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OF ITU

Q.82

(03/93)

**GENERAL RECOMMENDATIONS
ON TELEPHONE SWITCHING
AND SIGNALLING**

**FUNCTIONS AND INFORMATION FLOWS
FOR SERVICES IN THE ISDN**

**STAGE 2 DESCRIPTION FOR CALL
OFFERING SUPPLEMENTARY SERVICES
CLAUSE 2 – CALL FORWARDING
CLAUSE 3 – CALL DEFLECTION**

ITU-T Recommendation Q.82

(Previously “CCITT Recommendation”)

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation Q.82 was revised by the ITU-T Study Group XI (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

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

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SUMMARY

This Recommendation provides the Stage 2 description for the Call Forwarding supplementary services, supported by an ISDN. The Stage 2 descriptions are comprised of the switching functions and the signalling information flows.

The Call Forwarding Unconditional supplementary service permits a served user to have the network send to another number all incoming calls for the served user's number (or just those associated with a specified basic service). The served user's originating service is unaffected. If this service is activated, calls are forwarded no matter what the condition of the termination.

The Call Forwarding on Busy supplementary service permits a served user to have the network send to another number all incoming calls for the served user's number (or just those associated with a specified basic service) which meet busy at the served user's ISDN number. The served user's originating service is unaffected.

The Call Forwarding on No Reply supplementary service permits a served user to have the network send to another number all incoming calls for the serviced user's number (or just those associated with a specified basic service) which meet no reply at the served user's ISDN number. The served user's originating service is unaffected.

This Recommendation provides the Stage 2 description for the Call Deflection supplementary service, supported by an ISDN.

The Stage 2 descriptions are comprised of the switching functions and the signalling information flows.

The Call Deflection supplementary service permits a serviced user to, in real time, request that the network redirects an incoming call addressed to the served user's ISDN number to another number. The served user's originating service is unaffected.

STAGE 2 DESCRIPTION FOR CALL OFFERING SUPPLEMENTARY SERVICES

(Melbourne, 1988; modified at Helsinki, 1993)

2 Call forwarding

2.1 Scope

This Recommendation defines the Stage 2 for the Call Forwarding supplementary services (CFB, CFNR, CFU) of Integrated Services Digital Network (ISDN) as provided by public telecommunications operators. Stage 2 identifies the functional capabilities and the information flows needed to support the service description. The Stage 2 description also identifies user operations not directly associated with a call (see Recommendation I.130 [1]).

This Recommendation is specified according to the methodology specified in Recommendation Q.65 [2].

This Recommendation does not formally describe the relationship between this supplementary service and the basic call, but where possible this information is included for guidance.

In addition, this Recommendation does not specify the requirements where the service is provided to the user via a private ISDN. This Recommendation does not specify the requirements for the allocation of defined functional entities within a private ISDN; it does however define which functional entities may be allocated to a private ISDN.

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

This Recommendation describes the three versions of Call Forwarding supplementary services, when implemented using the “forward switching” network routing algorithm and partial rerouting at the public/private network interface as contained in Recommendation Q.80 [3].

The description of full rerouting as described in Recommendation Q.80 is outside the scope of this Recommendation.

The procedures for the activation/deactivation/registration of the forwarding services are contained in Annex B.

The CFU supplementary service permits a served user to have the network send to another number all incoming calls for the served user’s number (or just those associated with a specified basic service). The served user’s originating service is unaffected. If this service is activated, calls are forwarded no matter the condition of the termination.

The CFB supplementary service permits a served user to have the network send to another number all incoming calls for the served user’s number (or just those associated with a specified basic service) which meet busy at the served user’s ISDN number. The served user’s originating service is unaffected.

The CFNR supplementary service permits a served user to have the network send to another number all incoming calls for the served user’s number (or just those associated with a specified basic service) which meet no reply at the served user’s ISDN number. The served user’s originating service is unaffected.

The forwarded-to number is registered with the network for use on all calls.

This Recommendation is applicable to the Stage 3 Recommendations for the ISDN Forwarding supplementary services CFB, CFNR and CFU. The term “Stage 3” is also defined in Recommendation I.130 [1]. Where the text indicated the status of a requirement, i.e. as strict command or prohibition, as authorization leaving freedom, as a capability or possibility, this shall be reflected in the text of the relevant Stage 2 and Stage 3 Recommendations.

Furthermore, conformance to this Recommendation is met by conforming to the Stage 3 Recommendations with the field of application appropriate to the equipment being implemented. Therefore no method of testing is provided for this Recommendation.

2.2 References

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

- [1] CCITT Recommendation I.130 *Method for the characterization of telecommunication services supported an ISDN and network capabilities of an ISDN*, 1988.
- [2] CCITT Recommendation Q.65 *Stage 2 of the method for the characterization of services supported by ISDN*, 1988.
- [3] CCITT Recommendation Q.80 *Introduction to stage 2 service descriptions for supplementary services*, 1988.
- [4] CCITT Recommendation Q.71 *ISDN 64 kbit/s circuit mode switched bearer service*, 1992.
- [5] CCITT Recommendation I.112 *Vocabulary of terms for ISDNs*, 1988.
- [6] CCITT Recommendation E.164 *Numbering plan for the ISDN era*, 1988.
- [7] CCITT Recommendation I.252.2 *Call Forwarding Busy (CFB)*, 1992.
- [8] CCITT Recommendation I.252.3 *Call Forwarding No Reply (CFNR)*, 1992.
- [9] CCITT Recommendation I.252.4 *Call Forwarding Unconditional (CFU)*, 1992.

2.3 Definitions

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

Integrated Services Digital Network (ISDN): See 2.3/I.112 [5], definition 308.

Service - telecommunications service: See 2.2/I.112 [5], definition 201.

ISDN number: A number conforming to the numbering plan and structure specified in Recommendation E.164 [6].

originally called number: The number of the B1-party.

connected number: The number of the final destination (C-party).

forwarding number: The number of the served user, i.e. the subscriber who initiates the forwarding service and from where the call has been forwarded.

forwarded-to number (FTN): The number to which a call has been forwarded.

forwarding indicator (FI): Indicator showing that a call has been forwarded and indicating whether this information should be given to the calling party.

forwarding indication: Indication for the served user that forwarding has occurred.

presentation indicator (PI): Indicator showing whether the FTN should be presented to the calling user, as derived from the C-party's COLR supplementary service.

forwarding cause: Parameter which contains the reason for the forwarding, e.g. CFU, CFB, CFNR, CD.

network facility indicator (NFI): Indicator showing the preferred transit network or a network specific facility to be used for forwarding.

2.4 Symbols and abbreviations

Abbreviations used:

BC	Basic Call
CC	Call Control
CCA	Call Control Agent
CD	Call Deflection
CFB	Call Forwarding on Busy
CFNR	Call Forwarding No Reply
CFPC	Call Forwarding Profile Control
CFU	Call Forwarding Unconditional
FC	Forwarding Cause
FE	Functional Entry
FI	Forwarding Indicator
FTN	Forwarded-to Number
GD	Global Data
LE	Local Exchange
NDUB	Network Determined User Busy
NFI	Network Facility Indicator
NSO	Notification Subscription Option
PI	Presentation Indicator
PN	Private Network
PNX	Private Network Exchange
SCE	Service Control Entity
SCM	Service Control Model
TE	Terminal Equipment
UDUB	User Determined User Busy

2.5 Description

The general description of the CFB supplementary service is specified in I.252.2 [7].

The general description of the CFNR supplementary service is specified in I.252.3 [8].

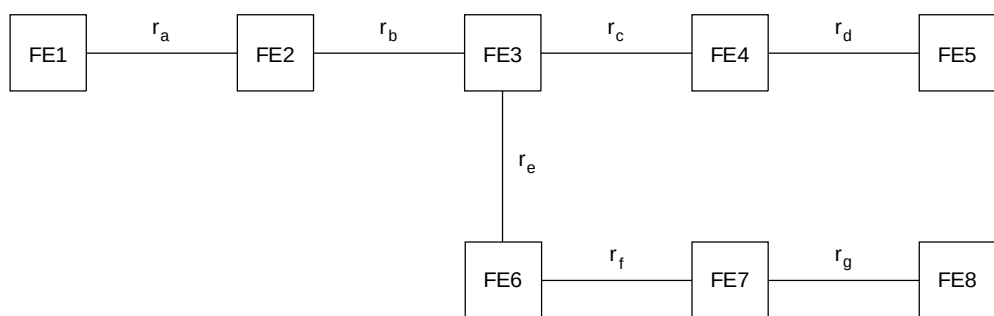
The general description of the CFU supplementary service is specified in I.252.4 [9].

2.6 Derivation of the functional model

2.6.1 Functional model description

The functional model for the CF supplementary service is shown in Figure 2-1.

NOTE – The addition of the functional model for the activation/deactivation/registration of the forwarding services is contained in Figure B.2-1.



T1126410-90/d01

FIGURE 2-1/Q.82
Functional model

2.6.2 Description of the functional entities

The functional entities required by the CF supplementary service in addition to those of the basic call are as follows:

- FE1: Caller's service agent
- FE2: Caller's service control entity
- FE3: Call forwarding execution entity
- FE4: Call forwarding detection and control entity
- FE5: Served user's service agent
- FE6: Interface controlling entity
- FE7: Forwarded-to user's service control entity
- FE8: Forwarded-to user's service agent

2.6.3 Relationship with a basic service

The relationship with a basic service is shown in Figure 2-2.

NOTE – The relationship in Figure 2-3 covers scenarios 8 and 9 in 2.10.

2.7 Information flows

2.7.1 Information flows diagram

The information flows for the Call Forwarding supplementary service are shown in Figures 2-4 to 2-12.

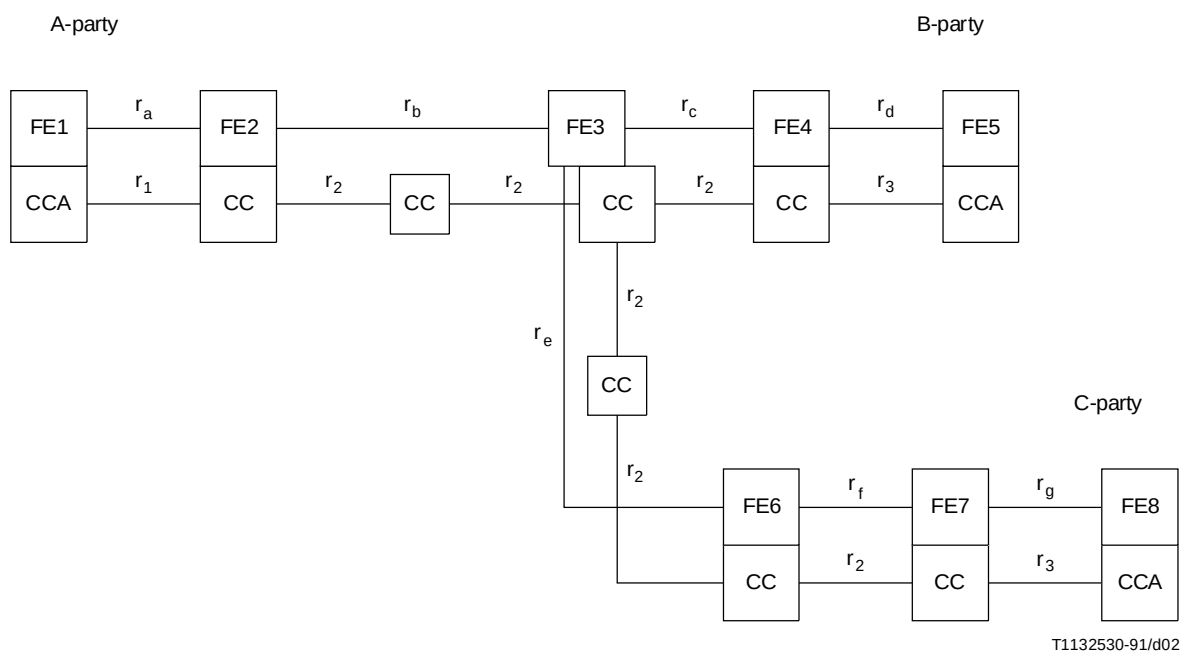


FIGURE 2-2/Q.82
Relationship with a basic service

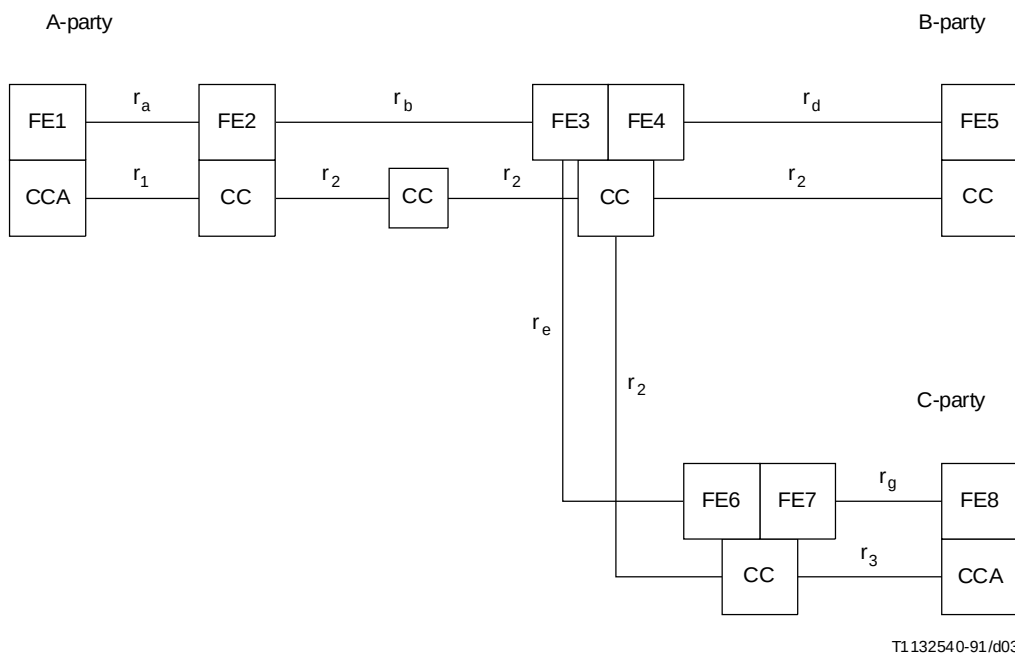
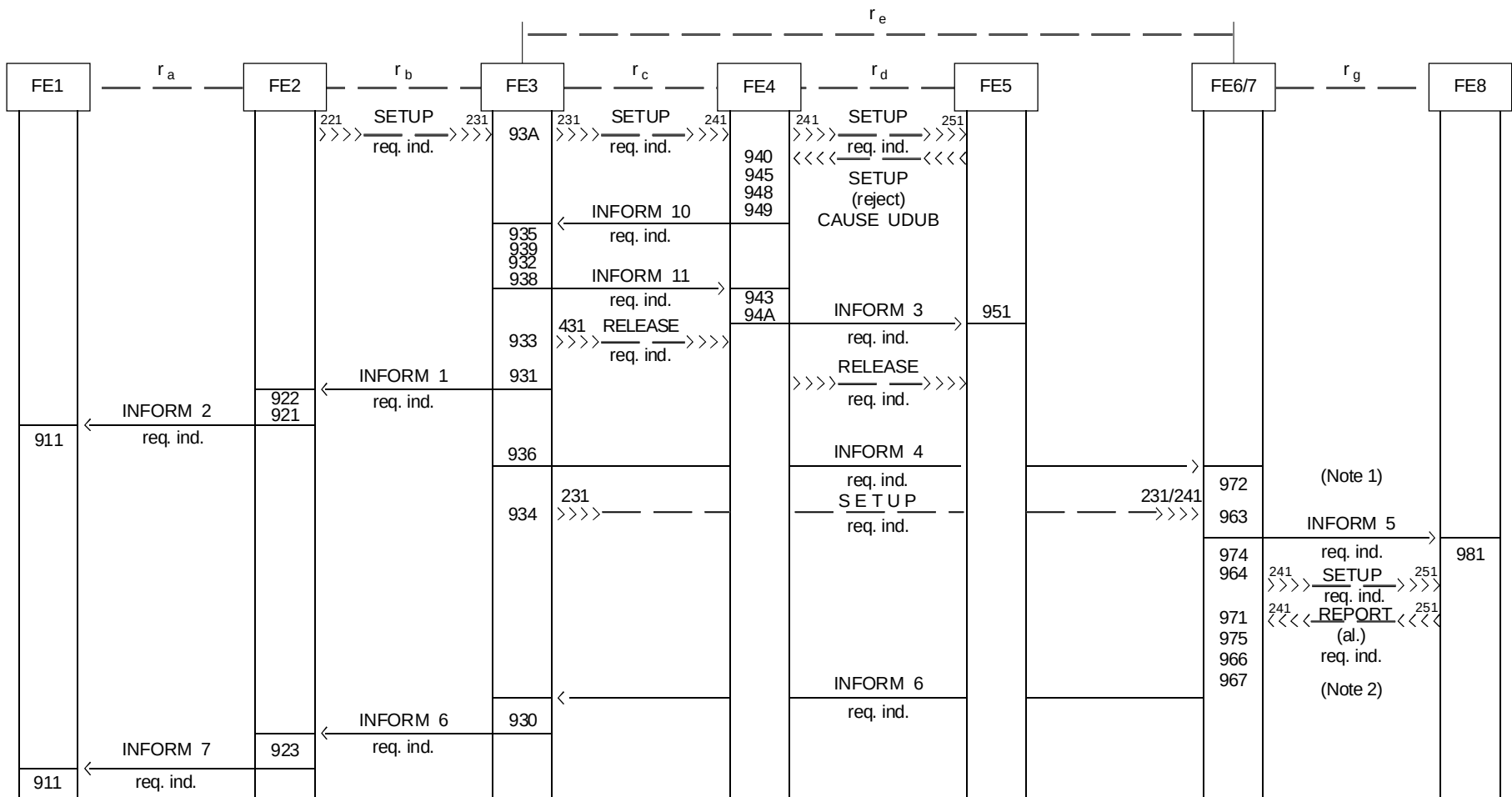


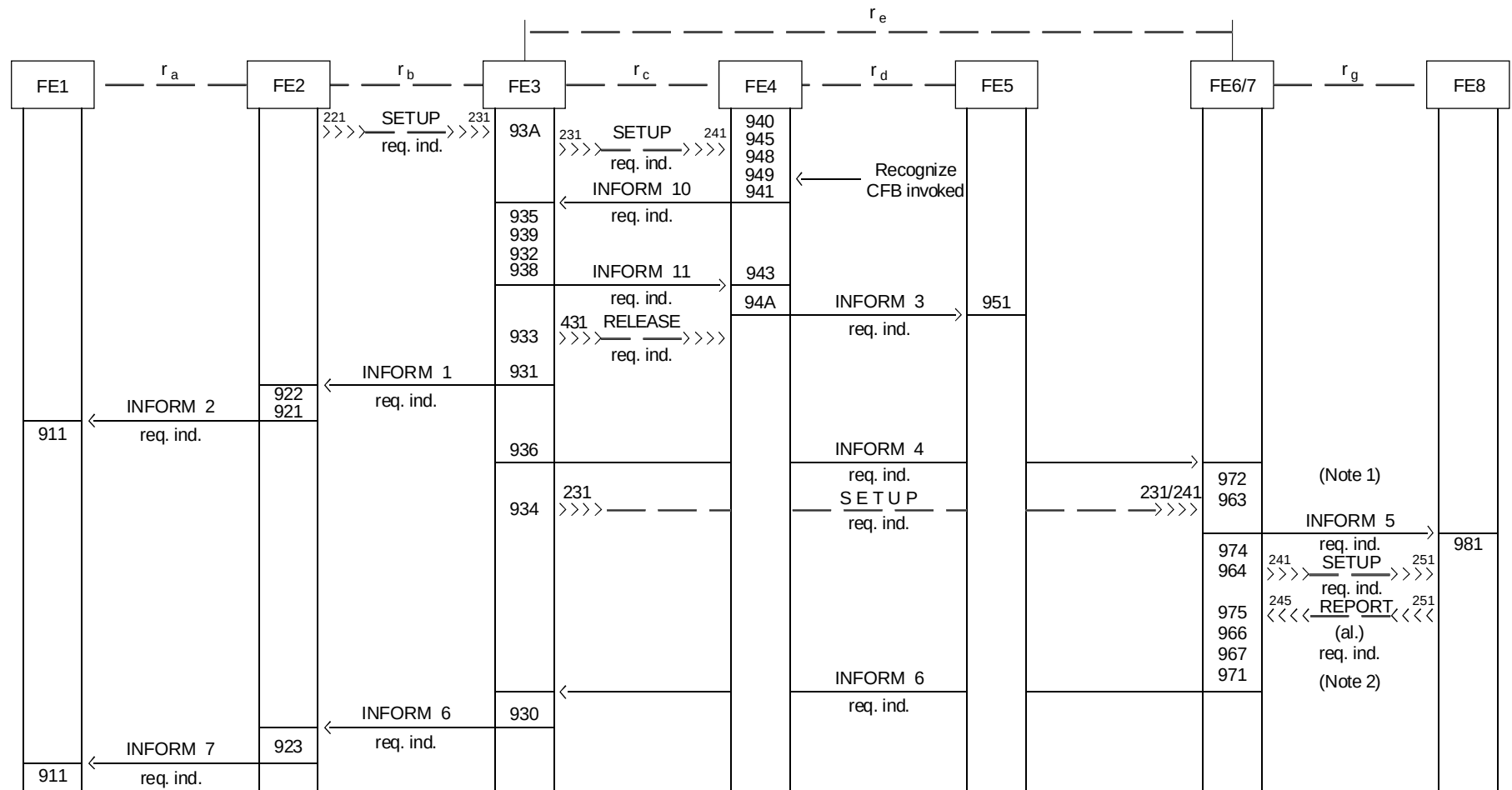
FIGURE 2-3/Q.82



T1144110-92/d04

NOTE – The notes are found after Figure 2-12.

FIGURE 2-4/Q.82
Information flow of CFB, UDUB

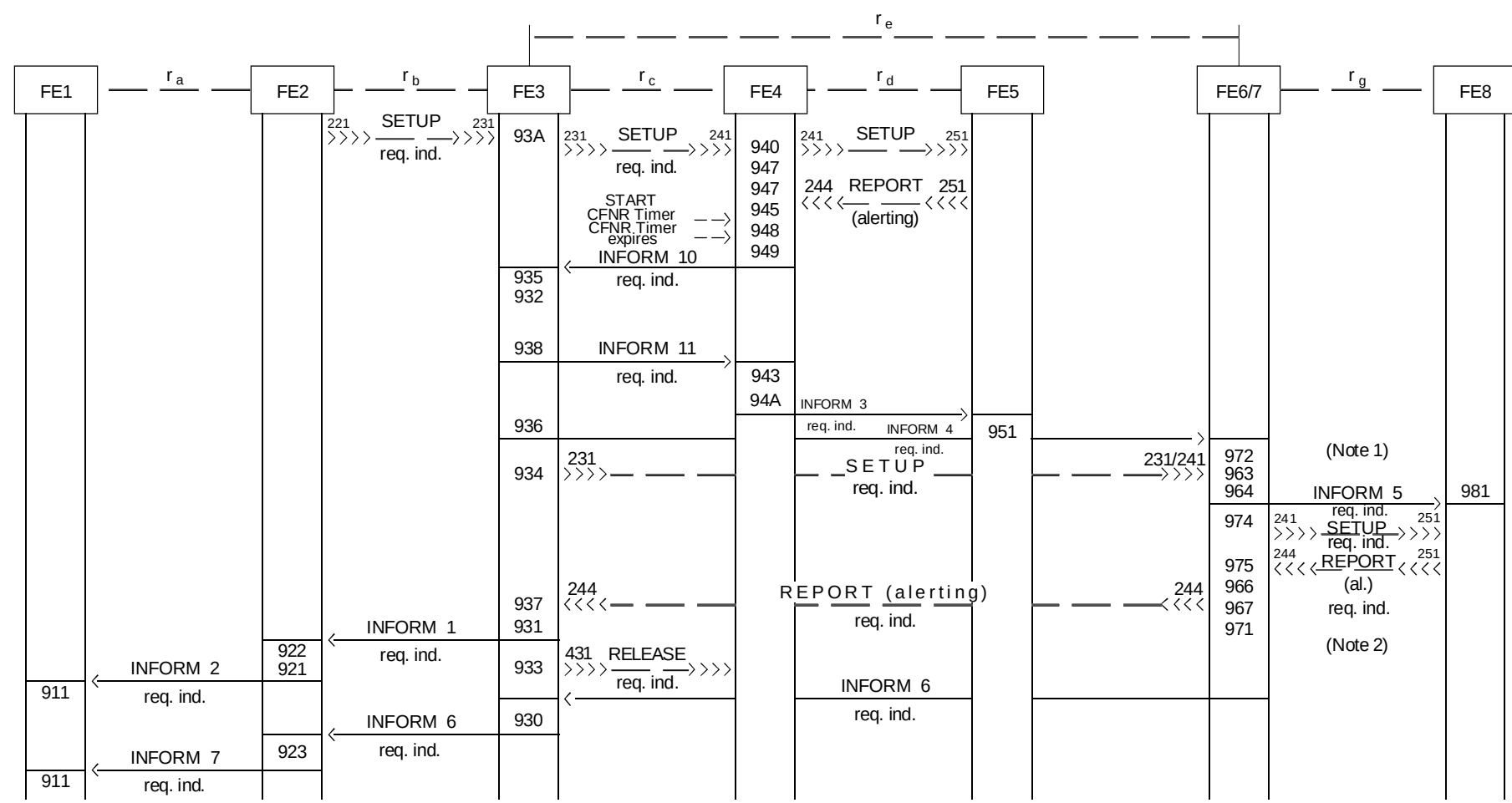


T1144120-92/d05

NOTE – The notes are found after Figure 2-12.

FIGURE 2-5/Q.82

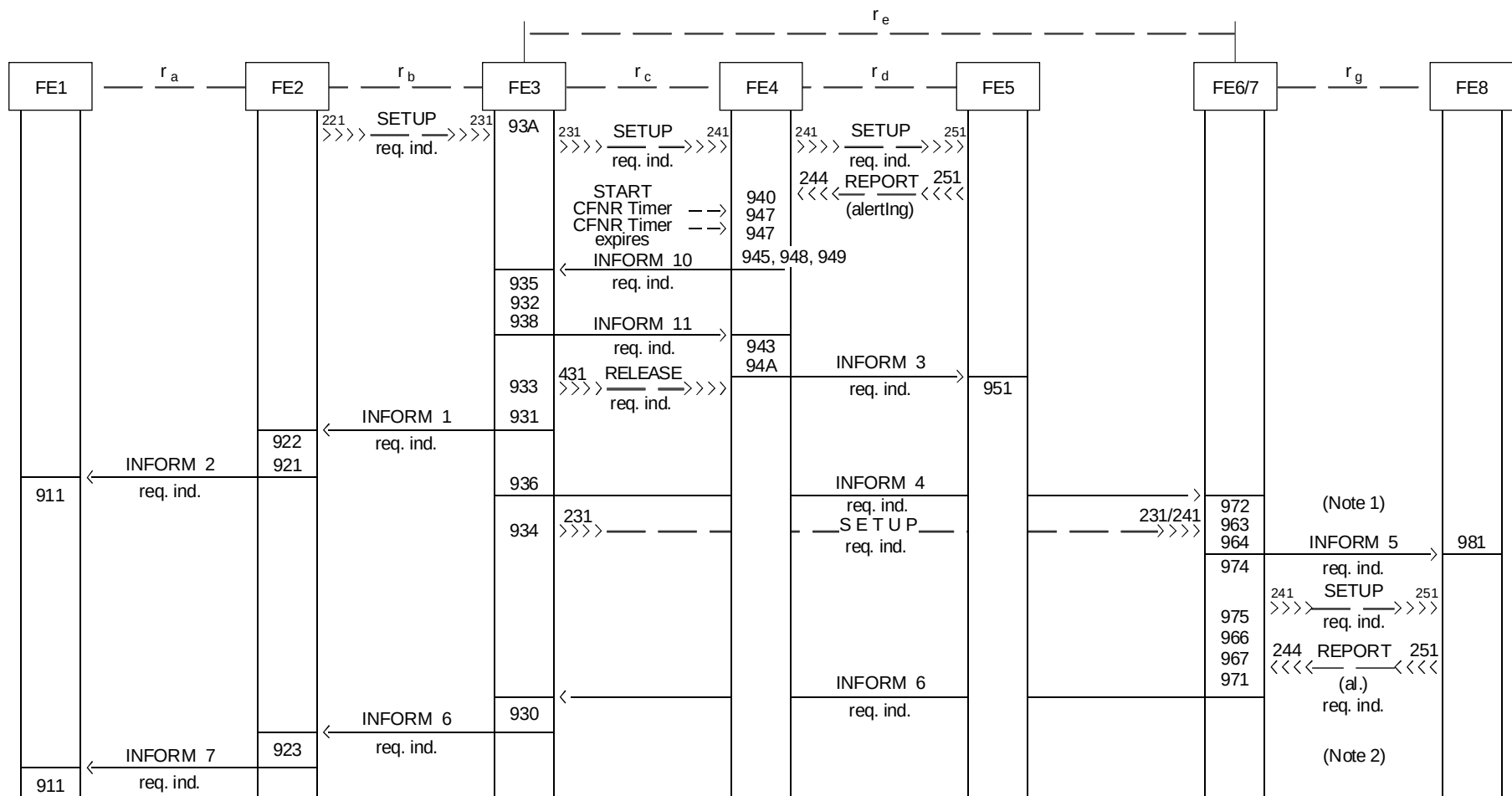
Information flow of CFB, NDUB



T1144130-92/d06

NOTE – The notes are found after Figure 2-12.

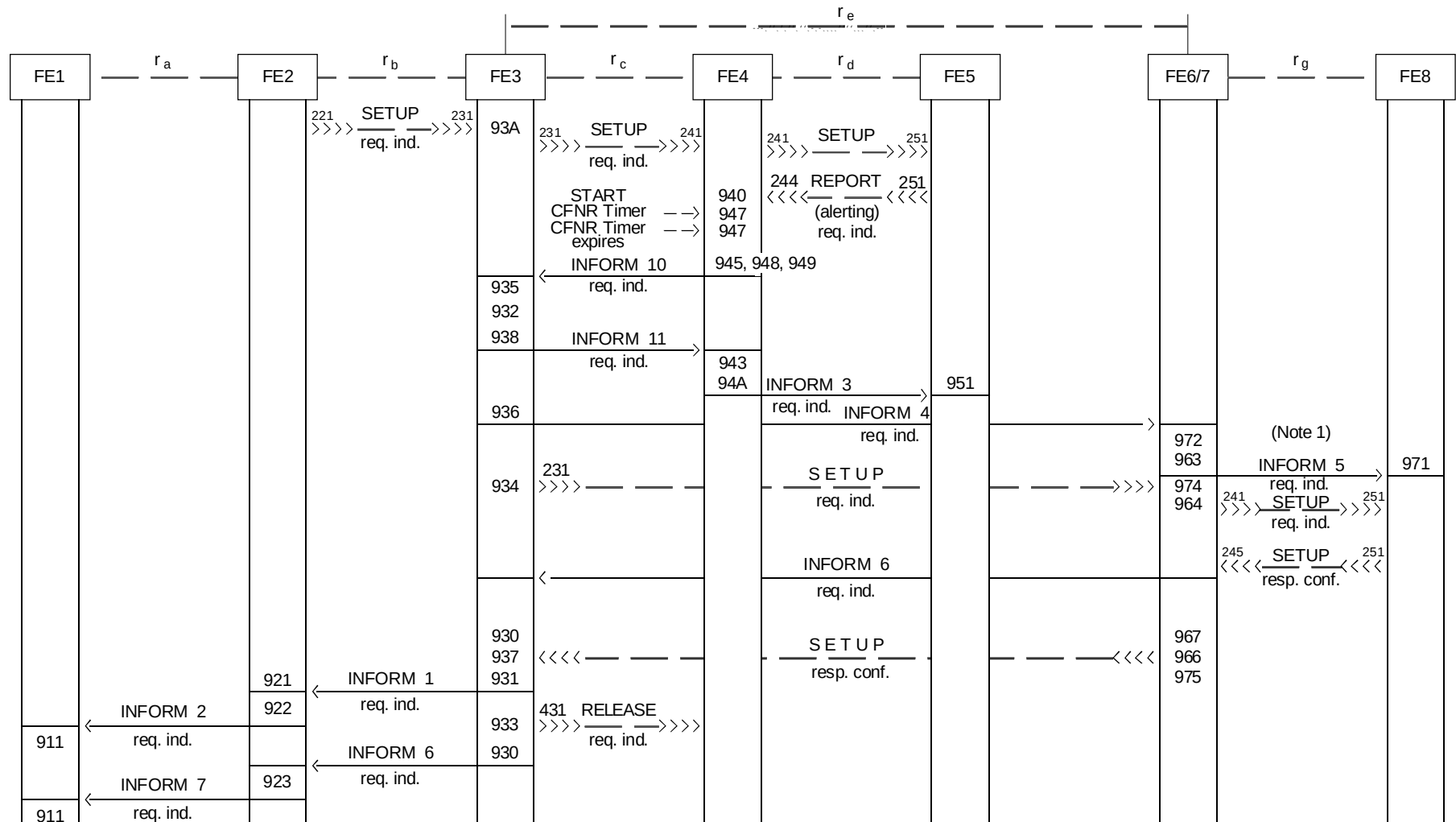
FIGURE 2-6/Q.82
CFNR, Option A, late release



T1144140-92/d07

NOTE – The notes are found after Figure 2-12.

FIGURE 2-7/Q.82
CFNR, Option B, early release

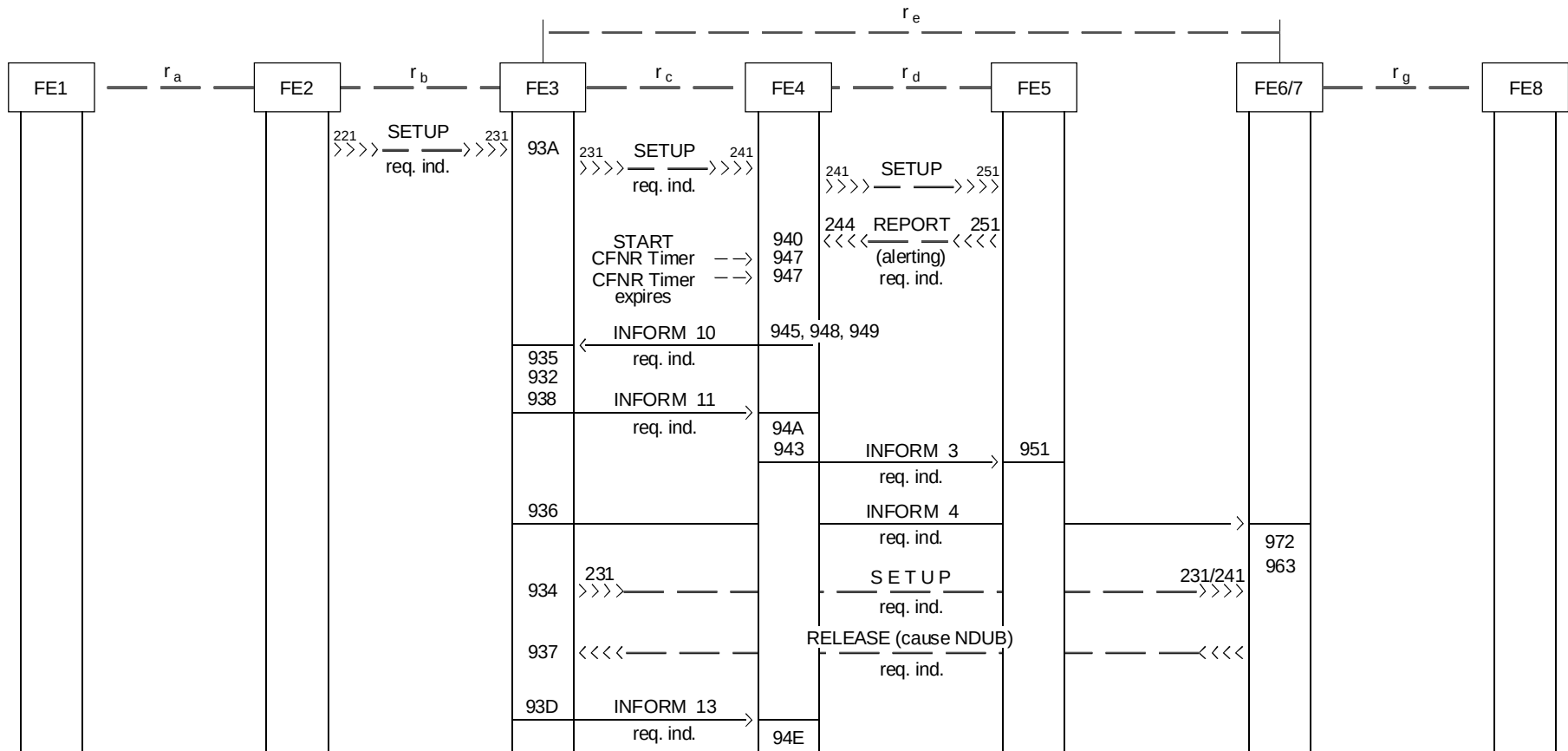


T1144150-92/d08

NOTE – The notes are found after Figure 2-12.

FIGURE 2-8/Q.82

CFNR, Option A, late release, C has automatic answering equipment

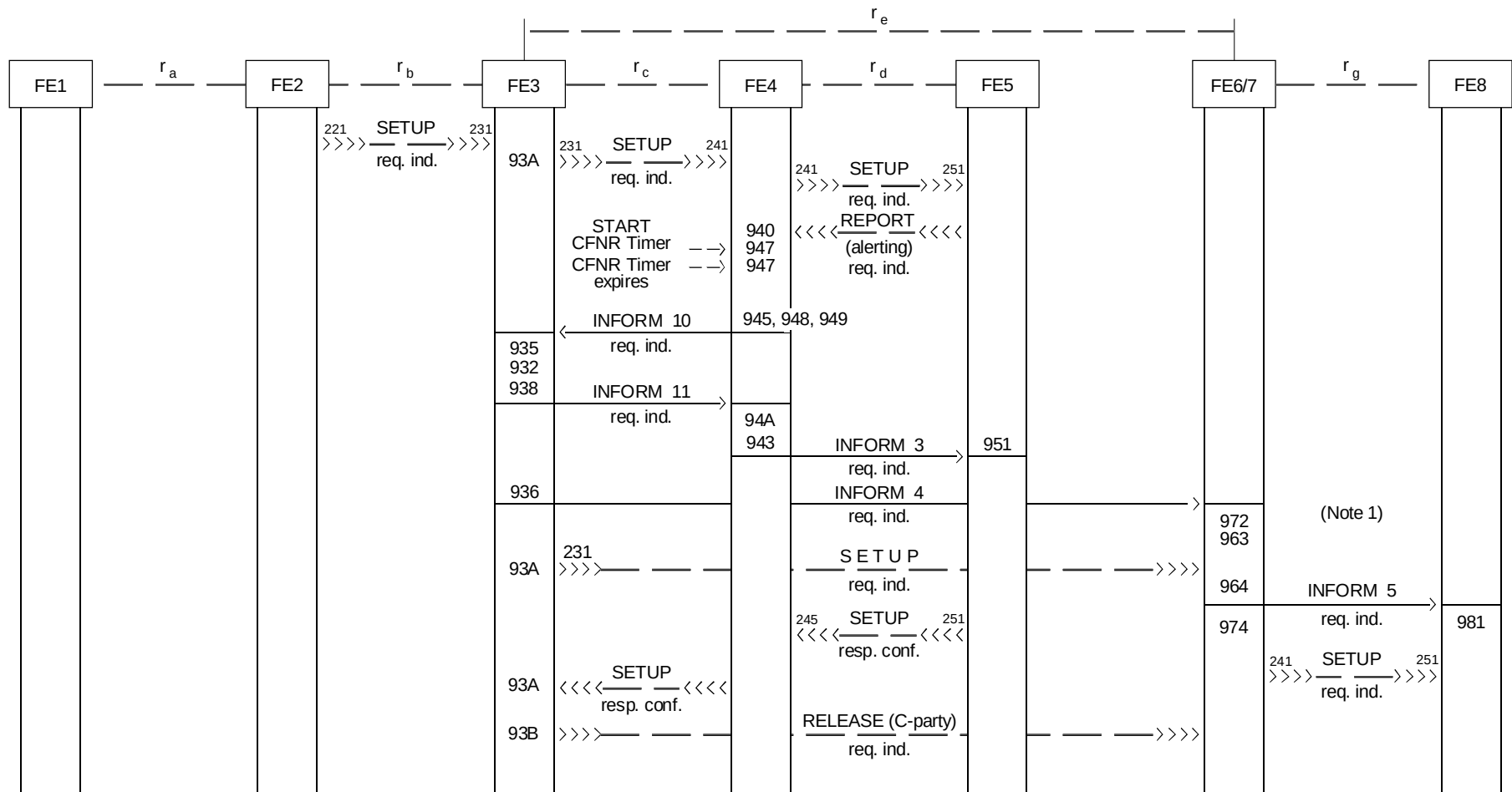


(Note 3)

T1144160-92/d09

NOTE – The notes are found after Figure 2-12.

FIGURE 2-9/Q.82
CFNR, Option A, late release, C-party NDUB

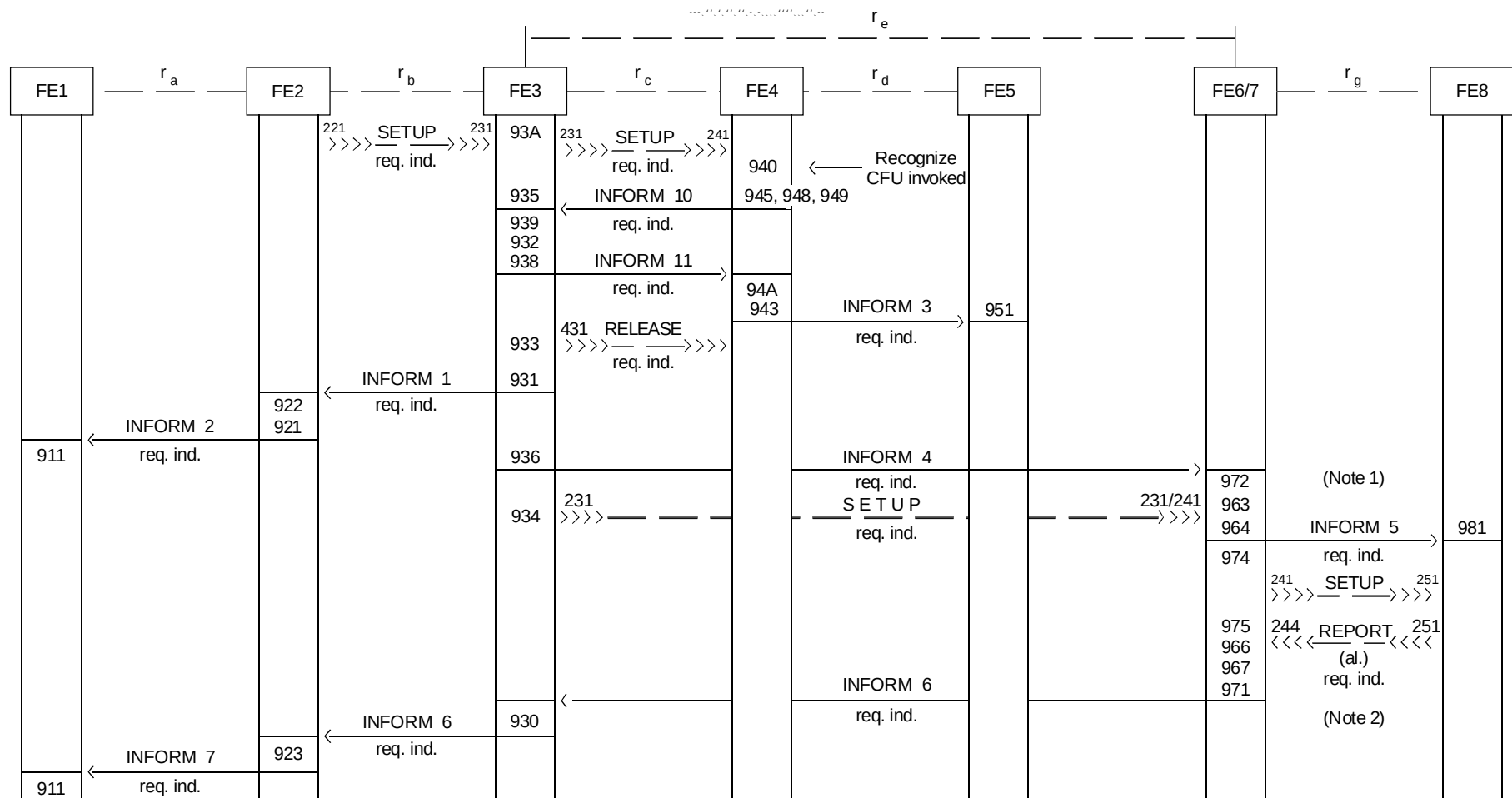


T1144170-92/d10

NOTE – The notes are found after Figure 2-12.

FIGURE 2-10/Q.82

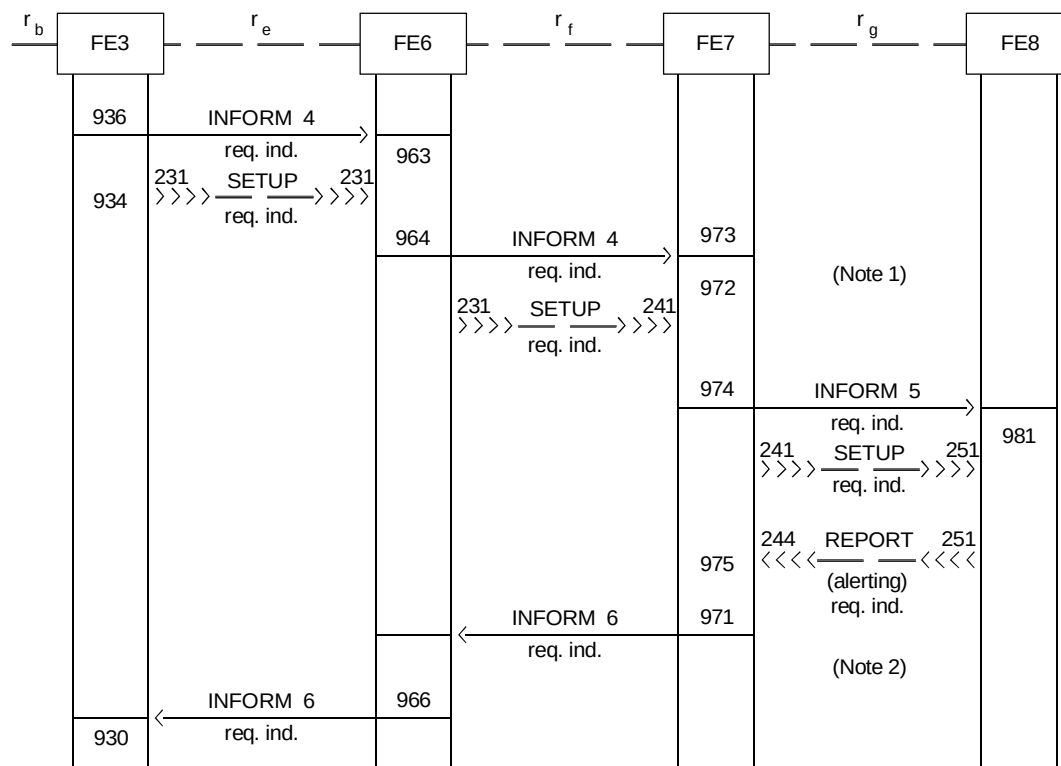
CFNR, Option A, late release, B-party answers before receipt of alerting of the C-party



T1144180-92/d11

NOTE – The notes are found after Figure 2-12.

FIGURE 2-11/Q.82
Information flow for CFU



T1144190-92/d12

FIGURE 2-12/Q.82

Flows across the public/private network interface at C-party

NOTES related to the Figures 2-4 to 2-12:

- The INFORM 5 shall be presented to FE8 not later than the associated SETUP req. ind.
- In case of:
 - COLR temporary mode activated at C; or
 - immediately responding terminal at C,
 the PI-value will be determined on receipt of SETUP resp. conf from FE8.
- The information flow "INFORM 13" is optional; i.e. only required with the option to restart the CFNR timer.

2.7.2 Definition of individual information flows

Relationship r_a

INFORM 2 (Notes 2 and 8)

The contents of INFORM 2 are shown in Table 2-1.

TABLE 2-1/Q.82

Parameter	Allowed value	req.ind.
Forwarding indicator		M

INFORM 7 (Notes 3 and 8)

The contents of INFORM 7 are shown in Table 2-2.

TABLE 2-2/Q.82

Parameter	Allowed value	req.ind.
Forwarded-to number	– ISDN number – Number restricted – Number not available	M

Relationship r_b

INFORM 1 (Note 8)

The contents of INFORM 1 are shown in Table 2-3.

TABLE 2-3/Q.82

Parameter	Allowed value	req.ind.
Forwarding indicator (FI) including notification subscription option	No Yes, without FTN Yes, with FTN	M
Forwarding cause	CFU, CFB, CFNR	M
Forwarded-to number FTN (Note)		O
NOTE – This option refers to the situation in which the forwarded-to number is withheld on the basis of a network provider decision.		

INFORM 6 (Note 8)

The contents of INFORM 6 are shown in Table 2-4.

TABLE 2-4/Q.82

Parameter	Allowed value	req.ind.
Presentation indicator	Presentation allowed Presentation not allowed	M

Relationship r_c

Contents of INFORM 10 (rerouting request)

NOTE – All the information necessary to FE3 to launch the forwarded call shall be included in the INFORM 10.

The contents of INFORM 10 are shown in Table 2-5.

TABLE 2-5/Q.82

Parameter	Allowed value	req.ind.
Cause for forwarding (CFU)		M
Called party address (incl. FTN)		M
Forwarding indicator		M
Forwarding number		O
Restriction indicator for forwarding number		M
Telecommunication service information		M
User-to-user information		O
Forwarding counter		M
Calling party sub-address		O
Network facility indicator (NFI)		O

INFORM 11

The contents of INFORM 11 are shown in Table 2-6.

TABLE 2-6/Q.82

Parameter	Allowed value	req.ind.
Forwarding invocation result	Positive/negative acknowledgment	M

INFORM 13

There is no content of INFORM 13.

Relationship r_d

INFORM 3

The contents of INFORM 3 are shown in Table 2-7.

TABLE 2-7/Q.82

Parameter	Allowed value	req.ind.
Served user's address ^{a)}		M
User-to-user information (if available) ^{a)}		M
Forwarding cause		M
Telecommunication service information ^{a)}		M
Calling party address (Note 1) ^{a)}		O
Last forwarding number (Note 7) ^{a)}		M (Note)
Cause for last forwarding ^{a)}		M (Note)
Originally called number (Note 7) ^{a)}		M (Note)
Cause for original forwarding ^{a)}		M (Note)
^{a)} Parameter not required in case of CFNR and CFB (UDUB). NOTE – Only applicable in case of multiple forwarding.		

INFORM 12

The contents of INFORM 12 are shown in Table 2-8.

TABLE 2-8/Q.82

Parameter	Allowed value	req.ind.
CF invocation result	Negative acknowledgement	M
Served user's address		M
Telecommunication service information		M

Relationship r_e

INFORM 4

The contents of INFORM 4 are shown in Table 2-9.

TABLE 2-9/Q.82

Parameter	Allowed value	req.ind.
Forwarding cause		M
Forwarding number (Note 6)		M
Forwarding counter		M
Original called number (Note 6)		M

INFORM 6 (Notes 5 and 8)

The contents of INFORM 6 are shown in Table 2-10.

TABLE 2-10/Q.82

Parameter	Allowed value	req.ind.
Presentation indicator for FTN	Presentation allowed Presentation not allowed	M ^{a)}
^{a)} Mandatory in case of presentation allowed.		

Relationship r_f

INFORM 4

The contents of INFORM 4 are shown in Table 2-11.

TABLE 2-11/Q.82

Parameter	Allowed value	req.ind.
Forwarding cause		M
Forwarding number (Note 6)		M
Forwarding counter		M
Originally called number (Note 6)		M

INFORM 6 (Notes 5 and 8)

The contents of INFORM 6 are shown in Table 2-12.

TABLE 2-12/Q.82

Parameter	Allowed value	req.ind.
Presentation indicator for FTN	Presentation allowed Presentation not allowed	M ^{a)}
^{a)} Mandatory in case of presentation allowed.		

Relationship r_g

INFORM 5

The contents of INFORM 5 are shown in Table 2-13.

TABLE 2-13/Q.82

Parameter	Allowed value	req.ind.
Last forwarding cause		M
Last forwarding number (Note 7)		O
Originally called number (Note 7)		O
Calling party address (Note 1)		O

NOTES related to this subclause (2.7.2) and the tables:

1 The calling party number shall be included if required by the “calling line identification presentation supplementary service”, if not restricted.

2 The INFORM 2 shall be sent only if the B-party has subscribed to the subscription option “calling user receives notification his call has been forwarded”.

3 The INFORM 7 shall be sent to FE1 only if the B-party has subscribed to the additional option that notification can include the forwarded-to number and if the C-party has not invoked to COLR.

4 The INFORM 3 is a subscription option. It also contains all information necessary to identify the served user, e.g. the served user’s number including all DDI-Digits.

In case of CFB (UDUB) and CFNR some of the parameters are part of the call offering information.

5 The INFORM 6 shall be sent after it has been determined that COLR will not be invoked, i.e. in case of

- COLR perm. mode not subscribed to;
- COLR temp. mode not subscribed to; and
- COLR temp. mode subscribed but not activated when alerting commences;

in case of COLR temporary mode activated on answer.

6 This number will always be transferred in the network together with a “restriction indicator” whose value is set according to the subscription options of the user.

On boundaries between different networks or to private networks the number might not be passed depending on a network provider decision.

7 This number shall only be included if no restrictions exist.

8 Notification of diversion of the calling user may be provided as a network provider option. If provided by the network, the network shall support the functional entity actions/information flows necessary for the “calling user receives notification that his call has been diverted” subscription option.

If not provided by the network, the network will not support the functional entity actions/information flows necessary for the “calling user receives notification that his call has been diverted” subscription option.

2.8 SDL diagrams for functional entities

Notification of diversion of the calling user may be provided as a network provider option. If provided by the network, the network shall support the functional entity actions/information flows necessary for the “calling user receives notification that his call has been diverted” subscription option.

If not provided by the network, the network will not support the functional entity actions/information flows necessary for the “calling user receives notification that his call has been diverted” subscription option.

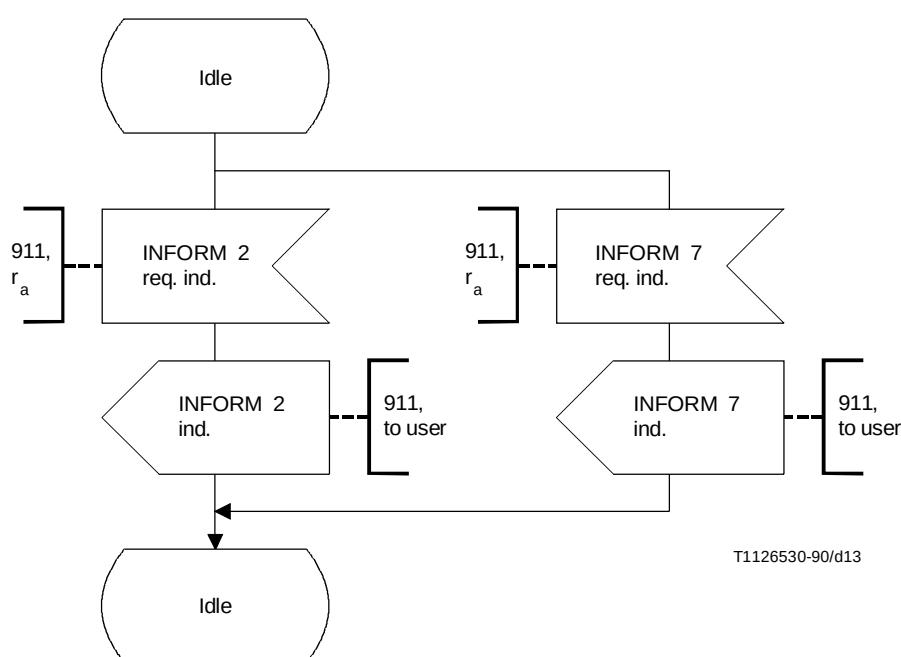
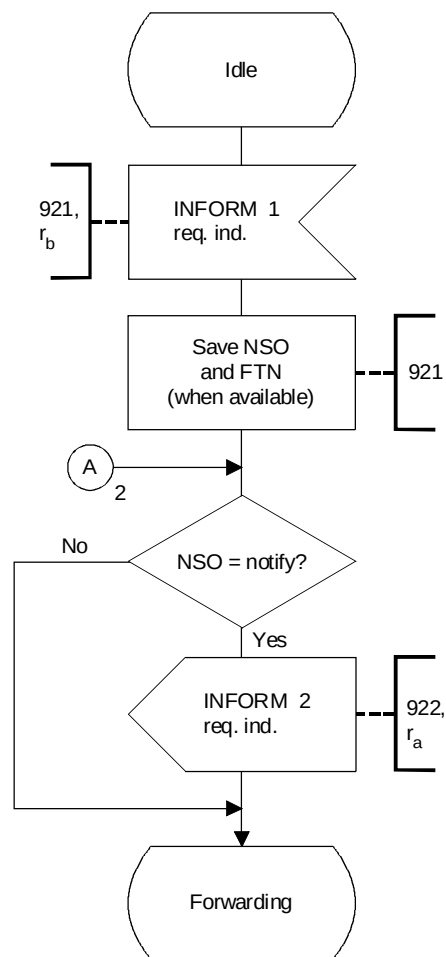


FIGURE 2-13/Q.82

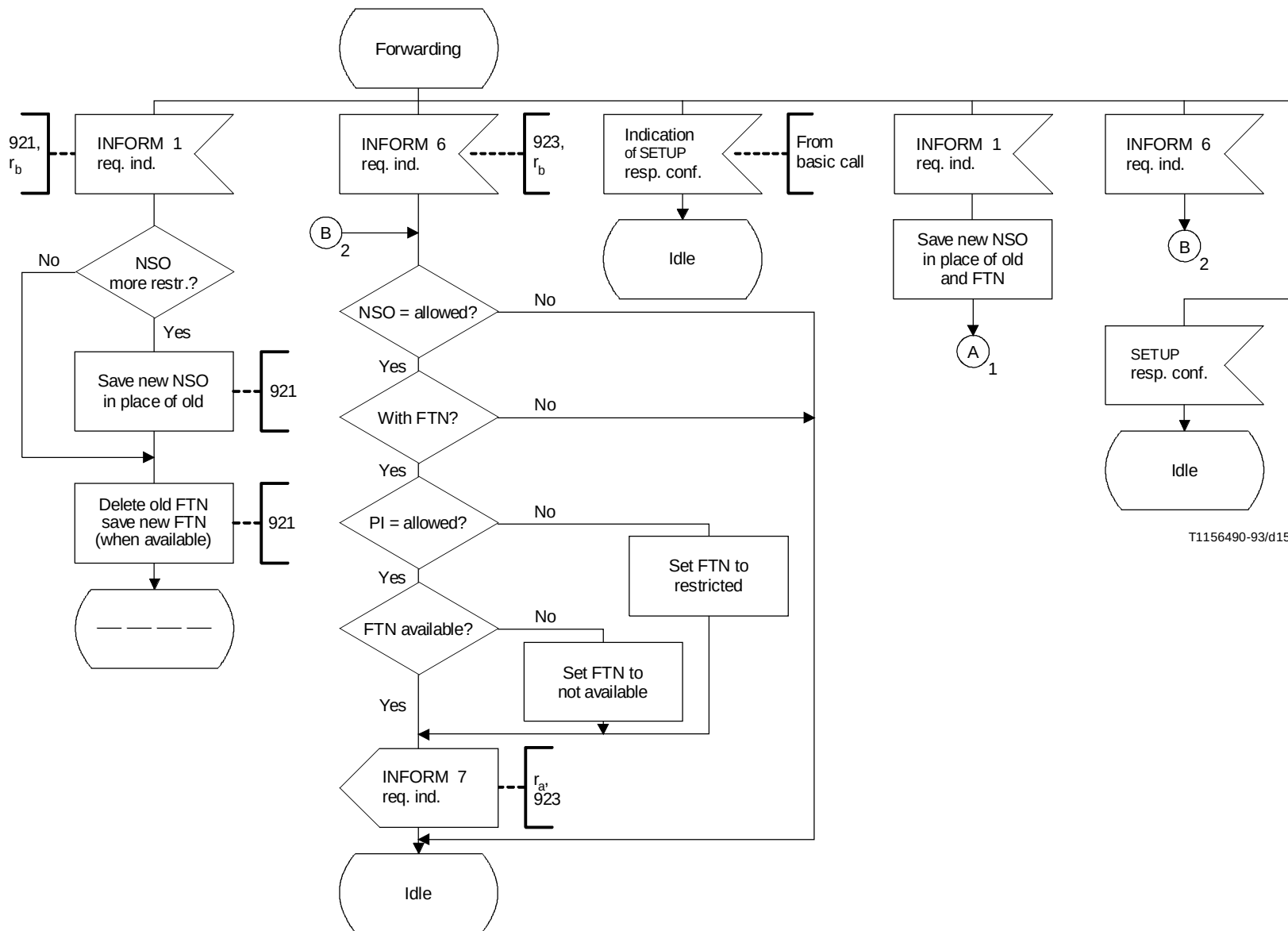
FE1. Call Diversion



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FIGURE 2-14/Q.82 (sheet 1 of 2)

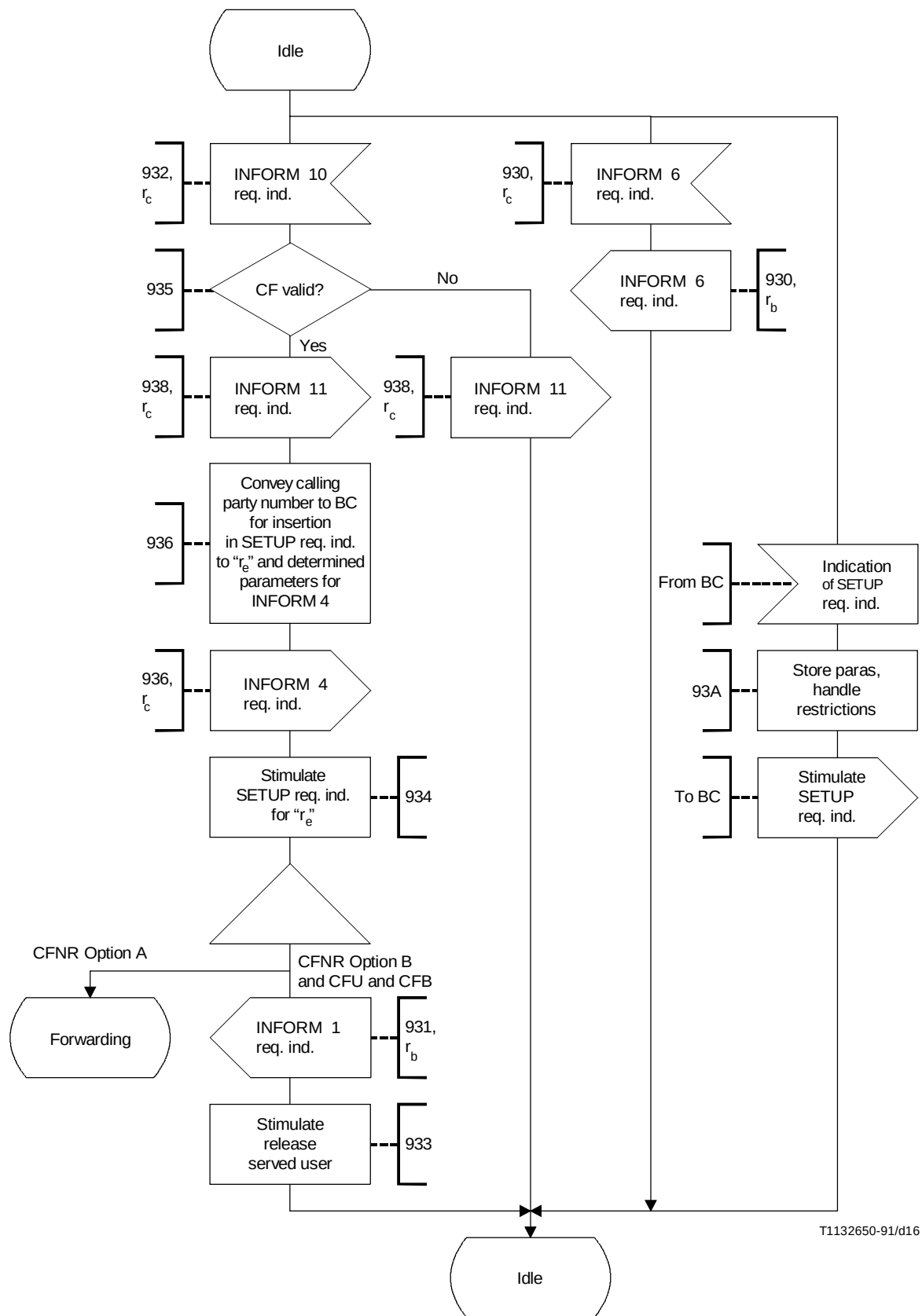
FE2. Call Diversion



T1156490-93/d15

FIGURE 2-14/Q.82 (sheet 2 of 2)

FE2. Call Diversion



T1132650-91/d16

FIGURE 2-15/Q.82

FE3. Call Forwarding