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OTA Support for MEID

Revision History

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Rev. 1	Initial Publication	October 2005

OTA SUPPORT FOR MEID

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FOREWORD

(This foreword is not part of this Specification.)

This document presents a recommended plan for the implementation of Over-The-Air (OTA) support for the Mobile Equipment Identity (MEID).

This document is organized into the following sections:

Introduction. This section defines the scope of this document.

OTA Subscriber Feature Modifications. This section specifies the OTA Subscriber Feature modifications needed to support the MEID.

MAP Part 000 Modifications. This section specifies the MAP Part 000 modifications needed to support the MEID for OTA.

CDMA OTA Automatic Roaming Information Flow Modifications. This section specifies the CDMA OTA automatic roaming information flow modifications required for the MEID.

TCAP Modifications. This section defines a new MAP RETURN ERROR Error Code value for *UnrecognizedMEID*.

MAP Operations Signaling Protocol Modifications. This section specifies the MAP operations signaling protocol modifications needed to add the MEID parameter for OTA.

MAP Parameters Signaling Protocol Modifications. This section specifies the MAP parameters signaling protocol modifications needed to support the MEID for OTA.

CDMA OTA Signaling Procedures Modifications. This section specifies the CDMA OTA signaling procedures modifications for the MEID.

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INTRODUCTION

This Specification presents a recommended plan for the implementation of Over-The-Air (OTA) support for the Mobile Equipment Identity (MEID).

1 Scope

The purpose of this document is to specify the modifications to [MAP] and [OTA] for OTA support of the MEID.

2 Normative References

The following specifications and standards contain provisions which, through reference in this text, constitute provisions of this document. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

3GPP2

[MAP] X.S0004-E v1.0, *Wireless Radiotelecommunications Intersystem Operations*; 2004

[MEID] X.S0008-0 v2.0, *MAP Support for the Mobile Equipment Identity (MEID)*; 2005

[OTA] N.S0011-0 v1.0, *OTASP and OTAPA*; 1999

3 Editorial Conventions

The following editorial conventions are used for this document:

- underline: addition
- ~~cross out~~: deletion
- change bar: indicates additions or deletions
- new sub-sections are identified in the sub-section heading

OTA SUBSCRIBER FEATURE MODIFICATIONS

This section specifies the [OTA] Subscriber Feature modifications needed to support the MEID.

2 Subscriber Feature Description

2.1 Over-The-Air Service Provisioning (OTASP)

2.1.1 Normal Procedures With Successful Outcome

Normal Operation With Successful Outcome

(See [OTA] MAIN, page 6)

This section describes a typical sequence of procedures for OTASP invoked from the MS, which results in a successful outcome. It is a service provider specific decision whether to complete the procedure in one or multiple steps.

1. A user acquires an OTASP capable MS.
2. The user must provide a charged battery or external power source for the MS before proceeding with OTASP.
3. The user is within the desired home system of the desired service provider service area, or obtains information on how to contact the service provider from outside the desired service provider service area.
4. The user “powers-on” the MS.
5. The user selects which NAM to program (if multiple NAMs are supported).
6. A service provider is selected. The following are some of the means by which a service provider may be selected:
   - » The MS may be programmed to attempt OTASP with one or more service providers.
   - » The MS may scan for all available service providers, and present the user with a list from which to choose.
   - » The user may explicitly specify a service provider by entering the OTASP feature code and the appropriate supplementary digits.
   - » If the user is not within the desired system operator’s coverage area, the user may be given instructions on how to contact the chosen service provider.

   The service provider selection is indicated to the network via a feature code. This feature code shall result in the establishment of a voice call between the user and the selected service provider’s customer service center.

   NOTE 1: The MS first attempts OTASP on a digital system, if possible and if available. If the MS cannot acquire a digital system or cannot initiate OTASP on a digital system, the MS may then attempt to initiate OTASP on an analog system.

NOTE 2: A service provider shall not be required to support OTASP for subscribers selecting a different service provider. If a subscriber selects a service provider for OTASP which is not the provider of the current serving system, then the current service provider may route the call to its own customer service center ~~representative~~, an announcement, or to the desired service provider. This is a service provider specific decision.

7. While the call to the customer service center is being established, the ESN is supplied to the network. In addition, if the MEID is available, it is also supplied to the network.

   ~~After the customer service representative has established a dialog with the user, the network may upload some NAM parameters from the MS. These actions may be deferred until after enabling message encryption, voice privacy or both.~~

8. The customer service center ~~representative~~ answers the call and establishes a dialog with the user. The network may then upload some NAM parameters from the MS. These actions may be deferred until after enabling message encryption, voice privacy or both.

   NOTE 4: The customer service center shall have a mechanism to associate the incoming call with the uploaded NAM information.

9. If required, the network and the MS shall exchange Authentication Key Generation parameters and generate the A-key.

   NOTE 5: The A-key shall not be displayed to the subscriber or at the customer service center ~~representative~~ at any time.

10. The network may then perform the SSD Update procedure and invoke digital voice privacy and message encryption mode.

    NOTE 6: There are three alternatives for the order in which Steps 8, 9 and 10 may be executed.

    » Step-8, Step-9, Step-10

    » Step-9, Step-8, Step-10

    » Step-9, Step-10, Step-8

    The only requirement is for Step-9 if required, to be executed before Step-10.

11. The customer service center obtains all user information appropriate for validating and verifying the user for wireless service.

12. If the user is successfully verified by the customer service center, the customer service center ~~service representative~~ performs the following tasks:

    » Assigns a Mobile Identification Number (MIN) to the user.

    » Determines subscriber service needs.

    » Creates a subscriber profile record in the network provisioning system data base.

    » Assigns other NAM parameters needed by the MS.

    NOTE 7: If the user fails verification, the user may be denied service by the service provider, and the service provisioning process is terminated.

13. The network transmits the required NAM parameters to the MS over the air interface.

14. If service provisioning is successful, the MS or a signal received from the network may provide validity feedback to the new subscriber indicating that service provisioning was completed successfully. A flowchart (Figures A1 and A2) in 2.1.5 illustrates the above sequence of procedures.

MAP PART 000 MODIFICATIONS

This section specifies the [MAP] Part 000 modifications needed to support the MEID.

2 Part Structure

• • •

2.3 References

2.3.1 Normative References

(See [MAP], page 000-9)

• • •

[MEID] X.S0008-0 v2.0, MAP Support for the Mobile Equipment Identity (MEID); October 2005

The remainder of Section 2 is retained unchanged.

3 Definitions and Documentation Conventions

3.1 Definitions

(See [MAP], page 000-16)

• • •

OTASPCallEntry

The OTASPCallEntry is a name created to represent an implementation dependent temporary call record used during an OTASP or OTAPA session. Depending on the implementations OTASPCallEntry may exist at one or more of the following network entities: HLR, AC, MSC or VLR. Conceptually, the OTASPCallEntry may be identified by either the MEID or ESN or, alternatively, the Activation MIN for OTASP, or for OTAPA, the MS's MIN at the start of the OTAPA session. The OTASPCallEntry may be used to store temporary OTASP or OTAPA session related information (e.g., A-key, SSD, another network entity's SS7 address~~, etc.~~).

The remainder of Section 3 is retained unchanged.

4 Symbols and Abbreviations

(See [MAP], page 000-16)

Table 2 Symbols and Abbreviations

Symbol or Abbreviation	Meaning
• • •	
MEID	Mobile Equipment Identity
• • •	

CDMA OTA AUTOMATIC ROAMING INFORMATION FLOW MODIFICATIONS

This section specifies the CDMA OTA automatic roaming information flow modifications required for the MEID (see [OTA], Section 4_C). For clarity, only the modified versions of the figures are shown (i.e., with change bars).

4.1.C1 Transport Encryption Parameters to Serving MSC for OTA

(See [OTA] 4_C, page 3-3)

This operation scenario describes the use of the AuthenticationDirective operation to transport Encryption Parameters (SMEKEY and CDMAPLCM) to the Serving MSC.

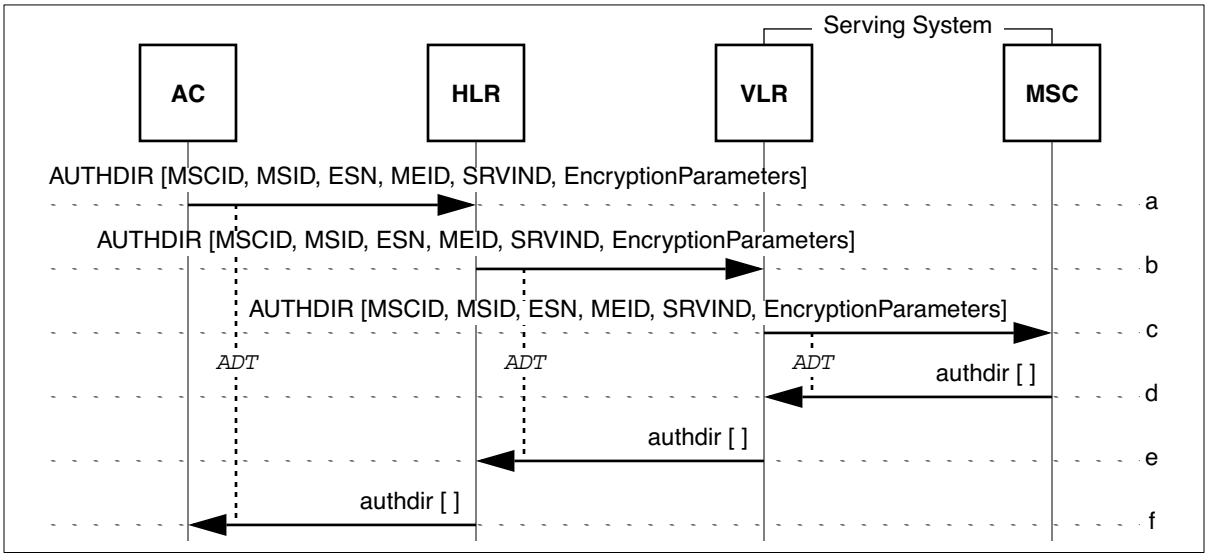

Figure 4.1.C1Transport Encryption Parameters to the Serving MSC for OTA

a. The AC has computed the Encryption Parameters (SMEKEY and CDMAPLCM) and needs to send them to the Serving MSC. It sends an AUTHDIR to the HLR.

Parameters	Usage	Type
MSID	Activation_MIN used temporarily during OTASP, or for OTAPA, the MS's MSID at the start of the OTAPA session. When the MS has both the MIN and the IMSI at the start of the OTAPA session, then the MIN form of the MSID is used.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
SRVIND	Indicates CDMA OTASP service or OTAPA service, as appropriate.	R
MSCID	For OTASP, the Serving MSC's MSCID ~~System ID~~ is included. (Note: this information is not needed and may not even be available for OTAPA.)	O

Parameters	Usage	Type
EncryptionParameters:	Encryption Parameters for signaling message encryption and voice privacy over the air-interface.	R
[CDMAPLCM]	CDMA Private Long Code Mask for voice privacy over the air-interface.	R
[SMEKEY]	Signaling Message Encryption Key for Signaling Message Encryption over the air-interface.	R

b. The HLR forwards the `AUTHDIR` to the VLR currently serving the identified MS. For OTASP, the HLR is able to obtain the VLR's address from the MSCID parameter it receives from the AC. Parameters are as in Step-a.

c. The Serving VLR sends an `AUTHDIR` to the Serving MSC. For OTASP, the VLR is able to obtain the Serving MSC's address from the MSCID parameter it receives from the HLR. The parameters are the same as in Step-a with the exception of the MSCID parameter which is not needed.

d. The Serving MSC returns an empty `authdir` to the Serving VLR to indicate that the EncryptionParameters were successfully received.

e. The Serving VLR forwards the `authdir` to the HLR.

f. The HLR forwards the `authdir` to the AC.

4.32.C1 Serving MSC Attachment to an OTAF

(See [OTA] 4_C, page 3-6)

This operation scenario describes the use of SMSDeliveryPointToPoint operation to provide an attachment between the Serving MSC and an OTAF for CDMA OTASP.

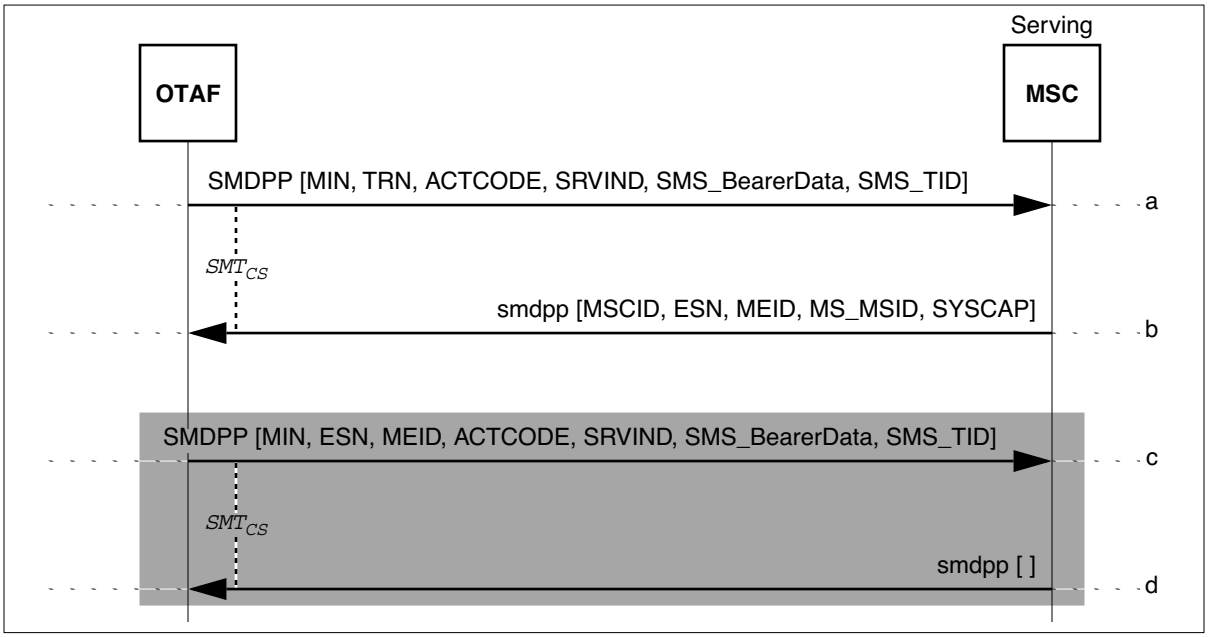

Figure 4.32.C1Serving MSC Attachment to an OTAF

a. An Activation_MIN to be used temporarily for the duration of this OTASP attempt is assigned. The OTAF sends an SMDPP to the Serving MSC.

Parameters	Usage	Type
MIN	Activation_MIN used temporarily during OTASP.	R
TRN	Used to associate the SMDPP (and the OTAF) with the OTASP call.	R
ACTCODE	Instructs the Serving MSC to attach to the OTAF for this call.	R
SRVIND	Indicates CDMA OTASP service.	R
SMS_BearerData	This parameter is empty. It is included to comply with MAP backward compatibility rules.	MBC
SMS_TID	This parameter is empty. It is included to comply with MAP backward compatibility rules.	MBC

b. The Serving MSC associates the call in question with the OTAF. It returns an smdpp to the OTAF ~~containing the following parameters~~.

Parameters	Usage	Type
MSCID	Serving MSC's MSCID ~~System ID~~.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O

Parameters	Usage	Type
MS_MSID	MIN or IMSI received from the MS.	R
SYSCAP	Serving System's authentication capabilities.	R

If the AC had previously denied access to this MS, the DENACC parameter may be included. If the HLR had previously denied authorization to this MS, the AUTHDEN parameter may be included.

Steps c-d are executed to release the TRN if the OTAF is the desired OTAF and no redirection to another CSC-OTAF will take place.

c. The OTAF sends a second SMDPP to the MSC with the ACTCODE directing the MSC to release the TRN, permitting the TRN to be reused.

Parameters	Usage	Type
MIN	Activation_MIN used temporarily during OTASP.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
ACTCODE	Instructs the Serving MSC to release the TRN.	R
SRVIND	Indicates CDMA OTASP service.	R
SMS_BearerData	This parameter is empty. It is included to comply with MAP backward compatibility rules.	MBC
SMS_TID	This parameter is empty. It is included to comply with MAP backward compatibility rules.	MBC

d. The MSC sends an empty smdpp to the OTAF to acknowledge the receipt of the SMDPP at Step-c.

4.32.C2 Exchange of OTASP Data Messages

(See [OTA] 4_C, page 3-8)

This operation scenario describes the use of the SMSDeliveryPointToPoint operation to exchange OTASP Data Messages between the OTAF and the Serving MSC.

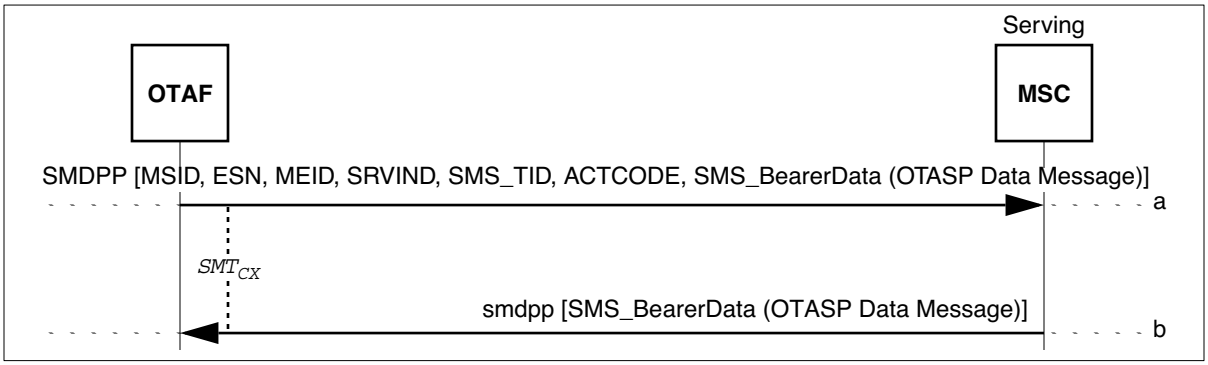

Figure 4.32.C2Exchange of OTASP Data Messages

Note: In the figure above, SMT_{CX} = (x = m, l: depending on the mode of MS operation [if known at the OTAF], the lengths of the OTASP Data Messages being exchanged and the corresponding response time at the MS). See Section 7 for operation timer values in Table 63.

a. The OTAF sends an `SMDPP` to the Serving MSC.

Parameters	Usage	Type
MSID	Activation_MIN used temporarily during OTASP, or for OTAPA, the MS's MSID at the start of the OTAPA session. When the MS has both the MIN and the IMSI at the start of the OTAPA session, the MIN form of the MSID is used.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
SRVIND	Indicates CDMA OTASP service ~~or OTAPA service, as appropriate~~.	R
SMS_TID	This parameter is empty. It is included to comply with MAP backward compatibility rules.	MBC
ACTCODE	Included for OTAPA when an *OTAPA Request message* is encapsulated in the SMS_BearerData.	R
SMS_BearerData	Contains an OTASP Data Message.	R

b. The Serving MSC returns an `smdpp` to the OTAF with the SMS_BearerData containing the OTASP Data Message received from the MS, as a response to the OTASP Data Message contained in the SMS_BearerData at Step-a.

4.32.C3 OTAF Request to Initiate MSC Procedures

(See [OTA] 4_C, page 3-9)

This operation scenario describes the use of SMSDeliveryPointToPoint operation to initiate MSC procedures.

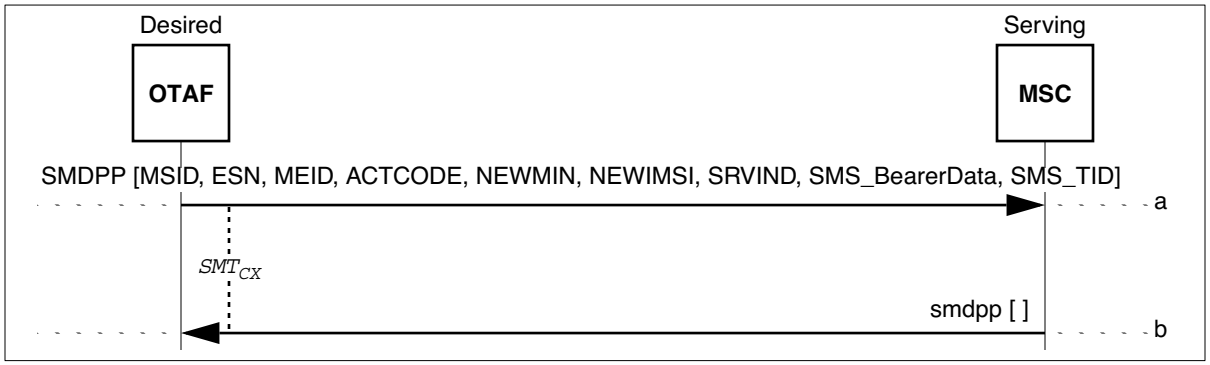

Figure 4.32.C3OTAF Request to Initiate MSC Procedures

Note: In the figure above, SMT_{cx} = (x = s, m: depending on the ACTCODE value). See. Section 7 for operation timer values in Table 63.

a. The OTAF sends an `SMDPP` to the Serving MSC.

Parameters	Usage	Type
MSID	Activation_MIN used temporarily during OTASP, or for OTAPA, the MS's MSID at the start of the OTAPA session. When the MS has both the MIN and the IMSI at the start of the OTAPA session, the MIN form of the MSID is used.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
ACTCODE	Instructs the Serving MSC as to which procedures it should initiate.	R
NEWMIN	The new MIN assigned to the MS during this OTASP attempt or OTAPA session (e.g., provided to enable ~~permit~~ the MS to be registered with the responsible HLR).	O
NEWIMSI	The new IMSI assigned to the MS during this OTASP attempt or OTAPA session (e.g., provided to enable ~~permit~~ the MS to be registered with the responsible HLR).	O
SRVIND	Indicates CDMA OTASP service or OTAPA service, as appropriate.	R
SMS_BearerData	This parameter is empty. It is included to comply with MAP backward compatibility rules.	R
SMS_TID	This parameter is empty. It is included to comply with MAP backward compatibility rules.	MBC

b. The Serving MSC initiates the desired procedures (e.g., Registration Notification to the HLR pointed to by the NEWMIN or NEWIMSI) and sends an empty `smdpp` to the OTAF.

For unsuccessful cases the Serving MSC may return the AUTHDEN parameter or the SMS_CauseCode parameter, or both parameters.

4.CC.1 OTAF Request to Initiate AC Procedures

(See [OTA] 4_C, page 3-13)

This operation scenario describes the use of the OTASPRequest operation to initiate AC procedures.

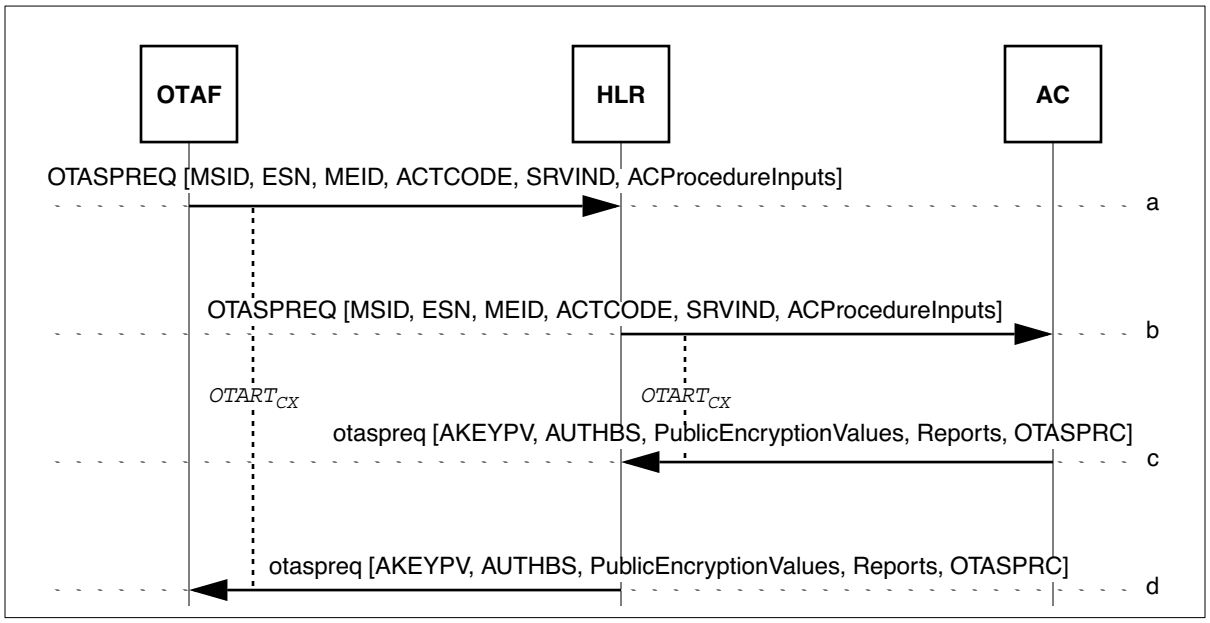

Figure 4.CC.1OTAF Request to Initiate MSC Procedures

Note: In the above figure, $OTART_{CX}$ = (x = s, l: depending on the ACTCODE value). See Section 7 for operation timer values in Table 63.

a. The OTAF sends an OTASPREQ to the HLR with the ActionCode (ACTCODE) parameter requesting the AC to initiate certain procedures (e.g., the AC may be requested to initiate the SSD update procedures and possibly return SSDURPT and UCHALRPT).

Parameters	Usage	Type
MSID	Activation_MIN used temporarily during OTASP, or for OTAPA, the MS's MSID at the start of the OTAPA session. When the MS has both the MIN and the IMSI at the start of the OTAPA session then the MIN form of the MSID is used.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
ACTCODE	Requests the AC to initiate a particular procedure.	R
SRVIND	Indicates CDMA OTASP service or OTAPA service, as appropriate.	R
ACProcedureInputs:	Parameters needed for AC procedures.	R
[AKEYPV]	Supported A-key protocol version(s). Include if public encryption values generation is requested.	O
[MSKEY]	Mobile Station Partial Key. Include if A-key generation is requested.	O

Parameters	Usage	Type
[MSCID]	Serving MSC's MSCID ~~System ID~~. Include for OTASP if SSD update or Re-authentication is requested. (Note - This information is not needed and may not even be available for OTAPA.)	O
[SYSCAP]	Authentication capabilities of Serving System. Include for CDMA OTASP for backward compatibility with [OTA], if SSD update or re-authentication is requested.	O
[MS_MSID]	Include for CDMA OTASP but not for CDMA OTAPA. Only use the MSIMSI form of the MS_MSID if the IMSI_T was received from the MS at OTASP call origination and a MIN is not programmed in the MS. *Note:* It may be necessary to upload a NAM parameter block to determine this for an unknown MS.(For CDMA OTASP, if the OTAF initiates an SSD update, the AC uses the received MS_MSID to calculate AUTHU whereas the MS uses its MIN, if one is programmed. If a MIN is programmed in the MS, the SSD update cannot succeed unless the MS_MSID provides that MIN to the AC.	O
[AUTHDATA]	The authentication data used by the MS to compute AUTHR. Include if re-authentication is requested.	O
[AUTHR]	Authentication result provided by the MS. Include if re-authentication is requested.	O
[COUNT]	Value of CallHistoryCount provided by the MS. Include if re-authentication is requested.	O
[RAND]	Random number derived from the MS provided RANDC by the OTAF. Include if re-authentication is requested.	O
[NEWMSID]	Include for CDMA OTASP or CDMA OTAPA if the ActionCode indicates *Commit A-Key* and if a new MIN has been assigned to the MS or, for an MS that has no MIN programmed (or whose MIN is being erased), if a new IMSI has been assigned to the MS. Otherwise this parameter is not included. The NEWMIN form of this parameter should be used if both a new MIN and a new IMSI are assigned to the MS. *Note:* It may be necessary to upload a NAM parameter block to determine this for an unknown MS that has initiated a CDMA OTASP session. *Note:* A new MIN must be assigned to replace the existing MIN or the existing MIN must be erased from memory for an unknown MS that has a previously programmed MIN. (Otherwise, the MS would use that old MIN for its authentication calculations, but the AC would not have that old MIN available for its authentication calculations.)	O
[RANDBS]	A Random variable set to a value as received from the MS. Included if the MS challenges the network.	O
[TERMTYP]	The MS's TerminalType. Include if needed by the AC when the ACTCODE is *Commit A-Key*. For OTAPA, the TERMTYPE should, presumably, be available from subscriber records; for OTASP, the CSC ~~representative~~ would, in general, have to obtain the TERMTYP from the subscriber.	O

b. The HLR forwards the `OTASPREQ` to the AC. Parameters are the same as in Step-a. The AC starts executing the specified procedures.

c. The AC returns an `otaspreq` to the HLR.

Parameters	Usage	Type
AKEYPV	A-key computation protocol version used by the AC. Include if public encryption values are being returned.	O
AUTHBS	Authentication Signature.	O
PublicEncryptionValues:	Parameters comprising Public Encryption Values.	
[MODVAL]	Modulus value.	O
[PRIMVAL]	Primitive value.	O
[BSKEY]	Base Station Partial Key.	O
Reports:	Reports for various AC procedures.	
[SSDURPT]	SSD Update report. Include if received from the Serving MSC.	O
[UCHALRPT]	Unique Challenge report. Include if received from the Serving MSC.	O
[DENACC]	Deny Access parameter. Include if the MS has not been re-authenticated correctly, or if a count mismatch was detected.	O
[VPRPT]	Voice privacy report. Include if received from the Serving MSC.	O
[SMERPT]	Signaling message encryption report. Include if received from the Serving MSC.	O
OTASPRC	Include to describe an OTASP or OTAPA related error condition at the AC, other than the ones that can be described by the DENACC, SSDURPT, UCHALRPT, VPRPT and SMERPT parameters.	O

d. The HLR forwards the `otaspreq` to OTAF. The parameters are as in Step-c.

8.CC.1a Serving MSC Attached to the Initial and Desired CSC

(See [OTA] 4_C, page 3-18)

This operation scenario describes the use of SMSDeliveryPointToPoint operation to provide an attachment between the Serving MSC and the Desired OTAF, as used in CDMA systems. In this scenario, the desired OTAF is attached to (or served by) the initial CSC.

Note, see 8.CC.1b for an alternative recommendation.

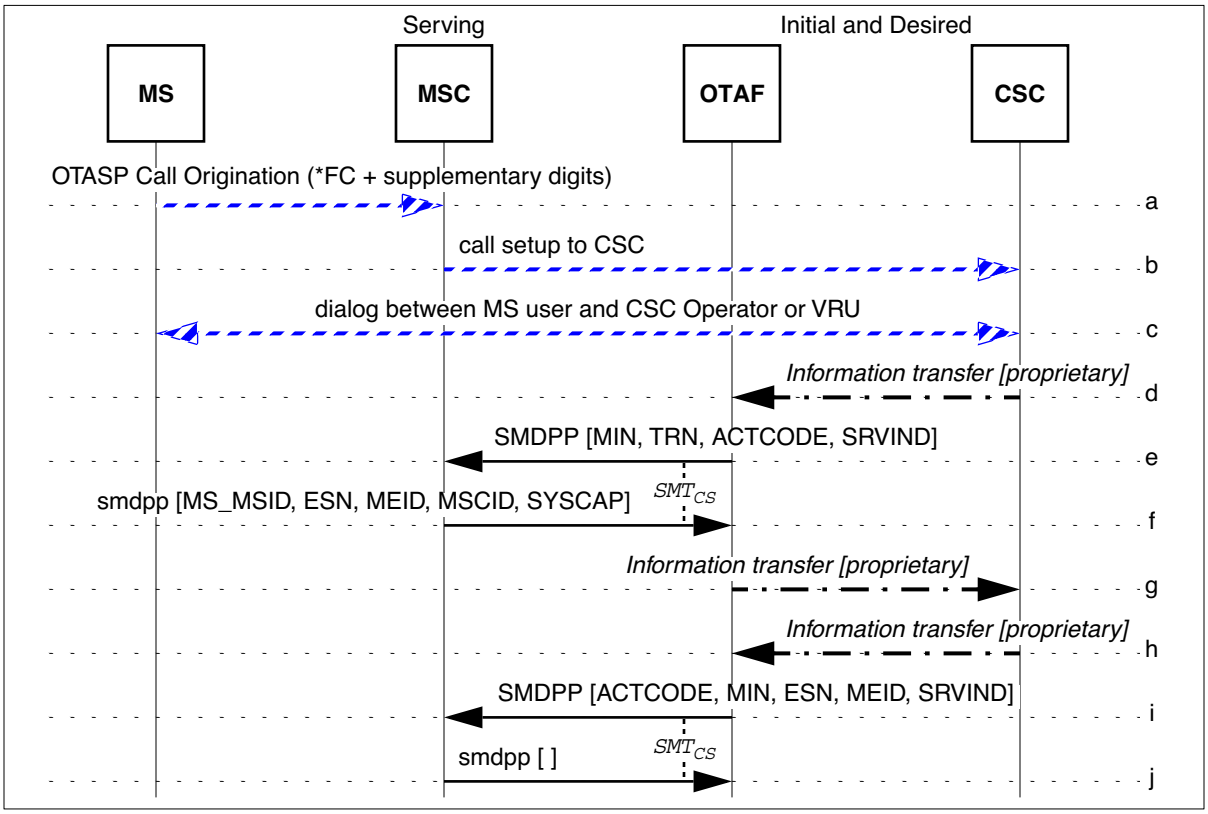

Figure 8.CC.1aServing MSC Attached to the Initial and Desired CSC

a. The Serving MSC recognizes the call origination to be an OTASP request from the OTASP Feature Code (*FC) received. It allocates a unique Temporary Reference Number (TRN) for this OTASP attempt.

b. The Serving MSC may perform normal subscriber validation and authentication prior to proceeding. Irrespective of which, the MSC connects the voice call to a CSC based on the Feature Code and any supplementary digits (e.g., *FC, *FC + XX, *FC + XX + DN) specified by the user during OTASP activation. The TRN is transferred to the CSC during call set-up. Note: The TRN may be sent as a Calling Number or a Called Number based on the signaling scheme used.

c. A call taker or a voice response unit at the CSC begins a dialog with the user. The CSC determines that the desired OTAF is attached to this CSC.

d. The CSC informs (in a proprietary manner) the OTAF of the initial contact.

e. The OTAF assigns a MIN to be used during this OTASP attempt. It sends an SMDPP to the Serving MSC. The OTAF is able to determine the routing address of the MSC from the TRN previously provided.

Parameters	Usage	Type
MIN	Activation_MIN used temporarily during OTASP.	R
TRN	Used to associate the SMDPP (and the OTAF) with the OTASP call.	R
ACTCODE	Instructs the Serving MSC to attach to the OTAF for this call.	R
SRVIND	Indicates CDMA OTASP service.	R

f. The Serving MSC associates the call in question with the OTAF. It returns an smdpp to the OTAF containing the following parameters.

Parameters	Usage	Type
MS_MSID	MIN or IMSI received from the MS.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
MSCID	Serving MSC's MSCID ~~System ID~~.	R
SYSCAP	Serving System's authentication capabilities.	R

g. The OTAF informs (in a proprietary manner) the CSC that the attachment with the Serving MSC was accomplished.

h. The CSC informs (in a proprietary manner) the OTAF that it should direct the Serving MSC to release the TRN.

i. The OTAF sends a second SMDPP to the MSC with the ACTCODE directing the MSC to release the TRN, permitting the TRN to be reused. Parameters are the same as in 4.32.C1, Step-c.

j. The MSC sends an empty smdpp to the OTAF acknowledging the receipt of the SMDPP in Step-i.

8.CC.1b Serving MSC Attached to the Initial and Desired CSC (ALT)

(See [OTA] 4_C, page 3-20)

This operation scenario describes the use of the FeatureRequest operation to facilitate attachment following the receipt of an OTASP origination from an MS.

Note, see 8.CC.1a for an alternative recommendation.

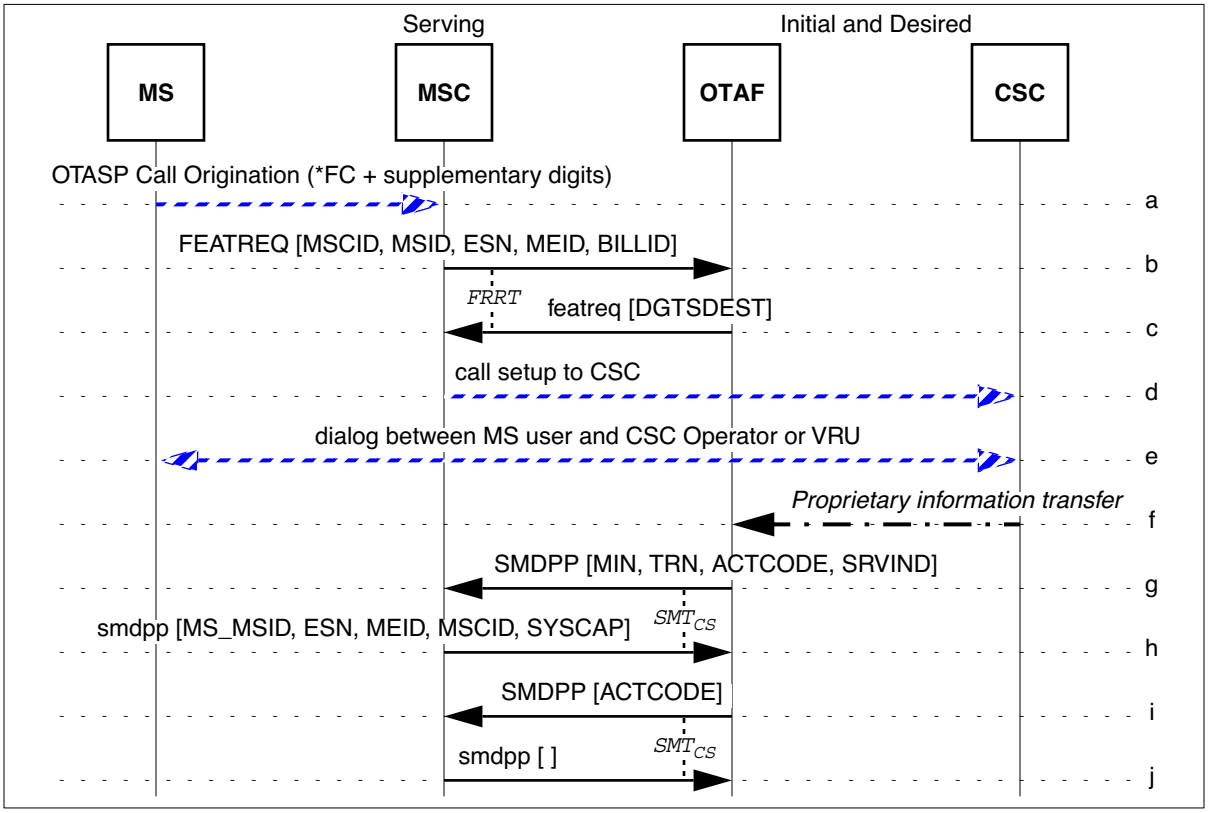

Figure 8.CC.1bServing MSC Attached to the Initial and Desired CSC (ALT)

a. The MSC receives an OTASP call origination.

b. The Serving MSC may perform normal subscriber validation and authentication prior to proceeding. Irrespective of the outcome of the validation and authentication, the Serving MSC recognizes the call as an OTASP request from the OTASP Feature Code (*FC) received.

As a result, it assigns a Billing ID to the call and sends a `FEATREQ` to the OTAF to obtain a Temporary Reference Number (TRN) to use in routing the call to the CSC. The MSID and ESN parameters are set to the values received from the MS in the origination message, and the MSC's MSCID is used to populate that parameter. If the MS is equipped with an MEID, the MEID parameter is set to the MS's MEID value. If SS7 is used, the MSC's point code and subsystem number are used to populate the PC_SSN parameter.

The address to be used by the OTAF to send the SMDPP messages to the MSC for OTASP may be derived from the MSCID using a local translation function, or it may be obtained from lower layer addressing information (or from the PC_SSN parameter, if present).

c. The CSC is assumed to have a pool of numbers, similar to a pool of TLDNs, that can be used to route calls to the CSC. (If one CSC serves multiple OTAFs, then, based on implementation, this pool may be partitioned into separate pools for each OTAF or it may be one combined

pool.) Based on implementation, the OTAF selects one of these numbers that is not currently in use or it uses proprietary signaling (not shown in the figure) to obtain such a number from the CSC, and returns this number for use as the TRN to the MSC using the Digits (destination) parameter in the `featreq`.

d. The voice call to the CSC is established using the TRN as called party number. It is assumed that the CSC is connected to the PSTN using an interface, e.g., direct inward dialing PBX trunks or an ISDN interface, that always provides the called number as part of the signaling used to offer the call.

e. The potential new subscriber and the responding customer service agent (or VRU port) begin a dialog.

f. In parallel with Step-e, proprietary signaling between the CSC and the OTAF is used to notify the OTAF of the initial contact (and of the TRN used for that contact).

g. The OTAF assigns an Activation_MIN to be used temporarily for the duration of this OTASP attempt. It sends an `SMDPP` to the Serving MSC.

Parameters	Usage	Type
MIN	Activation_MIN used temporarily during OTASP.	R
TRN	Used to associate the SMDPP (and the OTAF) with the OTASP call.	R
ACTCODE	Instructs the Serving MSC to attach to the OTAF for this call.	R
SRVIND	Indicates CDMA OTASP service.	R

h. The Serving MSC associates the call in question with the OTAF. It returns an `smdpp` to the OTAF ~~containing the following parameters~~.

Parameters	Usage	Type
MS_MSID	MIN or IMSI received from the MS.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
MSCID	Serving MSC's MSCID ~~System ID~~.	R
SYSCAP	Serving System's authentication capabilities.	R

i. The OTAF sends a second `SMDPP` to the MSC with the ACTCODE directing the MSC to release the TRN, permitting the TRN to be re-used.

j. The MSC sends an empty `smdpp` to the OTAF acknowledging the receipt of the `SMDPP` in Step-i.

8.CC.2a OTASP Call Redirected from Initial CSC to Desired CSC - Initial OTAF not Attached to Serving MSC

(See [OTA] 4_C, page 3-22)

This scenario describes the use of SMSDeliveryPointToPoint operation to attach the Serving MSC to the desired OTAF. In this scenario the desired OTAF is not attached to (nor served by) the initial CSC that engages in a voice conversation with the MS user. Instead, the desired OTAF is attached to (or served by) a CSC to which the MS's voice call gets redirected from the initial CSC. Also, in this scenario, the initial OTAF is not attached to the Serving MSC.

Note, see 8.CC.2b for an alternative recommendation.

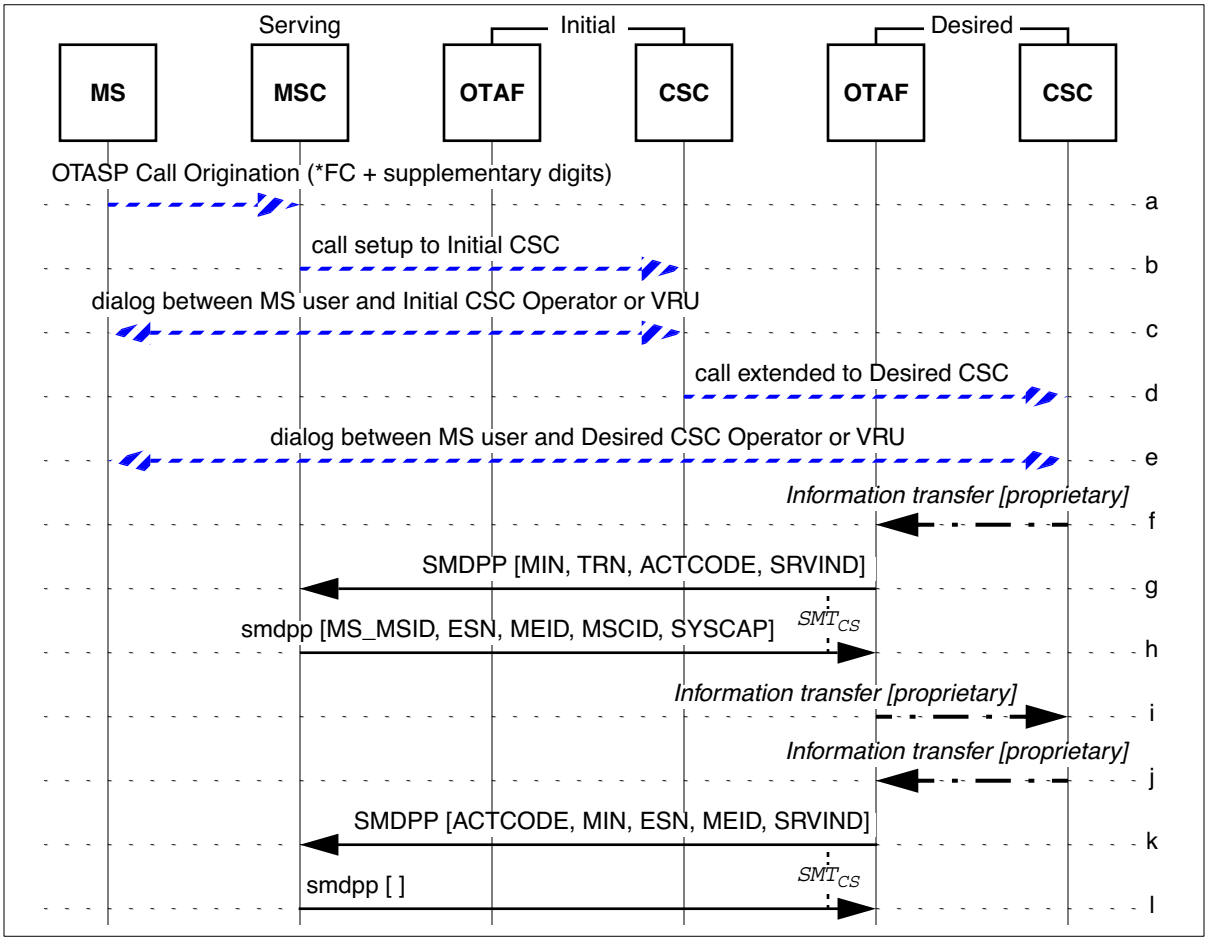

Figure 8.CC.2aOTASP Call Redirected from Initial CSC to Desired CSC - Initial OTAF not Attached to Serving MSC

a. The Serving MSC recognizes the call to be an OTASP request from the OTASP Feature Code (*FC) received. It allocates a unique TRN for this OTASP attempt.

b. The Serving MSC may perform normal subscriber validation and authentication prior to proceeding. Irrespective of the outcome of the validation and authentication, the MSC connects the voice call to a CSC, based on the Feature Code and any supplementary digits (e.g., *FC, *FC + XX, *FC + XX + DN) specified by the user during OTASP activation. The TRN is transferred to the CSC during call set-up.

Note: The TRN may be sent as a Calling Number or a Called Number based on the signaling schemes used.

c. A call taker or a voice response unit at the CSC begins a dialog with the user and determines that the desired OTAF is not attached to this CSC. The CSC call taker or voice response unit . . .

d. . . extends the voice call to another CSC that is associated with the desired OTAF. The TRN is also forwarded to the new CSC.

e. A CSC call taker or a voice response unit at the new CSC begins a dialog with the user.

f. The CSC contacts (in a proprietary manner) the desired OTAF.

g-l. Same as 8.CC.1a, Steps e-j.

8.CC.2b Serving MSC Redirected from Initial CSC to Desired CSC

(See [OTA] 4C, page 3-25)

This ~~operation~~ scenario describes the transfer of attachment from the OTAF-CSC pair associated to the Serving MSC to a different OTAF-CSC pair. When used, this scenario would follow Step-d in the scenario shown in 8.CC.1b.

Note, see 8.CC.2a for an alternative recommendation.

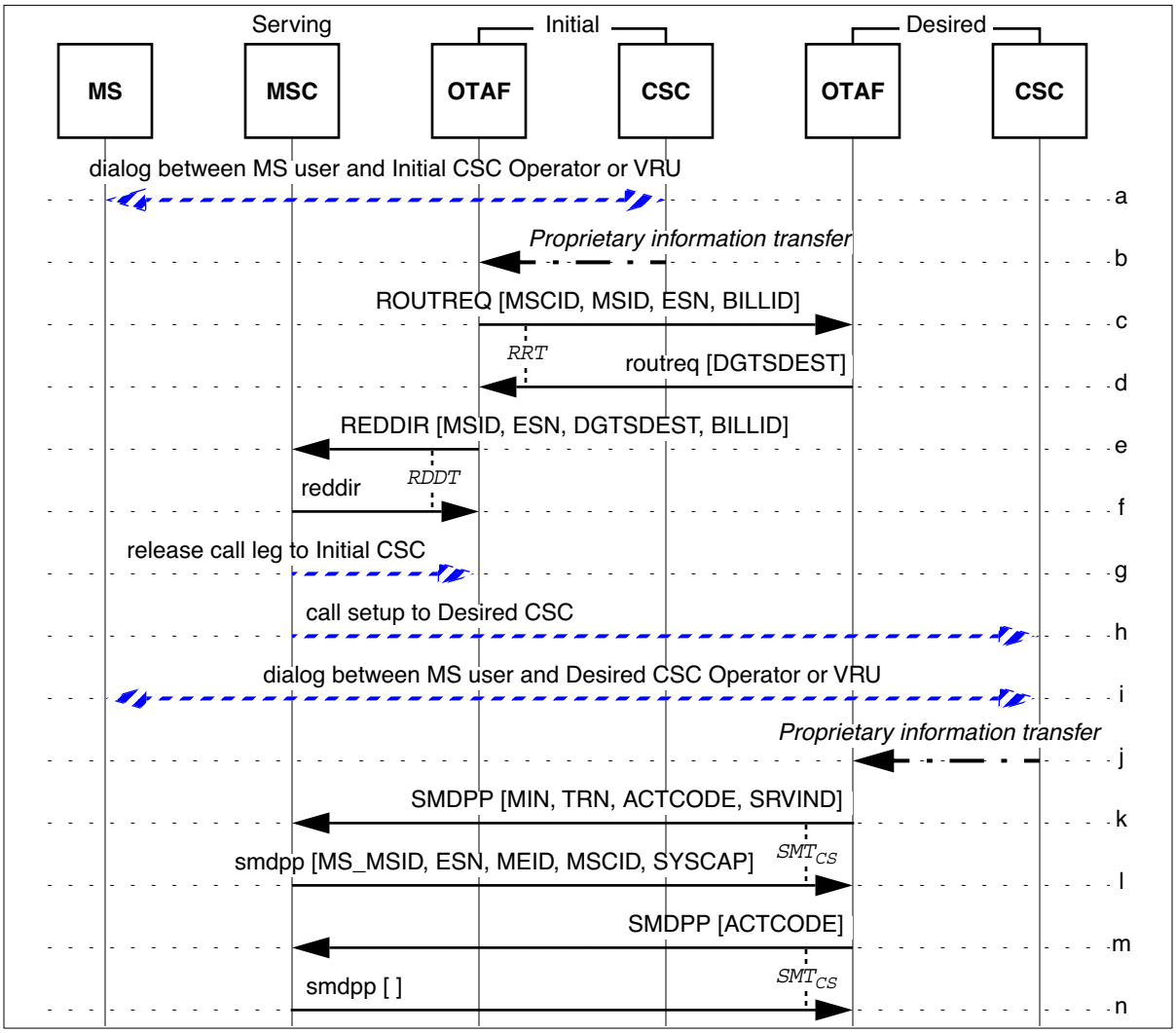

Figure 8.CC.2bServing MSC Redirected from Initial CSC to Desired CSC

a. Based on the ongoing dialog with the initial CSC, the CSC operator determines that the initial OTAF-CSC pair is not the desired OTAF-CSC pair. The CSC is informed of the identify of the desired OTAF-CSC pair.

b. The initial CSC agrees to transfer attachment to the desired OTAF-CSC pair. Proprietary signaling is used to identify the desired OTAF-CSC pair to the initial OTAF, which uses local tables to determine the network address of the desired OTAF.

c. The initial OTAF sends a ROUTREQ to the desired OTAF to obtain a number that can be used for redirection of the OTASP call from the initial CSC to the desired CSC. The BILLID, ~~BillingID,~~ MSCID, MSID, and ESN parameters ~~in this message~~ are populated with the values

received at Step-b in the scenario shown in 8.CC.1b (as is the PC_SSN parameter if one was received and if SS7 is used). The OTAF uses local information to determine the Serving MSC's SystemMyTypeCode (i.e., based on Serving MSC's MSCID).

The address to be used by the desired OTAF in sending OTASP related SMDPP messages to the MSC may be derived from the MSCID using a local translation function, or it may be obtained from the PC_SSN parameter, if present, but it should not be obtained from lower layer addressing information (e.g., SCCP Calling Party Address).

d. The desired OTAF sends the initial OTAF the number to use in redirecting the OTAF call using the Digits (destination) parameter in the routreq. This number will serve as the TRN once the call is redirected.

e. The initial OTAF sends a REDDIR to the Serving MSC, using as Digits (destination) the value received at Step-d. The MSID, ESN, and BILLID parameters ~~BillingID~~ are populated with the values received at Step-b in the Scenario shown in 8.CC.1b.

f. The Serving MSC returns a reddir to the initial OTAF.

g. The MSC releases the call leg to the initial CSC. It also releases the TRN used to route that call leg.

h. The MSC extends the OTASP call to the desired CSC using the number received in the Digits (destination) parameter at Step-e as the called party number, and associates this number to the call as the TRN.

i. The subscriber and the responding CSC operator (or VRU port) begin a dialog.

j. In parallel with Step-i, proprietary signaling between the CSC and the OTAF is used by the CSC to inform the OTAF of the contact and of the number on which the call arrived.

k. The OTAF assigns an Activation_MIN to be used temporarily for the duration of this OTASP attempt. It sends an SMDPP to the Serving MSC.

Parameters	Usage	Type
MIN	Activation_MIN used temporarily during OTASP.	R
TRN	Used to associate the SMDPP (and the OTAF) with the OTASP call.	R
ACTCODE	Instructs the Serving MSC to attach to the OTAF for this call.	R
SRVIND	Indicates CDMA OTASP service.	R

l. The Serving MSC associates the call in question with the OTAF. It returns an smdpp to the OTAF ~~containing the following parameters~~.

Parameters	Usage	Type
MS_MSID	MIN or IMSI received from the MS.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
MSCID	Serving MSC's MSCID ~~System ID~~.	R
SYSCAP	Serving System's authentication capabilities.	R

m. The OTAF sends a second `SMDPP` to the MSC with the ACTCODE directing the MSC to release the TRN, permitting the TRN to be re-used.

n. The MSC sends an empty `smdpp` to the OTAF acknowledging the receipt of the SMDPP in Step-m.

8.CC.2c OTASP Call Redirected from Initial CSC to Desired CSC - Initial OTAF Initially Attached to Serving MSC

(See [OTA] 4_C, page 3-28)

This scenario describes the use of SMSDeliveryPointToPoint operation to attach the Serving MSC to the desired OTAF. In this scenario the desired OTAF is not attached to (or served by) the initial CSC that engages in a voice conversation with the MS user. Instead, the desired OTAF is attached to (or served by) a CSC to which the MS's voice call gets redirected from the initial CSC. Also, in this scenario, the initial OTAF is initially attached to the Serving MSC.

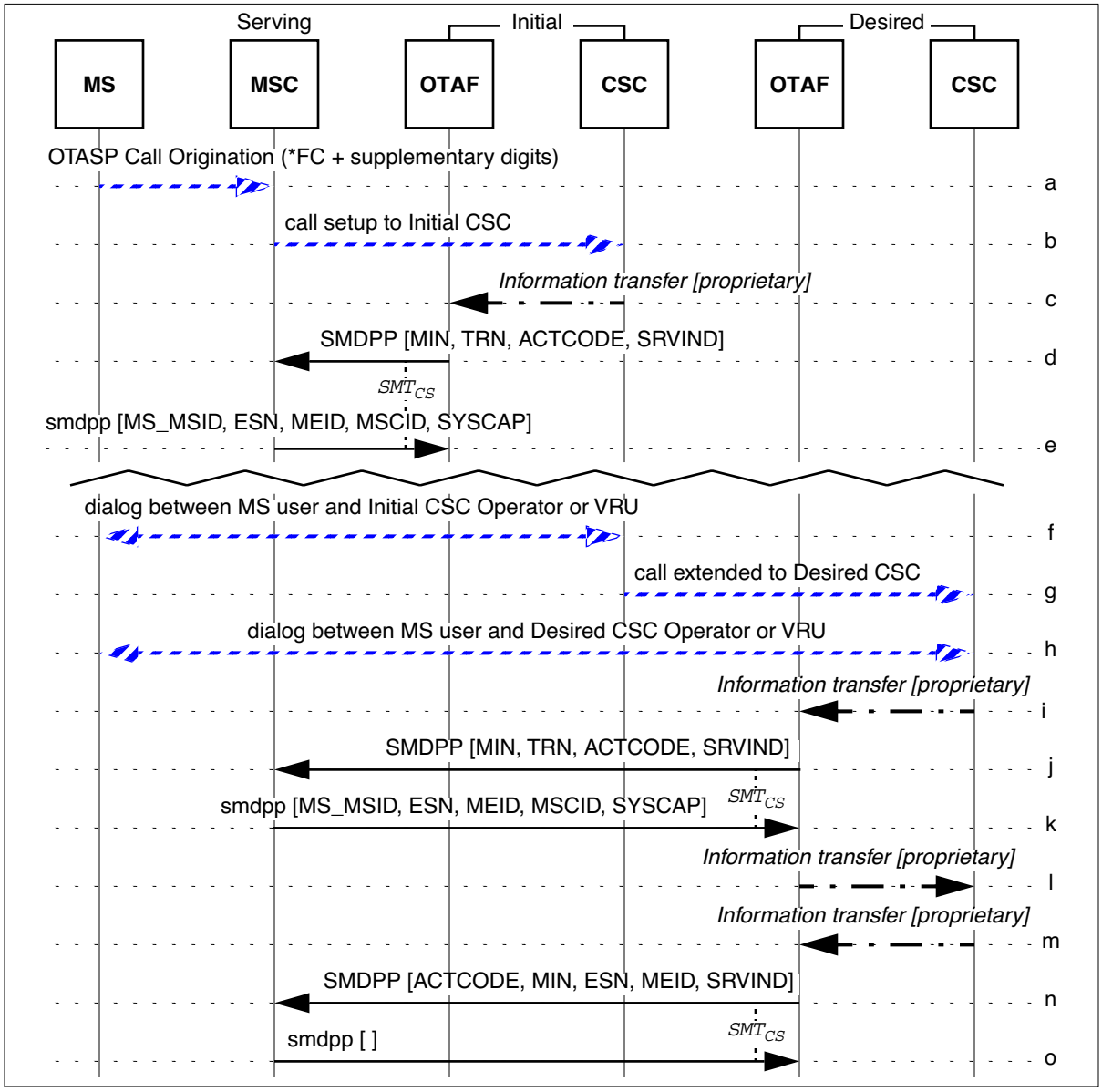

Figure 8.CC.2cOTASP Call Redirected from Initial CSC to Desired CSC - Initial OTAF Initially Attached to Serving MSC

a. The Serving MSC recognizes the call to be an OTASP request from the OTASP Feature Code (*FC) received. It allocates a unique TRN for this OTASP attempt.

b. The Serving MSC may perform normal subscriber validation and authentication prior to proceeding. Irrespective of the outcome of the validation and authentication, the MSC connects the voice call to a CSC, based on the Feature Code and any supplementary digits (e.g., *FC, *FC + XX, *FC + XX + DN) specified by the user during OTASP activation. The TRN is transferred to the CSC during call set-up.

Note: The TRN may be sent as a Calling Number or a Called Number based on the signaling schemes used.

c. The CSC contacts an initial OTAF attached to it.

d-e. Same as in 8.CC.1a, Steps e-f.

f. A call taker or a voice response unit at the CSC begins a dialog with the user and determines that the desired OTAF is not attached to (or served by) this CSC. The CSC call taker or voice response unit . . .

g. . . . extends the voice call to another CSC that is associated with the desired OTAF. The TRN is also forwarded to the new CSC.

h. A CSC call taker or a voice response unit at the new CSC begins a dialog with the user.

i. The CSC contacts the desired OTAF.

j-o. Same as in 8.CC.1a, Steps e-j.

8.CC.3 A-key Generation

(See [OTA] 4C, page 3-31)

• • •

a. The OTAF determines that the A-key generation procedure is to be performed, perhaps from a trigger from the CSC. It sends the HLR an OTASPREQ, which includes AKEYPV, corresponding to the MS's capabilities, and ACTCODE, set to Generate Public Encryption Values procedure.

Parameters	Usage	Type
MSID	Activation_MIN used temporarily during OTASP, or for OTAPA, the MS's MSID at the start of the OTAPA session. When the MS has both the MIN and the IMSI at the start of the OTAPA session then the MIN form of the MSID is used.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
ACTCODE	Request AC to Generate Public Encryption values.	R
MS_MSID	Include for CDMA OTASP but not for CDMA OTAPA. Only use the MSIMSI form of the MS_MSID if the IMSI_T was received from the MS at OTASP call origination and a MIN is not programmed in the MS. *Note:* It may be necessary to upload a NAM parameter block to determine this for an unknown MS.(For CDMA OTASP, if the OTAF initiates an SSD update, the AC uses the received MS_MSID to calculate AUTHU whereas the MS uses its MIN, if one is programmed. If a MIN is programmed in the MS, the SSD update cannot succeed unless the MS_MSID provides that MIN to the AC.)	O
SRVIND	Indicates CDMA OTASP service or OTAPA service, as appropriate.	R
AKEYPV	Indicates MS's A-key generation capabilities.	R

• • •

m. The OTAF sends an OTASPREQ, containing MSKEY and ACTCODE parameters set to Generate A-key procedure, to the HLR.

Parameters	Usage	Type
MSID	Activation_MIN used temporarily during OTASP, or, for OTAPA, the MS's MSID at the start of the OTAPA session. When the MS has both the MIN and the IMSI at the start of the OTAPA session, then the MIN form of the MSID is used.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
ACTCODE	Request AC to Generate A-key.	R
MS_MSID	Include for CDMA OTASP but not for CDMA OTAPA. Only use the MSIMSI form of the MS_MSID if the IMSI_T was received from the MS at OTASP call origination and a MIN is not programmed in the MS.	O

Parameters	Usage	Type
SRVIND	Indicates CDMA OTASP service or OTAPA service, as appropriate.	R
MSKEY	Encryption key value from MS.	R

The remainder of this section is retained unchanged.

8.CC.4 SSD Update When SSD is Not Shared

(See [OTA] 4_C, page 3-34)

• • •

a. The OTAF determines that SSD for the MS is to be updated, perhaps from a CSC request. It sends an OTASPREQ to the HLR indicating in the ActionCode (ACTCODE) parameter that the SSD update procedure be performed for the MS.

Parameters	Usage	Type
MSID	Activation_MIN used temporarily during OTASP, or, for OTAPA, the MS's MSID at the start of the OTAPA session. When the MS has both the MIN and the IMSI at the start of the OTAPA session, then the MIN form of the MSID is used.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
ACTCODE	Request the AC to initiate SSD Update.	R
MS_MSID	Include for CDMA OTASP but not for CDMA OTAPA. Only use the MSIMSI form of the MS_MSID if the IMSI_T was received from the MS at OTASP call origination and a MIN is not programmed in the MS. *Note:* It may be necessary to upload a NAM parameter block to determine this for an unknown MS. (For CDMA OTASP, if the OTAF initiates an SSD update, the AC uses the received MS_MSID to calculate AUTHU whereas the MS uses its MIN, if one is programmed. If a MIN is programmed in the MS, the SSD update cannot succeed unless the MS_MSID provides that MIN to the AC.)	O
SYSCAP	Serving System's authentication capabilities.	R
MSCID	Serving MSC's MSCID ~~System ID~~. Included for OTASP but not included for OTAPA.	R
SRVIND	Indicates CDMA OTASP or OTAPA service, as appropriately.	R

The remainder of this section is retained unchanged.

8.CC.5 Re-Authentication for Voice Privacy, Message Encryption or Both

(See [OTA] 4_C, page 3-39)

• • •

e. The OTAF sends an OTASPREQ including RAND, AUTHR, COUNT and AUTHDATA parameters to the HLR.

Parameters	Usage	Type
MSID	Activation_MIN used temporarily during OTASP, or for OTAPA, the MS's MSID at the start of the OTAPA session. When the MS has both the MIN and the IMSI at the start of the OTAPA session then the MIN form of the MSID is used.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
MS_MSID	Include for CDMA OTASP but not for CDMA OTAPA. Only use the MSIMSI form of the MS_MSID if the IMSI_T was received from the MS at OTASP call origination and a MIN is not programmed in the MS. *Note:* It may be necessary to upload a NAM parameter block to determine this for an unknown MS. (For CDMA OTASP, if the OTAF initiates an SSD update, the AC uses the received MS_MSID to calculate AUTHU whereas the MS uses its MIN, if one is programmed. If a MIN is programmed in the MS, the SSD update cannot succeed unless the MS_MSID provides that MIN to the AC.)	O
ACTCODE	Request the AC to initiate SSD Update.	R
SYSCAP	Serving System's authentication capabilities (for CDMA OTASP only).	O
MSCID	Serving MSC's MSCID ~~System ID~~. Included for OTASP but not included for OTAPA.	R
SRVIND	Indicates CDMA OTASP or OTAPA service, as appropriately.	R
AUTHDATA	The authentication data returned from MS.	
RAND	Random number generated by OTAF and sent to MS.	R
AUTHR	Authentication result returned from MS.	R
COUNT	CallHistoryCount value returned from MS.	R

The remainder of this section is retained unchanged.

8.CC.7 AC Request to Commit A-Key

(See [OTA] 4_C, page 3-45)

• • •

a. The OTAF sends an OTASPREQ to the HLR.

Parameters	Usage	Type
MSID	Activation_MIN used temporarily during OTASP, or for OTAPA, the MS's MSID at the start of the OTAPA session. When the MS has both the MIN and the IMSI at the start of the OTAPA session, then the MIN form of the MSID is used.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
SRVIND	Indicates CDMA OTASP or OTAPA service, as appropriately.	R
NEWMSID	Include for CDMA OTASP or CDMA OTAPA if the ActionCode indicates Commit A-Key and if a new MIN has been assigned to the MS or, for an MS that has no MIN programmed (or whose MIN is being erased), if a new IMSI has been assigned to the MS. Otherwise this parameter is not included. The NEWMIN form of this parameter should be used if both a new MIN and a new IMSI are assigned to the MS.	O
MS_MSID	Include for CDMA OTASP but not for CDMA OTAPA. Only use the MSIMSI form of the MS_MSID if the IMSI_T was received from the MS at OTASP call origination and a MIN is not programmed in the MS.	O
ACTCODE	Requests the AC to commit the A-key.	R
TERMTYPE	The MS's TerminalType. Include if needed by the AC.	O

The remainder of this section is retained unchanged.

8.CC.8 AC Request to Release Resources

(See [OTA] 4$_C$, page 3-47)

• • •

a. The OTAF sends an OTASPREQ to the HLR.

Parameters	Usage	Type
MSID	Activation_MIN used temporarily during OTASP, or for OTAPA, the MS's MSID at the start of the OTAPA session. When the MS has both the MIN and the IMSI at the start of the OTAPA session, then the MIN form of the MSID is used.	R
ESN	MS's ESN.	R
MEID	MS's MEID. Include if available.	O
MS_MSID	Include for CDMA OTASP but not for CDMA OTAPA. Only use the MSIMSI form of the MS_MSID if the IMSI_T was received from the MS at OTASP call origination and a MIN is not programmed in the MS.	O
ACTCODE	Requests the AC to release resources.	R
SRVIND	Indicates CDMA OTASP or OTAPA service, as appropriately.	R

The remainder of this section is retained unchanged.

TCAP MODIFICATIONS

A new RETURN ERROR Error Code value shall be defined for *UnrecognizedMEID* (see [MAP] Part 520, TCAP Application Signaling Protocol).

1 Application Services

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1.3 TCAP Formats and Procedures

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1.3.2 Component Portion

• • •

1.3.2.3 TCAP RETURN ERROR Component

• • •

1.3.2.3.1 Error Definitions

(See [MAP], page 520-6)

The detailed handling of operation errors is specified in the operations procedures.

The following definitions for errors are not exhaustive, but are included so that different manufacturers and users have a common understanding of the mapping between a reported error and the occurrence which generates it. The detection of the errors is not mandatory, however, if an error is detected for one of the examples given, then the indicated error code should be used. Implementations should not give cause for these reasons to be generated. For SMSDeliveryBackward, SMSDeliveryForward, and SMSDeliveryPointToPoint, detected errors should be mapped into the SMS_CauseCode parameter returned in the RETURN RESULT.

UnrecognizedMIN

a. Supplied MIN is not currently served by the VLR.

b. Supplied MIN is not currently served by the HLR.

c. Supplied MIN is not currently served by the Serving MSC.

d. Supplied MIN does not currently have an active call on an originating MSC.

UnrecognizedESN

a. Supplied ESN does not match HLR's stored value for subscriber's ESN.

b. Supplied ESN does not match VLR's stored value for subscriber's ESN.

c. Supplied ESN is negative listed.

ID/HLRMismatch

a. Supplied MSID is not resident on the HLR.

b. Supplied MDN is not resident on the HLR.

OperationSequenceProblem

a. Unexpected INVOKE in response to an INVOKE.

b. Operation is not allowed in the current state.

ResourceShortage

a. Network entity congestion.

b. Application (or function) congestion.

c. Network congestion.

d. No transaction IDs available.

e. Internal processing resource shortage (memory, I/O, disk, processor, etc.)

f. No TLDNs available.

OperationNotSupported

a. Operation is not supported on the addressed network entity.

TrunkUnavailable

a. Specific requested trunk is not available.

b. No trunks are available, but are required to perform the operation.

ParameterError

a. Parameter errors and parameter encoding errors (550-2). Parameter errors include exactly one FaultyParameter parameter in the parameter set.

UnrecognizedParameterValue

a. UnrecognizedParameterValue is a parameter value which is encoded properly (550-2), but its value is not recognized. UnrecognizedParameterValue errors should include exactly one FaultyParameter parameter in the parameter set.

SystemFailure

a. System component failure.

b. Network component failure.

c. Chained operation failure.

d. Required subsystem failure.

FeatureInactive

a. Cannot reroute call because indicated feature is inactive.

MissingParameter

a. Expected optional parameter is missing.

b. All profile parameters are expected, but some are missing.

c. All qualification parameters are expected, but some are missing.

d. *MissingParameter* errors should include exactly one FaultyParameter parameter in the parameter set.

Note that this Error Code is not used to indicate a missing mandatory parameter; a REJECT component with a Problem Specifier of *Incorrect Parameter* is used in this case.

UnrecognizedIMSI/TMSI

a. Supplied IMSI is not currently served by the VLR.

b. Supplied IMSI is not currently served by the HLR.

c. Supplied IMSI is not currently served by the Serving MSC.

d. Supplied IMSI does not currently have an active call on an originating MSC.

e. Supplied TMSI is not currently served by the Old Serving VLR. TMSI_ZONE may be matched, but TMSI_CODE is not matched.

f. Supplied TMSI is not currently served by the Serving VLR. TMSI_ZONE may be matched, but TMSI_CODE is not matched.

TMSI/VLRMismatch

a. Supplied TMSI is not resident on the Old Serving VLR.

b. Supplied TMSI is not resident on the Serving VLR.

UnrecognizedMEID

a. Supplied MEID does not match HLR's stored value for subscriber's MEID.

b. Supplied MEID does not match VLR's stored value for subscriber's MEID.

c. Supplied MEID is negative listed.

For MAP the Error Code Identifier is coded as Private TCAP. Error Codes are coded as follows:

Table 4 Error Codes

Error Code Name	Error Code							
	H	G	F	E	D	C	B	A
UnrecognizedMIN	1	0	0	0	0	0	0	1
UnrecognizedESN	1	0	0	0	0	0	1	0
ID/HLRMismatch	1	0	0	0	0	0	1	1
OperationSequenceProblem	1	0	0	0	0	1	0	0
ResourceShortage	1	0	0	0	0	1	0	1
OperationNotSupported	1	0	0	0	0	1	1	0
TrunkUnavailable	1	0	0	0	0	1	1	1
ParameterError	1	0	0	0	1	0	0	0
SystemFailure	1	0	0	0	1	0	0	1
UnrecognizedParameterValue	1	0	0	0	1	0	1	0
FeatureInactive	1	0	0	0	1	0	1	1
MissingParameter	1	0	0	0	1	1	0	0
UnrecognizedIMSI/TMSI	1	0	0	0	1	1	0	1
TMSI/VLRMismatch	1	0	0	0	1	1	1	0
Unrecognized MEID	1	0	0	0	1	1	1	1
Reserved (Note a)	1	0	0	1	0	0	0	0
	through							
	1	1	1	0	1	1	1	1
Reserved for Protocol Extension (Note b)	1	1	1	1	0	0	0	0
	through							
	1	1	1	1	1	1	1	1

Notes:

a. Treat a reserved value the same as value 133 (decimal), *ResourceShortage*.

b. Error codes 224 to 255 (decimal) shall be reserved for protocol extension. If unknown, treat the same as value 133 (decimal), *Resource Shortage*.

MAP OPERATIONS SIGNALING PROTOCOL MODIFICATIONS

[MEID] specifies the addition of the MEID parameter to a number of operation parameter sets that are needed for OTASP and OTAPA. These modifications to [MAP] Part 540, MAP Operations Signaling Protocol, are shown in this section.

2 Operation Definitions

2.2 AuthenticationDirective

(see [MAP], page 540-13)

The AuthenticationDirective (AUTHDIR) operation is used to request modification of an MS's authentication parameters. It is also used to transport encryption parameters to the Serving MSC for CDMA OTASP, TDMA OTASP and CDMA OTAPA.

• • •

AuthenticationDirective INVOKE Parameters				**Timer: ADT**
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	520-1.3.2.1	
Length	variable octets	M	520-1.3.2.1	
Contents				
• • •				
MEID		O	See [MEID]	s
• • •				

Notes:

• • •

s. Include if available AND if being transmitted for OTASP or OTAPA.

The remaining text in this Section is retained unchanged.

2.6 AuthenticationStatusReport

(see [MAP], page 540-24)

The AuthenticationStatusReport (ASREPORT) operation is used to report on the outcome of an authentication operation initiated by the AC or VLR if SSD is shared.

• • •

AuthenticationStatusReport INVOKE Parameters				**Timer: ASRT**
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	520-1.3.2.1	
Length	variable octets	M	520-1.3.2.1	
Contents				
• • •				
MEID		O	See [MEID]	n
• • •				

Notes:

• • •

n. Include if available.

The remaining text in this Section is retained unchanged.

2.7 BaseStationChallenge

(see [MAP], page 540-27)

The BaseStationChallenge (BSCHALL) operation is used to request a response to a Base Station Challenge Order received from an MS.

• • •

BaseStationChallenge INVOKE Parameters				**Timer: BSCT**
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	520-1.3.2.1	
Length	variable octets	M	520-1.3.2.1	
Contents				
• • •				
MEID		O	See [MEID]	f
• • •				

Notes:

• • •

f. Include if available.

The remaining text in this Section is retained unchanged.

2.20 FeatureRequest

(see [MAP], page 540-52)

The FeatureRequest (FEATREQ) operation is used to request feature-related treatment on behalf of a registered MS.

• • •

FeatureRequest INVOKE Parameters				Timer: FRT
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	520-1.3.2.1	
Length	variable octets	M	520-1.3.2.1	
Contents				
• • •				
MEID		O	See [MEID]	p
• • •				

Notes:

• • •

p. Include if available when initiated by an MSC or VLR.

The remaining text in this Section is retained unchanged.

2.42 OTASPRequest

(see [MAP], page 540-107)

The OTASPRequest (OTASPREQ) operation is used by the OTAF to request the initiation of certain AC procedures (such as A-key Generation, SSD Update and Commit or Release a temporary A-key, etc.), and to also return certain parameters.

• • •

OTASPRequest INVOKE Parameters				**Timer: OTART**
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	520-1.3.2.1	
Length	variable octets	M	520-1.3.2.1	
Contents				
• • •				
MEID		O	See [MEID]	p
• • •				

Notes:

• • •

p. Include if available.

The remaining text in this Section is retained unchanged.

2.50 RegistrationNotification

(see [MAP], page 540-125)

The RegistrationNotification (REGNOT) operation is used to report the location of an MS and, optionally, to (a) validate the MS or (b) validate the MS and obtain its profile information. It is also used for delivering the Serving MSC's routing address to the desired OTAF in support of TDMA OTASP.

• • •

RegistrationNotification INVOKE Parameters				**Timer: RNT**
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	520-1.3.2.1	
Length	variable octets	M	520-1.3.2.1	
Contents				
• • •				
MEID		O	See [MEID]	u
• • •				

Notes:

• • •

u. Include if known to identify the Mobile Equipment.

The remaining text in this Section is retained unchanged.

2.61 SMSDeliveryPointToPoint

(see [MAP], page 540-148)

The SMSDeliveryPointToPoint (SMDPP) operation is a general purpose operation that is used to convey a short message or in general any other information or encapsulated data from one point to another point and report on the success of failure of that transfer (for example, as used in SMS and OTASP).

• • •

SMSDeliveryPointToPoint INVOKE Parameters				Timer: SMT
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	520-1.3.2.1	
Length	variable octets	M	520-1.3.2.1	
Contents				
• • •				
MEID		O	See [MEID]	q
• • •				

Notes:

• • •

q. Include if available for OTA or OTAPA.

The SMSDeliveryPointToPoint 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:

SMSDeliveryPointToPoint RETURN RESULT Parameters				
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	520-1.3.2.1	
Length	variable octets	M	520-1.3.2.1	
Contents				
• • •				
MEID		O	See [MEID]	i
• • •				

Notes:

• • •

i. Include if available for OTA or OTAPA.

MAP PARAMETER SIGNALING PROTOCOL MODIFICATIONS

This section specifies [MAP] Part 550, MAP Parameters Signaling Protocol, modifications for the MEID.

2.234 SMS_CauseCode

(See [MAP], page 550-308)

The SMS_CauseCode (SMSCAUSE) parameter indicates a reason for not delivering an SMS or OTASP message or indicates certain conditions at the Serving MSC for use during OTASP.

Field	Value	Type	Reference	Notes
Identifier	SMS_CauseCode IMPLICIT OCTET STRING	M	Part 550 Section 1.2	
Length	variable octets	M	Part 550 Section 1.1	

Contents

H	G	F	E	D	C	B	A	Octet	Notes
SMS_CauseCode								1	a
• • •								n	b

Notes:

a. Only the SMS_CauseCode SMS delivery postponed is used to indicate that an SMS message is pending delivery and that notification shall be provided.

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

SMS_CauseCode (octet 1)	
Value	**Meaning**
Network Problems	
0	**Address vacant.** SMS Destination Address is valid but not currently allocated to an SMS terminal. The MSID associated with a valid destination address is not known to its HLR.
1	**Address translation failure.** The SMS Destination Address is invalid (e.g., address is not a recognized address type, address is not for a known or possible SMS functional entity, the MSID associated with a destination MS address does not correspond to its HLR, the MEID or ESN associated with a destination MS does not match the expected value, the SMS_DestinationAddress, SMS_OriginalDestinationAddress, destination MSID, or original destination subaddress does not match the address of a destination SME). For CDMA OTASP, the TRN, the Activation_MIN, the MEID or the ESN is currently not allocated to an OTASP call.
2	**Network resource shortage.** Network transmission failed due to lack of a network resource shortage or link capacity.
3	**Network failure.** A network node failed, a link failed or a required operation failed.
4	**Invalid Teleservice ID.** The SMS_TeleserviceIdentifier is not known, is not supported or is not authorized by an addressed functional entity.
5	**Other network problem.**
6	**Unsupported network interface.** The intersystem network interface required for the delivery of the received message is not supported.
7 through 31	Reserved. Treat the same as value 5, *Other network problem.*
Terminal Problems	
32	**No page response.** The addressed MS-based SME is known, but it does not respond to a page. SMS Notification is not pending.
33	**Destination busy.** The destination MS-based SME is SMS capable, but is currently engaged in a call, a service or a call mode that precludes the use of SMS or the destination SME is congested. This value shall only be used between the MSC and the MC when allowed by bilateral agreement. SMS Notification is not pending.
34	**No acknowledgment.** The destination SME does not acknowledge receipt of the SMS delivery (e.g., SMS or an OTASP Data message). This value may be used when *Terminal busy* and *No page response* are not appropriate. SMS Notification is not pending.
35	**Destination resource shortage.** A required terminal resource (e.g., memory) is not available to process this message. SMS notification is not pending.

SMS_CauseCode (octet 1)	
Value	**Meaning**
36	**SMS delivery postponed.** Delivery is not currently possible (e.g., *No page response, Destination busy, No acknowledgment, Destination out of service, Other terminal problem*), but SMS notification is pending.
37	**Destination out of service.** The addressed destination is out of service for an extended period of time (e.g., MS sleep, inactive, power off). SMS notification is not pending.
38	**Destination no longer at this address.** The MS-based SME is no longer at the temporary SMS routing address. The message sender should not re-use the temporary SMS routing address. SMS notification is not pending.
39	**Other terminal problem.** A terminal problem other than described above. SMS notification is not pending.
40 through 47	Reserved. Treat the same as value 39, *Other terminal problem*.
48 through 63	Reserved. Treat the same as value 36, *SMS delivery postponed*.
Radio Interface Problems	
64	**Radio interface shortage.** There is no channel available or there is radio congestion at this time.
65	**Radio interface incompatibility.** The MS for an MS-based SME is operating in a mode that does not support SMS at this time. This cause code may also be used to indicate that the air interface does not support OTASP Data Message delivery.
66	**Other radio interface problem.** A radio interface problem to an MS-based SME other than described above
67	Unsupported Base Station Capability. Base Station does not support this service (e.g., SMS, OTASP, OTAPA).
68 through 95	Reserved. Treat the same as value 66, *Other radio interface problem*.
General Problems	
96	**Encoding problem.** The size of a parameter or field is not what is expected.
97	**Service origination denied.** The originating MSID is not recognized, the originating address is not allowed for the originating MS, the MEID or ESN does not match the originating MSID, the origination is not authorized, the originating address is not recognized.

SMS_CauseCode (octet 1)	
Value	**Meaning**
98	**Service termination denied.** The destination is not authorized to receive this service message, the MC refused the message, the destination SME refused the message, the destination is not authorized for a required supplementary service, etc. This cause code may also be used to indicate that an MS rejected an OTASP Data Message.
99	**Supplementary service not supported.** The originating supplementary service is not known or supported, the sender is not authorized for an originating supplementary service, etc.
100	**Service not supported.** The service is not supported by an addressed functional entity.
101	Reserved. Treat the same as value 107, *Other general problems.*
102	**Missing expected parameter.** An optional parameter that is required for a particular function.
103	**Missing mandatory parameter.** A parameter is missing that is mandatory for a particular message.
104	**Unrecognized parameter value.** A known parameter has a unknown or unsupported value.
105	**Unexpected parameter value.** A known parameter has a known, but unexpected value.
106	**User Data size error.** The User Data size is too large for access technology, transport network, or call mode, etc. The User Data size is not what is expected for the indicated teleservice
107	**Other general problems.**
108	**Session not active.** An OTASP or OTAPA session does not currently exist for the MS. The session may have been terminated (e.g., due to loss of the associated traffic channel).
109 through 223	Reserved. Treat the same as value 107, *Other general problems*.
224 through 255	Reserved for *TIA-41* protocol extension. If unknown, treat the same as value 107, *Other general problems*.

CDMA OTA SIGNALING PROCEDURES MODIFICATIONS

This section specifies the CDMA OTA signaling procedures modifications for the MEID (See [OTA] Section 7_C).

4.1 Authentication Directive

4.1.3 VLR Receiving AuthenticationDirective INVOKE

(See [OTA] 7_C, page 6-8)

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Table 2 VLR AuthenticationDirective Response

Problem Detection and Recommended Response from VLR to HLR	
RETURN ERROR Error Code	**PROBLEM DEFINITION**
UnrecognizedMIN	A VLR record does not presently exist for the supplied MobileIdentificationNumber parameter.
UnrecognizedESN	A VLR record exists for the supplied MSID parameter, but the supplied ElectronicSerialNumber parameter does not match the ESN in the VLR record. *Note:* This response may have been originated by the MSC.
UnrecognizedMEID	A record exists for the supplied MSID parameter, but the supplied MEID parameter does not match the MEID in the record.
ID/HLRMismatch	The supplied MobileIdentificationNumber or IMSI parameter is not in the HLR's range of MINs MSIDs or directory numbers (suspect routing error).
OperationSequenceProblem	The VLR has another Authentication process in-progress for the supplied MSID parameter. *Note:* This response may have been originated by the MSC.
ResourceShortage	A required VLR resource (e.g., internal memory record, VLR is fully occupied) is temporarily not available (e.g., congestion). *Note:* This response may have been originated by the MSC.
OperationNotSupported	The requested MAP operation is recognized, but not supported, by the receiving VLR, or the requesting functional entity is not authorized. *Note:* It is recommended that an VLR supports AuthenticationDirective transactions. *Note:* This response may have been originated by the MSC.
ParameterError	A supplied parameter value has an encoding problem (e.g., the supplied MobileIdentificationNumber parameter digit values do not meet the BCD specification). *Note:* Include the Parameter Identifier in question as the FaultyParameter parameter. *Note:* This response may have been originated by the MSC.
SystemFailure	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. *Note:* This response may have been originated by the MSC.
UnrecognizedParameter-Value	A supplied parameter value is unrecognized or has nonstandard values. Include the Parameter Identifier in question as the FaultyParameter parameter. *Note:* This response may have been originated by the MSC.
MissingParameter	An optional parameter required by the VLR was expected, but not received (e.g., only MobileIdentificationNumber and ElectronicSerialNumber parameters received). A received optional parameter required the VLR to expect an additional optional parameter that was not received (e.g., RandomVariableSSD (RANDSSD) and SharedSecretData (SSD) or RandomVariableSSD (RANDSSD), RandomVariableUniqueChallenge (RANDU) and AuthenticationResponseUniqueChallenge (AUTHU)). *Note:* Include the Parameter Identifier in question as the FaultyParameter parameter. *Note:* This response may have been originated by the MSC.

4.6 Base Station Challenge

4.6.2 VLR Receiving BaseStationChallenge INVOKE

(See [OTA] 7_C, page 6-37)

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Table 14 VLR BaseStationChallenge Response

Problem Detection and Recommended Response from VLR to HLR	
RETURN ERROR Error Code	**PROBLEM DEFINITION**
UnrecognizedMIN	The VLR does not presently have a record for the supplied MobileIdentificationNumber parameters. The VLR does not have an OTASPCallEntry for the CDMA OTASP transaction.
UnrecognizedESN	The VLR presently has a record for the supplied MSID parameter, but the supplied ElectronicSerialNumber parameter does not match the ESN in the MS record.
UnrecognizedMEID	A VLR record exists for the supplied MSID parameter, but the supplied MEID parameter does not match the MEID in the VLR record.
ID/HLRMismatch	The supplied MSIDs HLR indicated the MobileIdentificationNumber parameter is not in the HLR's range (suspect routing error). *Note:* This response may have been originated by the HLR or AC.
OperationSequenceProblem	The MS is not marked pending SSD update or the VLR has another Authentication process active for the supplied MSID parameter. *Note:* This response may have been originated by the HLR or AC.
ResourceShortage	A required VLR resource (e.g., internal memory record, VLR is fully occupied) is temporarily not available (e.g., congestion). *Note:* This response may have been originated by the HLR or AC.
OperationNotSupported	The requested MAP operation is recognized, but not supported, by the receiving VLR, or the requesting functional entity is not authorized. *Note:* It is recommended that a VLR supports BaseStationChallenge transactions. *Note:* This response may have been originated by the HLR or AC.
ParameterError	A supplied parameter value has an encoding problem (e.g., The supplied MobileIdentificationNumber or IMSI parameter digit values do not meet the BCD specification). *Note:* Include the Parameter Identifier in question as the FaultyParameter parameter. *Note:* This response may have been originated by the HLR or AC.
SystemFailure	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. *Note:* This response may have been originated by the HLR or AC.
UnrecognizedIMSI/TMSI	The VLR does not presently have a record for the supplied IMSI parameter.

4.6.3 HLR Receiving BaseStationChallenge INVOKE

(See [OTA] 7_C, page 6-40)

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Table 15 HLR BaseStationChallenge Response

Problem Detection and Recommended Response from VLR to HLR	
RETURN ERROR Error Code	**PROBLEM DEFINITION**
UnrecognizedMIN	The HLR does not presently have a record for the supplied MobileIdentificationNumber parameter (The HLR does not have an OTASPCallEntry for the CDMA OTASP transaction.)
UnrecognizedESN	The HLR presently has a record for the supplied MSID parameter, but the supplied ElectronicSerialNumber parameter does not match the ESN in the MS record.
UnrecognizedMEID	The HLR presently has a record for the supplied MSID parameter, but the supplied MEID parameter does not match the MEID in the MS record.
ID/HLRMismatch	The supplied MSID parameter is not in the HLR s range (suspect routing error). *Note:* This response may have been originated by the AC.
OperationSequenceProblem	*Note:* This response may have been originated by the AC.
ResourceShortage	A required HLR resource (e.g., internal memory record, HLR is fully occupied) is temporarily not available (e.g., congestion). *Note:* This response may have been originated by the AC.
OperationNotSupported	The requested MAP operation is recognized, but not supported by the HLR or the requesting functional entity is not authorized. *Note:* It is recommended that an HLR supports BaseStationChallenge transactions. *Note:* This response may have been originated by the AC.
ParameterError	A supplied parameter value has an encoding problem (e.g., The supplied MobileIdentificationNumber or IMSI parameter digit values do not meet the BCD specification. *Note:* Include the Parameter Identifier in question as the FaultyParameter parameter. *Note:* This response may have been originated by the AC.
SystemFailure	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. *Note:* This response may have been originated by the AC.
UnrecognizedIMSI/TMSI	The HLR does not presently have a record for the supplied IMSI parameter.

4.6.4 AC Receiving BaseStationChallenge INVOKE

(See [OTA] 7_C, page 6-43)

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Table 16 AC BaseStationChallenge Response

Problem Detection and Recommended Response from VLR to HLR	
RETURN ERROR Error Code	**PROBLEM DEFINITION**
UnrecognizedMIN	The AC does not presently have a record for the supplied MobileIdentificationNumber parameter (The AC does not have an OTASPCallEntry for the CDMA OTASP transaction.)
UnrecognizedESN	The AC presently has a record for the supplied MSID parameter, but the supplied ElectronicSerialNumber parameter does not match the ESN in the MS record.
UnrecognizedMEID	The AC presently has a record for the supplied MSID parameter, but the supplied MEID parameter does not match the MEID in the MS record.
ID/HLRMismatch	The supplied MSID parameter is not in the AC s range (suspect routing error).
OperationSequenceProblem	The MS is not marked pending SSD update or the AC has another Authentication process active for the supplied MSID parameter.
ResourceShortage	A required AC resource (e.g., internal memory record, HLR is fully occupied) is temporarily not available (e.g., congestion).
OperationNotSupported	The requested MAP operation is recognized, but not supported by the AC or the requesting functional entity is not authorized. *Note:* It is recommended that an AC supports BaseStationChallenge transactions.
ParameterError	A supplied parameter value has an encoding problem (e.g., The supplied MobileIdentificationNumber or IMSI parameter digit values do not meet the BCD specification. *Note:* Include the Parameter Identifier in question as the FaultyParameter parameter.
SystemFailure	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.
UnrecognizedIMSI/TMSI	The AC does not presently have a record for the supplied IMSI parameter.

4.47 SMS Notification

4.47.1 HLR Initiating SMSNotification INVOKE

(See [OTA] 7C, page 6-53)

Upon request to send an SMSNotification message, the HLR shall do the following:

1 Include the ElectronicSerialNumber parameter set to the ESN of the desired MS.

2 IF the MEID of the MS is available:

2-1 Include the MEID parameter set to the MEID of the desired MS.

3 ENDIF.

The remainder of this section is retained unchanged.

5.C1 OTAF Attachment with Serving MSC

5.C1.1 MSC Obtaining a TRN

(See [OTA] 7C, page 6-61)

When the MSC determines that a TRN is required:

1 IF the MSC administers TRNs itself:

1-1 IF a TRN is available:

1-1-1 Assign a TRN.

1-1-2 Include the TRN.

1-1-3 Return to the calling task.

1-2 ELSE:

1-2-1 Return to the calling task with an *unsuccessful* indication.

1-3 ENDIF.

2 ELSE (the MSC obtains TRNs from the OTAF):

2-1 Include the BillingID parameter set to identify the OTASP call.

2-2 Include the Digits (Dialed) parameter set to the digits received from the MS.

2-3 Include the ElectronicSerialNumber parameter set to the ElectronicSerialNumber received from the MS.

2-4 IF the MEID of the MS is known:

2-5 Include the MEID parameter set to the MEID received from the MS.

2-6 ENDIF.

2-7 Include the MSID parameter set to either the MIN or IMSI received from the MS.

2-8 Include the MSCID parameter set to the identity of the MSC.

2-9 Include TransactionCapability parameter set to indicate that the TerminationList is not supported.

2-10 Send a FeatureRequest INVOKE to the OTAF associated with the MSC.

The remainder of this section is retained unchanged.

5.C1.3 MSC Receiving an SMDPP INVOKE to Attach with OTAF

(See [OTA] 7$_C$, page 6-65)

Upon receipt of an SMDPP INVOKE with the ActionCode parameter indicating "Attach MSC to OTAF " and the ServiceIndicator parameter indicates CDMA OTASP service, the MSC shall do the following:

1 IF the received message can be processed:

1-1 IF the TRN is known AND corresponds to an active OTASP call:

1-1-1 Determine the MS's MSID, ElectronicSerialNumber and, if available, MEID associated with the TRN.

~~1-1-1 Determine MS's MSID and ElectronicSerialNumber associated with the TRN.~~

1-1-2 Create an OTASPCallEntry.

1-1-3 IF an OTASPCallEntry could not be created:

1-1-3-1 Include the SMS_CauseCode parameter set to indicate *Network Resource Shortage*.

1-1-4 ELSE:

1-1-4-1 IF the mobile origination contained a MIN value:

1-1-4-2 Include the MobileStationMIN parameter set to the MS's MIN value.

1-1-4-3 ELSEIF the mobile origination contained an IMSI value:

1-1-4-3-1 Include the MobileStationIMSI parameter set to the MS's IMSI value.

1-1-4-4 ENDIF.

1-1-4-5 Include the ElectronicSerialNumber parameter set to MS's ElectronicSerialNumber value.

1-1-4-6 IF the MS's MEID is known:

1-1-4-6-1 Include the MEID parameter set to the MS's MEID value.

1-1-4-7 ENDIF.

1-1-4-8 Include the MSCID parameter set to Serving MSC's MSCID value.

1-1-4-9 Include the SystemCapabilities parameter set to indicate Serving System's authentication capabilities.

1-1-4-10 IF the mobile is operating in an unsupported mode:

1-1-4-10-1 Set the SMS_CauseCode to *Radio Interface Incompatibility*.

1-1-4-11 ELSEIF the MS has performed intersystem handoff:

1-1-4-11-1 Include the SMS_CauseCode parameter set to indicate *Network Interface not Supported*.

1-1-4-12 ENDIF.

1-1-4-13 IF the AC has denied access to this MS:

1-1-4-13-1 Include the DenyAccess parameter.

1-1-4-14 ENDIF.

1-1-4-15 IF the HLR has denied access to this MS OR IF the registration attempt was unsuccessful:

1-1-4-15-1 Include the AuthorizationDenied parameter.

1-1-4-16 ENDIF.

1-1-5 ENDIF.

1-2 ELSE:

1-2-1 Include the SMS_CauseCode parameter set to indicate *Address Translation Failure*.

1-3 ENDIF.

2 ELSE:

2-1 Include the SMS_CauseCode parameter set to the proper value.

3 ENDIF.

4 Send an SMDPP RETURN RESULT to the requesting OTAF.

5 Exit this task.

5.C2 OTAF Attachment with Serving MSC (ALT)

5.C2.2 OTAF Requesting TRN from an Alternate OTAF (ALT)

(See [OTA] 7_C, page 6-71)

When an OTAF requires a TRN to be used to direct or redirect an OTASP call to a CSC associated to a different OTAF, it shall perform the following:

1 IF the OTAF had received a FeatureRequest INVOKE for the OTASP call:

1-1 Relay the received BillingID parameter to identify the call on the Originating MSC.

1-2 Relay the received MSID parameter.

1-3 Relay the received ElectronicSerialNumber parameter.

1-4 IF the MEID parameter is received:

1-4-1 Relay the received MEID parameter.

1-5 ENDIF.

1-6 Relay the received MSCID parameter to identify the Originating MSC.

1-7 Include the SystemMyTypeCode parameter.

1-8 IF the PC_SSN parameter is received:

1-8-1 Relay the received PC_SSN parameter to address the Originating MSC.

1-9 ENDIF.

The remainder of this section is retained unchanged.

• • •

5.C2.4 OTAF Initiating MSC Redirection of an OTASP Call (ALT)

(See [OTA] 7C, page 6-74)

When an OTAF determines that it should initiate MSC redirection of an OTASP call, it shall perform the following:

1 IF the OTAF had received a FeatureRequest INVOKE for the OTASP call:

1-1 Execute “OTAF Requesting TRN from an Alternate OTAF ” task (see 5.C2.2).

1-2 IF a TRN is obtained:

1-2-1 Include the Digits (Destination) parameter set to the TRN.

1-2-2 Relay the received BillingID parameter.

1-2-3 Relay the received MSID parameter.

1-2-4 Relay the received ElectronicSerialNumber parameter.

1-2-5 IF the MEID parameter is received:

1-2-5-1 Relay the received MEID parameter.

1-2-6 ENDIF.

1-2-7 Include the SystemMyTypeCode parameter to identify the manufacturer of the OTAF.

1-2-8 Include the SenderIdentificationNumber, parameter set to the OTAF’s identification number.

1-2-9 Send a RedirectionDirective INVOKE to the Originating MSC associated with the OTASP call.

1-2-10 Start the Redirection Directive Timer (RDT).

1-2-11 WAIT for a Redirection Directive response:

1-2-12 WHEN a RETURN RESULT is received:

1-2-12-1 Stop timer (RDT).

1-2-12-2 IF the message can be processed:

1-2-12-2-1 IF the call is still connected to the CSC:

1-2-12-2-1-1 Direct the CSC to release the call.

1-2-12-2-2 ENDIF.

1-2-12-2-3 Exit this task.

1-2-12-3 ELSE (the message cannot be processed):

1-2-12-3-1 Execute the “Local Recovery Procedures” task (see 3.5.1).

1-2-12-3-2 Exit this task.

1-2-12-4 ENDIF.

1-2-13 WHEN the CSC notifies the OTAF that the call has disconnected:

1-2-13-1 Stop timer (RDT).

1-2-13-2 Exit this task.

1-2-14 WHEN a RETURN ERROR or REJECT is received:

1-2-14-1 Stop timer (RDT).

1-2-14-2 Execute the “Local Recovery Procedures” task (see 3.5.1).

1-2-14-3 Exit this task.

1-2-15 WHEN timer (RDT) expires:

1-2-15-1 Execute the “Local Recovery Procedures” task (see 3.5.1).

1-2-15-2 Exit this task.

1-2-16 ENDWAIT.

1-3 ENDIF.

2 ENDIF.

Table 5.C2.4 Originating MSC RedirectionDirective Response for OTASP

Problem Detection and Recommended Response from VLR to HLR	
RETURN ERROR Error Code	**PROBLEM DEFINITION**
UnrecognizedMIN	The AC does not presently have a record for the supplied MobileIdentificationNumber parameter (The AC does not have an OTASPCallEntry for the CDMA OTASP transaction.)
UnrecognizedESN	The AC presently has a record for the supplied MSID parameter, but the supplied ElectronicSerialNumber parameter does not match the ESN in the MS record.
UnrecognizedMEID	The AC presently has a record for the supplied MSID parameter, but the supplied MEID parameter does not match the MEID in the MS record.
ID/HLRMismatch	The supplied MSID parameter is not in the AC s range (suspect routing error).
OperationSequenceProblem	The MS is not marked pending SSD update or the AC has another Authentication process active for the supplied MSID parameter.
ResourceShortage	A required AC resource (e.g., internal memory record, HLR is fully occupied) is temporarily not available (e.g., congestion).
OperationNotSupported	The requested MAP operation is recognized, but not supported by the AC or the requesting functional entity is not authorized. *Note:* It is recommended that an AC supports BaseStationChallenge transactions.
ParameterError	A supplied parameter value has an encoding problem (e.g., The supplied MobileIdentificationNumber or IMSI parameter digit values do not meet the BCD specification. *Note:* Include the Parameter Identifier in question as the FaultyParameter parameter.
SystemFailure	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.
UnrecognizedIMSI/TMSI	The AC does not presently have a record for the supplied IMSI parameter.

5.C3 Exchange of OTASP Data Message

5.C3.1 OTAF Initiating SMDPP INVOKE for OTASP Data Message Exchange

(See [OTA] 7_C, page 6-76)

When triggered (the trigger must include the formatted *C.S0016* message), the OTAF shall do the following:

1 Include the SMS_BearerData parameter set identical to the *OTASP Data* message.

2 IF the *OTASP Data* message encapsulated in the SMS_BearerData parameter is an *OTAPA Request Message*:

2-1 Include the ActionCode parameter set to a value of *Allocate Resources* or a value of *Release Resources* as appropriate.

2-2 IF the ActionCode parameter is set to a value of *Allocate Resources*:

2-2-1 Include the InterMessageTime parameter set to the appropriate guard timer value, if applicable.

2-3 ENDIF.

3 ENDIF.

4 Include the SMS_TeleserviceIdentifier parameter with its length set equal to zero.

5 Include the ElectronicSerialNumber parameter set to the MS's ElectronicSerialNumber value returned from the Serving MSC.

6 IF the MEID is available for the MS:

6-1 Include the MEID parameter set to the MS's MEID.

7 ENDIF.

8 IF CDMA OTASP Service:

8-1 Include the MobileIdentificationNumber parameter set to the Activation_MIN value.

9 ENDIF.

10 IF CDMA OTAPA Service:

10-1 Include the MSID parameter set to the value of the MS's MIN or IMSI at the start of the OTAPA session. (When the MS has both the MIN and the IMSI at the start of the OTAPA session then the MIN form of the MSID is used.)

11 ENDIF.

12 Include the ServiceIndicator parameter, set to either the CDMA OTASP Service or the CDMA OTAPA Service value, as appropriate.

13 Send an SMDPP INVOKE to the Serving MSC.

14 Start the SMDPP timer (SMT_{CX})(x = m, l: depending on the mode of MS operation, the lengths of the OTASP Data Messages being exchanged and the corresponding response time at the MS).

15 WAIT for an SMDPP response:

The remainder of this Section 5.C3 is retained unchanged.

5.C4 MSC PROCEDURE TRIGGERS FOR OTASP

5.C4.1 OTAF Initiating SMDPP INVOKE for MS Registration

(See [OTA] 7$_C$, page 6-83)

When triggered (the trigger must include the newly assigned MSID value), the OTAF shall do the following:

1 Include the SMS_BearerData parameter with its length set equal to zero.

2 Include the SMS_TeleserviceIdentifier parameter with its length set equal to zero.

3 Include the ElectronicSerialNumber parameter set to the MS's ElectronicSerialNumber value returned from the Serving MSC.

4 IF the MEID is available for the MS:

4-1 Include the MEID parameter set to the MS's MEID.

5 ENDIF.

6 IF the MIN has been assigned:

6-1 Include the NewlyAssignedMIN parameter set to the MIN value.

7 ENDIF.

8 IF the IMSI has been assigned:

8-1 Include the NewlyAssignedIMSI parameter set to the IMSI value.

9 ENDIF.

10 IF CDMA OTASP Service:

10-1 Include the MobileIdentificationNumber parameter set to the Activation_MIN value.

11 ENDIF.

12 IF CDMA OTAPA Service:

12-1 IF the MS has MIN at the start of the session:

12-1-1 Include the MobileIdentificationNumber parameter set to the MS's MIN.

12-2 ELSE:

12-2-1 Include the IMSI parameter set to the MS's IMSI.

12-3 ENDIF.

13 ENDIF.

14 Include the ServiceIndicator parameter set to either the CDMA OTASP Service or the CDMA OTAPA Service value, as appropriate.

15 Include the ActionCode parameter set to indicate *Initiate Registration Notification*.

16 Send an SMDPP INVOKE to the Serving MSC.

The remainder of this Section 5.C4.1 is retained unchanged.

5.C4.3 OTAF Initiating SMDPP INVOKE to Record New MSID

(See [OTA] 7$_C$, page 6-86)

When triggered (the trigger must include the newly assigned MobileIdentificationNumber or IMSI or both value(s)), the OTAF shall do the following:

1 Include the SMS_BearerData parameter with its length set equal to zero.

2 Include the SMS_TeleserviceIdentifier parameter with its length set equal to zero.

3 Include the ElectronicSerialNumber parameter set to the MS's ElectronicSerialNumber value returned from the Serving MSC.

4 IF the MEID is available for the MS:

4-1 Include the MEID parameter set to the MS's MEID.

5 ENDIF.

6 IF CDMA OTASP Service:

6-1 Include the MobileIdentificationNumber parameter set to the Activation_MIN value.

7 ENDIF.

8 IF CDMA OTAPA Service:

8-1 Include the MSID parameter set to the value of the MS's MIN or IMSI at the start of the OTAPA session. (When the MS has both the MIN and the IMSI at the start of the OTAPA session then the MIN form of the MSID is used.)

9 ENDIF.

10 Include the ServiceIndicator parameter, set to either the CDMA OTASP Service or the CDMA OTAPA Service value, as appropriate.

11 Include the ActionCode parameter set to indicate Record *NEWMSID*.

12 IF the MIN has been assigned:

12-1 Include the NewlyAssignedMIN parameter set to the MIN value.

13 ENDIF.

14 IF the IMSI has been assigned:

14-1 Include the NewlyAssignedIMSI parameter set to the IMSI value.

15 ENDIF.

16 Send an SMDPP INVOKE to the Serving MSC.

The remainder of this Section 5.C4 is retained unchanged.

5.C7 OTASP Request

(See [OTA] 7_C, page 6-95)

The OTASPRequest operation triggers the AC to initiate certain procedures.The ActionCode parameter which is included in the OTASPRequest INVOKE specifies the procedures that the AC shall initiate.

5.C7.1 OTAF Initiating OTASPRequest INVOKE

Upon being triggered, the OTAF shall perform the following:

1 Include the ElectronicSerialNumber parameter set to the MS's ElectronicSerialNumber value returned from the Serving MSC.

2 IF the MEID is available for the MS:

2-1 Include the MEID parameter set to the MS's MEID.

3 ENDIF.

4 IF CDMA OTASP Service:

4-1 Include the MobileIdentificationNumber parameter set to the Activation_MIN value.

5 ENDIF.

6 IF CDMA OTAPA Service:

6-1 Include the MSID parameter set to the value of the MS's MIN or IMSI at the start of the OTAPA session. (When the MS has both the MIN and the IMSI at the start of the OTAPA session then the MIN form of the MSID is used.)

7 ENDIF.

8 Include the ServiceIndicator parameter set, either to CDMA OTASP Service value or CDMA OTAPA Service value, as appropriate.

9 Include the ActionCode parameter set to indicate the procedures that the AC shall initiate.

10 Include the MobileStationMSID parameter for CDMA OTASP but not for CDMA OTAPA. Only use the MSIMSI form of the MS_MSID if the IMSI_T was received from the MS at OTASP call origination and a MIN is not programmed in the MS.

11 CASE ActionCode OF:

12 *Generate Public Encryption Values*:

12-1 Include the AKeyProtocolVersion parameter set to MS-supported A-key protocol version(s) value(s).

13 Generate A-key:

13-1 Include the MobileStationPartialKey parameter received from the MS.

14 Perform SSD Update Procedure:

14-1 For CDMA OTASP, include the MSCID parameter set to the Serving System's MSCID value.

14-2 For CDMA OTASP, include the SystemCapabilities parameter set to indicate Serving System's authentication capabilities returned from Serving MSC.

15 Perform Re-authentication Procedure:

15-1 Include the AuthenticationData parameter set to the value received from the MS.

15-2 Include the RandomVariable parameter set to the value sent to the MS from the OTAF.

15-3 Include the AuthenticationResponse parameter set to the value received from the MS.

15-4 Include the CallHistoryCount parameter set to the value received from the MS.

15-5 For CDMA OTASP, include the MSCID parameter set to the Serving System's MSCID value.

15-6 For CDMA OTASP, include the SystemCapabilities parameter set to indicate Serving System's authentication capabilities returned from Serving MSC.

16 Commit A-key:

16-1 IF a NewlyAssignedMIN parameter is assigned to the MS during this OTASP session:

16-1-1 Include the NewlyAssignedMIN parameter set to the new Mobile Identification Number value.

16-2 ENDIF.

16-3 IF CDMA OTASP Service or CDMA OTAPA Service:

16-3-1 IF a new MIN has been assigned to the MS:

16-3-1-1 Include the NewlyAssignedMIN form of the NewlyAssignedMSID parameter, set to the value of the new MIN.

16-3-2 ELSEIF a new IMSI has been assigned to the MS:

16-3-2-1 IF the MS has no MIN or the MS's existing MIN is being erased:

16-3-2-1-1 Include the NewlyAssignedIMSI form of the NewlyAssignedMSID parameter, set to the value of the new IMSI.

16-3-2-2 ENDIF.

16-3-3 ENDIF.

16-4 ENDIF.

17 *Release Resources*:

17-1 NOTE: There are no other parameters included.

18 *Generate Authentication Signature*:

18-1 Include the RandomVariableBaseStation parameter set to a value as received from MS used to challenge the network.

19 ENDCASE.

20 Send an OTASPRequest INVOKE to the appropriate HLR.

The remainder of this Section 5.C7.1 is retained unchanged.

5.C7.3 AC Receiving an OTASPREQ INVOKE

(See [OTA] 7_C, page 6-103)

When an AC receives an OTASPRequest INVOKE from the HLR with the ServiceIndicator parameter indicating either CDMA OTASP Service or CDMA OTAPA Service, it shall perform the following:

1 IF the received message cannot be processed:

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

1-2 Exit this task.

2 ENDIF.

3 CASE ActionCode of:

4 Generate Public Encryption Values:

4-1 IF an OTASPCallEntry does not exist:

4-1-1 Create OTASPCallEntry.

4-1-2 IF OTASPCallEntry could not be created:

4-1-2-1 Send a RETURN ERROR with the Error Code of *SystemFailure* to the requesting HLR.

4-1-2-2 Exit this task.

4-1-3 ENDIF.

4-2 ENDIF.

4-3 IF one of the received A-key Protocol Versions is supported by the AC:

4-3-1 Select and store the AKeyProtocolVersion parameter value that shall be used by the AC.

4-4 ELSE:

4-4-1 Include the OTASP_ResultCode parameter set to *UnsupportedAKeyProtocolVersion*.

4-4-2 Send a RETURN RESULT to the requesting HLR.

4-4-3 Exit this task.

4-5 ENDIF.

4-6 Compute Base Station Partial Key value.

4-7 IF Base Station Partial Key value was successfully computed:

4-7-1 Store the ModulusValue parameter value used for computing BaseStationPartialKey.

4-7-2 Store the exponent value used for computing BaseStationPartialKey.

4-7-3 Include the AKeyProtocolVersion parameter set to the protocol version value previously stored by the AC.

4-7-4 Include the ModulusValue parameter set to the value used for computing BaseStationPartialKey.

4-7-5 Include the PrimitiveValue parameter set to the value used for computing BaseStationPartialKey.

4-7-6 Include the BaseStationPartialKey parameter set to the computed Base Station Partial Key value.

4-7-7 Send a RETURN RESULT to the requesting HLR.

4-8 ELSE:

4-8-1 Include the OTASP_ResultCode parameter set to *ComputationFailure*.

4-8-2 Send a RETURN RESULT to the requesting HLR.

4-8-3 Execute “Local Recovery Procedures” task (see 3.5.1).

4-9 ENDIF.

4-10 Exit this task.

5 Generate A-key:

5-1 Retrieve OTASPCallEntry.

5-2 IF an OTASPCallEntry does not exist:

5-2-1 Include the OTASP_ResultCode parameter set to *UnrecognizedOTASPCallEntry*.

5-2-2 Send a RETURN RESULT to the requesting HLR.

5-2-3 Exit this task.

5-3 ENDIF.

5-4 Compute A-key using received MobileStationPartialKey parameter value.

5-5 IF A-key was successfully computed:

5-5-1 Store the A-key in the OTASPCallEntry.

5-5-2 Send an empty RETURN RESULT to the requesting HLR.

5-6 ELSE:

5-6-1 Include the OTASP_ResultCode parameter set to indicate *ComputationFailure*.

5-6-2 Send a RETURN RESULT to the requesting HLR.

5-6-3 Execute “Local Recovery Procedures” task (see 3.5.1).

5-7 ENDIF.

5-8 Exit this task.

6 Perform SSD Update Procedure:

6-1 IF a permanent record exists which corresponds to the received MobileStationMSID value (for CDMA OTASP) or the received MSID value (for CDMA OTAPA):

6-1-1 IF an OTASPCallEntry exists AND IF the OTASPCallEntry contains an A-key:

6-1-1-1 Retrieve the A-key from the OTASPCallEntry for use during SSD update.

6-1-2 ELSE:

6-1-2-1 Retrieve the A-key from the permanent record for use during SSD update.

6-1-2-2 IF the ServiceIndicator parameter indicates CDMA OTASP Service AND IF an OTASPCallEntry does not exist:

6-1-2-2-1 Create OTASPCallEntry containing a reference to the permanent record.

6-1-2-2-2 IF an OTASPCallEntry could not be created:

6-1-2-2-2-1 Send a RETURN ERROR with the Error Code of *SystemFailure* to the requesting HLR.

6-1-2-2-2-2 Exit this task.

6-1-2-2-3 ENDIF.

6-1-2-3 ENDIF.

6-1-3 ENDIF.

6-2 ELSE:

6-2-1 Retrieve the OTASPCallEntry.

6-2-2 IF an OTASPCallEntry does not exist:

6-2-2-1 Include the OTASP_ResultCode parameter set to *UnrecognizedOTASPCallEntry*.

6-2-2-2 Send a RETURN RESULT to the requesting HLR.

6-2-2-3 Exit this task.

6-2-3 ENDIF.

6-2-4 Retrieve the A-key from the OTASPCallEntry for use during SSD update.

6-3 ENDIF:

6-4 Execute “AC Initiating AuthenticationDirective INVOKE” task (see 4.1.1) using all received parameters.

6-5 IF the above task returned with a *success* indication:

6-5-1 Relay all received parameters.

6-5-2 Send a RETURN RESULT to the requesting HLR.

6-6 ELSE:

6-6-1 Send a RETURN ERROR to the requesting HLR with the Error Code indicating *SystemFailure*.

6-7 ENDIF.

6-8 Exit this task.

7 Perform Re-Authentication Procedure:

7-1 IF a permanent record exists which corresponds to the received MobileStationMSID value (for CDMA OTASP) or the received MSID value (for CDMA OTAPA):

7-1-1 IF an OTASPCallEntry exists AND IF the OTASPCallEntry contains an A-key:

7-1-1-1 IF the OTASPCallEntry contains an SSD:

7-1-1-1-1 Retrieve the SSD from the OTASPCallEntry for use during Re-Authentication.

7-1-1-2 ELSE:

7-1-1-2-1 Send a RETURN ERROR with the Error Code of *OperationSequenceProblem* to the requesting HLR.

7-1-1-2-2 Exit this task.

7-1-1-3 ENDIF.

7-1-2 ELSE:

7-1-2-1 Retrieve the SSD from the permanent record for use during Re-Authentication.

7-1-2-2 IF the ServiceIndicator parameter indicates CDMA OTASP Service AND IF an OTASPCallEntry does not exist:

7-1-2-2-1 Create OTASPCallEntry containing a reference to the permanent record.

7-1-2-2-2 IF an OTASPCallEntry could not be created:

7-1-2-2-2-1 Send a RETURN ERROR with the Error Code of *SystemFailure* to the requesting HLR.

7-1-2-2-2-2 Exit this task.

7-1-2-2-3 ENDIF.

7-1-2-3 ENDIF.

7-1-3 ENDIF.

7-2 ELSE:

7-2-1 Retrieve the OTASPCallEntry.

7-2-2 IF an OTASPCallEntry does not exist:

7-2-2-1 Include the OTASP_ResultCode parameter set to *UnrecognizedOTASPCallEntry*.

7-2-2-2 Send a RETURN RESULT to the requesting HLR.

7-2-2-3 Exit this task.

7-2-3 ENDIF.

7-2-4 IF the OTASPCallEntry contains SSD:

7-2-4-1 Retrieve the SSD from the OTASPCallEntry for use during Re-Authentication.

7-2-5 ELSE:

7-2-5-1 Send a RETURN ERROR with the Error Code of *OperationSequenceProblem* to the requesting HLR.

7-2-5-2 Exit this task.

7-2-6 ENDIF.

7-3 ENDIF.

7-4 Execute the Authentication-Signature Generation procedure using received RandomVariable, ElectronicSerialNumber and AuthenticationData parameter values and using the retrieved SSD for the MS.

7-5 IF the Authentication-Signature Generation procedure result and the received AuthenticationResponse parameter value match:

7-5-1 IF a COUNT mismatch is relevant AND the stored count and the received CallHistoryCount parameter value do not significantly match:

7-5-1-1 Include the DenyAccess parameter set to *COUNT Mismatch*.

7-5-1-2 Send a RETURN RESULT to the requesting HLR.

7-5-1-3 Exit this task.

7-5-2 ENDIF.

7-5-3 Execute "AC Initiating AuthenticationDirective INVOKE" task (see 4.1.1) using all received parameters.

7-5-4 IF the above task was successful:

7-5-4-1 Relay all received parameters.

7-5-4-2 Send a RETURN RESULT to the requesting HLR.

7-5-5 ELSE:

7-5-5-1 Send a RETURN ERROR with the Error Code indicating *SystemFailure* to the requesting HLR.

7-5-6 ENDIF.

7-6 ELSE (AuthenticationResponse received does not match):

7-6-1 Include the DenyAccess parameter set to *AUTHR mismatch*.

7-6-2 Send a RETURN RESULT to the requesting HLR.

7-7 ENDIF.

7-8 Exit this task.

8 *Commit A-key*[1]:

8-1 Retrieve the OTASPCallEntry.

8-2 IF an OTASPCallEntry is not found:

8-2-1 Include the OTASP_ResultCode parameter set to *UnrecognizedOTASPCallEntry*.

8-2-2 Send a RETURN RESULT to the requesting HLR.

8-2-3 Exit this task.

8-3 ENDIF.

[1] A-key generated during an OTASP or OTAPA session can be transferred to a permanent record at the AC using the following procedures. If system policy permits, the AC may remove the old record, if one exists.

8-4 IF the OTASPCallEntry contains an A-key:

8-4-1 IF the OTASPCallEntry does not contain a valid SSD:

8-4-1-1 Send a RETURN ERROR with the Error Code of *OperationSequenceProblem* to the requesting HLR.

8-4-1-2 Exit this task.

8-4-2 ENDIF.

8-5 ENDIF.

8-6 IF the received message contains a NewlyAssignedMSID parameter:

8-6-1 Store the temporary A-key and SSD (if both are present) into a permanent record corresponding to the received NewlyAssignedMSID, ElectronicSerialNumber ~~and ESN~~ and if available, MEID values (permanent record may previously exist or be created by this procedure).

8-7 ELSE:

8-7-1 Store the temporary A-key and SSD (if both are present) into a permanent record corresponding to the received MobileStationMSID (for CDMA OTASP) or the received MSID value (for CDMA OTAPA), ElectronicSerialNumber ~~and ESN~~ and if available, MEID values (permanent record may previously exist or be created by this procedure).

8-8 ENDIF.

8-9 IF unable to permanently store the A-key and SSD:

8-9-1 Include the OTASP_ResultCode parameter set to *Unable to Commit*.

8-9-2 Send a RETURN RESULT to the requesting HLR.

8-9-3 Exit this task.

8-10 ENDIF.

8-11 Remove the A-key and the SSD from the OTASPCallEntry.

8-12 Send a RETURN RESULT to the requesting HLR.

8-13 Exit this task.

9 Release Resources:

9-1 IF an OTASPCallEntry is found:

9-1-1 Delete the OTASPCallEntry.

9-2 ENDIF.

9-3 Send a RETURN RESULT to the requesting HLR.

9-4 Exit this task.

10 *Generate Authentication Signature*:

10-1 IF the ServiceIndicator is set to *OTAPA Service:*

10-1-1 SSD-A is XORed with the MS's A-key and is stored in XOREDSSD[1].

10-2 ENDIF.

10-3 Execute the Authentication-Signature Generation procedure using XOREDSSD, received ElectronicSerialNumber and MSID and using the received RANDBS for the MS.

[1] This variable is used to store the result of XORing the SSD-A with the MS' A-key.

10-4 Include the AuthenticationResponseBaseStation parameter set to the AuthenticationSignature value generated in above step.

10-5 Send a RETURN RESULT to the requesting HLR.

10-6 Exit this task.

11 ENDCASE.

Table 5.C7.3AC OTASPRequest Response

Problem Detection and Recommended Response from AC to HLR	
RETURN ERROR Error Code	**PROBLEM DEFINITION**
OperationSequenceProblem	The requested action cannot be performed or is not expected in the current state.
ResourceShortage	A required AC resource (e.g., internal memory record, AC is fully occupied) is temporarily not available (e.g., congestion).
OperationNotSupported	The requested MAP operation is recognized but is not supported by the receiving AC, or the requesting functional entity is not authorized. *Note:* It is recommended that an AC support OTASPRequest transactions.
ParameterError	A supplied parameter has an encoding problem (e.g., the supplied MobileIdentificationNumber parameter digit values do not meet the BCD specification). *Note:* Include the Parameter Identifier in question as the FaultyParameter parameter.
SystemFailure	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.
UnrecognizedParameter-Value	A supplied parameter value is unrecognized or has nonstandard values *Note:* Include the Parameter Identifier in question as the FaultyParameter parameter.
MissingParameter	An expected, or required, optional parameter was not received. *Note:* Include the Parameter Identifier in question as the FaultyParameter parameter.
RETURN RESULT	*Note:* Only RETURN RESULT operations needing clarification have been included.
DenyAccess	The supplied DenyAccess parameter indicates if the MS fails re-authentication or if there is a COUNT mismatch.
OTASP_ResultCode	The supplied OTASP_ResultCode parameter identifies the reason for an unsuccessful procedure at the AC.
SignalingMessageEncryption-Report	The supplied SignalingMessageEncryptionReport parameter provides more information on an unsuccessful attempt by the AC to initiate Signaling Message Encryption at the Serving MSC.
SSDUpdateReport	The supplied SSDUpdateReport parameter provides more information on an unsuccessful attempt by the AC to initiate SSD Update.
UniqueChallengeReport	The supplied UniqueChallengeReport parameter provides more information on an unsuccessful attempt to perform Unique Challenge with the MS as part of the SSD Update procedure.
VoicePrivacyReport	The supplied VoicePrivacyReport parameter provides more information on an unsuccessful attempt by the AC to initiate Voice Privacy at the Serving MSC.