# ETSI

**EUROPEAN**
**TELECOMMUNICATION**
**STANDARD**

## ETS 300 572

**February 1995**

Source: ETSI TC-SMG

Reference: DE/SMG-030490P

ICS: 33.060.30

**Key words:** European digital cellular telecommunications system, Global System for Mobile communications (GSM)

# European digital cellular telecommunications system (Phase 2); Unstructured Supplementary Service Data (USSD) - Stage 3 (GSM 04.90)

## ETSI

European Telecommunications Standards Institute

**ETSI Secretariat**

**Postal address:** F-06921 Sophia Antipolis CEDEX - FRANCE
**Office address:** 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
**X.400:** c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

# Contents

Blank page

## Foreword

This European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) Technical Committee (TC) of the European Telecommunications Standards Institute (ETSI).

This ETS specifies the procedures used at the radio interface (reference point Um as defined in ETS 300 551) for normal operation, registration, erasure, activation, deactivation, interrogation and network invocation of call offering supplementary services within the European digital cellular telecommunications system (Phase 2).

This ETS corresponds to GSM technical specification, GSM 04.90 version 4.1.1.

The specification from which this ETS has been derived was originally based on CEPT documentation, hence the presentation of this ETS may not be entirely in accordance with the ETSI/PNE rules.

Reference is made within this ETS to GSM Technical Specifications (GSM-TS) (NOTE).

> NOTE: TC-SMG has produced documents which give the technical specifications for the implementation of the European digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TS). These TSs may have subsequently become I-ETSs (Phase 1), or ETSs (Phase 2), whilst others may become ETSI Technical Reports (ETRs). GSM-TSs are, for editorial reasons, still referred to in current GSM ETSs.

Blank page

# 1 Scope

This technical specification gives the stage 3 description of the unstructured supplementary service data (USSD) operations.

The group of unstructured supplementary service data operations is divided into two different classes:

- Network initiated unstructured supplementary service data operations (section 5);

- Mobile initiated unstructured supplementary service data operations (section 6).

# 2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

[1]     GSM 01.04 (ETR 100): "European digital cellular telecommunications system (Phase 2); "Abbreviations and acronyms".

[2]     GSM 04.08 (ETS 300 557): "European digital cellular telecommunications system (Phase 2); Mobile radio interface layer 3 specification".

[3]     GSM 04.80 (ETS 300 564): "European digital cellular telecommunications system (Phase 2); Mobile radio interface layer 3 supplementary services specification Formats and coding".

# 3 Definitions and abbreviations

Abbreviations used in this specification are listed in GSM 01.04.

# 4 Cross phase compatibility

For the mobile initiated USSD operations, a number of changes exist between this specification and the protocol version 1 specification. For these operations the main body of this specification assumes that all network entities comply with this version of the service. In this case an additional sub-section defines the additional requirements for when one or more network entities or the MS complies with the protocol version 1 specifications for the USSD operations.

# 5 Network initiated unstructured supplementary service data operations

## 5.1 Unstructured supplementary service data request

### 5.1.1 Normal operation

The network invokes an USSD request by sending a REGISTER message containing a UnstructuredSS-Request invoke component to the mobile station.

The mobile station shall respond to the request by sending a FACILITY message containing the user's mobile subscriber's response in a return result component. The network shall pass the data received in the response to the application handling USSD operations and shall wait for the response of the application. The application may either continue or terminate the dialogue.

When the application continues the dialogue, it may initiate another USSD operation by sending a FACILITY message (see figure 5.2). The operation may either be an USSD request or notification (see section 5.1.2).

When the application terminates the dialogue, the network shall clear the transaction by sending a RELEASE COMPLETE message. The mobile station may also clear the transaction at any time by sending a RELEASE COMPLETE message upon the request of the user.

If the mobile station is unable to process the request received from the network, it shall return an error indication by sending a FACILITY message containing a return error component. Error values are specified in TS GSM 04.80.

When the mobile station receives an USSD operation in parallel to any call independent supplementary service transaction, it shall respond with a return error component in a RELEASE COMPLETE message, containing the "USSD-Busy" error as specified in TS GSM 04.80, to indicate the failure in handling a parallel USSD operation. However, the network is allowed to initiate USSD operations in parallel to call related transactions.

```
MS                                                                      Network
                              REGISTER
   <----------------------------------------------------------------------
       Facility (Invoke = UnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))

                              FACILITY
   ---------------------------------------------------------------------->
     Facility (Return result = UnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))

                              FACILITY
   - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
                   Facility (Return error (Error))

                              FACILITY
   - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
                   Facility (Reject (Invoke_problem))

                          RELEASE COMPLETE
   <----------------------------------------------------------------------
```

NOTE: The mobile station may clear the transaction at any time by sending a RELEASE COMPLETE upon request of the user.

**Figure 5.1: Single network initiated USSD request**

MS                                                                                                                    Network

REGISTER
<----------------------------------------------------------------------------------------------------------------------------
Facility (Invoke = UnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))

FACILITY
---------------------------------------------------------------------------------------------------------------------------->
Facility (Return result = UnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))

FACILITY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
Facility (Return error (Error))

FACILITY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
Facility (Reject (Invoke_problem))

FACILITY
<----------------------------------------------------------------------------------------------------------------------------
Facility (Invoke = UnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))

FACILITY
---------------------------------------------------------------------------------------------------------------------------->
Facility (Return result = UnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))

FACILITY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
Facility (Return error (Error))

FACILITY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
Facility (Reject (Invoke_problem))

.
.
.

RELEASE COMPLETE
<----------------------------------------------------------------------------------------------------------------------------

NOTE 1:     The mobile station may clear the transaction at any time by sending a RELEASE
            COMPLETE upon request of the user.

NOTE 2:     The second USSD operation may also be an USSD notification. The network may use
            the on-going transaction for sending further USSD operations. Only one additional
            USSD request is shown.

**Figure 5.2: Multiple network initiated USSD request**

## 5.2 Unstructured supplementary service data notification

### 5.2.1 Normal operation

The network invokes an USSD notification by sending a REGISTER message to the mobile station containing a UnstructuredSS-Notify invoke component.

The mobile station shall acknowledge the operation by sending a FACILITY message containing an empty result component to the network. The application may either continue or terminate the dialogue.

When the application continues the dialogue, it may initiate another USSD operation by sending a FACILITY message (see figure 5.4). The operation may either be an USSD request (see section 5.1.1) or notification.

When the application terminates the dialogue, the network shall clear the transaction by sending a RELEASE COMPLETE message. The mobile station may also clear the transaction at any time by sending a RELEASE COMPLETE message upon request of the user.

If the mobile station is unable to process the request received from the network, it shall return an error indication by sending a FACILITY message containing a return error component. Error values are specified in TS GSM 04.80.
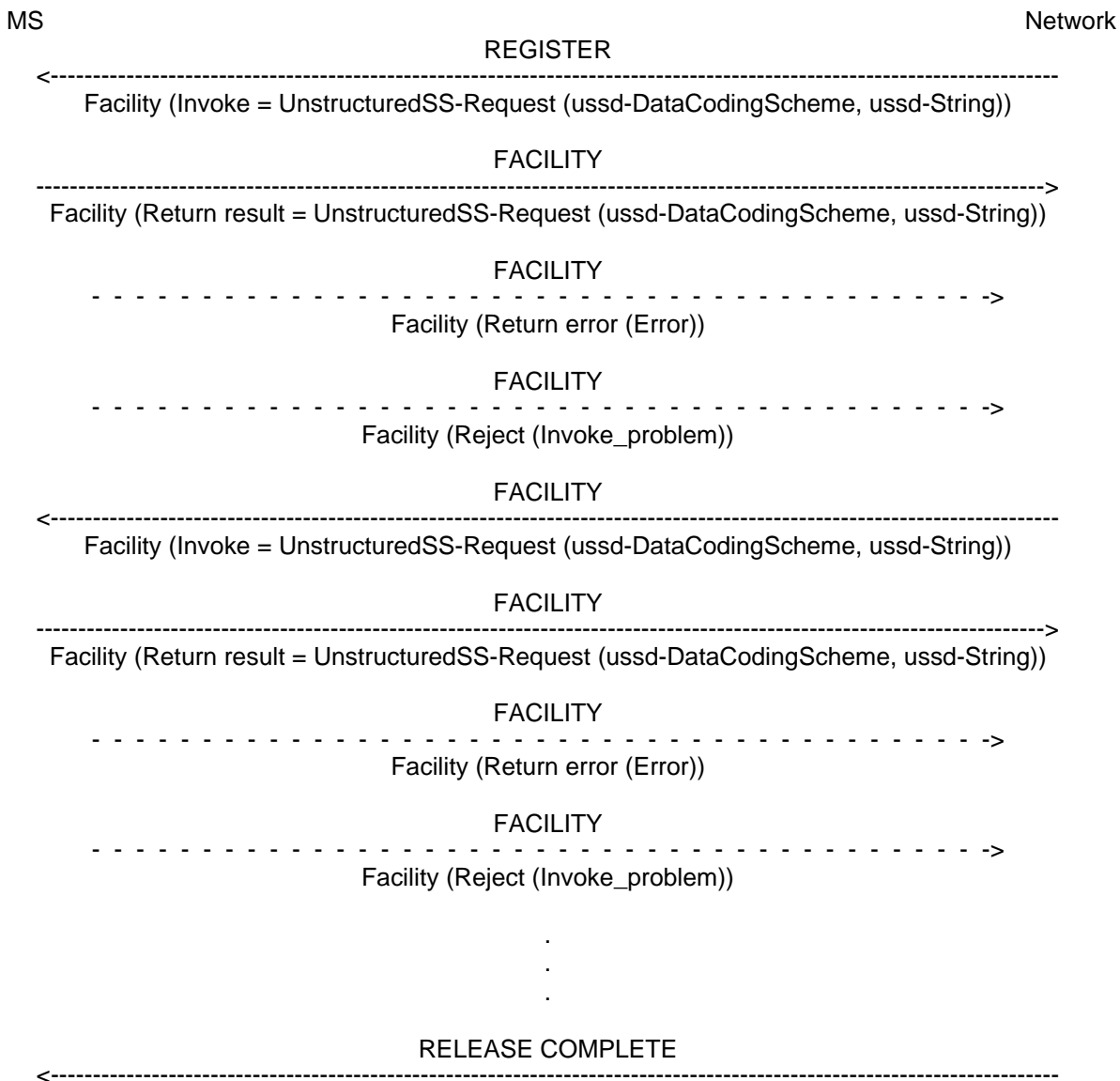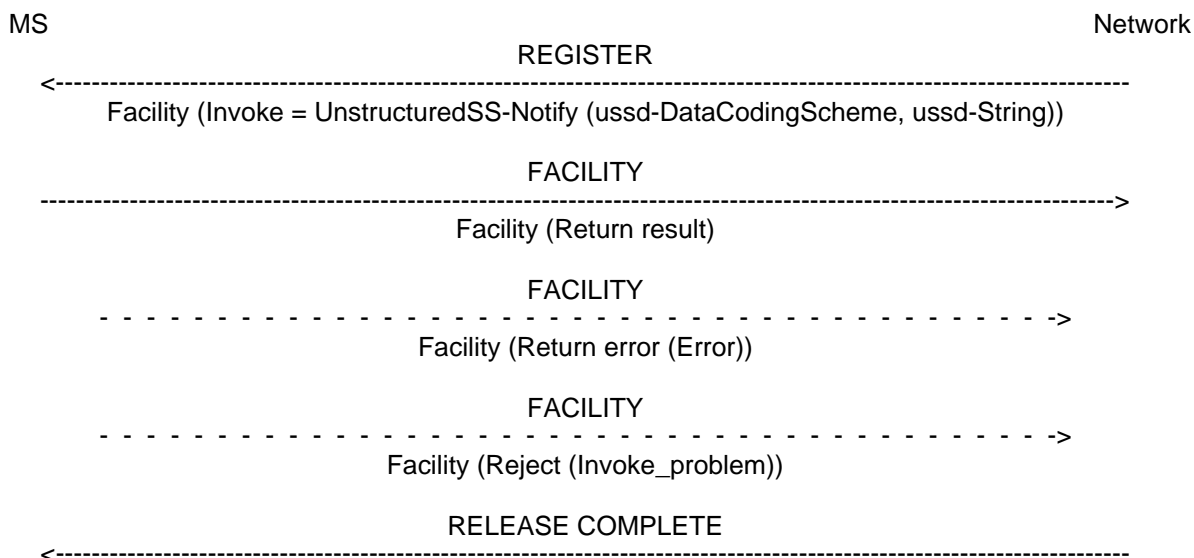
When the mobile station receives an USSD operation in parallel to any call independent supplementary service transaction, it shall respond with a return error component in a RELEASE COMPLETE message, containing the "USSD-Busy" error as specified in TS GSM 04.80, to indicate the failure in handling a parallel USSD operation. However, the network is allowed to initiated USSD operations in parallel to call related transactions.

```
 MS                                                                              Network
                                   REGISTER
   <-------------------------------------------------------------------------------------
        Facility (Invoke = UnstructuredSS-Notify (ussd-DataCodingScheme, ussd-String))

                                   FACILITY
   ------------------------------------------------------------------------------------->
                              Facility (Return result)

                                   FACILITY
   - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
                           Facility (Return error (Error))

                                   FACILITY
   - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
                        Facility (Reject (Invoke_problem))

                              RELEASE COMPLETE
   <-------------------------------------------------------------------------------------
```

NOTE:     The mobile station may clear the transaction at any time by sending a RELEASE COMPLETE upon request of the user.

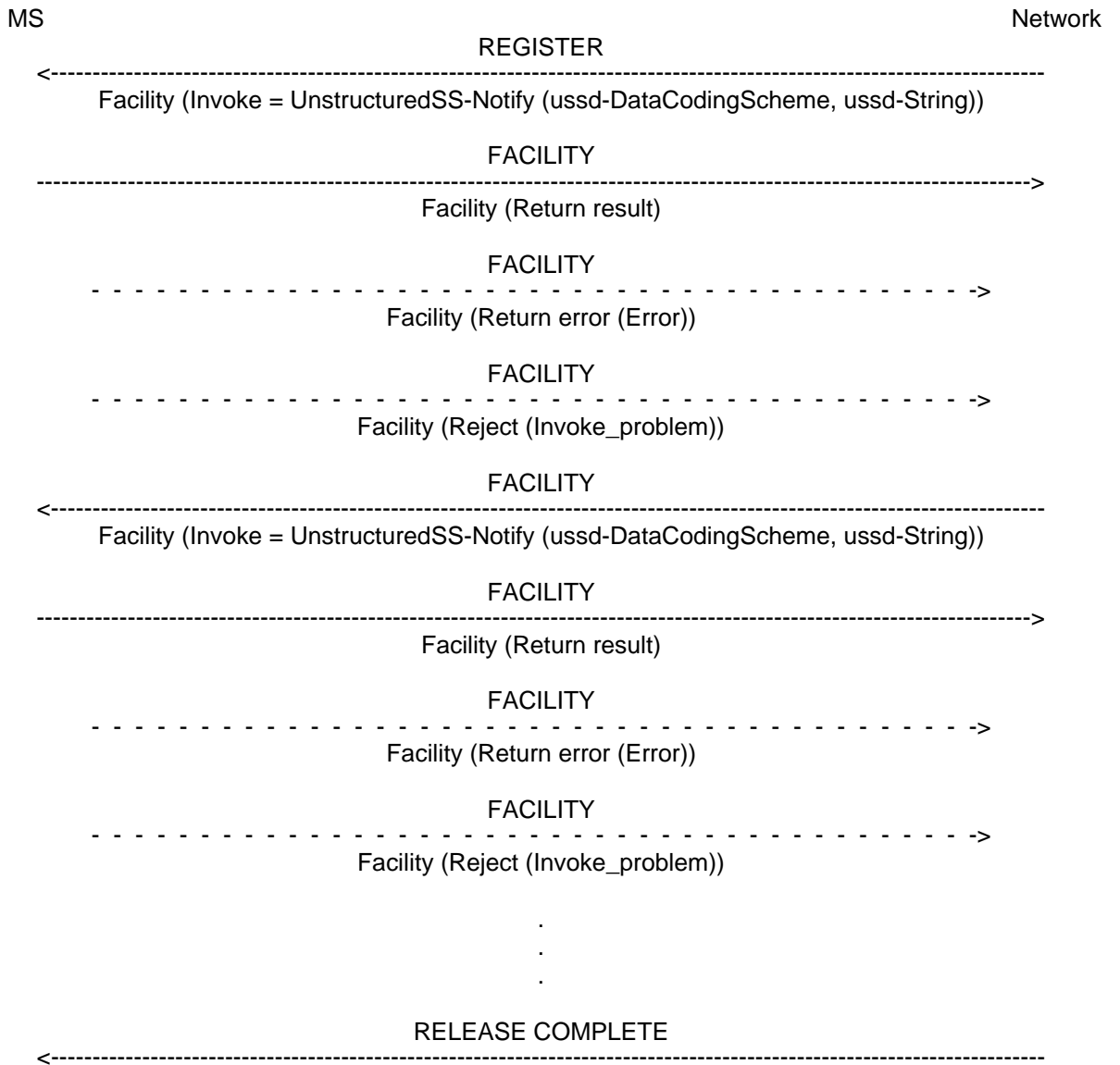**Figure 5.3: Single network initiated USSD notification**

MS                                                                                                          Network

REGISTER
<-------------------------------------------------------------------------------------------------------------------
Facility (Invoke = UnstructuredSS-Notify (ussd-DataCodingScheme, ussd-String))

FACILITY
------------------------------------------------------------------------------------------------------------------->
Facility (Return result)

FACILITY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
Facility (Return error (Error))

FACILITY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
Facility (Reject (Invoke_problem))

FACILITY
<-------------------------------------------------------------------------------------------------------------------
Facility (Invoke = UnstructuredSS-Notify (ussd-DataCodingScheme, ussd-String))

FACILITY
------------------------------------------------------------------------------------------------------------------->
Facility (Return result)

FACILITY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
Facility (Return error (Error))

FACILITY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
Facility (Reject (Invoke_problem))

.
.
.

RELEASE COMPLETE
<-------------------------------------------------------------------------------------------------------------------

NOTE 1:    The mobile station may clear the transaction at any time by sending a RELEASE
           COMPLETE upon request of the user.

NOTE 2:    The second USSD operation may also be an USSD request. The network may use the
           on-going transaction for sending further USSD operations. Only one additional USSD
           notification is shown.

**Figure 5.4: Multiple network initiated USSD notification**

# 6 Mobile initiated unstructured supplementary service data operations

## 6.1 Normal operation

The mobile station invokes an USSD request by sending a REGISTER message to the network containing a ProcessUnstructuredSS-Request invoke component.
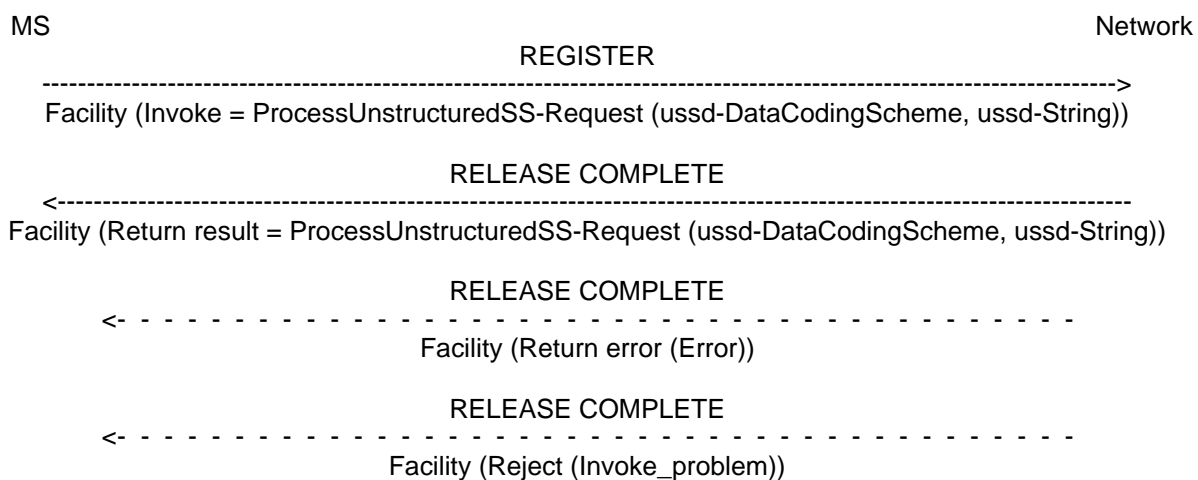
The receiving network entity shall pass the data received in the request to the application handling USSD operations and shall wait for the response of the application. The application may either terminate the dialogue or may request several times further information in order to perform the requested operation (see figures 6.1 and 6.2).

When the application requests more information to process the request, the network shall initiate an USSD request (see section 5.1.1), using the on-going transaction (see figure 6.2). The mobile station shall return the user's response in a FACILITY message containing a return result component. The network shall pass the data received in the response to the application. If the mobile station is unable to process the request received from the network, it shall return an error indication by sending a FACILITY message containing a return error component.

When the application terminates the dialogue, the network shall clear the transaction by sending a RELEASE COMPLETE message containing a return result component. The mobile station may also clear the transaction at any time by sending a RELEASE COMPLETE message upon request of the user.
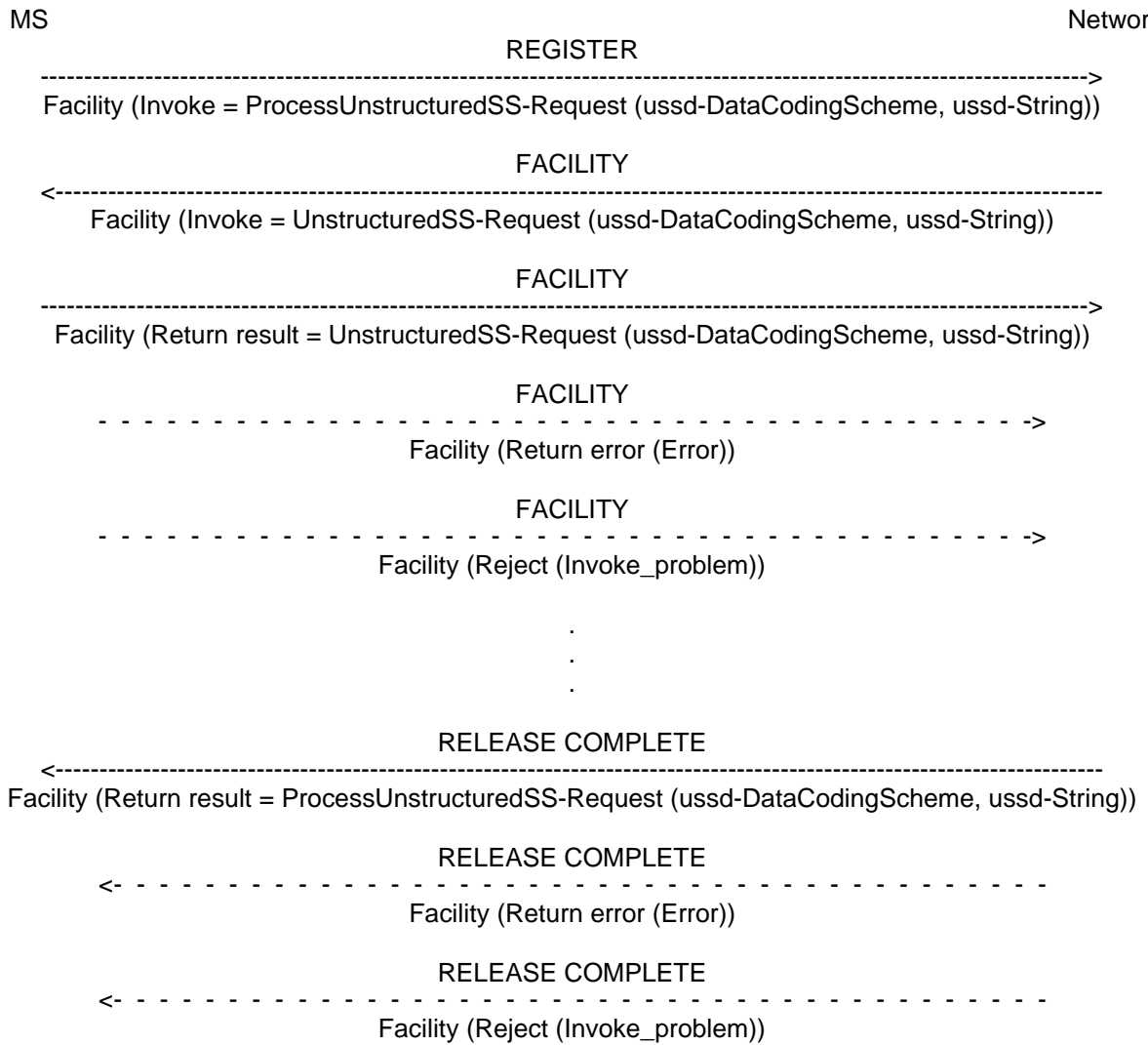
If the network is unable to process the request received from the mobile station, it shall clear the transaction by sending a RELEASE COMPLETE message containing a return error component. Error values are specified in TS GSM 04.80.

The mobile station shall not initiate USSD operations in parallel to any call independent supplementary service transaction. Only one transaction for USSD operations per user is allowed at a time. However, the mobile station is allowed to initiate USSD operations in parallel to call related transactions.

```
MS                                                                                Network
                                      REGISTER
   ------------------------------------------------------------------------------------>
      Facility (Invoke = ProcessUnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))

                                RELEASE COMPLETE
   <------------------------------------------------------------------------------------
   Facility (Return result = ProcessUnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))


                                RELEASE COMPLETE
   <- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                              Facility (Return error (Error))

                                RELEASE COMPLETE
   <- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                            Facility (Reject (Invoke_problem))
```

NOTE: The mobile station may clear the transaction at any time by sending a RELEASE COMPLETE upon request of the user.

**Figure 6.1: Mobile initiated USSD operation, network does not request further information**

MS                                                                                                                      Network

REGISTER
-------------------------------------------------------------------------------------------------------------------------->
Facility (Invoke = ProcessUnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))

FACILITY
<-------------------------------------------------------------------------------------------------------------------------
Facility (Invoke = UnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))

FACILITY
-------------------------------------------------------------------------------------------------------------------------->
Facility (Return result = UnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))

FACILITY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
Facility (Return error (Error))

FACILITY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
Facility (Reject (Invoke_problem))

.
.
.

RELEASE COMPLETE
<-------------------------------------------------------------------------------------------------------------------------
Facility (Return result = ProcessUnstructuredSS-Request (ussd-DataCodingScheme, ussd-String))

RELEASE COMPLETE
<- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
Facility (Return error (Error))

RELEASE COMPLETE
<- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
Facility (Reject (Invoke_problem))

NOTE 1:    The mobile station may clear the transaction at any time by sending a RELEASE
           COMPLETE upon request of the user.

NOTE 2:    The network may request further information several times. Only one information
           request is shown. The network initiated USSD operation may also be an USSD
           notification. Only a network initiated USSD request is shown.

**Figure 6.2: Mobile initiated USSD operation, network requests further information**

## 6.2 Cross phase compatibility

### 6.2.1 Network only supports protocol version 1 of unstructured supplementary service data operations

If a mobile initiated USSD request using protocol version 2 is rejected by the network, and the reason for the rejection is indicated either by the problem code "unrecognized operation" or a cause "Facility rejected", the mobile station shall assume that the network only supports protocol version 1 of USSD operations. The mobile station shall re-attempt the request by using the appropriate protocol version 1 USSD operation without a SS version indicator if the unstructured data entered by the user can be coded as an IA5 string.

### 6.2.2 Mobile station only supports protocol version 1 of unstructured supplementary service data operations

A mobile station supporting only protocol version 1 invokes an USSD request by sending a REGISTER message to the network containing a ProcessUnstructuredSsData invoke component without a SS version indicator. In this situation the network is not allowed to start a network initiated USSD operation. If the application requires such an operation for its proper function, the USSD operation sent by the mobile station shall be rejected by the application. The network shall terminate the transaction by sending a RELEASE COMPLETE message with cause "Facility rejected" (see TS GSM 04.08).

## History

| Document history | |
|---|---|
| February 1995 | First Edition |
| November 1995 | Converted into Adobe Acrobat Portable Document Format (PDF) |
| | |
| | |
| | |