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Answer Hold (AH)

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FOREWORD

This document contains recommendations for supporting the wireless subscriber feature “Answer Hold (AH)”.

The *ANSI/TIA/EIA-41-D* recommendation upon which this Interim Standard builds is:

- *TIA/EIA-41-D Cellular Radiotelecommunications Intersystem Operations; Telecommunications Industry Association; 1997.*

ASSUMPTIONS

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

- The AH feature shall be applicable to all terminating call deliveries (e.g., unanswered calls in the Alerting or Call Waiting state) permitting called AH subscribers to place a terminating call on hold, upon answer allowing conversation to begin at a later more convenient time.
- When the AH authorized called party activates the AH feature, the calling party shall be provided an appropriate network announcement (e.g., as defined by the service provider) indicating the call delivery is in progress.
- Terminating calls are in the answer state when AH is invoked (i.e., answer supervision is returned).
- A terminating call in the AH state shall normally remain in the AH state until:
 - the called AH subscriber retrieves the call (e.g., **SEND**).
 - the calling party disconnects.
- AH and Call Waiting (CW) subscribers, active with an in progress call and with a terminating call in the AH state, shall be permitted to retrieve the call in the AH state with normal CW procedures (e.g., **SEND** [terminate AH treatment, place the other party on hold, connect the AH called subscriber to the calling party in the AH state, and enter the 2-way CW state]).
- When the AH service has been invoked, the AH state should be maintained during all 3G-to-3G handoff processes.
- When the call is terminated for any reason, the AH state shall be automatically released.

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1. INTRODUCTION

1.1 OBJECTIVE

This document presents, Stage-2 (*TIA/EIA-41.3-D* enhancements), and Stage-3 (*TIA/EIA-41.5-D* and *TIA/EIA-41.6-D* enhancements) recommendations for supporting the Answer Hold (AH) feature use in the Wireless Radiotelephone Service.

1.2 SCOPE

This document specifies the wireless intersystem network operation enhancements required for supporting roaming subscribers with the Answer Hold (AH) feature.

1.3 ORGANIZATION

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

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2. REFERENCES

2.1 Normative References

ANSI T1 Standards:

- ANSI T1

ITU:

- Recommendation

TIA/EIA:

- ANSI/TIA/EIA-41-D Cellular Radiotelecommunications Intersystem Operations; Telecommunications Industry Association; December 1997.
- TIA/EIA-IS-664 Cellular Features Description Telecommunications Industry Association; January 1996.

2.2 Informative References

TTC:

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

#

This section provides the Stage-1 feature description for Answer Hold (AH) according to the structure of *TIA/EIA-664*.

3.1 **Definitions**

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

Answer Hold (AH)

See Answer Hold.

X.1 Answer Hold (AH)

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

Answer Hold (AH) provides a called subscriber the capability to answer the call, but selectively delay the conversation (e.g., calls in the alerting or Call Waiting state). The incoming call is provided an appropriate network announcement to notify the calling party to please hold.

AH is also applicable to incoming calls being delivered to called AH authorized subscribers as Call Waiting (CW) calls.

AH authorized subscribers, with AH active on an incoming call, shall resolve the call in the AH state prior to originating a new outgoing call or call leg.

New incoming calls to AH authorized subscribers, with AH active on an incoming call, shall receive the appropriate busy treatment (e.g., busy tone, redirected to voice mail, etc.) for the called AH subscriber. As a result, only one incoming call shall be in the AH state per each AH called subscriber.

Applicability to Telecommunications Services

AH is applicable to voice telecommunications services.

X.1.1 Normal Procedures With Successful Outcome

Authorization

AH may be generally available or may be provided after pre-arrangement with the service provider.

Answer Hold (AH)

De-Authorization

AH may be withdrawn at the subscriber’s request or for administrative reasons.

Registration

AH has no registration.

De-Registration

AH has no de-registration.

Activation

AH shall be activated upon authorization.

De-Activation

AH shall be de-activated upon de-authorization.

Invocation

AH may be invoked when there is an un-answered incoming call while the called AH subscriber is being alerted or active in a call (e.g., MS receiving alerting treatment, MS receiving Call Waiting [CW] treatment).

Normal Operation With Successful Outcome

When the called AH subscriber has placed a calling party in the Answer Hold state, the called AH subscriber is considered busy for other incoming calls. Services applicable to a busy called subscriber should be invoked for incoming calls.

	State Alerting	Condition The called AH mobile station is in the alerting state for an incoming call delivery.
XID	Call Party Action	System Reaction
1a1	The called subscriber invokes the AH feature using an MS specific procedure.	The calling party is placed in the Answer Hold state, and has AH treatment applied (e.g., network provided default AH announcement, the called AH subscriber’s pre-registered network provided announcement). Go to the Answer Hold state.

Table 1.1a: Alerting State for Answer Hold

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Answer Hold (AH)

	State 2-way CW notification	Condition The called AH subscriber is in a 2-way conversation with the other party and call waiting notification is applied.
XID	Call Party Action	System Reaction
1b1	The called subscriber invokes the AH feature using an MS specific procedure.	The calling party is placed in the Answer Hold state and has AH treatment applied (e.g., network provided default AH announcement, the called AH subscriber's pre-registered network provided announcement). Go to the 2-way CW state. Or release the First Call.

Table 1.1b: 2-Way CW Notification State for Answer Hold

	State Answer Hold	Condition The calling party is in the AH state with the appropriate AH treatment being applied-
XID	Call Party Action	System Reaction
1c1	The called subscriber retrieves the call in the Answer Hold state using an MS specific procedure.	The calling party has AH treatment removed, the AH subscriber is connected in conversation with the calling party. Go to 2-way state.
1c2	The called AH subscriber enters END .	Apply recall distinctive alerting toward the called AH subscriber. Optionally apply audible alerting tone toward the held party. Go to the Alerting state. Or release the called party. Go to the Idle state.
1c3	The calling party abandons.	Release the calling party. Go to the Idle state.

Table 1.1c: Answer Hold State for Answer Hold

Call Detail Record

The system should record call detail information for the following:

- a. AH invocation events.
- b. AH usage events.

See *ANSI-124* for the specific information to be included for each element.

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Answer Hold (AH)

X.1.2 Exception Procedures or Unsuccessful Outcome

Registration

None identified.

De-Registration

None identified.

Activation

None identified.

De-Activation

None identified.

Invocation

None identified.

Exceptions While Roaming

None identified.

Exceptions During Intersystem Handoff

Invocation of AH is not supported for handoff to a 2G or 1G system.

X.1.3 Alternate Procedures

None identified.

X.1.4 Interactions With Other Cellular Services

Answer Hold (AH)

Not applicable.

Call Delivery (CD)

None identified.

Answer Hold (AH)

Call Forwarding—Busy (CFB)

CFB takes precedence over AH. That is, calls arriving to a subscriber with AH and CFB active, and the subscriber is busy (e.g., the called subscriber is not able to accept another call); the call shall be diverted to the CFB forward-to number.

Call Forwarding—Default (CFD)

None identified.

Call Forwarding—No Answer (CFNA)

None identified.

Call Forwarding—Unconditional (CFU)

None identified.

Call Transfer (CT)

When the called subscriber has placed a calling party in the AH state, CT can not be invoked.

Call Waiting (CW)

CW is invoked before AH. That is, calls arriving to a subscriber with AH and CW active, and the subscriber is busy, and the subscriber is able to receive a second call (e.g., no other call is waiting to be answered), the arriving call is presented to the subscriber with CW notification. The called subscriber may then invoke AH.

Calls arriving to a subscriber with AH and CW active, and the subscriber is busy, and the subscriber is unable to receive a second call (e.g., another call is waiting to be answered or another call is in the hold or AH state), the arriving call is not presented to the subscriber; instead, the call shall be provided the appropriate default busy treatment (e.g., CFB, CFD, busy tone).

Calling Name Presentation (CNAP)

CNAP is invoked before AH. That is, calls arriving to a subscriber with AH and CNAP active, the call is delivered with CNAP first. The called subscriber may then invoke AH.

Calling Name Restriction (CNAR)

None identified.

Answer Hold (AH)

Calling Number Identification Presentation (CNIP)

CNIP is invoked before AH. That is, calls arriving to a subscriber with AH and CNIP active, the call is delivered with CNIP first. The called subscriber may then invoke AH.

Calling Number Identification Restriction (CNIR)

None identified.

Conference Calling (CC)

When the called subscriber has placed a calling party in the AH state, CC can not be invoked.

Do Not Disturb (DND)

DND takes precedence over AH. A call to a subscriber with both AH and DND active shall be given DND treatment immediately and not be given AH treatment.

Emergency Services (Future)

None identified.

Flexible Alerting (FA)

Interaction between FA and AH is beyond the scope of this Standard.

Message Waiting Notification (MWN)

None identified.

Mobile Access Hunting (MAH)

Interaction between MAH and AH is beyond the scope of this Standard.

Password Call Acceptance (PCA)

PCA is invoked before AH. That is, calls arriving to a subscriber with AH and PCA active, the call is screened by PCA first. If PCA accepts the call, an attempt is made to deliver or terminate the call to the called subscriber. The called subscriber may then invoke AH.

Preferred Language (PL)

None identified.

Answer Hold (AH)

Priority Access and Channel Assignment (PACA)

PACA affects AH. A call to a subscriber waiting for a PACA channel is considered to be busy, if both CFB and AH are active, the call shall be given CFB treatment.

Remote Feature Control (RFC)

None identified.

Selective Call Acceptance (SCA)

SCA is invoked before AH. That is, calls arriving to a subscriber with AH and SCA active, the call is screened by SCA first. If SCA accepts the call, an attempt is made to deliver or terminate the call to the called subscriber. The called subscriber may then invoke AH.

Subscriber PIN Access (SPINA)

None identified.

Subscriber PIN Intercept (SPINI)

None identified.

Three-Way Calling (3WC)

None identified.

User Selective Call Forwarding (USCF) (Future)¹

For further study.

Voice Message Retrieval (VMR)

None identified.

Voice Privacy (VP)

None identified.

¹ User Selective Call Forwarding is not a feature currently defined. This description is retained to describe an intent of feature interaction.

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

3.1 **DEFINITIONS**

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

none identified.

4 **SYMBOLS AND ABBREVIATIONS**

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

AH	Answer Hold
CDMA_FEATIND	CDMA_FeatureIndicator parameter

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5. TIA/EIA Chapter -41-D3 “Automatic Roaming Information Flows” Modifications

Answer Hold

This section illustrates some typical scenarios related to Answer Hold (AH) operations.

6.x Answer Hold

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

6.x.1 AH Invocation on Call Delivery to an Idle MS

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

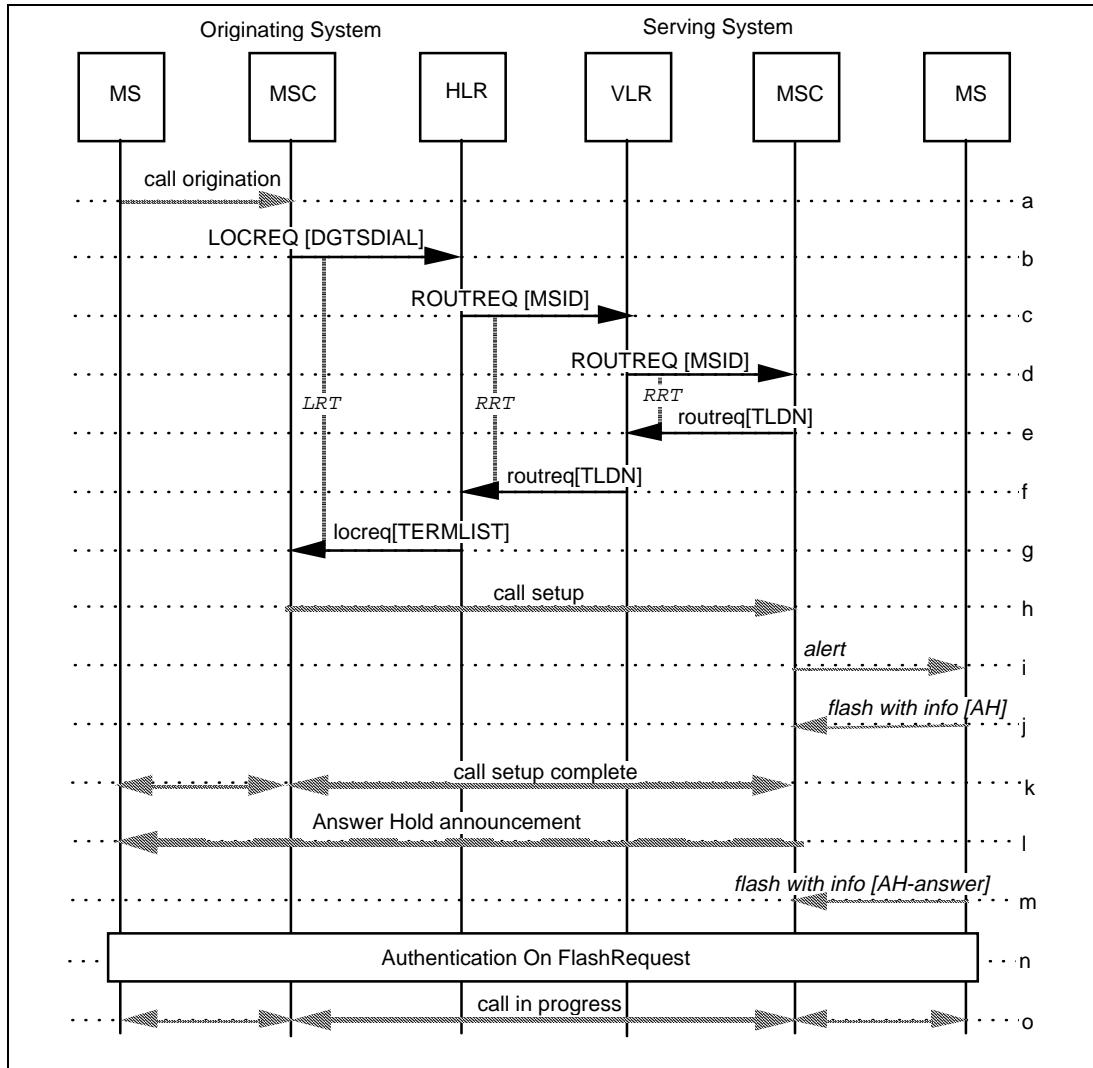


Figure 6.x.1 AH Invocation on Call Delivery

AH V&V Text Rev-0.8

- a. The MS sends an originating message to the MSC.
- b. The MSC sends a **LOCREQ** to the HLR.
- c. The HLR determines the current Serving MSC for the called party MS and sends a **ROUTREQ** to the VLR of the Serving System.
- d. The VLR of the Serving System sends the **ROUTREQ** to the Serving MSC.
- e. The Serving MSC assigns a TLDN and returns the TLDN as the destination digits in the **roureq** to the VLR.
- f. The VLR returns the **roureq** to the HLR.
- g. The HLR returns the destination digits to the Originating MSC in the **locreq**.
- h. The Originating MSC establishes a voice path to the Serving MSC using TLDN in the **locreq**.
- i. The Serving MSC sends alert message to the terminating MS.
- j. The called subscriber answers the call using an MS specific AH procedure. A *flash with info* (Answer Hold) message is received by the Serving MSC.
- k. The Serving MSC responds to the call setup message.
- l. The Serving MSC sends the announcement to the Originating MS.
- m. The called subscriber answers the call in the AH state using an MS specific AH procedure. A *flash with info* (Answer Hold answer) resuming call hold message is received by the Serving MSC.
- n. The Serving MSC initiates and successfully completes the Authentication on FlashRequest process, see scenario 5.4.5.
- o. The call is connected.

6.x.2 AH Invocation After Handoff

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

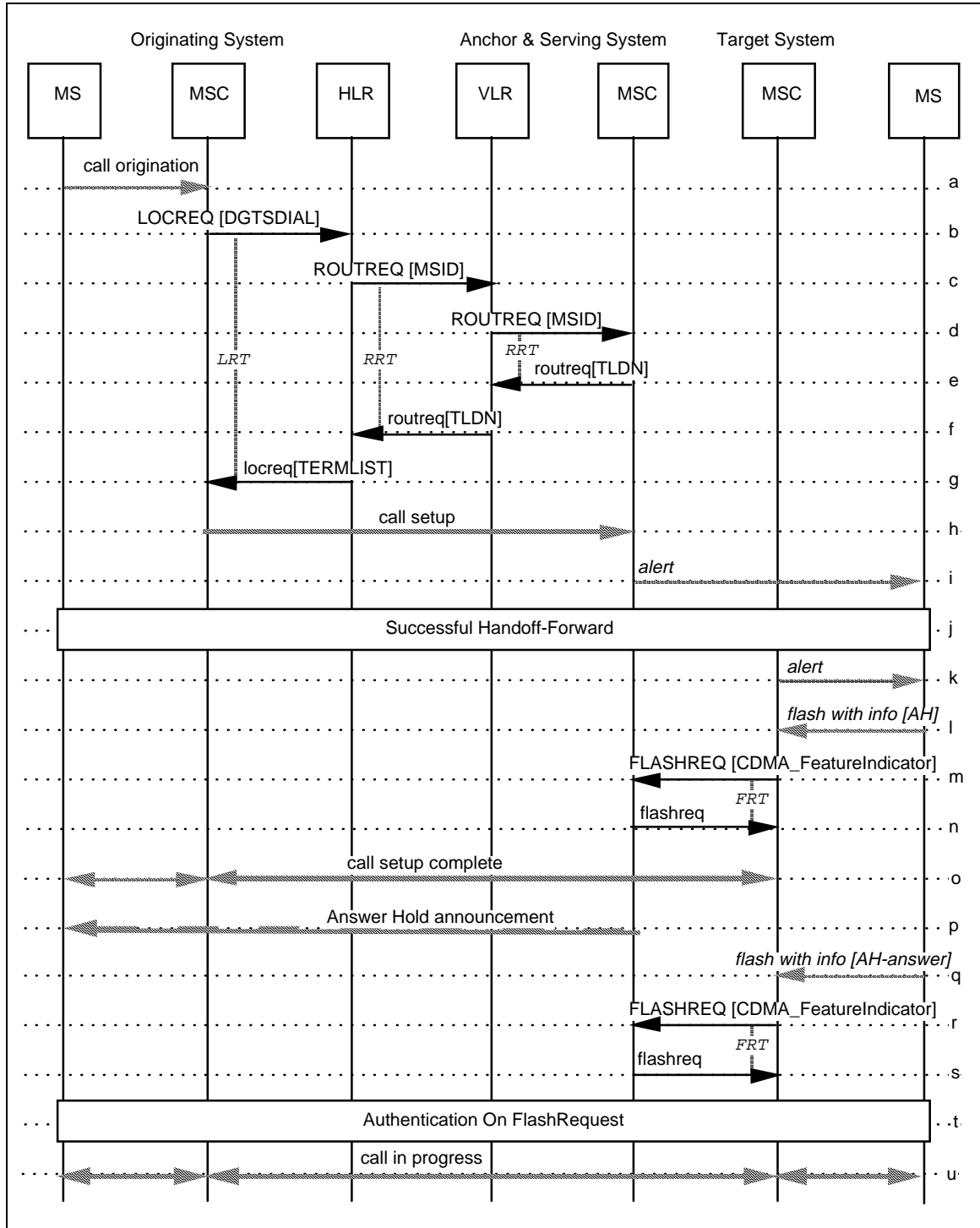


Figure 6.x.2 AH Invocation After Handoff

a~i. Same as 6.X.1, steps a~i.

AH V&V Text Rev-0.8

- j. The Serving MSC elects, based on its internal algorithm, to initiate and in this case successfully completes a handoff forward; see Chapter 2, Section 5.1 Successful Handoff-Forward.
- k. Following handoff the Target (now serving) MSC continues alerting the MS.
- l. The called subscriber answers the call using an MS specific AH procedure. A *flash with info* (Answer Hold) message is received by the Target (now serving) MSC.
- m. The Target (now serving) MSC sends the **FLASHREQ** to inform the Anchor MSC that the called subscriber has initiated the Answer Hold feature.
- n. The Anchor MSC returns a **flashreq**.
- o. The Anchor MSC responds to the call setup message.
- p. The Anchor MSC sends the Answer Hold activation announcement to the calling party.
- q. The called subscriber answers the call in the AH state using an MS specific AH procedure.
- r. The Target (now serving) MSC sends an **FLASHREQ** to inform the Anchor MSC that the called subscriber has initiated the Answer Hold feature.
- s. The Anchor MSC, on receipt of the **FLASHREQ**, returns an **flashreq** to the Target (now serving) MSC. Optionally a call timer may be started for call detail record purposes.
- u. The Anchor MSC initiates and successfully completes the Authentication on FlashRequest process, see scenario 5.4.5.
- v. The call is connected.

6.x.3 AH Invocation Before Handoff

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

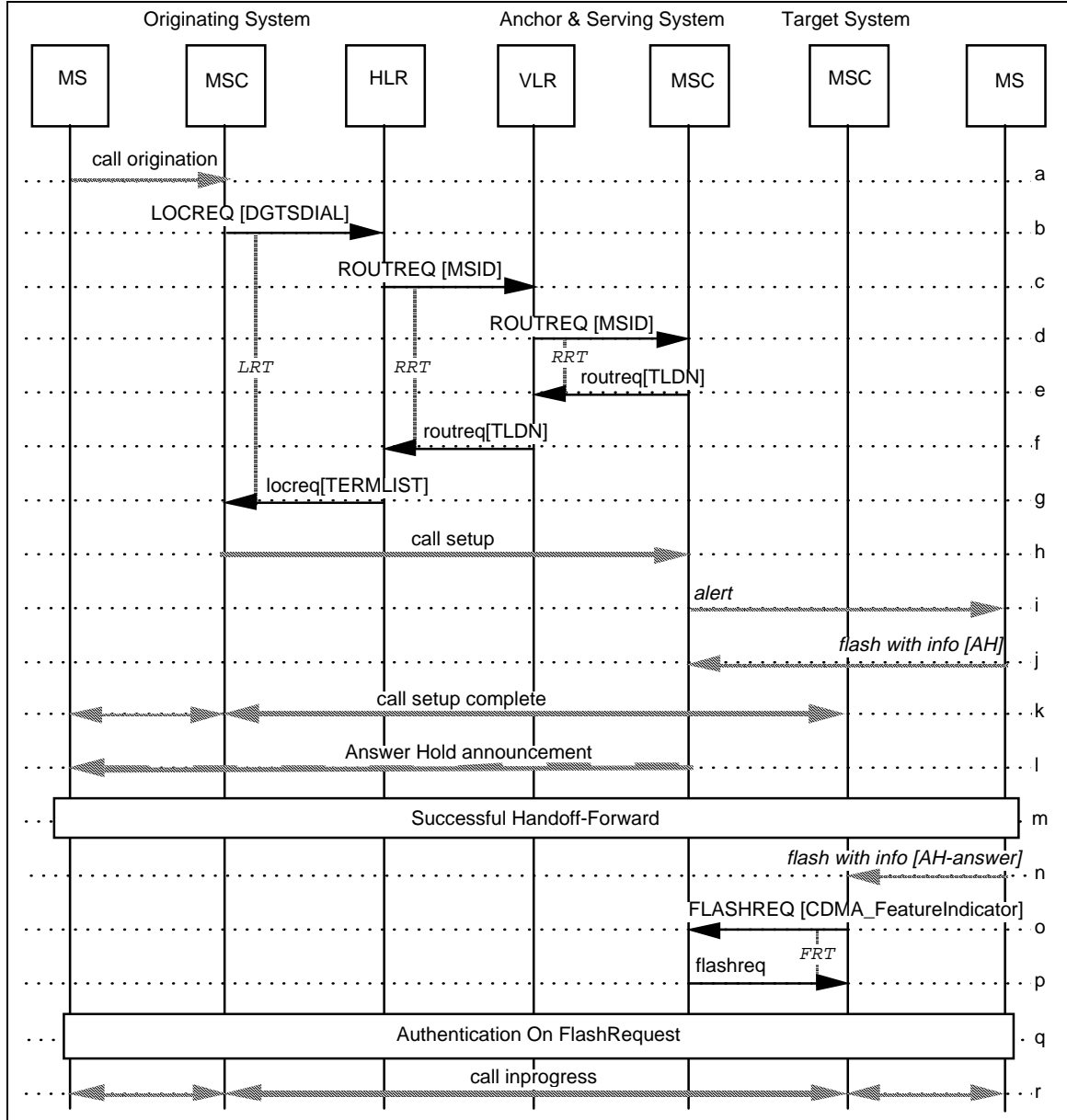


Figure 6.x.3 AH Invocation Before Handoff

- a~l. Same as 6.X.1, steps a~l.
- n. The Serving MSC elects, based on its internal algorithm, to initiate and in this case successfully completes a handoff forward; see Chapter 2, Section 5.1 Successful Handoff-Forward.
- o~r. Same as 6.X.2, steps q~u.

AH V&V Text Rev-0.8

6. TIA/EIA-41-D Chapter 5 “Signaling Protocol” Modifications

6.4.2.14 FlashRequest

(TIA/EIA-41-D Chapter 5, page 5-52)

The FlashRequest operation is used to forward a flash received from an MS engaged in a call toward the Anchor MSC (possibly via one or more Tandem MSCs).

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

Table 37 FlashRequest INVOKE Parameters

FlashRequest INVOKE Parameters				Timer: FRT
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.3.2.1	
Length	variable octets	M	6.3.2.1	
Contents				
Digits (Dialed)		M	6.5.2.58	a
InterMSCCircuitID		M	6.5.2.72	
MobileIdentificationNumber		M	6.5.2.81	
ConfidentialityModes (Actual)		O	6.5.2.50	b
ElectronicSerialNumber		O	6.5.2.63	
CDMA FeatureIndicator		O	6.5.2.xx	c

Notes:

- a. The Digits parameter is sent non-encrypted.
- b. Include if the SignalingMessageEncryptionKey parameter was provided to the Serving MSC.
- c. Include if the FEATURE field was received from the MS.

The remainder of this section is retained without modification.

6.5 MAP PARAMETERS

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

6.5.1.2 Parameter Identifiers

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

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

The omitted portion of this section is retained without modification.

AH V&V Text Rev-0.8

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Table 112 IS-41 MAP Parameter Identifiers (concluded)

Parameter Identifier Name	Parameter Identifier Code								Reference
	H	G	F	E	D	C	B	A	
...
PilotBillingID	1	0	0	1	1	1	1	1	6.5.2.94
	1	0	0	0	0	0	1	0	
	0	0	1	0	1	0	0	1	
...
CDMA_FeatureIndicator	1	0	0	1	1	1	1	1	6.5.2.xx
	1	0	0	0	0	0	1	0	
	0	x	x	x	x	x	x	x	
...

6.5.2 Parameter Definitions

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

6.5.2.20 CallingFeaturesIndicator

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

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

The minimum length of this parameter is 2 octets.

Field	Value	Type	Reference	Notes					
Identifier	CallingFeaturesIndicator IMPLICIT OCTET STRING	M	6.5.1.2						
Length	variable octets	M	6.5.1.1						
Contents									
H	G	F	E	D	C	B	A	octet	Notes
CW-FA		CFNA-FA		CFB-FA		CFU-FA		1	a
CT-FA		VP-FA		CD-FA		3WC-FA		2	a
CNIROver-FA		CNIR-FA		CNIP2-FA		CNIP1-FA		3	a
<u>Reserved</u> <u>PN-4551 USCE</u>		<u>AH-FA</u>		<u>DP-FA</u> <u>(IS-737)</u>		PCW-FA		4	a, b
...								n	c

Figure 27 CallingFeaturesIndicator parameter

Notes:

- a. CFU-FA, CFB-FA, etc., denotes the FeatureActivity status for the designated feature, where the FeatureActivity encoding is defined in Table 125.
 - **CFU-FA** = Call Forwarding–Unconditional: FeatureActivity.
 - **CFB-FA** = Call Forwarding–Busy: FeatureActivity.

- **CFNA-FA** = Call Forwarding–No Answer: FeatureActivity.
 - **CW-FA** = Call Waiting: FeatureActivity.
 - **3WC-FA** = Three-Way Calling: FeatureActivity.
 - **CD-FA** = Call Delivery: FeatureActivity (not interpreted on reception by *IS-41-C* or later).
 - **VP-FA** = Voice Privacy: FeatureActivity.
 - **CT-FA** = Call Transfer: FeatureActivity.
 - **CNIP1-FA** = One number (network-provided only) Calling Number Identification Presentation: FeatureActivity. CNIP2-FA takes precedence over CNIP1-FA.
 - **CNIP2-FA** = Two number (network-provided and user-provided) Calling Number Identification Presentation: FeatureActivity. CNIP2-FA takes precedence over CNIP1-FA.
 - **CNIR-FA** = Calling Number Identification Restriction: FeatureActivity. An *Authorized and Activated* value for CNIR-FA indicates that Calling Number Identification Presentation is restricted.
 - **CNIROver-FA** = Calling Number Identification Restriction Override: FeatureActivity. An *Authorized and activated* value for CNIROver indicates that Calling Number Identification Restriction is overridden.
 - **PCW-FA** = Priority Call Waiting: FeatureActivity.
 - **DP-FA** = Data Privacy: FeatureActivity. (Note: part of *IS-737*.)
 - **AH-FA** = Answer Hold: FeatureActivity.
 - **USCF-FA** = User Selective Call Forwarding: FeatureActivity (*PN-4551*).
- b. Reserved bits shall be ignored on receipt and set to zero on sending.
- c. Ignore extra octets, if received. Send only defined (or significant) octets.

Table 125 CallingFeaturesIndicator value

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

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6.5.2.xx CDMA_FeatureIndicator

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

The CDMA_FeatureIndicator (CDMA_FEATIND) parameter transports the contents of the CDMA FEATURE field (e.g., AH, USCF type).

Field	Value	Type	Reference	Notes					
Identifier	CDMA_FeatureIndicator IMPLICIT OCTET STRING	M	6.5.1.2						
Length	1 octet	M	6.5.1.1						
Contents									
H	G	F	E	D	C	B	A	octet	Notes
Feature Indicator								1	a, b

Figure 6.5.2.xx CDMA_FeatureIndicator parameter

Notes:

- a. See *CDMA* for the definition of this field.
- b. Reserved bits shall be ignored on receipt and set to zero on sending.

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6.2 TIA/EIA-124-B Chapter 6 “Stage 3 Description: Implementation Perspective” Modifications

(TIA/EIA-124B, page 123)

6.4.88 FeatureIndicator

(TIA/EIA-124C, page 251)

The FeatureIndicator (FEATIND) defines the particular feature accessed by a feature code or a remote feature operation. These features are in accordance with ANSI/TIA/EIA-664, except as noted.

Table 109: FeatureIndicator

Field	Value	Type	Reference	Notes
Identifier	FeatureIndicator IMPLICIT	M	6.1.3.5	a
Length	usually 1 octet	M	6.1.3.6	
ENUMERATED		M	6.5.4	b
Value Identifier	Value	Value Meaning		
unspecified	0	The type of feature is not defined by this standard.		
...		
callForwarding-Other ^a	4	call forwarding other		
callWaiting ^f	5	call waiting		
threeWayCalling ^f	6	three way calling		
callDelivery	7	call delivery		
...		
speedDialing ^e	14	speed dialing		
adviceOfCharging ^f	15	advice of charging		
voiceMail ^f	16	voice mail		
voiceMailDeposit ^f	17	voice mail deposit		
...		
voiceMailSend	36	voice mail send		
answerHold ^b	37	answer hold.		
reserved (userSelectiveCall Forwarding ^b)	38	user selective call forwarding (See PN-4551)		
...		
----	negative values	reserved for bilateral agreements.		
----	other positive values	reserved.		

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- a. Not an *ANSI-664* feature, individual implementations may vary.
- b. These values are applicable for PN-4287 Pre-paid charging.
- c. Not an *ANSI-664* feature. Do not disturb is assumed to block all call delivery and call termination attempts. Voice mail may apply.
- d. Not an *ANSI-664* feature. This feature is assumed to temporarily increase the normal privileges of a mobile subscriber.
- e. Not an *ANSI-664* feature, individual implementations may vary. This is also known as abbreviated dialing, or speed calling.
- f. Not an *ANSI-664* feature, individual implementations may vary.

Notes:

- a. If this parameter is omitted, then a value 0, "unspecified," is assumed.
- b. Treat reserved values as value 0, "unspecified".

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

3.2.2 In Call MS Flash Attempt

(TIA/EIA-41-D Chapter 6, page 6-14)

If the Anchor MSC receives a flash request initiated by an MS engaged in a call, the Anchor MSC shall:

~~When the MS attempts to signal during a call by pressing the **SEND** key, the Anchor MSC shall:~~

- 1 IF it is required to authenticate flash requests (e.g., signaling encryption is not supported):
 - 1-1 Include the SystemAccessType parameter set to *Flash request*.
 - 1-2 Execute the “MSC Initiating an Authentication Request” task (see 4.4.1).
 - 1-3 IF authentication fails:
 - 1-3-1 Execute “Local Recovery Procedures” task (see 3.5.1).
 - 1-3-2 Exit this task.
 - 1-4 ENDIF.
- 2 ENDIF.
- 3 IF *FlashPrivileges* are allowed by the OneTimeFeatureIndicator parameter:
 - 3-a IF AnswerHold is authorized and active:
 - 3-a-1 IF the flash request carries a request to apply AH to an incoming call:
 - 3-a-1-1 Remove the ring-back tone.
 - 3-a-1-2 Play the AnswerHold announcement to the calling party.
 - 3-a-1-3 Put the calling party on hold, maintaining the connection to the current party.
 - 3-a-1-4 Exit this task.
 - 3-a-2 ELSEIF the flash request carries a request to retrieve a party held by AH:
 - 3-a-2-1 IF another party is currently connected:
 - 3-a-2-1-1 Put the current party on hold.
 - 3-a-2-1-2 Connect the AH held party to the MS.
 - 3-a-2-1-3 Optionally apply warning tone toward the MS.
 - 3-a-2-1-4 Exit this task.
 - 3-a-2-2 ELSE (no other party is connected):
 - 3-a-2-2-1 Connect the AH held party to the MS.
 - 3-a-2-2-2 Exit this task.
 - 3-a-2-3 ENDIF.
 - 3-a-3 ENDIF.
 - 3-b ENDIF.

- 1 3-1 IF CW has been invoked:
2
3 3-1-1 Put the current party on hold.
4 3-1-2 Connect the held party.
5 3-1-3 Optionally apply warning tone.
6 3-1-4 Exit this task.
7
8 3-2 ELSEIF a call is waiting for CW treatment:
9
10 3-2-1 Put the current party on hold.
11 3-2-2 Connect the waiting party.
12 3-2-3 Optionally apply warning tone.
13 3-2-4 Exit this task.
14
15 3-3 ELSEIF 3WC has been invoked:
16
17 3-3-1 Add the held party to the current connection.
18 3-3-2 Optionally apply warning tone.
19 3-3-3 Exit this task.
20
21 3-4 ELSEIF CT has been invoked:
22
23 3-4-1 Drop the current party.
24 3-4-2 Connect the held party.
25 3-4-3 Optionally apply warning tone.
26 3-4-4 Exit this task.
27
28 3-5 ELSEIF a party is on hold:
29
30 3-5-1 Connect the held party,
31 3-5-2 Optionally apply warning tone.
32 3-5-3 Exit this task.
33
34 3-6 ELSE:
35
36 3-6-1 Put the current call on hold.
37 3-6-2 IF there are no digits included with the flash request:
38 3-6-2-1 (Wait around for the subscriber to enter digits or execute internal
39 algorithms.)
40 3-6-3 ENDIF.
41 3-6-4 Execute the "MSC Analyze MS Dialed Number" task to set the Point
42 Of Return (see 3.2.3).
43
44 3-7 ENDIF.
45
46 4 ENDIF.
47
48 5 Exit this task.
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3.3.5 MS Termination Alerting

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

Upon request, the MSC shall perform the following:

- 1 IF the indicated MS is *idle*:
- 1-1 IF a channel has not been allocated for the MS (i.e., the MS has not been paged):
 - 1-1-1 IF an appropriate *idle* voice or traffic channel is available for the identified air interface control channel:
 - 1-1-1-1 Reserve the available voice or traffic channel.
 - 1-1-1-2 Execute the “Page an MS Procedure” task (see 3.3.3).
 - 1-1-1-3 IF the paging was locally successful:
 - 1-1-1-3-1 GOTO Await Answer.
 - 1-1-1-4 ELSEIF the paging was successful on another system:
 - 1-1-1-4-1 Execute the “MSC Initiation of an Intersystem Setup” task (see 4.27.1).
 - 1-1-1-4-2 GOTO Await Answer.
 - 1-1-1-5 ELSE (the paging was unsuccessful):
 - 1-1-1-5-1 IF the MS has activated Call Forwarding—No Answer in the CallingFeaturesIndicator or has the *No Page Response* TerminatingTrigger active:
 - 1-1-1-5-1-1 Include the RedirectionReason parameter set to *No Page Response*.
 - 1-1-1-5-1-2 IF this call has requested the *None Reachable* termination trigger AND IF this is the last leg AND IF a GroupInformation parameter was received:
 - 1-1-1-5-1-2-1 Include the GroupInformation parameter.
 - 1-1-1-5-1-3 ELSEIF the LegInformation parameter was received:
 - 1-1-1-5-1-3-1 Include the LegInformation parameter.
 - 1-1-1-5-1-4 ENDIF.
 - 1-1-1-5-1-5 IF the MSC is the Originating MSC:
 - 1-1-1-5-1-5-1 Execute the “MSC Initiating a Transfer-To-Number Request” task (see 4.49.1).
 - 1-1-1-5-1-6 ELSEIF the Originating MSC is provisioned for call redirection:
 - 1-1-1-5-1-6-1 Execute the “MSC Initiating a Redirection Request” task (see 4.36.1).
 - 1-1-1-5-1-7 ELSE:
 - 1-1-1-5-1-7-1 Execute the “MSC Initiating a Transfer-To-Number Request” task (see 4.49.1).
 - 1-1-1-5-1-8 ENDIF.
 - 1-1-1-5-2 ELSE:
 - 1-1-1-5-2-1 Execute the “Apply Access Denial Treatment” task (see 3.4.5).

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1 1-1-1-5-2-2 Exit this task.
2 1-1-1-5-3 ENDIF.
3 1-1-1-6 ENDIF.
4 1-1-2 ENDIF.
5 1-2 ENDIF.
6 1-3 IF the RoutingDigits parameter is received:
7 1-3-1 Analyze the routing digits to select an internal trunk group (such as, a
8 service monitor, scrambling device).
9 1-3-2 Execute the “MSC CNIP Terminating Call Invocation” task (see 5.8.4).
10 1-4 ENDIF.
11 1-5 IF the MobileDirectoryNumber parameter is received:
12 1-5-1 Include the MobileDirectoryNumber parameter as the Called Number
13 in the MS alerting command.
14 1-6 ELSE:
15 1-6-1 Include the MobileIdentificationNumber parameter as the Called
16 Number in the MS alerting command.
17 1-7 ENDIF.
18 1-8 IF the AlertCode parameter received:
19 1-8-1 Include the AlertCode parameter in the MS alerting command to
20 control the pitch and cadence of the alerting.
21 1-9 ELSE:
22 1-9-1 Include the system default AlertCode parameter in the MS alerting
23 command to control the pitch and cadence of the alerting.
24 1-10 ENDIF.
25 1-11 Order the MS to alert.
26 **Await Answer** (get here for normal and CW alerting, alerting has been applied, no
27 timers have been started):
28 1-12 IF the TerminationTriggers is received:
29 1-12-1 Store the TerminationTriggers parameter for this leg.
30 1-12-2 IF the *NoAnswer* trigger is requested in the TerminationTriggers
31 parameter OR IF the MS has Call Forwarding—No Answer activated
32 in the CallingFeaturesIndicator parameter:
33 1-12-2-1 IF the NoAnswerTime parameter is received:
34 1-12-2-1-1 Start a no answer timer with the value in the received
35 NoAnswerTime parameter.
36 1-12-2-2 ELSE:
37 1-12-2-2-1 Start a no answer timer with a system default value.
38 1-12-2-3 ENDIF.
39 1-12-3 ENDIF.
40 1-13 ENDIF.
41 1-14 IF the LegInformation parameter is received:
42 1-14-1 Store the LegInformation to control subsequent redirections.
43 1-15 ENDIF.
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- 1-16 Start the alerting timer. 1
- 1-17 Apply ring back tone to the waiting call. 2
- 1-18 WAIT for the MS to answer: 3
- 1-19 WHEN the MS answers: 4
- 1-19-1 Remove the ring back tone. 5
- 1-19-w IF the MS was in a call state other than idle prior to alerting (e.g., CW or AH invoked): 6
- 1-19-w-1 Execute the "In Call MS Flash Attempt" task (see 3.2.2). 7
- 1-19-x ELSEIF AH is authorized and active AND IF AH is invoked by the MS when it answers: 8
- 1-19-x-1 Play the Answer Hold announcement to the calling party. 9
- 1-19-x-2 Put the calling party on hold. 10
- 1-19-y ELSE: 11
- 1-19-y-1 Connect the MS to the incoming call. 12
- 1-19-z ENDIF. 13
- ~~1-19-2 Connect the MS to the waiting call.~~ 14
- 1-19-2-1 Set the Call Waiting for the existing call field in the OneTimeFeatureIndicator 15
- 1-19-3-1 Set the Call Waiting for the existing call field in the OneTimeFeatureIndicator parameter equal to the OneTimeFeatureIndicator Call Waiting For Future Incoming Calls field. 16
- 1-19-4 ELSE (the OneTimeFeatureIndicator parameter was not received or the Call Waiting for Future Incoming Calls field is set to Ignore): 17
- 1-19-4-1 IF Call Waiting is *active* in the CallingFeaturesIndicator: 18
- 1-19-4-1-1 Set the Call Waiting for future incoming calls field in the OneTimeFeatureIndicator parameter set to *Normal CW*. 19
- 1-19-4-2 ELSEIF Priority Call Waiting is *active* in the CallingFeaturesIndicator: 20
- 1-19-4-2-1 Set the Priority Call Waiting for future incoming calls field in the OneTimeFeatureIndicator parameter set to *Priority CW*. 21
- 1-19-4-3 ELSE: 22
- 1-19-4-3-1 Set the *Call Waiting for future incoming calls* field in the OneTimeFeatureIndicator parameter set to *No CW*. 23
- 1-19-4-4 ENDIF. 24
- 1-19-5 ENDIF: 25
- 1-20 WHEN the alerting timer expires: 26
- 1-20-1 Remove the ring back tone. 27
- 1-20-2 Connect the calling party to an announcement or tone to indicate that the called party is not answering. 28
- 1-21 WHEN the no answer timer expires: 29
- 1-21-1 Include the RedirectionReason parameter set to *No Answer*. 30

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1 1-21-2 IF this call has requested the *None Reachable (NR)* termination trigger
 2 AND IF this is the last leg AND IF a GroupInformation parameter was
 3 received:
 4
 5 1-21-2-1 Include the GroupInformation parameter.
 6 1-21-3 ELSEIF the LegInformation parameter was received:
 7 1-21-3-1 Include the LegInformation parameter.
 8 1-21-4 ENDIF.
 9 1-21-5 IF the MSC is the Originating MSC:
 10 1-21-5-1 Execute the “MSC Initiating a Transfer-To-Number Request” task
 11 (see 4.49.1).
 12 1-21-6 ELSEIF the Originating MSC is provisioned for call redirection:
 13 1-21-6-1 Execute the “MSC Initiating a Redirection Request” task (see
 14 4.36.1).
 15 1-21-7 ELSE:
 16 1-21-7-1 Execute the “MSC Initiating a Transfer-To-Number Request” task
 17 (see 4.49.1).
 18 1-21-8 ENDIF.
 19 1-22 ENDWAIT.
 20 2 ELSE (the indicated MS is busy):
 21 2-1 IF Call Waiting is invoked (there is another call pending¹) OR IF the MS is
 22 otherwise unable to accept a call (e.g., the MS has invoked Priority Access
 23 and Channel Assignment, Call Transfer, Conference Calling, Three-Way
 24 Calling or the MS is not in a state where it can apply Call Waiting.):
 25 2-1-1 GOTO Busy MS Detected.
 26 2-2 ELSE (the MS may accept CW):
 27 2-2-1 IF the RoutingDigits parameter is received:
 28 2-2-1-1 Analyze the Routing digits to select an internal trunk group (such
 29 as, a service monitor, scrambling device).
 30 2-2-2 ENDIF.
 31 2-2-3 IF the MobileDirectoryNumber parameter is received:
 32 2-2-3-1 Include the MobileDirectoryNumber parameter as the Called
 33 Number in the MS alerting command.
 34 2-2-4 ELSE:
 35 2-2-4-1 Include the MobileIdentificationNumber parameter as the Called
 36 Number in the MS alerting command.
 37 2-2-5 ENDIF.
 38 2-2-6 Execute the “MSC CW Terminating Call Invocation” task (see 5.7.4).
 39 2-2-7 IF Call Waiting is *accepted*:

54 ¹MS busy or call pending can be defined as either a) actual calls in the MSC or b) a
 55 combination of actual calls in the MSC or TLDNs assigned. Choice b) uses less of
 56 the call redirection procedures and thereby routes calls faster. Choice a) handles
 57 abandoned calls more properly.
 58
 59
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2-2-7-1 GOTO Await Answer.

2-2-8 ELSE (Call Waiting was not accepted, the MS is busy):

Busy MS Detected:

2-2-8-1 IF the MS has activated Call Forwarding—Busy or has the Busy TerminationTriggers set to *Launch a RedirectionRequest* or *TransferToNumberRequest*:

2-2-8-1-1 Include the RedirectionReason parameter set to *Busy*.

2-2-8-1-2 IF this call has requested the *None Reachable* termination trigger AND IF this is the last leg AND IF a GroupInformation parameter was received:

2-2-8-1-2-1 Include the GroupInformation parameter.

2-2-8-1-3 ELSEIF the LegInformation parameter was received:

2-2-8-1-3-1 Include the LegInformation parameter.

2-2-8-1-4 ENDIF.

2-2-8-1-5 IF the call arrived via Call Delivery:

2-2-8-1-5-1 IF the Originating MSC is provisioned for call redirection:

2-2-8-1-5-1-1 Execute the “MSC Initiating a Redirection Request” task (see 4.36.1).

2-2-8-1-5-2 ELSE:

2-2-8-1-5-2-1 Execute the “MSC Initiating a Transfer-To-Number Request” task (see 4.49.1).

2-2-8-1-5-3 ENDIF.

2-2-8-1-6 ELSE (call did not arrive via Call Delivery):

2-2-8-1-6-1 Execute the “MSC Initiating a Transfer-To-Number Request” task (see 4.49.1).

2-2-8-1-7 ENDIF.

2-2-8-2 ELSE (busy triggers do not apply):

2-2-8-2-1 Apply busy treatment to the waiting call (e.g., apply busy tone).

2-2-8-3 ENDIF.

2-2-9 ENDIF.

2-3 ENDIF.

3 ENDIF.

4 Return to the calling task.

4.15 FLASH REQUEST

(TIA/EIA-41-D Chapter 6, page 6-138)

The Flash Request operation is used to convey user initiated signaling depressions of the SEND key from the Serving MSC to the Anchor MSC to effect call features.

Any digits entered by the MS user that are associated with the signaling SEND key depression, will be included in the message to the Anchor MSC.

4.15.1 Serving MSC Initiating a Flash Request

(TIA/EIA-41-D Chapter 6, page 6-138)

When the Serving MSC receives a flash from an MS engaged in a voice call alerting it shall perform the following:

- 1 Include the InterMSCCircuitID parameter set to the trunk for this call.
- 2 Include the MobileIdentificationNumber parameter set to the requesting MS's MIN.
- 3 Include the ElectronicSerialNumber parameter set to the requesting MS's ESN.
- 4 Include the Digits (Dialed) parameter set to the digits (non-encrypted) received from the MS.

X IF the Feature field was provided by the MS:

~~X~~ IF the CDMA_FeatureIndicator (CDMA_FEATIND) parameter was provided for the MS:

X-1 Include the CDMA_FeatureIndicator (CDMA_FEATIND) parameter set to value received from the MS in the FEATURE field.

Y ENDIF.

5 IF the SignalingMessageEncryptionKey (SMEKEY) parameter was provided for the MS:

5-1 Include the ConfidentialityModes (CMODES-actual) parameter set to the current Signaling Message Encryption mode and Voice Privacy mode of the requesting MS.

6 ENDIF.

7 Send a FlashRequest INVOKE toward the Anchor MSC for this call.

8 Start the Flash Request Timer (FRT).

9 WAIT for a Flash Request response.

10 WHEN a RETURN RESULT is received:

10-1 Stop timer (FRT).

10-2 Exit this task.

11 WHEN a RETURN ERROR or REJECT is received:

11-1 Stop timer (FRT).

11-2 Execute the "Local Recovery Procedures" task (see 3.5.1).

11-3 Exit this task.

12 WHEN the timer (FRT) expires:

12-1 Execute the "Local Recovery Procedures" task (see 3.5.1).

13 ENDWAIT.

14 Exit this task.

5.x ANSWER HOLD (AH)

5.x.1 MSC AH Terminating Call Invocation

(TIA/EIA-41-D Chapter 6, page 6-308)

Answer Hold is controlled by the call processing in the Anchor MSC in a manner consistent with this recommendation, see 3.3.5.

5.x.2 MSC Answer Hold Processing for Flash Request

(TIA/EIA-41-D Chapter 6, page 6-308)

Answer Hold is controlled by the call processing in the Anchor MSC in a manner consistent with this recommendation, see 3.2.2.

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