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3RD GENERATION  
PARTNERSHIP  
PROJECT 2  
"3GPP2"

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## ***User Selective Call Forwarding (Stage 1)***

***Revision: 0***

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## Revision History

<b>Revision</b>		<b>Date</b>
Rev. 0	Initial Publication	December 1999

### **Note**

This specification is extracted from TIA TR45.2 PN-4551 Rev. 7, November 1999.

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## FOREWORD

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This Interim Standard contains recommendations for supporting the wireless subscriber feature “User Selective Call Forwarding (USCF)”.

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

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

- USCF shall permit authorized subscribers to redirect incoming calls to:
  - the subscriber’s network based voice mail box.
  - a network registered USCF DN.
  - one of a selection of termination addresses which are stored in the mobile station.
- USCF shall permit authorized subscribers to identify the redirection destination of incoming calls, independent of authorization for other call forwarding features (e.g., Call Forwarding Default [CFD], Call Forwarding Busy [CFB] and Call forwarding No Answer [CFNA]).
- USCF shall not permit identifying special access numbers as the redirection destination for incoming calls (e.g., Emergency Services [e.g., 9-1-1], Operator Services [e.g., 0+], Service Codes [e.g., N-1-1], or to the subscriber’s MDN).
- The network registered USCF DN shall be used when a subscriber invokes USCF without specifying a USCF destination.
- USCF subscriber identified destinations (e.g., subscriber identified mobile station stored numbers) have precedence over the network stored USCF destination.
- USCF subscribers authorized for Variable Registration shall input network registered USCF DN via feature code (e.g., \*FC + # + termination address + SEND ). A second or subsequent registration shall overwrite the previous network registered USCF DN.
- “Alternate destination DNs” received over the radio link may need to be considered MS originations; thus accompanied with full origination authentication procedures (e.g., [AUTHR, RANDC, COUNT] for global challenge [AUTH=1] or unique challenge [AUTH=0]) or provided a unique challenge.

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# 1. INTRODUCTION

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## 1.1 OBJECTIVE

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This Interim Standard (IS) presents Stage-1 (new chapter *TIA/EIA-664-B*), 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 User Selective Call Forwarding (USCF) feature use in the Wireless Radiotelephone Service.

## 1.2 SCOPE

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This document specifies the wireless intersystem network operation enhancements required for supporting roaming subscribers with the User Selective Call Forwarding (USCF) feature.

## 1.3 ORGANIZATION

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

# 2. REFERENCES

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## 2.1 NORMATIVE REFERENCES

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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

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TTC:

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

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This section provides the Stage-1 feature description for User Selective Call Forwarding (USCF) according to the structure of *TIA/EIA-664*.

#### 3.1 **DEFINITIONS**

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

##### **USER SELECTIVE CALL FORWARDING (USCF)**

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See User Selective Call Forwarding.

#### X.1 **USER SELECTIVE CALL FORWARDING (USCF)**

---

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

User Selective Call Forwarding (USCF) provides a called subscriber the capability to selectively redirect incoming calls, in the alerting or Call Waiting state, to an alternate destination (e.g., to a voice mail system, to a network registered USCF DN, or to a DN stored in the Mobile Station (MS)). USCF alternate destination DNs received over the radio link have precedence over USCF pre-registered network stored DNs.

USCF called subscribers also authorized for calling party information presentation features (e.g., Calling Number Identification Presentation [CNIP], Calling Name Presentation [CNAP], etc.) may redirect incoming calls to different DNs based on the received calling party's identity.

USCF subscribers are capable of redirecting incoming calls to an alternate destination DN independent of their authorization status for other redirection features (e.g., Call Forwarding Busy (CFB), Call Forwarding Default (CFD), Call Forwarding No Answer (CFNA), etc.).

##### **APPLICABILITY TO TELECOMMUNICATIONS SERVICES**

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USCF is applicable to voice telecommunications services.

#### X.1.1 **NORMAL PROCEDURES WITH SUCCESSFUL OUTCOME**

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##### **AUTHORIZATION**

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USCF may be generally available or may be provided after pre-arrangement with the service provider. The authorization may have the following subscription options:

**Table 1.1a USCf Subscription Options**

Subscription Options	Values
Registration	Network Variable. Subscribers are authorized to register their network stored USCf DN.
	Network Fixed. Forward-to a network registered USCf DN determined upon authorization.
	MS Variable. Subscribers are authorized to register their MS stored DNs.
	Voice Mail. Forward to the voice mail address of the subscriber.

**DE-AUTHORIZATION**

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

**REGISTRATION**

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If the subscriber is authorized for Network Variable, an initial network registered USCf DN is registered at authorization by the subscriber. A second or subsequent Network Variable registration shall overwrite the previous network registered USCf DN. If the Network Variable registration is accepted, the system shall indicate success with feature confirmation treatment. If the Network Variable registration fails, the system may indicate failure with feature denial treatment.

If the subscriber is authorized for Network Fixed, the network registered USCf DN shall be registered upon authorization.

Storage in the MS of MS stored USCf DNs is left to MS implementation.

The voice mail address shall be registered upon authorization for USCf to voice mail subscribers.

**DE-REGISTRATION**

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USCF shall be de-registered upon de-activation by the home service provider.

**ACTIVATION**

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USCF shall be activated upon authorization.

**DE-ACTIVATION**

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USCF shall be de-activated upon de-authorization.

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**INVOCATION**

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USCF may be invoked when there is an un-answered incoming call while the USCF called subscriber is being alerted (i.e., idle MS receiving Alerting treatment).

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

**NORMAL OPERATION WITH SUCCESSFUL OUTCOME**

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The following tables describe call party actions and system reactions for USCF.

**Table 1.1b: USCF Invocation from the Alerting State**

XID	State	Alerting	Condition	
	Call Party Action		System Reaction	
1b1	The called subscriber invokes voice mail USCF using an MS specific procedure.		The calling party is redirected to the called USCF subscriber's voice mail system. Go to the Idle state.	
1b2	The called subscriber invokes Network Fixed or Network Variable USCF using an MS specific procedure.		The calling party is redirected to the network stored USCF DN. Go to the Idle state.	
1b3	The called subscriber invokes MS Variable USCF using an MS specific procedure.		The calling party is redirected to the MS stored USCF DN. Go to the Idle state.	
1b4	The calling party abandons the call.		Remove the call delivery notification from the USCF called subscriber. Go to the Idle state.	

**Table 1.1c: USCF Invocation from 2-Way Call Waiting Notification State**

	<b>State</b> 2-way call waiting notification	<b>Condition</b> The called USCF subscriber is in a two-way conversation with the other party and call waiting notification is applied.
<b>XID</b>	<b>Call Party Action</b>	<b>System Reaction</b>
1c1	The called USCF subscriber invokes USCF voice mail.	The calling party is redirected to the called USCF subscriber's voice mail system. Go to the 2-way state.
1c2	The called USCF subscriber invokes Network Fixed or Network Variable USCF.	The calling party is redirected to the network stored USCF DN. Go to the 2-way state.
1c3	The called USCF subscriber invokes MS Variable USCF.	The calling party is redirected to the MS stored USCF DN. Go to the 2-way state.
1c4	The other party disconnects.	Release the other party. Remove the call waiting notification. Apply alerting to the USCF called subscriber for the calling party. Go to the Alerting state.
1c5	The calling party abandons the call attempt.	Remove the call waiting notification from the USCF called subscriber. Go to the 2-way state.

**CALL DETAIL RECORD**

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The system should record call detail information for the following:

- a. Network based USCF registration activities and events.
- b. USCF invocation events.
- c. USCF Forward-to call leg usage (e.g., duration, number).

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

**X.1.2 EXCEPTION PROCEDURES OR UNSUCCESSFUL OUTCOME**

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**REGISTRATION**

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If the subscriber is not authorized for the request, or if the forward-to number is not acceptable, the system shall apply feature denial treatment when registration is attempted.

The system should not accept forward-to numbers to the operator (0- or 0+), service codes (N11), police, fire or similar agencies, or a revertive call.

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**DE-REGISTRATION**

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None identified.

**ACTIVATION**

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None identified.

**DE-ACTIVATION**

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None identified.

**INVOCATION**

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If the USCF redirection cannot be routed to the forwarded-to destination, then the call should be given the appropriate treatment, such as applying the Special Information Tone for intercept to the calling party.

If the USCF invocation is rejected based on lack of USCF authorization, the invoking user should be informed using service rejection indications and the mobile station ALERT state or the Call Waiting Notification state should remain until the mobile station user takes an alternate action (e.g., answer the call) or the call is otherwise disconnected.

Precautions should be taken to preclude undesirable looping of USCF forwarded numbers within the MSC or between the MSC and other switching centers. If such looping is detected, the call forwarding should be given the appropriate treatment, such as applying the Special Information Tone for intercept to the calling party.

**EXCEPTIONS WHILE ROAMING**

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None identified.

**EXCEPTIONS DURING INTERSYSTEM HANDOFF**

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None identified.

**X.1.3 ALTERNATE PROCEDURES**

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None identified.

## **X.1.4 INTERACTIONS WITH OTHER CELLULAR SERVICES**

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### **ADVICE OF CHARGE (AOC) (FUTURE)<sup>1</sup>**

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None identified.

### **ANSWER HOLDING (AH) (FUTURE)<sup>1</sup>**

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None identified.

### **CALL DELIVERY (CD)**

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CD affects USCF. That is, if CD is inactive while the subscriber is roaming, the subscriber is considered to be inaccessible. Even if the subscriber has USCF active, incoming calls shall be given the subscriber inaccessible treatment.

If CD is active and registered for a roaming subscriber, or if the subscriber is at home, USCF works normally.

### **CALL FORWARDING—BUSY (CFB)**

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CFB takes precedence over USCF. That is, calls arriving to a subscriber with USCF and CFB active, and the subscriber is busy; the call shall be diverted to the CFB forward-to number.

### **CALL FORWARDING—DEFAULT (CFD)**

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Calls arriving to a subscriber with USCF and CFD active shall be provided USCF treatment if invoked. If the called subscriber does not respond to the call delivery or the called subscriber is busy, then CFD may apply.

### **CALL FORWARDING—NO ANSWER (CFNA)**

---

USCF takes precedence over CFNA. That is, calls arriving to a subscriber with USCF and CFNA active shall be provided USCF treatment if invoked. If the called subscriber does not respond to the call delivery, then CFNA may apply.

### **CALL FORWARDING—UNCONDITIONAL (CFU)**

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CFU takes precedence over USCF. That is, calls arriving when CFU is active shall be forwarded unconditionally and USCF does not apply.

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<sup>1</sup>This feature is not currently defined. This description retained to describe an intent of feature interaction.

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**CALL TRANSFER (CT)**

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None identified.

**CALL WAITING (CW)**

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CW is invoked before USCF. That is, calls arriving to a subscriber with USCF 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 USCF.

Calls arriving to a subscriber with USCF 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), 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 USCF. That is, calls arriving to a subscriber with USCF and CNAP active, the call is delivered with CNAP first. The called subscriber may then invoke USCF.

**CALLING NAME RESTRICTION (CNAR)**

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If the called (redirecting) subscriber invokes USCF with either the CNAR mode Permanently Restricted or the CNAR Default is Presentation Restricted, the redirecting name shall indicate *presentation restricted* to prevent the called subscriber's name presentation to the forward-to party or to the forward-to station.

**CALLING NUMBER IDENTIFICATION PRESENTATION (CNIP)**

---

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

**CALLING NUMBER IDENTIFICATION RESTRICTION (CNIR)**

---

If the called (redirecting) subscriber invokes USCF with either the CNIR mode Permanently Restricted or the CNIR Default is Presentation Restricted, the redirecting number shall indicate *presentation restricted* to prevent the called subscriber's number presentation to the forward-to party or to the forward-to station.

**CONFERENCE CALLING (CC)**

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None identified.

**DO NOT DISTURB (DND)**

---

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

**EMERGENCY SERVICES (FUTURE)<sup>1</sup>**

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None identified.

**FLEXIBLE ALERTING (FA)**

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Interaction between FA and USCF is beyond the scope of this Standard. The following describes a possible implementation:

USCF of the FA Pilot Directory Number shall apply to calls to the Pilot Directory Number when USCF is active and a responding FA member activates USCF.

USCF for the FA pilot number takes precedence over USCF of the individual FA members. That is, if both the FA pilot number and an FA member have USCF active, USCF network stored numbers and USCF default treatment is determined by the FA pilot number.

**MESSAGE WAITING NOTIFICATION (MWN)**

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None identified.

**MOBILE ACCESS HUNTING (MAH)**

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Interaction between MAH and USCF is beyond the scope of this Standard. The following describes a possible implementation:

USCF of the MAH Pilot Directory Number shall apply to calls to the Pilot Directory Number when USCF is active and a responding FA member activates USCF.

USCF may apply for individual MAH members with a lower precedence than the MAH group USCF. That is, if both the MAH pilot number and an MAH member have USCF active, USCF network stored numbers and USCF default treatment is determined by the MAH pilot number.

**PASSWORD CALL ACCEPTANCE (PCA)**

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PCA is invoked before USCF. That is, calls arriving to a subscriber with USCF 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 USCF.

**PREFERRED LANGUAGE (PL)**

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**PRIORITY ACCESS AND CHANNEL ASSIGNMENT (PACA)**

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PACA affects USCF. A call to a subscriber waiting for a PACA channel is considered to be busy, USCF does not apply.

**REMOTE FEATURE CONTROL (RFC)**

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For further study.

**SELECTIVE CALL ACCEPTANCE (SCA)**

---

SCA is invoked before USCF. That is, calls arriving to a subscriber with USCF 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 USCF.

**SUBSCRIBER PIN ACCESS (SPINA)**

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None identified.

**SUBSCRIBER PIN INTERCEPT (SPINI)**

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None identified.

**THREE-WAY CALLING (3WC)**

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None identified.

**USER SELECTIVE CALL FORWARDING (USCF)**

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Not applicable.

**VOICE MESSAGE RETRIEVAL (VMR)**

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None identified.

**VOICE PRIVACY (VP)**

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None identified.