INTERNATIONAL TELECOMMUNICATION UNION

ITU-T Q.81.1

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

GENERAL RECOMMENDATIONS ON TELEPHONE SWITCHING AND SIGNALLING

FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN

STAGE 2 DESCRIPTION FOR NUMBER IDENTIFICATION SUPPLEMENTARY SERVICES – DIRECT DIALLING-IN

ITU-T Recommendation Q.81.1

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation Q.81 was published in Fascicle VI.1 of the *Blue Book*. This file is an extract from the *Blue Book* and contains *only* the part of the Recommendation still in force. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Recommendation Q.81.1

STAGE 2 DESCRIPTION FOR NUMBER IDENTIFICATION SUPPLEMENTARY SERVICES – DIRECT DIALLING-IN

1 Direct dialling in (DDI)

1.1 *Definition*

direct dialling in (DDI) enables a user to call directly another user on a ISPBX or other private system without attendant intervention.

1.2 *Description*

1.2.1 *General description*

A part of the ISDN number, which is significant to the user, is passed to the user. This supplementary service is based on the use of the ISDN number and does not include sub-addressing.

Note 1 - A similar method to select a terminal on a passive bus is described in the Stage 1 description of the supplementary service MSN.

Note 2 - The caller may or may not find the ISDN number in the public directory.

Recommendation E.164 provides the flexibility for Administrations to use national numbering plans of fixed or variable number lengths. This flexibility also applies to DDI numbers, i.e. even within a given PABX DDI numbers of different lengths may appear.

The number of digits used by a PABX supporting the DDI feature is not necessarily known by their serving local exchange nor by any other entity of the public network.

The DDI number (fixed or variable length) is sent en-bloc or by over-lap sending from the exchange to the PABX or other private system which finally and automatically establishes a connection to the destination without the assistance of an operator.

1.2.2 *Qualifications on the applicability to telecommunication services*

No restrictions.

1.3 *Derivation of a functional model* (Step 1)

1.3.1 *Functional model description*

Two functional models are used to show the different requirements of DDI.

Functional model 1 represents the situation where DDI is used to address a terminal on a single ISPBX connected to the public network.

Functional model 2 describes the situation where DDI is used to address a terminal within a private network consisting of several PBXs.

Although functional model 1can be seen as a special application of model 2 it is preferred to describe the two models independently to show different situations more clearly.

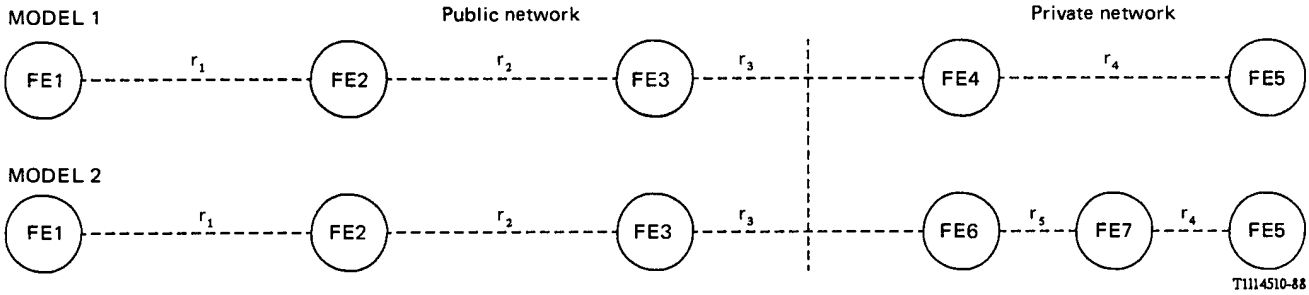


FIGURE 1-1/Q.81

Two functional models for DDI

1.3.2 *Description of the functional entities*

FE1: Call control agent of the calling user

FE2: Call control entity of the calling user

FE3: DDI Access control to the private network (located in the public network)

FE4: DDI Service control for the called user and access control in the private network

FE5: Call control agent of the called user

FE6: DDI Access control in the private network

FE7: DDI Service control in the private network for the called user.

1.3.3 *Relationship to basic service*

The call setup procedures in the public network are mainly the same as for the basic service.

FE1 and FE2 therefore have the same functionality as CCA and CC. r_1 and r_2 correspond to r_1 and r_2 in the basic service.

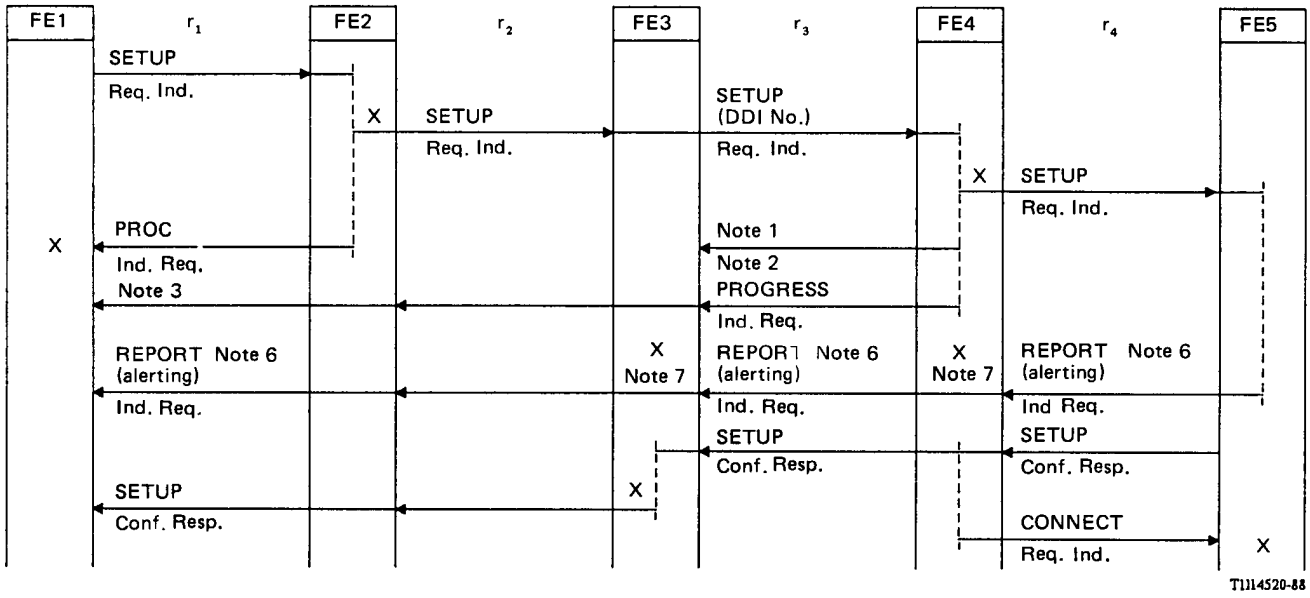
FE3 includes specific functionality of DDI in the relationship r_3.

FE4, FE6 and FE7 are entities in a private network that are only specified here as far as they are influenced by r_3. The same applies for r_4 and r_5.

1.4 *Information flow diagrams* (Step 2)

1.4.1 *Diagrams*

The diagrams for model 1 are shown in Figure 1-2/Q.81.



X Through connection of the switch

FIGURE 1-2/Q.81

En bloc sending to an ISDN terminal on a PABX

1.4.1.1 *Diagrams for model 2*

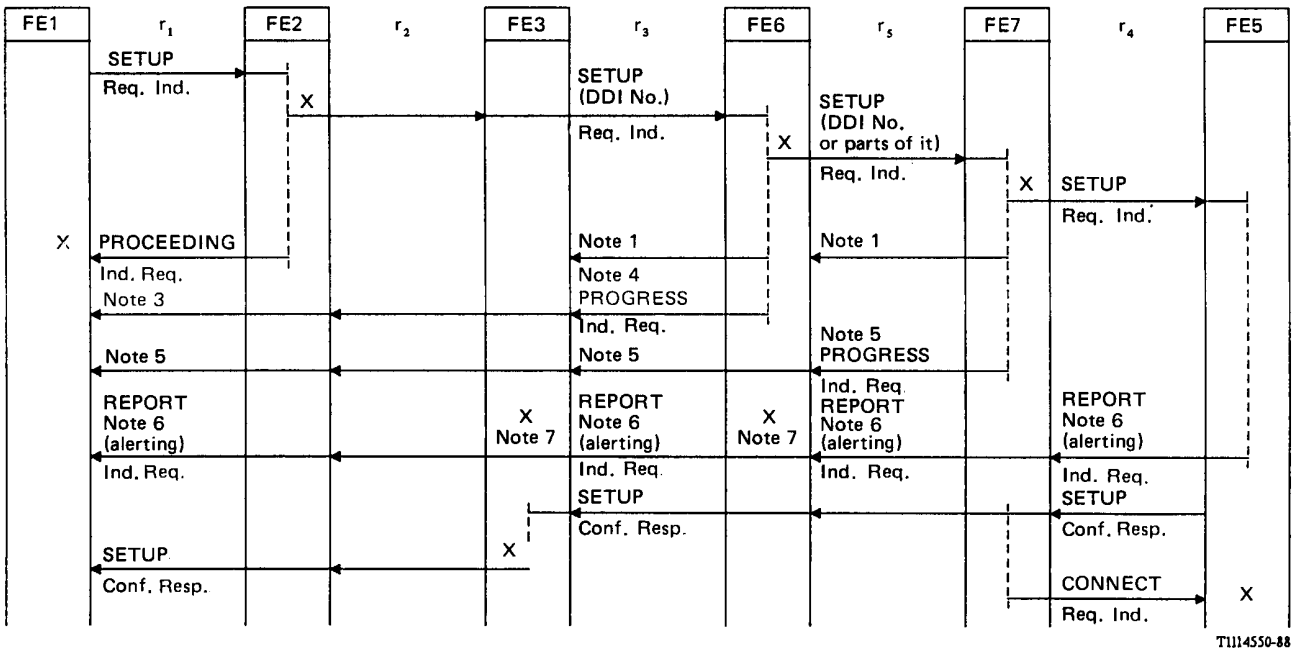


FIGURE 1-3/Q.81

En bloc sending to a private network

Notes to Figures 1-2/Q.81 and 1-3/Q.81

Note 1 - Optional signalling information which may be used to acknowledge seizure and/or for B channel negotiation.

Note 2 - Optional signalling information which may be used to indicate complete address information.

Note 3 - If not already sent, this signalling information may be sent to the originating user to indicate complete address information.

Note 4 - If the PABX recognizes the receipt of complete address information, this signalling information may be sent.

Note 5 - On receipt of complete address information, this signalling information may be generated by the sub-PABX. If already sent by the PABX, it will not be transferred to the originating user.

Note 6 - Instead of ALTERTING, a CONNECT signalling information may be sent directly in case of an automatically responding terminal.

Note 7 - Optional early switch through backward transmission path.

1.4.2 *Definitions*

The definitions for ACK, ADDRESS INFO, PROCEEDING, REPORT and SETUP are the same as for the basic service.

1.4.2.1 *Meaning of [PROGRESS]*

PROGRESS can be sent from the entity serving the called user to indicate that sufficient ADDRESS INFO was received to address a user terminal or access line. It is an unconfirmed information flow.

1.4.2.2 *Information content of [PROGRESS]*

B-channel information in r_3 if not yet included in a previous sent information element.

1.5 *SDL diagrams of functional entities* (Step 3)

SDL diagrams are provided for FE3 covering the aspects of both functional models and giving the relation between r_2 and r_3. FE1 and FE2 are, as said, already covered by the basic procedures so that all aspects of DDI, that are relevant for the public network, are covered in these diagrams.

In the SDL diagrams only those procedures are described that deviate from the basic procedures.

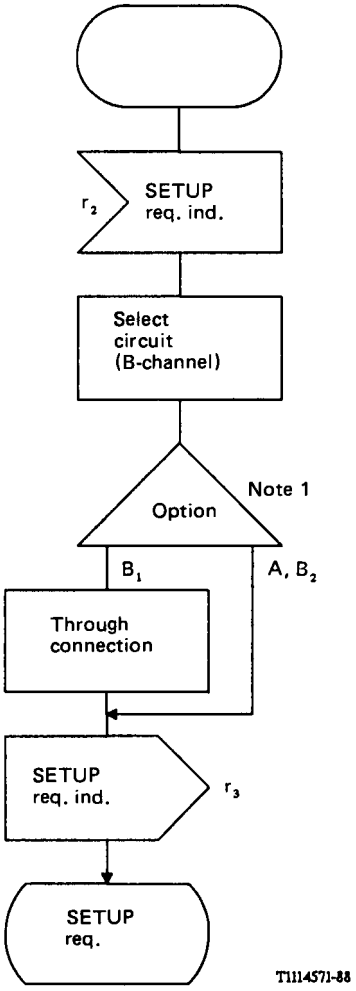


FIGURE 1-4/Q.81 (Sheet 1 of 3)

DDI functions in FE3

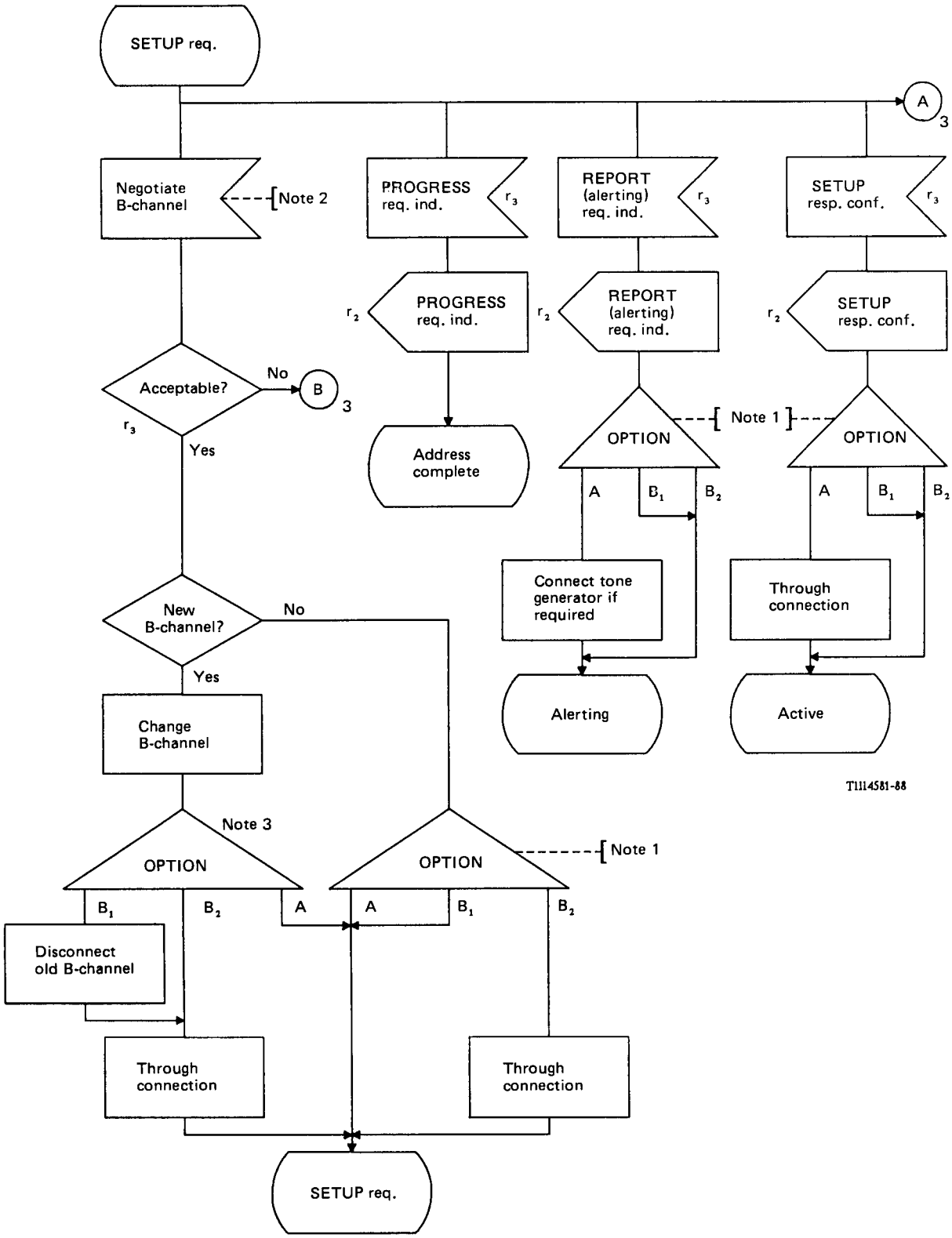


FIGURE 1-4/Q.81 (Sheet 2 of 3)

DDI functions in FE3

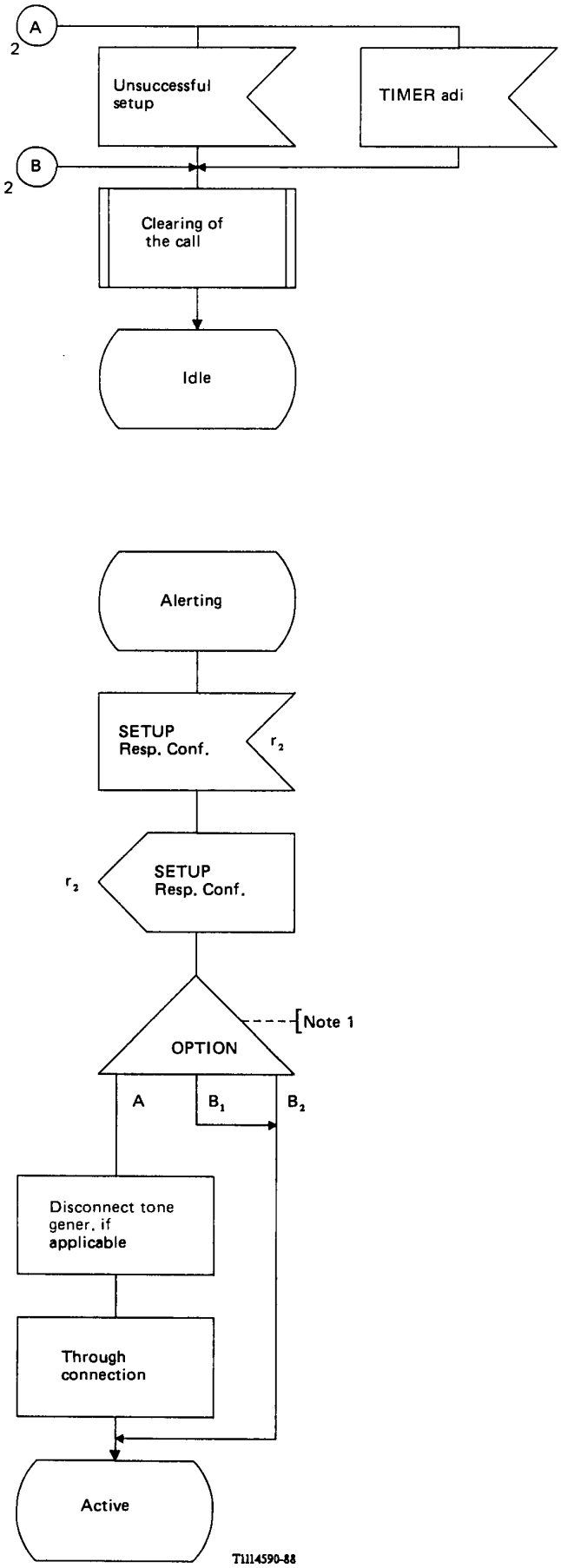


FIGURE 1-4/Q.81 (Sheet 3 of 3)

DDI functions in FE3

Notes to Figure 1-4/Q.81 (sheets 1 to 3)

Note 1 - Through connection is generally only done when the setup confirmation is received from the called user. This is described in option A.

In specific national applications through connection may already be done in an earlier point in time. This is covered in options B1 or B2 and requires further considerations.

Note 2 - Negotiation of a B channel is not necessarily an independent information flow. It can be combined with the first backward information flow that is required for call control. This information flow can be PROGRESS, REPORT (alerting) or SETUP.

1.6 *Functional entity actions* (Step 4)

1.6.1 *Specific actions in FE3*

1.6.1.1 *Channel selection*

Negotiation for the selection of a B-channel will be permitted between the network and the PABX. The selection procedure is as follows:

a) in the SETUP Request, the network will indicate one of the following:

   1) channel is indicated, no acceptable alternative; or

   2) channel is indicated, any alternative is acceptable; or

   3) any channel is acceptable.

b) In cases 1) and 2), if the indicated channel is acceptable and available, the PABX selects it for the call.

   In case 2), if the PABX cannot grant the indicated channel, it selects any other available B-channel and identifies that channel in the first information sent in response to the SETUP Indication.

   In case 3), the PABX selects any available B-channel and identifies that channel in the first information sent in response to the SETUP Indication.

c) If no channel identification information element is present in the first response, the B-channel indicated in the SETUP Request will be assumed.

   If the B-channel indicated in the first response is unacceptable to the network, it will clear the call.

d) When a B-channel has been selected by the PABX that channel may be connected by the PABX.

e) In case 1), if the indicated B-channel is not available, or in cases 2), 3), if no B-channel is available and the PABX cannot proceed with the offered call, the PABX clears the call.

The preferred solution for B-channel selection is alternative l): B-channel is selected by exchange B.

1.6.1.2 *Through connection*

The general time for through connection in FE3 is, when setup is confirmed by the called user. This prevents fraudulent use of the connection without charging.

As a consequence of this procedure all tones and announcements during call setup have to be generated in the public network.

As an alternative some network providers may allow for an early through connection.

1.6.2 *Specific actions in FE6 and FE7*

1.6.2.1 *Through connection*

In case of an ISDN terminal or sub-PABX connected to the PABX, the through connection of the B-channel in the PABX is done with the sending of SETUP to the terminal/sub-PABX. In the sub-PABX the through connection is done with the sending of SETUP to the terminal. In the terminal the through connection is done at the receipt of CONNECT ACKNOWLEDGE from the PABX/sub-PABX.

In case of an analogue terminal connected to the ISDN PABX/sub-PABX the through connection of the B-channel in the terminal is done with the sending of CONNECT to the ISDN PABX/sub-PABX. In the ISDN PABX/sub-PABX the through connection is done at the receipt of SETUP Confirmation from the terminal. Note that this case is for further study.

1.7 *Allocation of functional entities to physical locations*

The mapping between functional entities and their possible physical locations is given in the following matrix.

Functional entities / Scenario	FE1	FE2	FE3	FE4	FE5	FE6	FE7
Call to ISPBX	TE	LE	LE	NT2	TE	—	—
Call to private network	TE	LE	LE	—	TE	NT2	NT2