initiation of an AddService

(new for TIA/EIA-41-D, page 6-42)

When a Target (New Serving) MSC receives notification from the MS of a Packet Data Session Initiation the Target MSC shall do the following<sup>1</sup>:

- 1 Include parameters to identify the MS and the requested Service Configuration(s) that are supported by the Serving System.
- 2 IF and InterMSCCircuitID trunk is required:
  - 2-1 Allocate an inter-MSC trunk.
  - 2-2 Include the InterMSCCircuitID parameter set to the ID of that intersystem trunk.

---

<sup>1</sup>It is assumed that a call is in progress and Intersystem handoff from the Anchor System has occurred.

3   ENDIF.  
 4   Send an AddService INVOKE towards the Anchor MSC.  
 5   Start the Add Service Timer (AST).  
 6   WAIT for an Add Service response.  
 7   WHEN a RETURN RESULT is received:  
   7-1   Stop timer (AST).  
   7-2   IF the message can be processed:  
     7-2-1   IF authorization for the service was granted:  
       7-2-1-1   Connect the new service.  
     7-2-2   ELSEIF substitute services are authorized:  
       7-2-2-1   Perform service negotiation with the MS.  
       7-2-2-2   IF the Target MSC and the MS agree on authorized service:  
         7-2-2-2-1   Connect the new service.  
       7-2-2-3   ELSE (Target MSC and MS do not agree upon a service):  
         7-2-2-3-1   Exit this task.  
       7-2-2-4   ENDIF.  
   7-2-3   ELSE (requested service was rejected and no substitute service was  
     returned):  
     7-2-3-1   Exit this task.  
   7-2-4   ENDIF.  
   7-3   ELSE (the message cannot be processed):  
     7-3-1   Execute the "Local Recovery Procedures" task (see 3.5.1).  
   7-4   ENDIF.  
 8   WHEN a RETURN ERROR or REJECT is received:  
   8-1   Stop timer (AST).  
   8-2   Execute the "Local Recovery Procedures" task (see 3.5.1).  
 9   WHEN the timer (AST) expires:  
   9-1   Execute the "Local Recovery Procedures" task (see 3.5.1).  
 10   ENDWAIT.  
 11   Exit this task.

#### 4.w.w.2 Anchor MSC Receiving an AddService INVOKE

(new for TIA/EIA-41-D, page 6-42)

When an Anchor MSC receives an Add Service INVOKE, it shall perform the following:

1   IF the received message can be processed:  
   1-1   IF the requesting MS's AuthenticationCapability status information  
     indicates that authentication is required:  
     1-1-1   Include the SystemAccessType parameter set to indicate *Unspecified*.  
     1-1-2   Include the Digits (Dialed) parameter (if received in the AddService  
       INVOKE message).  
     1-1-3   Execute the "MSC Initiating an AuthenticationRequest" task (see  
       4.4.1).

1-1-4 IF authentication is successful:

1-1-4-1 IF the Digits (Dialed) parameter was received:

1-1-4-1-1 Execute the "MSC Analyze MS Dialed Number Task (see 3.2.3).

1-1-4-1-2 IF the call origination is allowed:

1-1-4-1-2-1 Include parameters that describe the added service.

1-1-4-1-3 ELSE:

1-1-4-1-3-1 Include the ReasonList parameter set to *Service not allowed*.

1-1-4-1-4 ENDIF.

1-1-4-2 ELSEIF (the Digits [Dialed] parameter was not received [e.g., packet service]) the requested service is authorized for the MS:

1-1-4-2-1 Include parameters that describe the added service.

1-1-4-2 ELSE:

1-1-4-2-1 Include the ReasonList parameter set to *Service not allowed*.

1-1-4-2 ENDIF.

1-1-5 ELSE (authentication fails):

1-1-5-1 IF the Digits (Dialed) parameter was received and the MS dialed a locally allowed number (e.g., 9-1-1):

1-1-5-1-1 Process the dialed number locally and route the call.

1-1-5-1-2 Include parameters that describe the added service.

1-1-5-2 ELSEIF the request shall be denied:

1-1-5-2-1 Include the ReasonList parameter set to *Service not allowed*.

1-1-5-2-2 Execute recovery procedures according to the MSC's internal algorithm.

1-1-5-3 ELSE:

1-1-5-3-1 Include parameters that describe the added service.

1-1-5-3 ENDIF.

1-1-5 ENDIF.

1-2 ELSE (the requesting MS is not capable of being authenticated):

1-2-1 IF the Digits (Dialed) parameter was received:

1-2-1-1 Execute the "MSC Analyze MS Dialed Number" task (see 3.2.3).

1-2-1-2 IF the call origination is allowed:

1-2-1-2-1 Include parameters that describe the added service.

1-2-1-3 ELSE:

1-2-1-3-1 Include the ReasonList parameter set to *Service not allowed*.

1-2-1-4 ENDIF.

1-2-2 ELSEIF (the Digits [Dialed] parameter was not received [e.g., packet service]) the requested service is authorized for the MS:

1-2-2-1 Include parameters that describe the added service.

1-2-3 ELSE:

1-2-2-1 Include the ReasonList parameter set to *Service not allowed*.

1-2-3 ENDIF.

1-3 ENDIF.



- 1-4 Send a RETURN RESULT.
- 2 ELSE:
- 2-1 Send a RETURN ERROR with the proper Error Code value toward the Serving MSC.
- 2-2 Execute the “Local Recovery Procedures” task (see 3.5.1).
- 3 ENDIF.
- 4 Exit this task.

**Table 4.w.w.2 Anchor MSC AddService Response.**

Problem Detection and Recommended Response from an Anchor MSC toward the Serving MSC	
RETURN ERROR Error Code	PROBLEM DEFINITION
<b>UnrecognizedMIN</b>	The MS identified by the supplied MobileIdentificationNumber is not involved in an active service that has been handed off to the requesting MSC.
<b>ResourceShortage</b>	A required MSC resource (e.g., internal memory record) is temporarily not available (e.g., congestion).
<b>OperationNotSupported</b>	The requested MAP operation is recognized, but not supported by the receiving MSC or the requesting functional entity is not authorized. <i>Note: It is recommended that an MSC support AddService transactions.</i>
<b>ParameterError</b>	A supplied parameter has an encoding error. <i>Note: Include the Parameter Identifier in question as the FaultyParameter parameter.</i>
<b>SystemFailure</b>	A required resource (e.g., data base access, functional entity) is not presently accessible due to a failure. Human intervention may be required for resolution.
<b>UnrecognizedParameterValue</b>	Supplied parameter value is unrecognized or has nonstandard values. <i>Note: Include the Parameter Identifier in question as the FaultyParameter parameter.</i>
<b>MissingParameter</b>	An optional parameter (e.g., CDMAServiceOptionList) required by the receiving MSC was expected but not delivered.
<b>UnrecognizedIMSI</b>	The MS identified by the supplied IMSI is not involved in an active service that has been handed off to the requesting MSC.

**4.w.w.3 Tandem MSC Receiving an AddService INVOKE**

(new for TIA/EIA-41-D, page 6-42)

When the Tandem MSC receives an AddService INVOKE, it shall perform the following:

- 1 IF the received message can be processed:
  - 1-1 Include parameters to identify the MS and Service Configuration(s) supported.
  - 1-2 IF the Serving System is a CDMA System:
    - 1-2-1 Filter the CDMAServiceOptionList parameter to delete any services that cannot be supported by the Tandem MSC.
  - 1-3 ENDIF.

1-4 IF an inter-MSC trunk is required:

1-4-1 Allocate an inter-MSC trunk.

1-4-2 Include the InterMSCCircuitID parameter set to the ID of that intersystem trunk.

1-5 ENDIF.

1-6 Relay received parameters (as modified) in an AddService INVOKE.

1-7 Start the Add Service Timer (AST).

1-8 WAIT for an Add Service response.

1-9 WHEN a RETURN RESULT is received:

1-9-1 Stop the Add Service Timer (AST).

1-9-2 Allocate facilities (e.g., ISLP), if needed.

1-9-3 Relay the received parameters.

1-9-4 Send a RETURN RESULT toward the Serving MSC.

1-10 WHEN a RETURN ERROR is received:

1-10-1 Stop the Add Service Timer (AST).

1-10-2 Relay the Error Code.

1-10-3 Send a RETURN ERROR toward the Serving MSC.

1-10-3 Execute the “Local Recovery Procedures” task (see 3.5.1).

1-11 WHEN a REJECT is received:

1-11-1 Send a RETURN ERROR toward the Serving MSC with the Error Code indicating *SystemFailure*.

1-11-2 Execute the “Local Recovery Procedures” task (see 3.5.1).

1-12 WHEN the timer (AST) expires:

(The initiating functional entity timer should also have expired so no notification is necessary.)

1-12-1 Execute the “Local Recovery Procedures” task (see 3.5.1).

1-13 ENDWAIT.

2 ELSE (the received message cannot be processed):

2-1 Send a RETURN ERROR with the proper Error Code value toward the Serving MSC.

2-2 Execute the “Local Recovery Procedures” task (see 3.5.1).

3 ENDIF.

4 Exit this task.

Table 4.w.w.3 Tandem MSC AddService Response.

Problem Detection and Recommended Response from a Tandem MSC toward the Serving MSC	
RETURN ERROR Error Code	PROBLEM DEFINITION
<b>UnrecognizedMIN</b>	The MS identified by the supplied MobileIdentificationNumber is not involved in an active service that has been handed off to the requesting MSC.
<b>ResourceShortage</b>	A required MSC resource (e.g., internal memory record) is temporarily not available (e.g., congestion).
<b>OperationNotSupported</b>	The requested MAP operation is recognized, but not supported by the receiving MSC or the requesting functional entity is not authorized. <i>Note: It is recommended that an MSC support AddService transactions.</i>
<b>ParameterError</b>	A supplied parameter has an encoding error. <i>Note: Include the Parameter Identifier in question as the FaultyParameter parameter.</i>
<b>SystemFailure</b>	A required resource (e.g., data base access, functional entity) is not presently accessible due to a failure. Human intervention may be required for resolution.
<b>UnrecognizedParameterValue</b>	Supplied parameter value is unrecognized or has nonstandard values. <i>Note: Include the Parameter Identifier in question as the FaultyParameter parameter.</i>
<b>MissingParameter</b>	An optional parameter (e.g., CDMAServiceOptionList) required by the receiving MSC was expected but not delivered.
<b>UnrecognizedIMSI</b>	The MS identified by the supplied IMSI is not involved in an active service that has been handed off to the requesting MSC.

## 4.Y.Y Drop Service

### 4.y.y.1 MSC Initiating a Drop Service

(new for TIA/EIA-41-D, page 6-42)

A DropService may release an individual service or all existing services. This may include packet mode data service, circuit mode service, or both. When an MSC determines that a DropService is necessary, it shall perform the following:

- 1 Include the ReleaseReason parameter set to the proper value.
- 2 IF the MSC is the Serving MSC:
  - 2-1 Populate the CDMAConnectionReferenceList parameter (e.g., list services to be dropped).
- 3 ELSEIF the MSC is a Tandem MSC:
  - 3-1 IF the BillingID parameter is received:
    - 3-1-1 Relay the BillingID parameter.
  - 3-2 ENDIF.
- 4 ENDIF.
- 5 Start the DropService Response Timer (DST).
- 6 Include all applicable parameters (see Chapter 5).
- 7 Send a DropService INVOKE to the other MSC.
- 8 IF the MSC is the Serving MSC:
  - 8-1 Set bit 8 of the Segment Counter field of the BillingID parameter to 1 (indicating that it is the last Serving MSC) for recording purposes.
- 9 ENDIF.
- 10 IF only a packet data service option remains active for this subscriber and IF the MSC is the Serving MSC:
  - 10-1 IF the MSC is configured to support after-handoff registration for packet data-only handoffs:
    - 10-1-1 IF the SignalingMessageEncryptionKey parameter was not received:
      - 10-1-1-1 Set the SystemAccessType parameter to value *Unspecified*.
      - 10-1-1-2 Invoke the “MSC Initiating an Authentication Request” task (see 4.4.1).
      - 10-1-1-3 IF the DenyAccess parameter is received:
        - 10-1-1-3-1 Drop the packet data session.
        - 10-1-1-3-2 Include the CDMAConnectionReferenceList parameter set to indicate that the packet data service has ended.
        - 10-1-1-3-3 Include the ReleaseReason parameter set to the value *SessionOverClearBackward*.
        - 10-1-1-3-4 Spawn the “MSC Initiating a Drop Service INVOKE” task (see 4.y.y.1) towards the previous Serving MSC.
        - 10-1-1-3-5 GOTO DropServiceResponse.
      - 10-1-1-4 ENDIF.
    - 10-1-2 ENDIF.
    - 10-1-3 Consider the type of access performed by the MS to be *Call Origination*.

```

10-1-4      Spawn the "MSC Initiating MS Registration" task (see 4.38.1).
10-2      ENDIF.
11      ENDIF.
DropServiceResponse:
12      WAIT for a Drop Service response.
13      WHEN a RETURN RESULT is received:
13-1      Stop the DropService Response Timer (DST).
13-2      IF the message can be processed:
13-2-1      IF a circuit mode service is being dropped:
13-2-1-1      IF a circuit mode data call is being dropped:
13-2-1-1-1      Disable the ISLP (if not previously) done).
13-2-1-2      ENDIF.
13-2-1-3      Mark the inter-MSC trunk as idle.
13-2-2      ENDIF.
13-2-5      IF the MSC is the Anchor MSC:
13-2-5-1      IF the BillingID parameter is received:
13-2-5-1-1      Extract the SegmentCounter field to close the DMH audit
                  record (see DMH for more information).
13-2-5-2      ELSE:
13-2-5-2-1      Close the DMH audit record with an unknown number of
                  segments.
13-2-5-3      ENDIF.
13-2-6      ENDIF.
13-3      ELSE (the received message cannot be processed):
13-3-1      Execute the "Local Recovery Procedures" task (see 3.5.1).
13-4      ENDIF.
14      WHEN a RETURN ERROR or REJECT is received:
14-1      Stop timer (DST).
14-2      Execute the "Local Recovery Procedures" task (see 3.5.1).
14-3      IF the MSC is the Anchor MSC:
14-3-1      Close the DMH audit record with an unknown number of segments.
14-4      ENDIF.
15      WHEN timer (DST) expires:
16-1      IF the MSC is the Anchor MSC:
16-1-1      Close the DMH audit record with an unknown number of segments.
16-2      ENDIF.
16-3      Execute the "Local Recovery Procedures" task (see 3.5.1).

```

- 17 ENDWAIT.
- 18 Exit this task.

## 4.y.y.2 MSC Receiving a DropService INVOKE

(new for TIA/EIA-41-D, page 6-42)

Upon receipt of a DropService INVOKE, an MSC shall perform the following:

- 1 IF the received message can be processed:
  - 1-1 FOR every service in the CDMAConnectionReferenceList parameter:
    - 1-1-1 IF the service is a circuit mode service:
      - 1-1-1-1 Mark the inter-MSC trunk idle.
      - 1-1-1-2 IF there is a task waiting for the indicated intersystem trunk:
        - 1-1-1-2-1 Pass a DropService message to the waiting task.
      - 1-1-1-3 ENDIF.
    - 1-1-2 ELSEIF the service is a packet service:
      - 1-1-2-1 Mark the packet session as idle.
    - 1-1-3 ENDIF.
  - 1-2 ENDFOR.
  - 1-3 IF the receiving MSC is the Anchor MSC:
    - 1-3-1 IF the BillingID parameter is received:
      - 1-3-1-1 Extract the SegmentCounter field to close the DMH audit record (see DMH for more information).
    - 1-3-2 ELSE:
      - 1-3-2-1 Close the DMH audit record with an unknown number of segments.
    - 1-3-3 ENDIF.
    - 1-3-4 Send a RETURN RESULT.
  - 1-4 ELSEIF the receiving MSC is the Serving MSC:
    - 1-4-1 IF the service indicated is a packet service:
      - 1-4-1-1 IF the ReleaseReason parameter is present AND has the value *Anchor MSC was removed from the packet data session*.
        - 1-4-1-1-1 Maintain the active packet data session.
      - 1-4-1-2 ELSE:
        - 1-4-1-2-1 Drop the active packet data session.
      - 1-4-1-3 ENDIF.
    - 1-4-2 ENDIF.
    - 1-4-3 Include the BillingID parameter containing the number of segments.
    - 1-4-4 Send a RETURN RESULT.
  - 1-5 ELSEIF the receiving MSC is a Tandem MSC:
    - 1-5-1 IF the receiving MSC is not waiting for a DropService RETURN RESULT:
      - 1-5-1-1 Relay the ReleaseReason parameter.
      - 1-5-1-2 IF the BillingID parameter was received:

```

1-5-1-2-1      Relay the BillingID parameter.
1-5-1-2-2      Spawn the "MSC Initiating a Drop Service INVOKE" task
                (see 4.y.y.1).
1-5-1-2-3      Send a RETURN RESULT.
1-5-1-3        ELSE:
1-5-1-3-1      Execute the "MSC Initiating a Drop Service INVOKE" task
                (see 4.y.y.1).
1-5-1-3-2      Relay the BillingID parameter, if received.
1-5-1-3-3      Send a RETURN RESULT.
1-5-1-4        ENDIF.
1-5-2          ELSEIF the CDMAConnectionReferenceList parameter contains
                CDMAConnectionReferenceInformation parameter instances not
                included in the CDMAConnectionReferenceList parameter in the
                previously sent DropService INVOKE:
1-5-2-1        Relay the ReleaseReason parameter.
1-5-2-2        Remove from the CDMAConnectionReferenceList parameter
                those instances of the CDMAConnectionReferenceInformation
                parameter included in the CDMAConnectionReferenceList
                parameter in the previously sent DropService INVOKE.
1-5-2-3        Include the CDMAConnectionReferenceList parameter.
1-5-2-4        IF the BillingID parameter was received:
1-5-2-4-1      Relay the BillingID parameter
1-5-2-4-2      Spawn the "MSC Initiating a Drop Service INVOKE" task
                (see 4.y.y.1).
1-5-2-4-3      Send a RETURN RESULT.
1-5-2-5        ELSE:
1-5-2-5-1      Execute the "MSC Initiating a Drop Service INVOKE" task
                (see 4.y.y.1).
1-5-2-5-2      Relay the BillingID parameter, if received.
1-5-2-5-3      Send a RETURN RESULT.
1-5-2-6        ENDIF.
1-5-3          ELSE (all CDMAConnectionReferenceList parameter instances in the
                CDMAConnectionReferenceInformation parameter were also
                included in the CDMAConnectionReferenceList parameter in the
                previously sent DropService INVOKE:
1-5-3-1        Include the BillingID parameter, if received.
1-5-3-2        Send a RETURN RESULT.
1-5-4          ENDIF.
1-6            ELSE (the receiving MSC is not the Anchor, Tandem, or Serving MSC):
1-6-1          Send a RETURN ERROR with the proper Error Code value (see the
                following table).
1-6-2          Perform Local Recovery Procedures (see 3.5.1).
1-7            ENDIF.
2              ENDIF.
3              Exit this task.

```

Table 4.y.y.2 Receiving MSC DropService Response.

Problem Detection and Recommended Response from a Receiving MSC toward the Initiating MSC	
RETURN ERROR Error Code	PROBLEM DEFINITION
<b>UnrecognizedMIN</b>	One of several cases may apply. A circuit mode call is presently active on the trunk circuit identified by the supplied InterMSCCircuitID parameter, but the MS identified by the supplied MobileIdentificationNumber parameter is not involved in the call. Alternatively, the service to be dropped is a packet service, but the MS identified by the supplied MobileIdentificationNumber is not involved in the service.
<b>ResourceShortage</b>	A required MSC resource (e.g., internal memory record) is temporarily not available (e.g., congestion).
<b>OperationNotSupported</b>	The requested MAP operation is recognized, but not supported by the receiving MSC or the requesting functional entity is not authorized. <i>Note: It is recommended that an MSC support DropService transactions.</i>
<b>ParameterError</b>	A supplied parameter has an encoding error. <i>Note: Include the Parameter Identifier in question as the FaultyParameter parameter.</i>
<b>SystemFailure</b>	A required resource (e.g., data base access, functional entity) is not presently accessible due to a failure. Human intervention may be required for resolution.
<b>UnrecognizedParameterValue</b>	Supplied parameter value is unrecognized or has nonstandard values (e.g., CDMAConnectionReferenceList has an unrecognized value). <i>Note: Include the Parameter Identifier in question as the FaultyParameter parameter.</i>
<b>MissingParameter</b>	An optional parameter (e.g., CDMAConnectionReferenceList) required by the receiving MSC was expected but not delivered.
<b>UnrecognizedIMSI</b>	One of several cases may apply. A circuit mode call is presently active on the trunk circuit identified by the supplied InterMSCCircuitID parameter, but the MS identified by the supplied IMSI parameter is not involved in the call. Alternatively, the service to be dropped is a packet service, but the MS identified by the supplied IMSI is not involved in the service.  A circuit mode call is presently active on the trunk circuit identified by the supplied InterMSCCircuitID parameter, but the MS identified by the supplied IMSI parameter is not involved in the call.



## 7 OPERATION TIMER VALUES

(TIA/EIA-41-D Chapter 6, page 6-400)

The omitted portion of this section is retained without modification.

**Table 63 Operation Timer Values (continued)**

Timer	Default (sec.)	Started when	Normally stopped when	Action when timer expires
...	...	...	...	...
<u>AST</u> <u>AddService</u> <u>Response Timer</u>	<u>6</u>	<u>AddService</u> <u>INVOKE is sent.</u>	<u>AddService RETURN</u> <u>RESULT or RETURN</u> <u>ERROR is received.</u>	<u>Execute</u> <u>recovery</u> <u>procedures.</u>
...	...	...	...	...
<u>DST</u> <u>DropService</u> <u>Response Timer</u>	<u>6</u>	<u>DropService</u> <u>INVOKE is sent.</u>	<u>DropService RETURN</u> <u>RESULT or RETURN</u> <u>ERROR is received.</u>	<u>Execute</u> <u>recovery</u> <u>procedures.</u>
...	...	...	...	...