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Freephone (FPH) supplementary service;
Digital Subscriber Signalling System No. one (DSS1) protocol;
Part 1: Protocol specification

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Contents

Foreword

This European Telecommunication Standard (ETS) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS is part 1 of a multi-part standard covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) Freephone (FPH) supplementary service, as described below:

Part 1: **"Protocol specification";**

Part 2:   "Protocol Implementation Conformance Statement (PICS) proforma specification";

Part 3:   "Test Suite Structure and Test Purposes (TSS&TP) specification for the user";

Part 4:   "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";

Part 5:   "TSS&TP specification for the network";

Part 6:   "ATS and partial PIXIT proforma specification for the network".

In accordance with CCITT Recommendation I.130, the following three level structure is used to describe the supplementary telecommunication services as provided by European public telecommunications operators under the pan-European ISDN:

-      Stage 1: is an overall service description, from the user's standpoint;

-      Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and

-      Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

This ETS details the stage 3 aspects (signalling system protocols and switching functions) needed to support the FPH supplementary service. The stage 1 and stage 2 aspects are detailed in ETS 300 208 and ETR 209, respectively.

Transposition dates	
Date of adoption of this ETS:	1 March 1996
Date of latest announcement of this ETS (doa):	31 May 1996
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	30 November 1996
Date of withdrawal of any conflicting National Standard (dow):	30 November 1996

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1 Scope

This first part of ETS 300 210 specifies the stage three of the Freephone (FPH) supplementary service for the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators at the T reference point or coincident S and T reference point (as defined in ITU-T Recommendation I.411 [6]) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol. Stage three identifies the protocol procedures and switching functions needed to support a telecommunication service (see CCITT Recommendation I.130 [2]).

In addition, this ETS specifies the protocol requirements at the T reference point where the service is provided to the user via a private ISDN.

This ETS does not specify the additional protocol requirements where the service is provided to the user via a telecommunication network that is not an ISDN.

The FPH supplementary service enables to allocate to the served user the charges for calls placed to the freephone number.

The FPH supplementary service is applicable to all circuit-switched telecommunication services.

Further parts of this ETS specify the method of testing required to identify conformance to this ETS.

This ETS is applicable to equipment, supporting the FPH supplementary service, to be attached at either side of a T reference point or coincident S and T reference point when used as an access to the public ISDN.

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]   CCITT Recommendation E.164 (1991): "Numbering plan for the ISDN era".

[2]   CCITT Recommendation I.130 (1988): "Method for the characterisation of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[3]   ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".

[4]   ITU-T Recommendation I.210 (1993): "Principles of telecommunication services supported by an ISDN and the means to describe them".

[5]   ITU-T Recommendation I.221 (1993): "Common specific characteristics of services".

[6]   ITU-T Recommendation I.411 (1993): "ISDN user-network interfaces - Reference configurations".

[7]   CCITT Recommendation Q.9 (1988): "Vocabulary of switching and signalling terms".

[8]   CCITT Recommendation X.208 (1988): "Specification of Abstract Syntax Notation One (ASN.1)".

[9]   CCITT Recommendation X.219 (1988): "Remote operations: Model, service and notation".

[10]   CCITT Recommendation Z.100 (1988): "Specification and Description Language (SDL)".

[11]   ETS 300 102-1: "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control".

[12]   ETS 300 102-2 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control Specification and Description Language (SDL) diagrams".

[13]   ETS 300 195-1 (1995): "Integrated Services Digital Network (ISDN); Supplementary service interactions; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[14]   ETS 300 196-1 (1993): "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

3   Definitions

For the purposes of this ETS, the following definitions apply:

busy: See ITU-T Recommendation I.221 [5], subclause 2.1.5.

call: See CCITT Recommendation Q.9 [7], definition 2201.

call control message: A message defined in ETS 300 102-1 [11], subclause 3.1, which on sending or receipt causes a change of the call state at either the network or the user. Call control messages also include the INFORMATION message and PROGRESS message.

call queuing: The possibility for a served user to have freephone calls meeting busy at the scheduled destination to be placed in a queue and connected as soon as a not busy is detected.

call reference: (excluding dummy call reference) an identifier of a signalling transaction. The signalling transaction may either be bearer related, in which case the signalling transaction can be used to control that bearer, or bearer independent, in which case there is no bearer associated with that signalling transaction. Where there is only one bearer required for a call, then the call reference of the associated bearer related signalling transaction may be used to identify the call.

call state: A state as defined in ETS 300 102-1 [11], subclause 2.1 for either the user or the network as appropriate. A call state may exist for each call reference value (and for each additional responding Connection Endpoint Identifier (CEI) in the incoming call states.

Data Link Connection Endpoint Identifier; Connection Endpoint Identifier (CEI): Identifier used by a layer 3 protocol entity to address its peer entity.

freephone call: A call to which the FPH supplementary service applies, and made to a freephone number.

freephone number: A number identifying the freephone subscriber. The freephone service access code and the freephone number concatenated are an ISDN number.

Integrated Services Digital Network (ISDN): See ITU-T Recommendation I.112 [3], definition 308.

invoke component: See ETS 300 196-1 [14], subclause 8.2.2.1. Where reference is made to an "xxxx" invoke component, an invoke component is meant with its operation value set to the value of the operation "xxxx".

ISDN number: A number conforming to the numbering plan and structure specified in CCITT Recommendation E.164 [1].

network: The DSS1 protocol entity at the network side of the user-network interface.

private network: The DSS1 protocol entity at the user side of the user-network interface when a T reference point applies.

reject component: See ETS 300 196-1 [14], subclause 8.2.2.4.

return error component: See ETS 300 196-1 [14], subclause 8.2.2.3. Where reference is made to an "xxxx" return error component, a return error component is meant which is related to an "xxxx" invoke component.

return result component: See ETS 300 196-1 [14], subclause 8.2.2.2. Where reference is made to an "xxxx" return result component, a return result component is meant which is related to an "xxxx" invoke component.

served user: The DSS1 protocol entity at the user side of the user-network interface used to control the FPH supplementary service when a coincident S and T reference point applies.

service; telecommunication service: See ITU-T Recommendation I.112 [3], definition 201.

service access code; freephone service access code: A number allocated by the network operator, to indicate that the following freephone number is a destination to be called using the FPH supplementary service.

subscriber: The customer who has subscribed to the FPH supplementary service. The customer may have a set of accesses visible through a unique freephone number.

supplementary service: See ITU-T Recommendation I.210 [4], subclause 2.4.

user: The DSS1 protocol entity at the user side of the user-network interface when a coincident S and T reference point applies.

4   Abbreviations

For the purposes of this ETS, the following abbreviations apply:

ASN.1	Abstract Syntax Notation one
CEI	Connection Endpoint Identifier
DSS1	Digital Subscriber Signalling System No. one
FPH	Freephone
ISDN	Integrated Services Digital Network

5   Description

The procedures for activation and deactivation of a record are outside the scope of this ETS.

If a user subscribes to the FPH supplementary service, then the network, in conjunction with the appropriate numbering authorities, shall allocate a special number (freephone number) to that user.

In particular, the served user may have incoming calls routed to his accesses or rejected according to a set of features.

Following the arrangement between the network operator and the subscriber, the network operator provides for the registration of these features in the network.

6 Operational requirements

6.1 Provision and withdrawal

Provision of the FPH supplementary service requires an arrangement between the network and the subscriber.

Withdrawal of this service shall be at the request of the subscriber or for service provider reasons.

6.2 Requirements on the originating network side

No requirements beyond basic call as specified in ETS 300 102-1 [11].

6.3 Requirements on the destination network side

The destination network side shall support the status request procedures defined in subclause 10.3 of ETS 300 196-1 [14] at the coincident S and T reference point.

7 Coding requirements

7.1 Coding of the Facility information element components

Table 1 shows the definition of the operations and types required for the FPH supplementary service using ASN.1 as defined in CCITT Recommendation X.208 [8] and using the OPERATION and ERROR macro as defined in figure 4/X.219 of CCITT Recommendation X.219 [9].

The formal definition of the component types to encode these operations and types is provided in ETS 300 196-1 [14], clause D.1.

The inclusion of components in the Facility information elements is defined in subclause 11.2.2.1 of ETS 300 196-1 [14].

Table 1: Definition of the operations and errors for the FPH supplementary service

```
Freephone-Operations {ccitt identified-organization etsi(0) 210 operations-and-errors(1)}

DEFINITIONS EXPLICIT TAGS ::=

BEGIN

EXPORTS          CallFPH, Monitor-T-FPH, Free-T-FPH, Call-T-FPH;

IMPORTS          OPERATION, ERROR
                 FROM Remote-Operation-Notation
                     {joint-iso-ccitt remote-operations(4) notation(0)}

                 notAvailable, notImplemented
                 FROM General-Errors
                     {ccitt identified-organisation etsi(0) 196 general-errors(2)}

                 PartyNumber
                 FROM Addressing-Data-Elements
                     {ccitt identified-organisation etsi(0) 196 addressing-data-elements(6)}

                 Q931InformationElement
                 FROM Embedded-Q931-Types
                     {ccitt identified-organisation etsi(0) 196 embedded-q931-types(7)};

CallFPH          ::= OPERATION
                     ARGUMENT    calledFreephoneNr      CalledFreephoneNr -- optional
```

Table 1 (concluded): Definition of the operations and errors for the FPH supplementary service

```
Monitor-T-FPH    ::= OPERATION
                 ARGUMENT SEQUENCE {
                             q931InfoElement         Q931InformationElement,
                             servedUserDestination   PartyNumber,
                             queueIdentity           QueueIdentity OPTIONAL}
                 RESULT
                 ERRORS {    notAvailable,
                             notImplemented}

-- the Bearer capability, High layer compatibility (optional) and Low layer compatibility
-- (optional) information elements shall be embedded in q931InfoElement.

Free-T-FPH       ::= OPERATION
                 ARGUMENT SEQUENCE {
                             servedUserDestination   PartyNumber,
                             fPHReference            FPHReference}

Call-T-FPH       ::= OPERATION
                 ARGUMENT SEQUENCE {
                             fPHReference            FPHReference,
                             calledFreephoneNr       CalledFreephoneNr OPTIONAL}

FPHReference          ::= INTEGER (0..127)
CalledFreephoneNr     ::= PartyNumber
QueueIdentity         ::= INTEGER (0..127)

fPHOID  OBJECT IDENTIFIER          ::= {ccitt identified-organization etsi(0) 210
                                        freephone-operations(1)}

callFPH        CallFPH        ::= globalValue {fPHOID callFPH-operation(1)}
monitor-T-FPH  Monitor-T-FPH  ::= globalValue {fPHOID monitor-T-FPH-operation(2)}
free-T-FPH     Free-T-FPH     ::= globalValue {fPHOID free-T-FPH-operation(3)}
call-T-FPH     Call-T-FPH     ::= globalValue {fPHOID call-T-FPH-operation(4)}

END -- Freephone-Operations
```

7.2   Coding of the Notification indicator information element

For the coding of the Notification indicator information element see subclause 11.2.2.2 of ETS 300 196-1 [14].

Table 2 contains the additional codepoint for the FPH supplementary service which shall be employed in octet 3 of the Notification indicator information element.

Table 2: Codepoint in the Notification indicator information element

Bits							
7	6	5	4	3	2	1	
0	0	0	0	1	0	0	call completion delay

8   State definitions

The call states as defined in subclause 2.1 of ETS 300 102-1 [11], shall be utilised in the FPH supplementary service operation, as appropriate.

Table 3 shows the network states which are defined for the busy status handling at the served user.

Table 3: Network states for the FPH supplementary service

Network state	Description
FPH Idle	The FPH supplementary service is idle.
FPH Busy Monitoring	The FPH supplementary service has accepted a busy monitoring request.
FPH Await Status	Waiting for the user's response to the status request procedure.

9 Signalling procedures at the coincident S and T reference point

9.1 Activation, deactivation and registration

Not applicable, i.e. signalling procedures for the control of the FPH supplementary service is outside the scope of this ETS.

9.2 Invocation and operation

9.2.1 Operation at the calling user

9.2.1.1 Normal operation

In order to establish an outgoing freephone call, and in accordance with the procedures of subclause 5.1 of ETS 300 102-1 [11], the user shall indicate in the Called party number information element the freephone service access code followed by the freephone number, encoded as if it was any other ISDN number.

On receiving an outgoing call request, according to the procedures of subclause 5.1 of ETS 300 102-1 [11], with a Called party number information element indicating a freephone service access code, and with a valid freephone number, the network shall treat the call as a freephone call.

As a network option, a freephone call may be queued when the destination user is busy, until such a time as that the user becomes not busy. When a freephone call is queued, the network shall send the ALERTING message to the calling user, containing a Notification indicator information element specifying "call completion delay". When a queued freephone call is subsequently presented to the served user, a second ALERTING message shall not be sent to the calling user.

9.2.1.2 Exceptional procedures

The exceptional procedures at the calling user's interface shall be according to subclause 5.8 of ETS 300 102-1 [11].

9.2.2 Operation at the served user

9.2.2.1 Normal operation

On presenting a freephone call to the destination user, using the procedures of subclause 5.2 of ETS 300 102-1 [11], as a network option, the network may include in the SETUP message a Facility information element containing a CallFPH invoke component.

As a further network option, the CallFPH invoke component may contain the CalledFreephoneNr parameter, indicating the ISDN number (freephone service access code and freephone number) requested by the calling user.

9.2.2.2 Exceptional procedures

If a reject component is received in response to a SETUP message containing a Facility information element with a CallFPH invoke component, the network shall take no action, and basic call shall continue according to the procedures of subclause 5.2 of ETS 300 102-1 [11].

9.2.3 Operation at the served user when queueing is required

9.2.3.1 Acceptance of a monitoring request for the FPH supplementary service

9.2.3.1.1 Normal operation

A request tot monitor a given destination, as a result of invocation of the FPH supplementary service, shall be accepted by the network of the served user and queued, if:

- the served user has subscribed to the given basic service;

- the limit on the number of requests for invocation of the FPH supplementary service to a given destination has not been exceeded (this limit is a network provider option);

- the served user has not invoked a supplementary service which prohibits the request; and,

- a served user exists that is compatible with the given basic service.

A served user is deemed to be compatible with the given basic service if the status request procedures of subclause 10.3 of ETS 300 196-1 [14] result in a response of "compatibleAndFree" or "compatibleAndBusy". If the monitoring request indicates multiple basic services then the compatibilityMode parameter in the invoke component shall be set to "oneOrMoreBasicServices".

9.2.3.1.2   Exceptional procedures

If the served user's network cannot accept the monitoring request, then the network of the served user shall reject the monitoring request with an appropriate error indication.

9.2.3.2   Queue processing for the FPH supplementary service

9.2.3.2.1   Normal operation

The details on the processing of the queue are outside the scope of this ETS, but each outstanding request shall be handled according to the procedures of subclause 9.2.3.3 to determine when the queued call can be presented to the served user.

9.2.3.2.2   Exceptional procedures

Not applicable.

9.2.3.3   Determination of the served user free

9.2.3.3.1   Normal operation

In order to accept a given call for which an invocation of the FPH supplementary service applies, the following procedure is followed.

If there is a free B-channel, the network shall reserve a B-channel, and determine if there is a served user that is compatible with the given basic service and free to accept the call, and if there is, start timer T-FPH1.

A served user is deemed to be compatible with the given basic service if the status request procedures of subclause 10.3 of ETS 300 196-1 [14] result in a response of "compatibleAndFree" or "compatibleAndBusy". If the monitoring request indicates multiple basic services then the compatibilityMode parameter in the invoke component shall be set to "oneOrMoreBasicServices".

Reservation of a B-channel in this case means that the last free B-channel shall not be allocated to an incoming call. Incoming calls may still be permitted according to the procedures of subclause 5.2 of ETS 300 102-1 [11], provided that another B-channel is available. The reserved B-channel may be used for outgoing calls.

If the network receives only a "compatibleAndBusy" response to the status request procedure the network shall cancel the B-channel reservation and continue with the queue processing as specified in subclause 9.2.3.2.

9.2.3.3.2   Exceptional procedures

If there is no served user present that is compatible with the given basic service, the network shall cancel the B-channel reservation and the monitoring.

If, on determination that there is a served user that is compatible with the given basic service and free to accept the queued call, there is no B-channel available, the network shall cancel the B-channel reservation and continue queue processing according to subclause 9.2.3.2.

9.2.3.4 Presentation of a queued call

9.2.3.4.1 Normal operation

If the request to establish the queued call is received by the served user's network, then the network shall cancel the B-channel reservation and offer the call to the served user according to the procedures of subclause 9.2.2.1.

9.2.3.4.2 Exceptional procedures

The procedures of subclause 9.2.2.2 are applicable.

10 Procedures for interworking with private ISDNs

10.1 Procedures where a private ISDN exists at the calling side

The procedures of subclause 9.2.1 shall apply.

10.2 Procedures where a private ISDN exists at the called side, and busy monitoring is performed by the private ISDN

10.2.1 Normal operation

The following subclauses cover the procedures associated with the presentation of a call as a result of the FPH supplementary service, and a signalling association to determine when such a call can be established. The protocols associated with these two procedures need not exist at the same interface.

The call reference established as part of the procedure of subclause 8.3.2.1.1 of ETS 300 196-1 [14] shall be used in all subsequent messages using the signalling association to identify this instance of the FPH supplementary service.

To request monitoring, the network shall request a bearer-independent transport mechanism according to the procedures of subclause 8.3.2.1.1 of ETS 300 196-1 [14], and in this request include a Facility information element with a Monitor-T-FPH invoke component.

The Monitor-T-FPH invoke component shall contain:

- in the Q931InfoElement parameter, the Bearer capability information element, and, if available, the High layer compatibility information element and the Low layer compatibility information element of the queued freephone call;

- in the ServedUserDestination parameter, an ISDN number which contains the called party number that will appear in the SETUP message when the queued call is presented to the destination; and,

- as a network option, the QueueIdentity parameter, an integer value which identifies the queue in which the freephone call is queued. The permitted values for the QueueIdentity parameter are subject to bilateral agreements between the public and private networks.

If the monitor operation is allowed, the private network shall:

- start monitoring the identified destination user within the private network to ascertain when a destination exists that is not busy. Procedures for the management of this monitoring, and for the queueing of monitoring requests within the private network, are outside the scope of this ETS;

- send a Facility information element containing a Monitor-T-FPH return result component on the bearer-independent transport mechanism according to the procedures of subclause 8.3.2.1.2 of ETS 300 196-1 [14].

To cancel monitoring, the network shall release the signalling transaction according to the procedures of subclause 8.3.2.1.3 of ETS 300 196-1 [14]. If the signalling transaction is released, the private network shall terminate monitoring in respect of the associated monitor request, and also continue the release of the signalling transaction according to the procedures of subclause 8.3.2.1 of ETS 300 196-1 [14].

The private network, to cancel monitoring (e.g. no compatible terminal), shall release the signalling transaction according to the procedures of subclause 8.3.2.1.3 of ET 300 196-1 [14]. If the signalling transaction is released, the network knows that monitoring is cancelled in the private network and continues the release of the signalling transaction according to the procedures of subclause 8.3.2.1 of ETS 300 196-1 [14].

To indicate that the destination has become free, the private network shall send a Facility information element containing a Free-T-FPH invoke component on the bearer-independent transport mechanism according to the procedures of subclause 8.3.2.1.2 of ETS 300 196-1 [14]. On receiving such an invoke component the network shall terminate the bearer-independent transport mechanism according to the procedures of subclause 8.3.2.1.3 of ETS 300 196-1 [14].

The fPHReference parameter of the Free-T-FPH invoke component shall include a unique value that is to be used to identify a subsequently presented call. This value shall not be reused by the private network while the network can be expected to have knowledge of a previous usage.

On receiving such a Free-T-FPH invoke component, the network shall present the queued freephone call to the private network.

On presenting such a freephone call to the private network, using the procedures of subclause 5.2 of ETS 300 102-1 [11], the network shall include in the SETUP message a Facility information element containing a Call-T-FPH invoke component.

The fPHReference parameter of the Call-T-FPH invoke component shall include the value indicated by the private network. On sending the SETUP message, the network shall release the fPHReference and allow it to be reused by the private network. On receiving the SETUP message, the private network shall relate this call to the indicated free destination user and release the fPHReference. The fPHReference is then available for reuse by the private network.

As a network option, the Call-T-FPH invoke component may contain the CalledFreephoneNr parameter, indicating the ISDN number (freephone service access code and freephone number) requested by the calling user.

10.2.2 Exceptional procedures

If the monitor operation is not allowed, the private network shall send a Facility information element containing a Monitor-T-FPH return error component on the bearer-independent transport mechanism according to the procedures of subclause 8.3.2.1.2 of ETS 300 196-1 [14].

The error included in the return error component shall be one of the following:

- "notAvailable", if the request does not relate to a basic service for which the network can currently support the identified FPH supplementary service (e.g. temporary fault); or,

- "notImplemented", if the request does not relate to a basic service for which the network supports the identified FPH supplementary service.

On receiving such a return error component, the network shall terminate the bearer-independent transport mechanism according to the procedures of ETS 300 196-1 [14] subclause 8.3.2.1.3.

If a reject component is received on the bearer-independent transport mechanism in response to any of the components as specified in subclause 10.2.1, the network or private network shall clear the association, and any references and reservations associated with it.

11 Interactions with other networks

Not applicable.

12 Interactions with other supplementary services

The interactions of the FPH supplementary service with other supplementary services shall be as specified in ETS 300 195-1 [13].

13   Parameter values (timers)

Timer T-STATUS is defined in subclause 10.3 of ETS 300 196-1 [14]. The duration of the timer shall be 4 seconds.

Timer T-FPH1 shall be started by the served user's network when a busy monitoring for destination free request is returned. The duration of the timer shall be a service provider option.

14   Dynamic description (SDLs)

ETS 300 102-2 [12] shall apply.

The SDL diagram for the FPH supplementary service shows the network process for the busy status handling at the served user's network side at the S and T reference point.

The SDL diagrams are specified according to CCITT Recommendation Z.100 [10].

In the context of this ETS, the direction of the input symbol and the output symbol at the network side is defined as follows:

Primitives from/to "call control" and internal user events as in ETS 300 102-2 [12].

Messages from/to the user as in ETS 300 102-2 [12].

Process FPH_NETWORK_B   SE02101_F1.1(2)
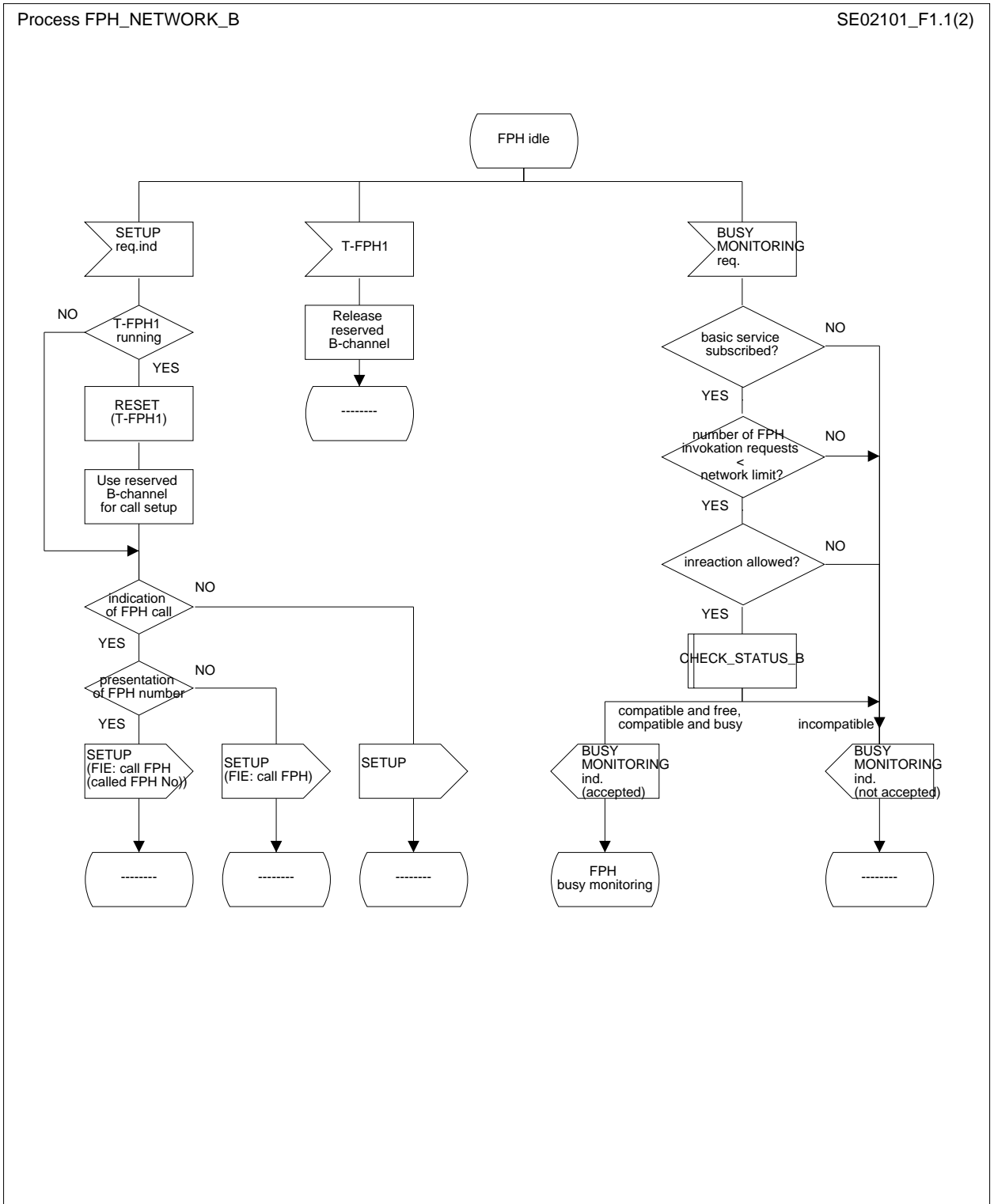
Figure 1 (sheet 1 of 2): FPH destination network process

Process FPH_NETWORK_B   SE02101_F1.2(2)
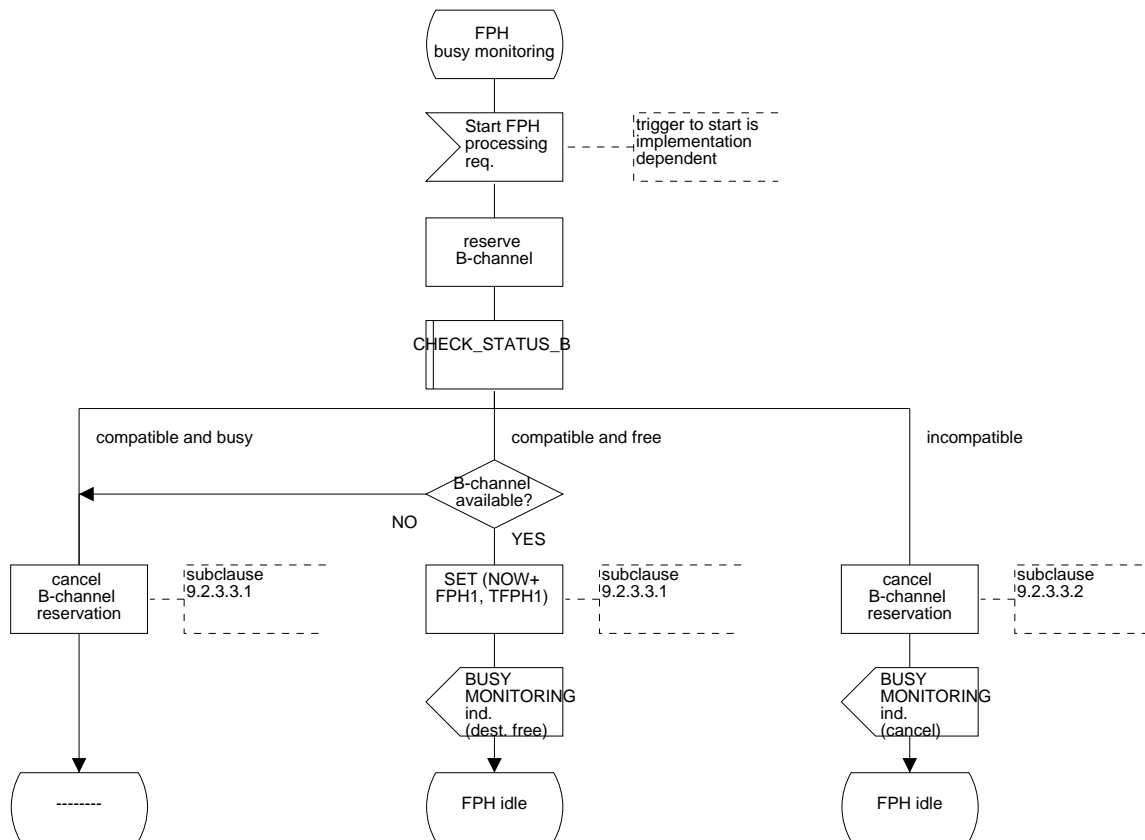
Figure 1 (sheet 2 of 2): FPH destination network process

Macro CHECK_STATUS_B   SE02101_F2(1)
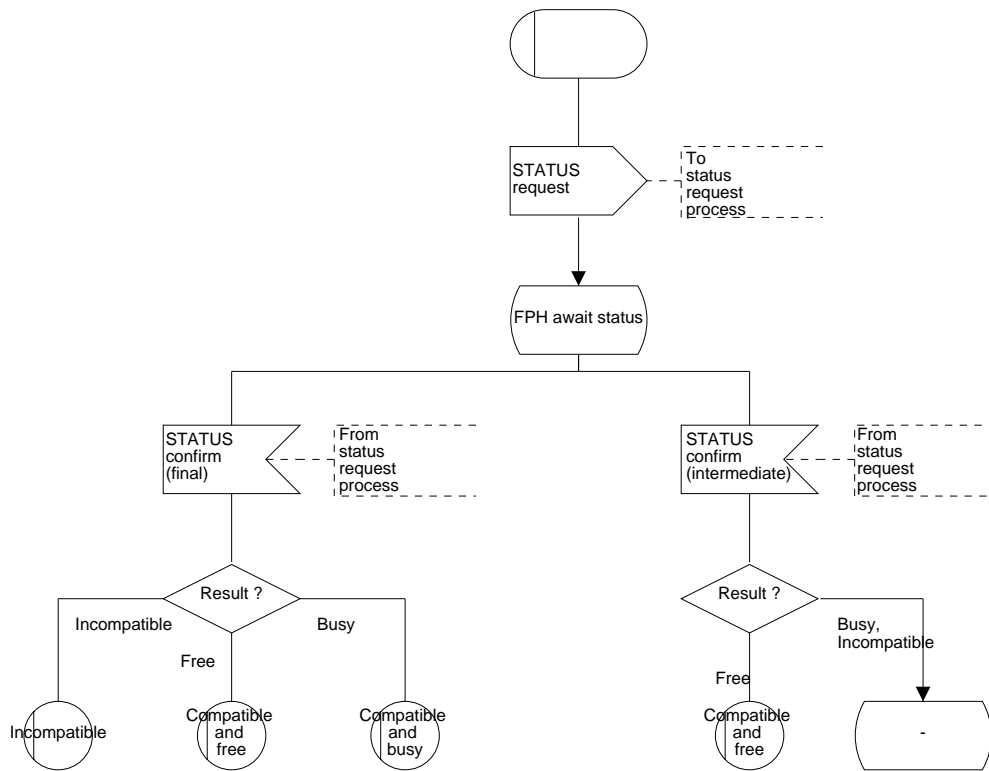
Figure 2: Macro CHECK_STATUS_B

Annex A (informative): Signalling flows

This annex provides the relevant examples for the freephone call. The examples are intended to illustrate the DSS1 protocol part and are not exhaustive.

Key to figures A.1 to A.6:

CR1, CR2, CR3   Call Reference
DCR   Dummy Call Reference
FIE   Facility Information Element
OP   Operation

```
        User A                                    Network A
            |                                        |
            |  SETUP(CR1, Called Party Number IE     |
            |          <service access code,         |
            |           freephone number>)           |
            |--------------------------------------->|
            |                                        |
            |  CALL PROCEEDING (CR1)                 |
            |<---------------------------------------|
            |                                        |
            |  ALERTING (CR1)                        |
            |<---------------------------------------|
            |                                        |
            |  CONNECT (CR1)                         |
            |<---------------------------------------|
            |                                        |
```
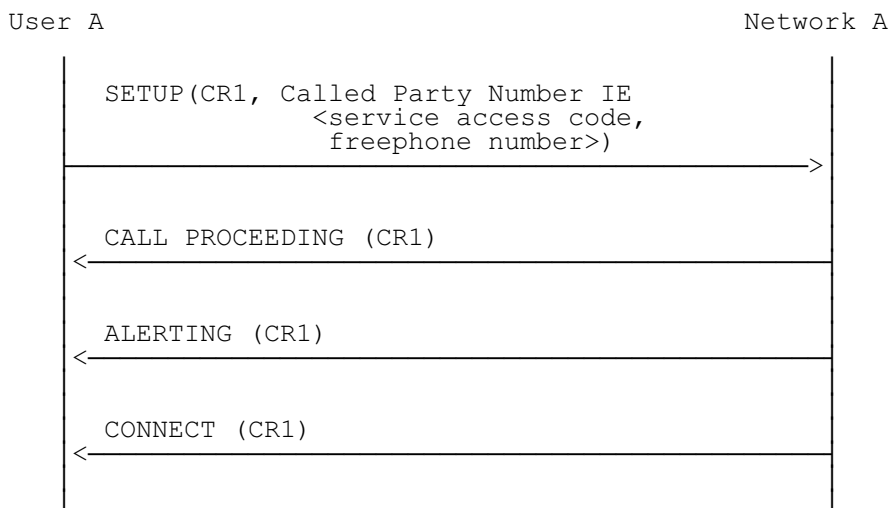
Figure A.1: Normal operation, user A

```
        User A                                    Network A
            |                                        |
            |  SETUP(CR1, Called Party Number IE     |
            |          <service access code,         |
            |           freephone number>)           |
            |--------------------------------------->|
            |                                        |
            |  CALL PROCEEDING (CR1)                 |
            |<---------------------------------------|
            |                                        |
            |  ALERTING (CR1, Notification indicator IE |
            |            < call completion delay>)   |
            |<---------------------------------------|
            |                                        |
            |  CONNECT (CR1)                         |
            |<---------------------------------------|
            |                                        |
```
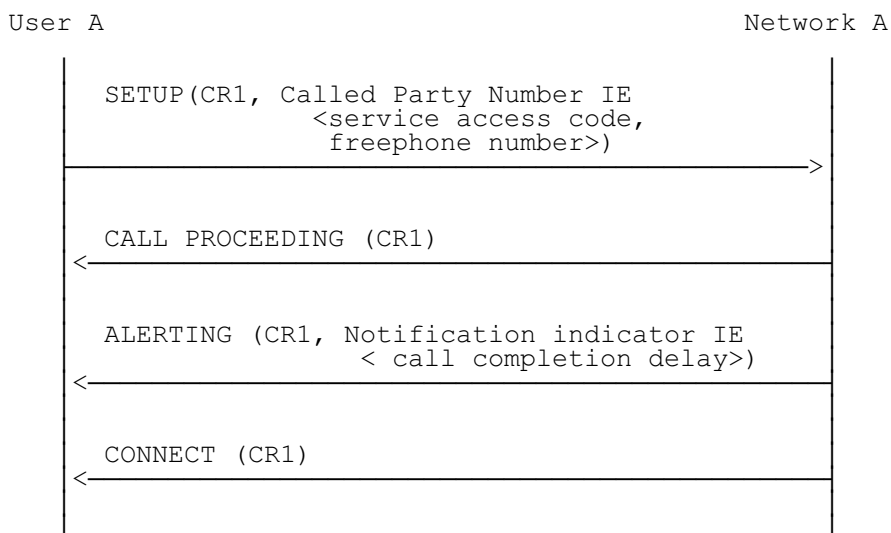
Figure A.2: Normal operation, user A, call queued at served user

```
Network B                                              User B

      SETUP(CR1, FIE<INV, InvID=A,
                   OP=CallFPH> )
    |---------------------------------------------------->|
    |                                                     |
    |                                                     |
      CALL PROCEEDING (CR1)
    |<----------------------------------------------------|
    |                                                     |
      ALERTING (CR1)
    |<----------------------------------------------------|
    |                                                     |
      CONNECT (CR1)
    |<----------------------------------------------------|
    |                                                     |
      CONNECT ACK (CR1)
    |---------------------------------------------------->|
    |                                                     |
```
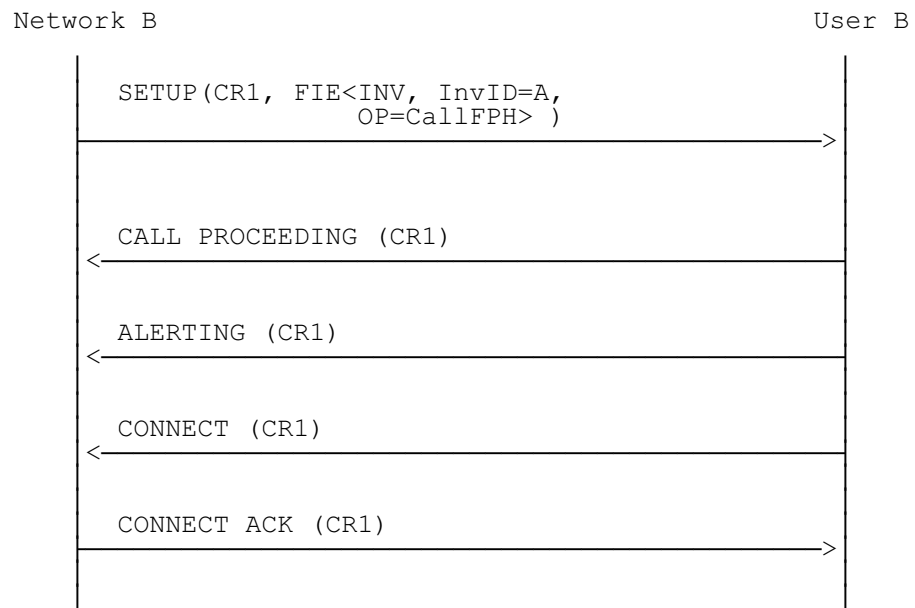
Figure A.3: Normal operation, user B

```
Network B                                              User B

      SETUP (CR1, FIE<INV, InvID=D
                    OP=Call-T-FPH> )
    |---------------------------------------------------->|
    |                                                     |
      ALERTING (CR1)
    |<----------------------------------------------------|
    |                                                     |
      CONNECT (CR1)
    |<----------------------------------------------------|
    |                                                     |
      CONNECT ACK (CR1)
    |---------------------------------------------------->|
    |                                                     |
```
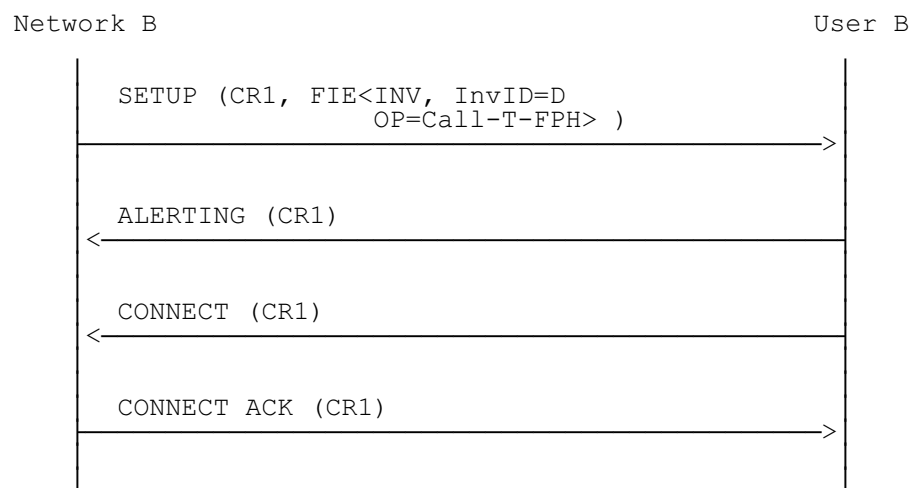
Figure A.4: Normal operation, user B private ISDN

```
          Network B                                              User B

                    │                                                 │
                    │  FACILITY(DCR, FIE<INV, InvID=B,                 │
  Monitoring        │                  OP=StatusRequest> )            │
  req ind           │─────────────────────────────────────────────────>
                    │                                                 │
                    │  FACILITY(DCR, FIE<RR, InvID=B,                  │
                    │                  RES(busy)>)                     │
                    <─────────────────────────────────────────────────│
                    │                                                 │
  Monitoring        │ < Expiry T-STATUS >                             │
  req conf          │                                                 │
                    │                                                 │
  Any call          │  FACILITY(DCR, FIE<INV, InvID=C,                 │
  cleared           │                  OP=StatusRequest> )            │
                    │─────────────────────────────────────────────────>
                    │                                                 │
                    │  FACILITY(DCR, FIE<RR, InvID=C,                  │
                    │                  RES(free)> )                    │
  User B free       <─────────────────────────────────────────────────│
                    │                                                 │
                    │  SETUP (CR2, FIE<INV, InvID=D                    │
                    │                OP=CallFPH> )                     │
                    │─────────────────────────────────────────────────>
                    │                                                 │
                    │  ALERTING (CR2)                                 │
                    <─────────────────────────────────────────────────│
                    │                                                 │
                    │  CONNECT (CR2)                                  │
                    <─────────────────────────────────────────────────│
                    │                                                 │
                    │  CONNECT ACK (CR2)                              │
                    │─────────────────────────────────────────────────>
                    │                                                 │
```

Figure A.5: Monitoring request, user B

```
            Network B                                        User B

                 │                                              │
                 │                                              │
                 │   REGISTER(CR2, FIE<INV, InvID=B,            │
   Monitoring    │                 OP=Monitor-T-Status> )       │
   request       │─────────────────────────────────────────────>│
                 │                                              │
                 │                                              │
                 │   FACILITY(CR2, FIE<RR, InvID=B > )          │
   Monitoring    │<─────────────────────────────────────────────│
   allowed       │                                              │
                 │                                              │
   User B free   │   FACILITY(CR2, FIE<INV, InvID=C,            │
                 │                 OP=Free-T-FPH> )              │
                 │<─────────────────────────────────────────────│
                 │                                              │
                 │                                              │
                 │   RELEASE (CR2)                              │
                 │─────────────────────────────────────────────>│
                 │                                              │
                 │                                              │
                 │   RELEASE COMPLETE (CR2)                     │
                 │<─────────────────────────────────────────────│
                 │                                              │
       (note)    │   SETUP (CR3, FIE<INV, InvID=D              │
                 │              OP=Call-T-FPH> )                │
                 │─────────────────────────────────────────────>│
                 │                                              │
                 │                                              │
                 │   ALERTING (CR3)                            │
                 │<─────────────────────────────────────────────│
                 │                                              │
                 │                                              │
                 │   CONNECT (CR3)                             │
                 │<─────────────────────────────────────────────│
                 │                                              │
                 │                                              │
                 │   CONNECT ACK (CR3)                         │
                 │─────────────────────────────────────────────>│
                 │                                              │
                 │                                              │
```
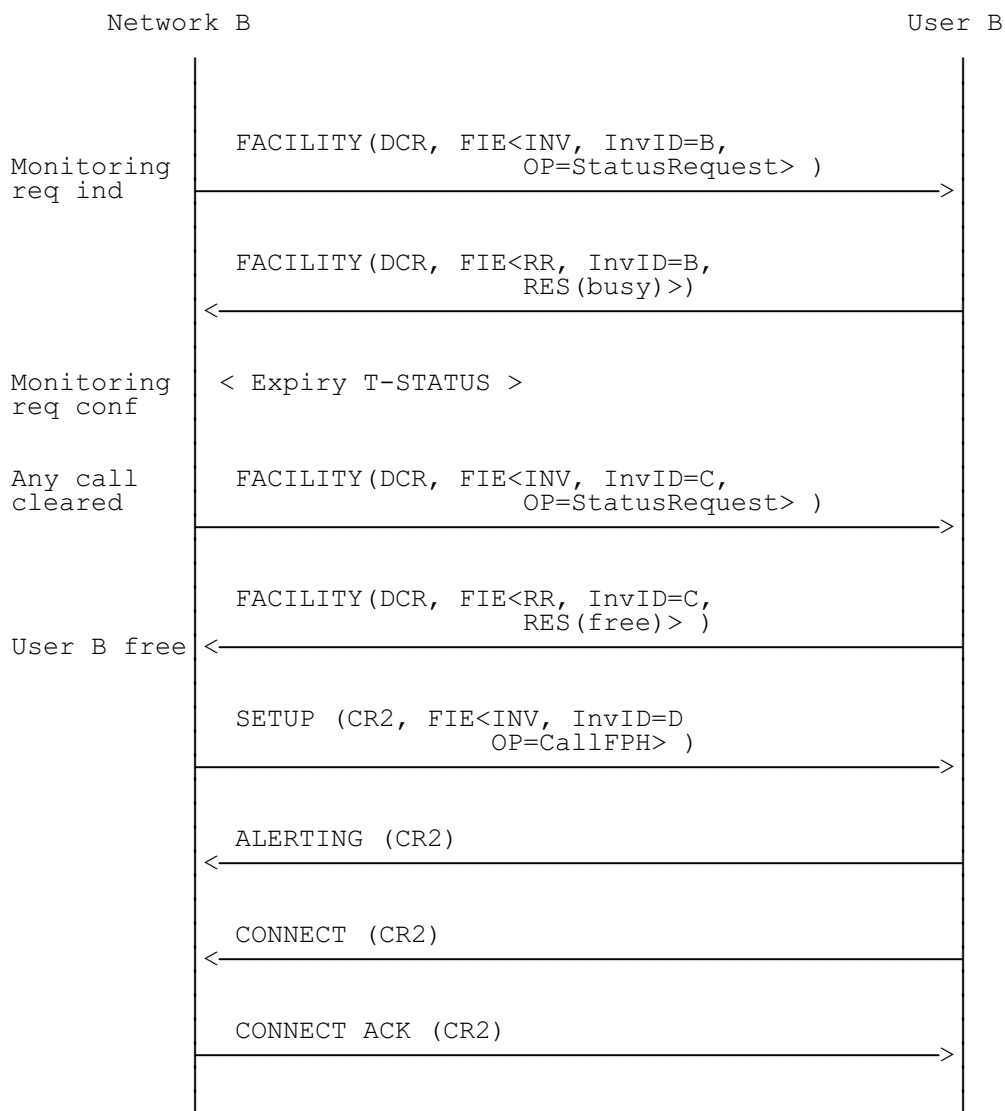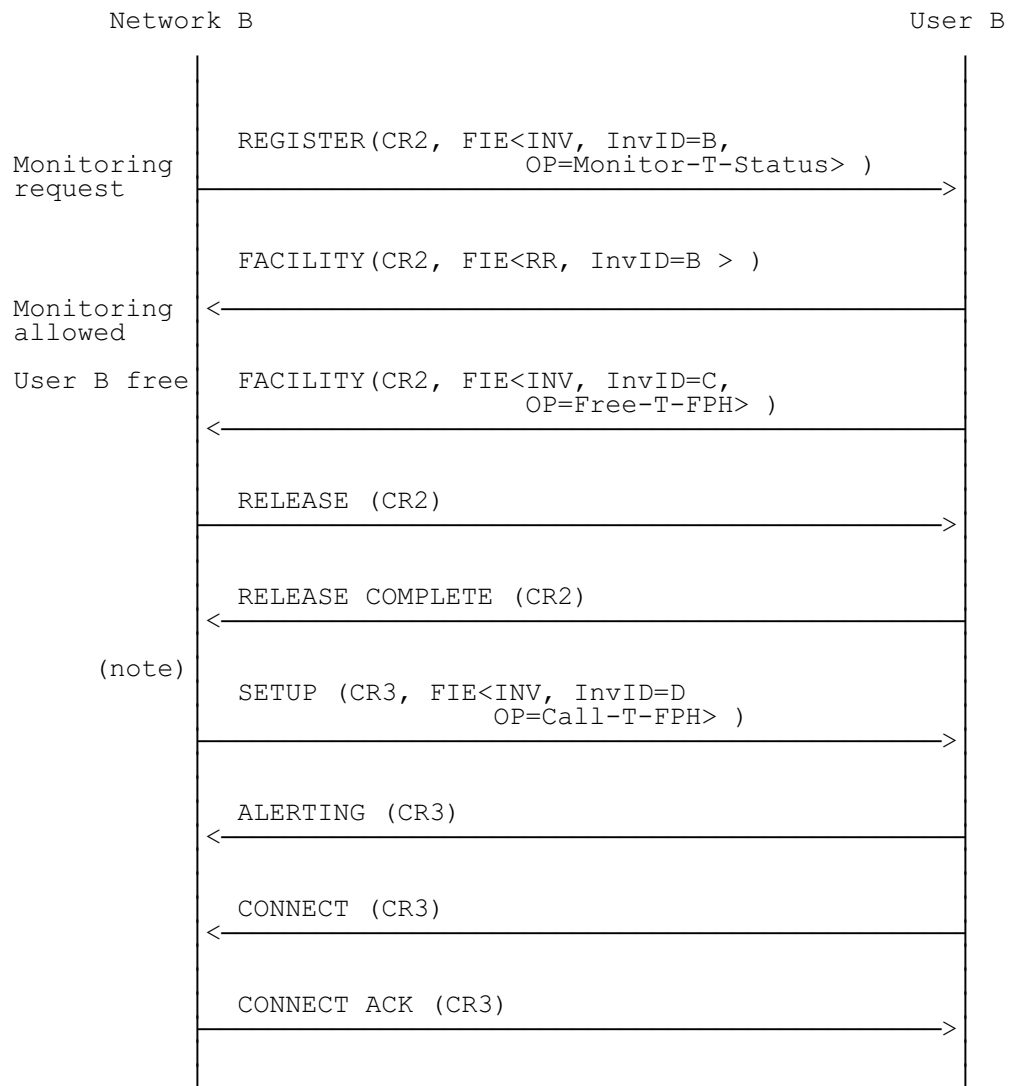
NOTE: The protocols associated with CR2 and CR3 do not need to exist at the same interface.

Figure A.6: Monitoring request, user B private ISDN

Annex B (informative): Premature release reasons and corresponding cause value

The call request may also be cleared, according to the procedures of subclause 5.3 of ETS 300 102-1 [11], due to operation of the FPH supplementary service. The network shall use the causes specified in table 4 in the DISCONNECT message sent to the calling user.

Table B.1: Premature release reasons and corresponding cause values

Release reason	Corresponding cause value
Catchment area violation	Cause #31: "normal, unspecified"
Call limiter exceeded	Cause #17: "user busy"
Unknown freephone number	Cause #1: "unallocated number"
Call gapping	Cause #42: "switching equipment congestion"
Freephone barred	Cause #21:"call rejected"
Illegal type of call	Cause #63: "service not available"
All destinations busy	Cause #17: "user busy"
Calls not allowed from calling line	Cause #21: "call rejected"
Address incomplete	Cause #28: "address incomplete"
Queueing failure	Cause #17: "user busy"

Annex C (informative):   Assignment of object identifier values

The following object identifier values are assigned in this ETS:

{ccitt identified-organization etsi(0) 210 freephone-operations(1)}

{ccitt identified-organization etsi(0) 210 freephone-operations(1) callFPH-operation(1)}

{ccitt identified-organization etsi(0) 210 freephone-operations(1) monitor-T-FPH-operation(2)}

{ccitt identified-organization etsi(0) 210 freephone-operations(1) free-T-FPH-operation(3)}

{ccitt identified-organization etsi(0) 210 freephone-operations(1) call-T-FPH-operation(4)}

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