INTERNATIONAL TELECOMMUNICATION UNION

ITU-T Q.84

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(10/95)

GENERAL RECOMMENDATIONS ON TELEPHONE SWITCHING AND SIGNALLING

FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN

STAGE 2 DESCRIPTION FOR MULTIPARTY SUPPLEMENTARY SERVICES

CLAUSE 2 – THREE-PARTY SERVICE

ITU-T Recommendation Q.84

(Previously “CCITT Recommendation”)

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). 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, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation Q.84, clause 2, was revised by ITU-T Study Group 11 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 17th of October 1995.

NOTE

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 service description of the Three-Party supplementary service. This service enables a user who is involved in at least two calls (one active call and at least one call on hold) to join the two calls together into a three-way conversation, i.e. a simultaneous communication between the served user and two other parties.

STAGE 2 DESCRIPTION FOR MULTIPARTY SUPPLEMENTARY SERVICES

(revised in 1995)

2 Three-Party Service (3 PTY)

2.1 Scope

This Recommendation defines the stage 2 of the Three-Party supplementary service. Stage 2 identifies the functional capabilities and the information flows needed to support the service as described in stage 1. 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].

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 telecommunication network that is not an ISDN.

The Three-Party supplementary service enables a user who is involved in at least two calls (one active call and at least one call on hold) to join the two calls together into a three-way conversation, i.e. a simultaneous communication between the served user and two other parties.

This supplementary service is not applicable to non-voice services.

NOTE – This Recommendation is derived from the service description specified in Recommendation I.254.2 (1992): "Three-Party supplementary service".

This Recommendation is applicable to the stage 3 standards for the Integrated Services Digital Network.

2.2 References

The following Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision: all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

[1] CCITT Recommendation I.130 (1988), *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN*.

[2] CCITT Recommendation Q.65 (1988), *Stage 2 of the method for the characterization of services supported by an ISDN*.

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

[4] ITU-T Recommendation Q.71 (1993), *ISDN circuit mode switched bearer services*.

[5] ITU-T Recommendation Z.100 (1993), *CCITT specification and description language (SDL)*.

2.3 Definitions

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

2.3.1 integrated services digital network (ISDN): See definition 308 of 2.3/I.112 [3].

2.3.2 service; telecommunications service: See definition 201 of 2.2/I.112 [3].

2.3.3 three-way conversation: Communication between all three user's agents, i.e. the served users agent and the two remote users agents.

2.4 Symbols and abbreviations

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

3PTY	Three-Party Service
CC	Call Control
CCA	Call Control Agent
FE	Functional Entity
FEA	Functional Entity Action
ISDN	Integrated Services Digital Network
LE	Local Exchange
PTNX	Private Telecommunication Network Exchange
SDL	Specification and Description Language
TE	Terminal Equipment

2.5 Description

Not applicable.

2.6 Derivation of the functional model

2.6.1 Functional model description

The functional model for the 3PTY supplementary service is shown in Figure 2-1.

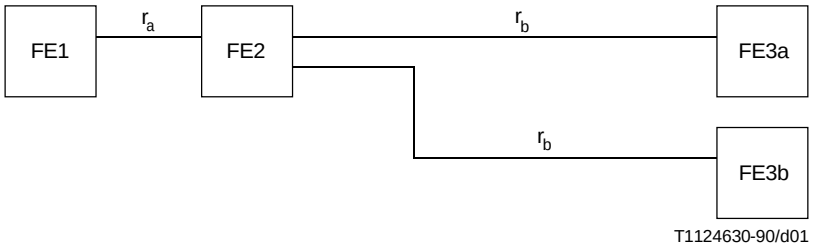


FIGURE 2-1/Q.84

Functional model

2.6.2 Description of functional entities

The Functional Entities (FEs) required for the 3PTY supplementary service above those of the basic call are:

- FE1: Served user's agent;
- FE2: 3PTY control entity;
- FE3: Remote user's agent.

2.6.3 Relationship with a basic service

The relationship of the 3PTY supplementary service with the basic service is shown in Figure 2-2.

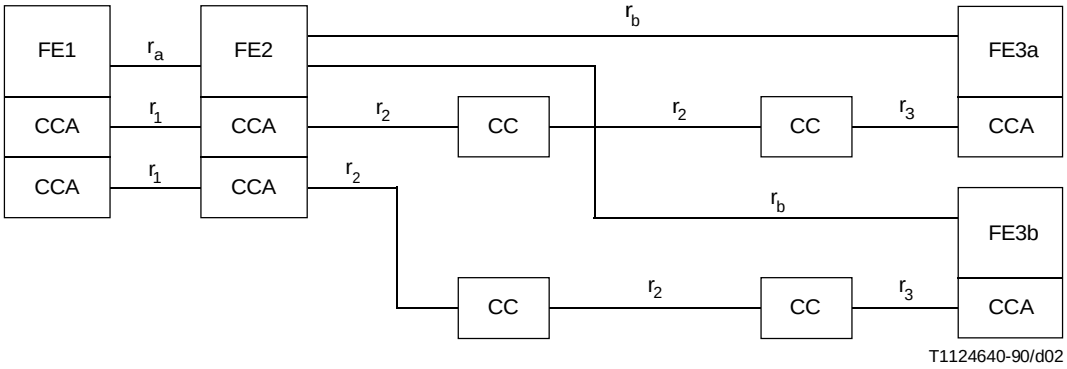


FIGURE 2-2/Q.84

Relationship with a basic service

2.7 Information flows

2.7.1 Information flow diagrams

The information flows for the 3PTY supplementary service are shown in Figures 2-3 to 2-7 for the following procedures:

– Figure 2-3: Begin three-way conversation;

– Figure 2-4: End the three-way conversation;

– Figure 2-5: Disconnect call by remote user whilst in three-way conversation mode;

– Figure 2-6: Disconnect call by served user whilst in three-way conversation mode;

– Figure 2-7: Disconnect entire call by served user whilst in three-way conversation mode.

NOTE – The information flow diagrams for the clearing of connections are provided in Recommendation Q.71 [5].

2.7.2 Definition of individual information flows

2.7.2.1 Relationship r_a

The contents of the information flows (see Figures 2-3 and 2-4) via relationship r_a and specific to the 3PTY supplementary service are given in the subclauses below.

2.7.2.1.1 Contents of 3-WAY START

This confirmed information flow initiates the bridging of the two calls into a three-way conversation mode, the request shall be sent in the context of the held call.

There are no contents of the 3-WAY START information flow.

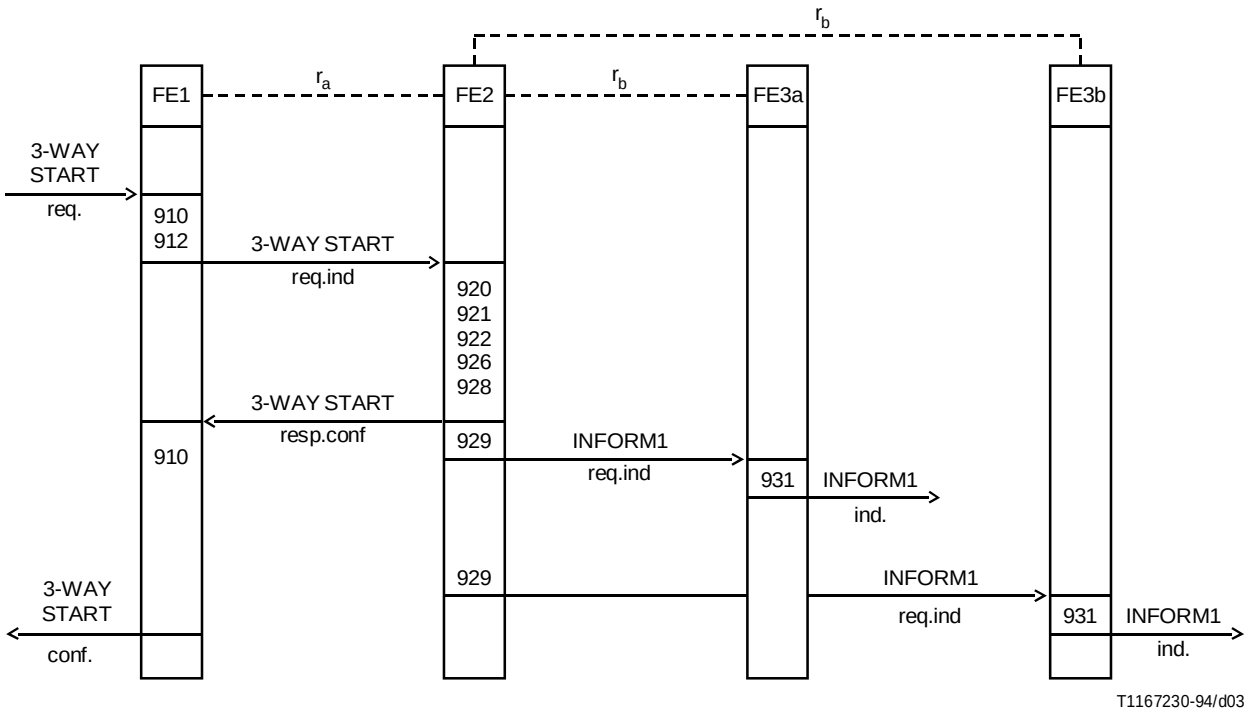
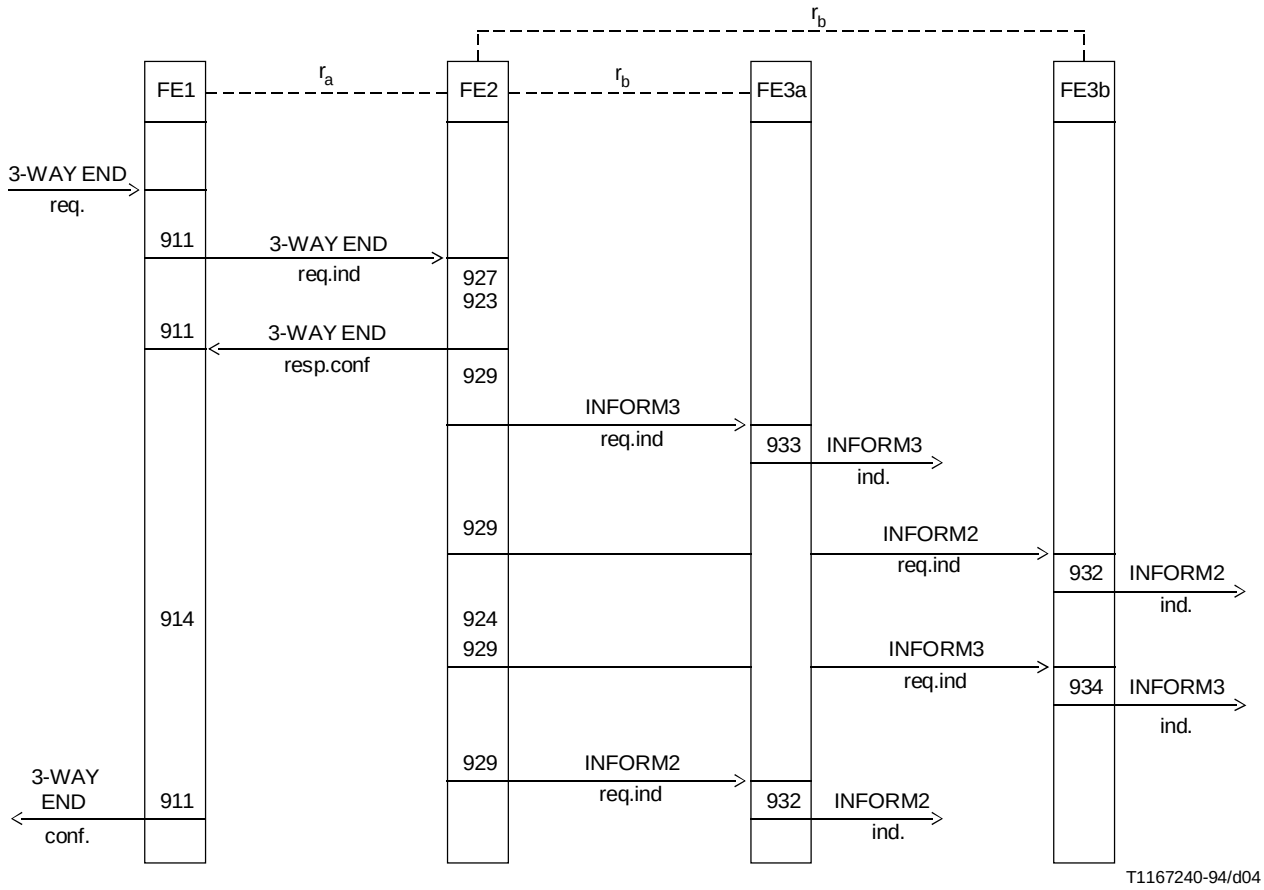


FIGURE 2-3/Q.84

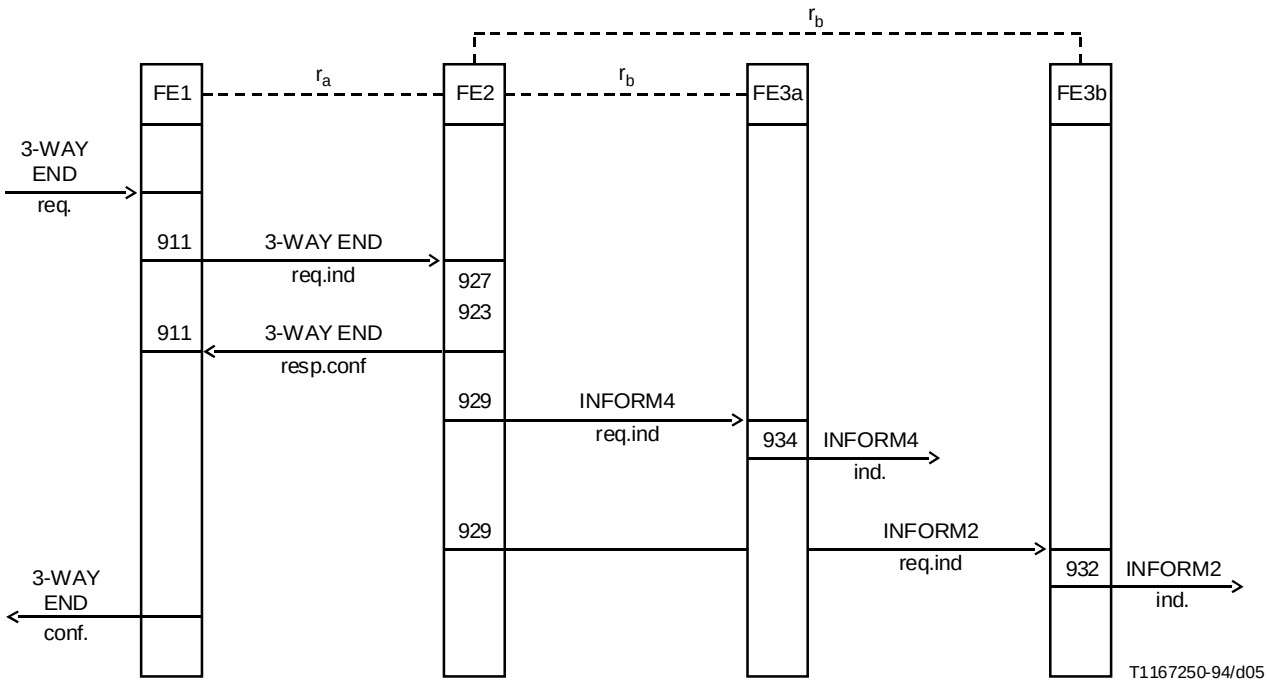
Begin three-way conversation



NOTE – This figure shows the scenario where FE3a is considered as the user agent with the held connection, FE3b is considered as the user agent with the active connection. FE3a is (in this figure) explicitly chosen to have a private communication with the served users agent FE1.

FIGURE 2-4a/Q.84

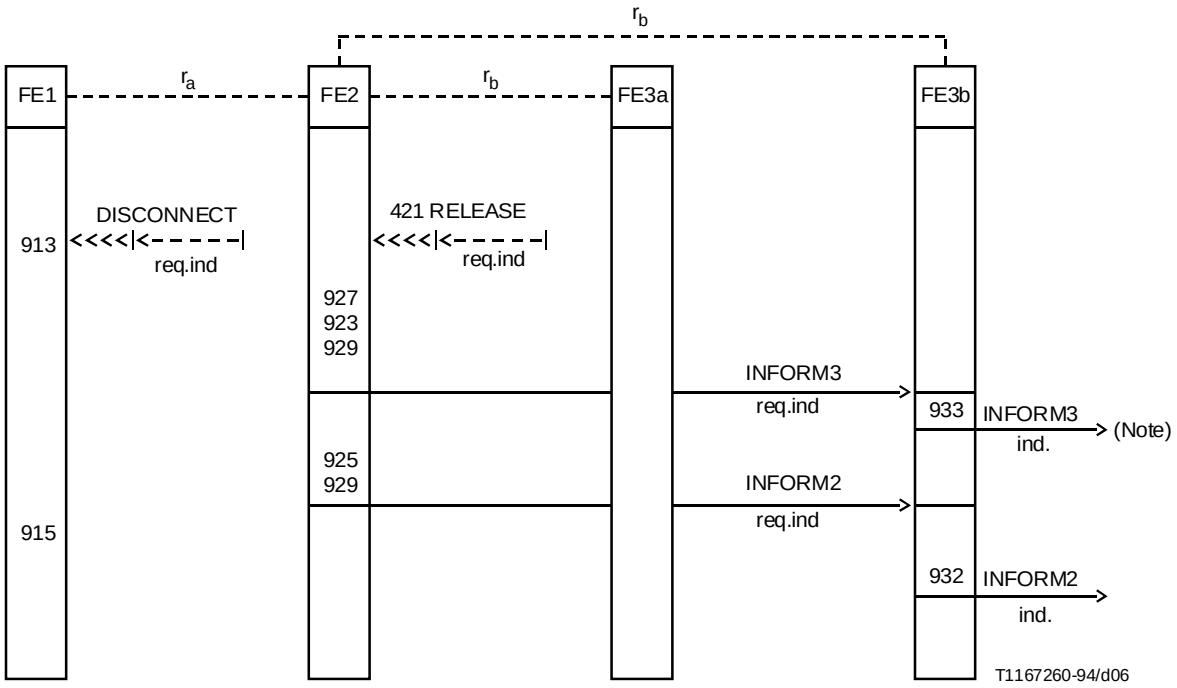
Create private communication (case a)



NOTE – This figure shows the scenario where FE3a is considered as the user agent with the held connection FE3b is considered as the user agent with the active connection. FE3b is (in this figure) explicitly chosen to have a private communication with the served users agent FE1.

FIGURE 2-4b/Q.84

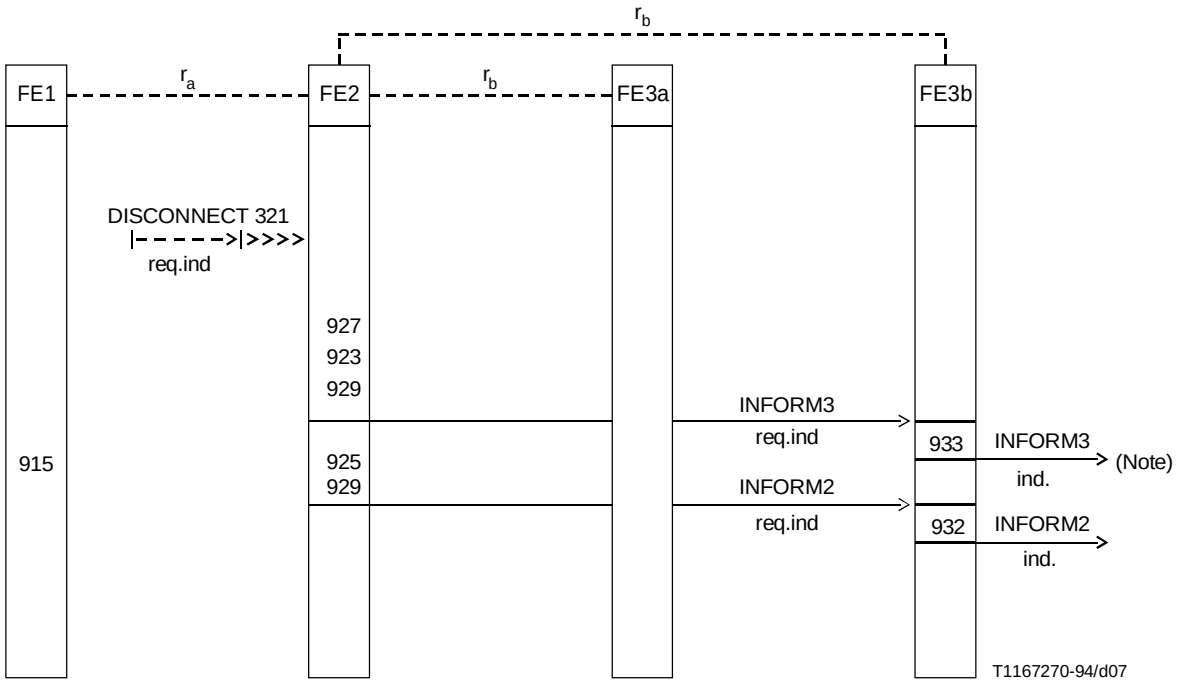
Create private communication (case b)



NOTE – INFORM3 req.ind is only sent in the case where a held connection between the served user and the remote user still exists.

FIGURE 2-5/Q.84

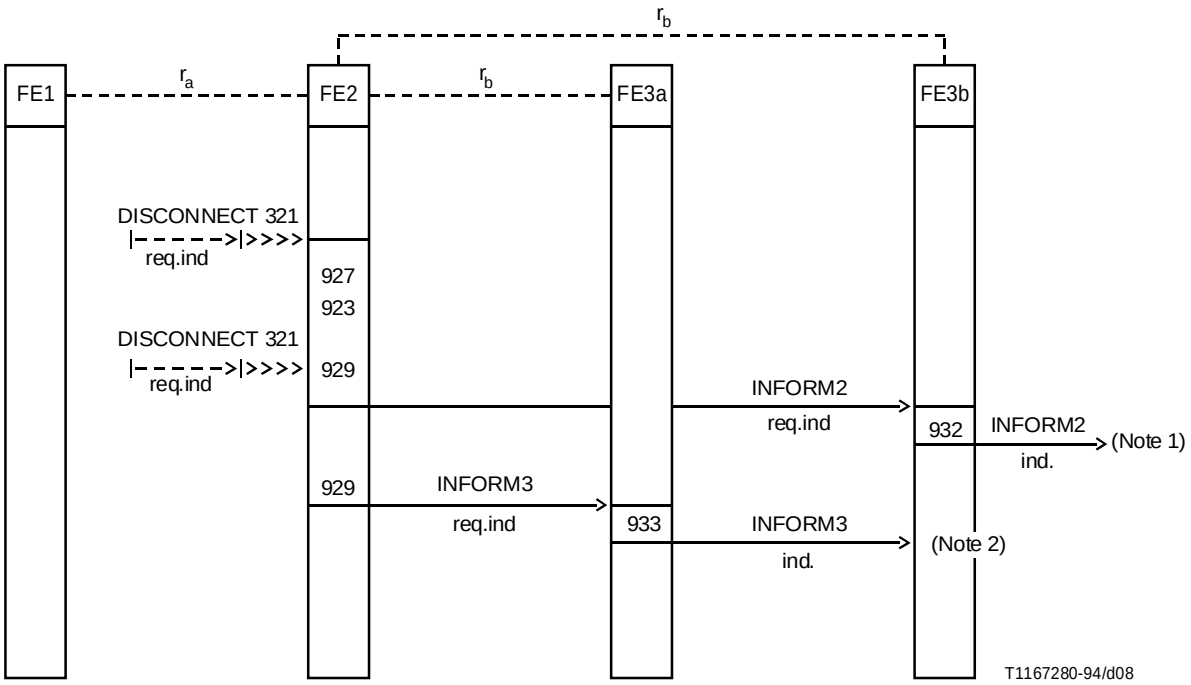
Disconnect call by remote user whilst in three-way conversation mode



NOTE – INFORM3 req.ind is only sent in the case where a held connection between the served user and the remote user still exists.

FIGURE 2-6/Q.84

Disconnect (call FE1-FE3a) call by served user whilst in three-way conversation mode



NOTES

1 INFORM2 req.ind is sent to the user agent with the active connection in case the held connection has been cleared first.

2 INFORM3 req.ind is sent to the user agent with the held connection in case the active connection has been cleared first.

FIGURE 2-7/Q.84

Disconnect entire call by served user whilst in three-way conversation mode

2.7.2.1.2 Contents of 3-WAY START REJECT

Table 2-1 shows the contents of the 3-WAY START REJECT information flow.

TABLE 2-1/Q.84

Contents of 3-WAY START REJECT information flow

Parameter	req.ind
Reject reason	Mandatory

2.7.2.1.3 Contents of 3-WAY END

The confirmed information flow initiates the termination of the three-way conversation mode.

There are no contents of the 3-WAY END information flow.

2.7.2.2 Relationship r_b

INFORM1 shall be used to inform the two remote parties that a three-way conversation has been established.

INFORM2 shall be used to inform the remote party that the three-way conversation has been released and a single call exists between served user and the one remote party.

INFORM3 shall be used to inform the remote party that a single held connection exists between the served user and the one remote party.

INFORM4 shall be used to inform the remote party that the conference has been disconnected and that a held call exists between the served user and the one remote user.

There are no contents of the INFORM1, INFORM2, INFORM3 and INFORM4 information flows.

2.8 SDL diagrams for functional entities

The Specification and Description Language (SDL) diagrams are provided according to Recommendation Z.100 [5].

2.8.1 FE1

The SDL diagrams for FE1 are shown in Figure 2-8.

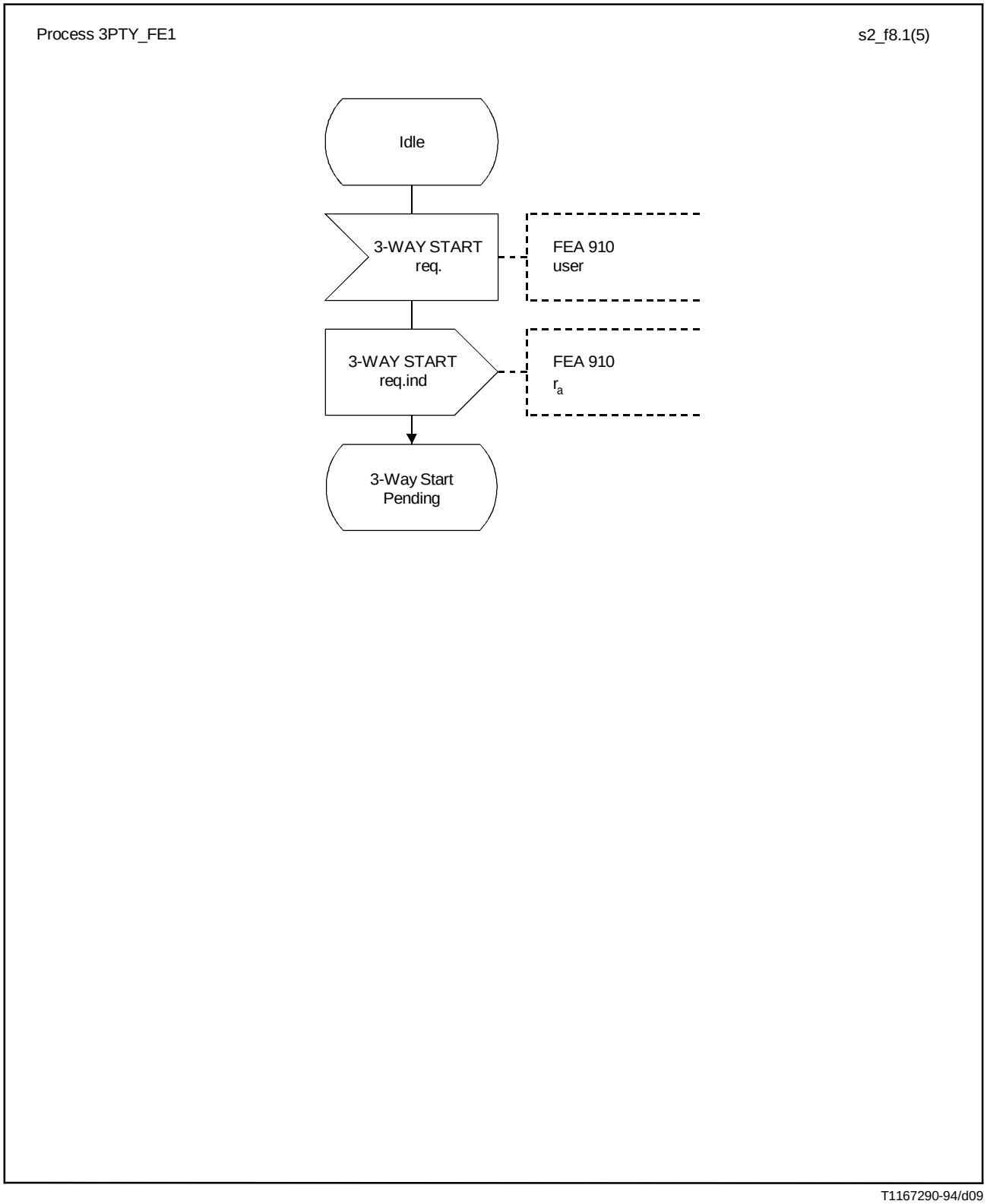


FIGURE 2-8/Q.84 (sheet 1 of 5)

SDL diagrams for FE1

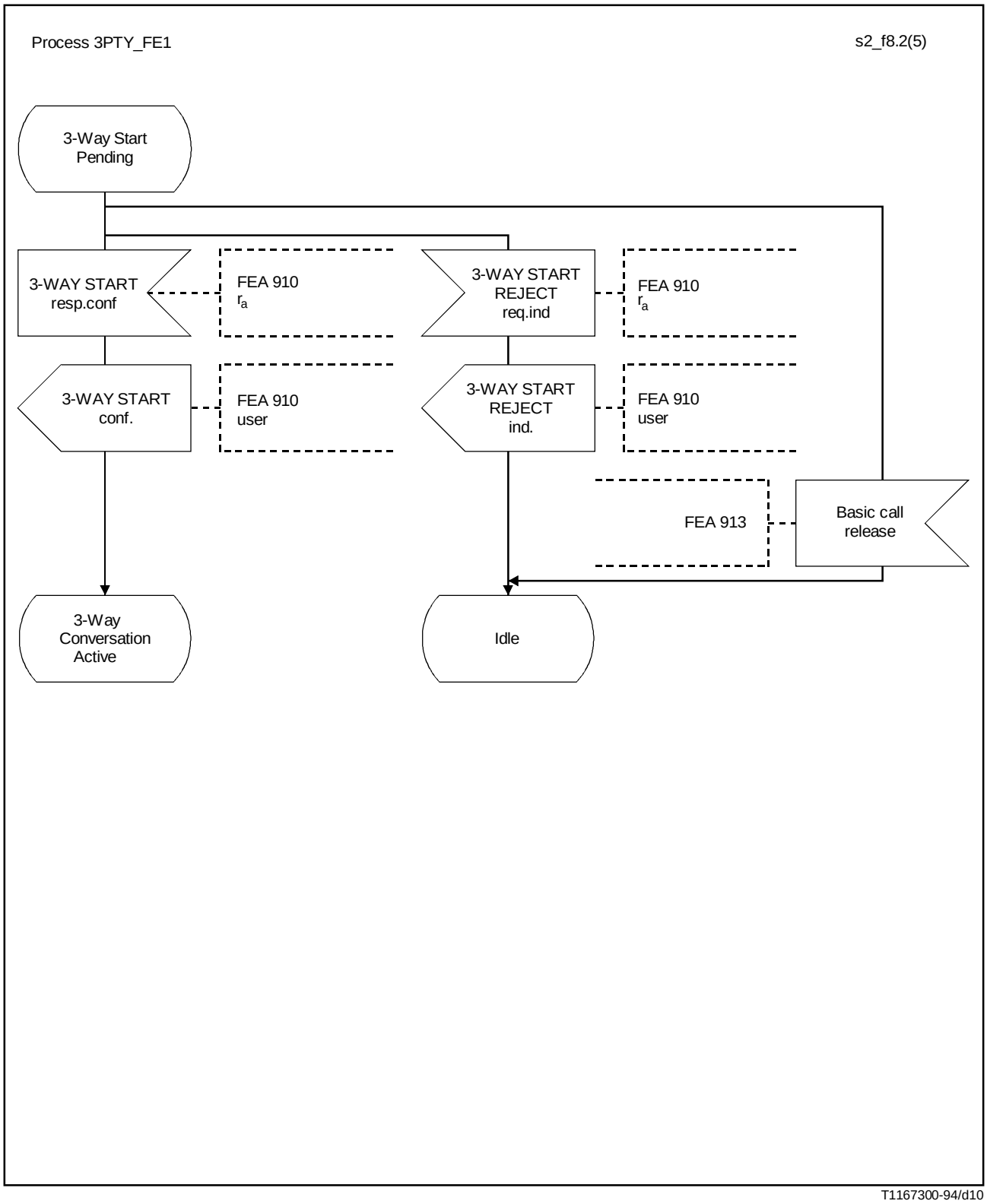


FIGURE 2-8/Q.84 (sheet 2 of 5)

SDL diagrams for FE1

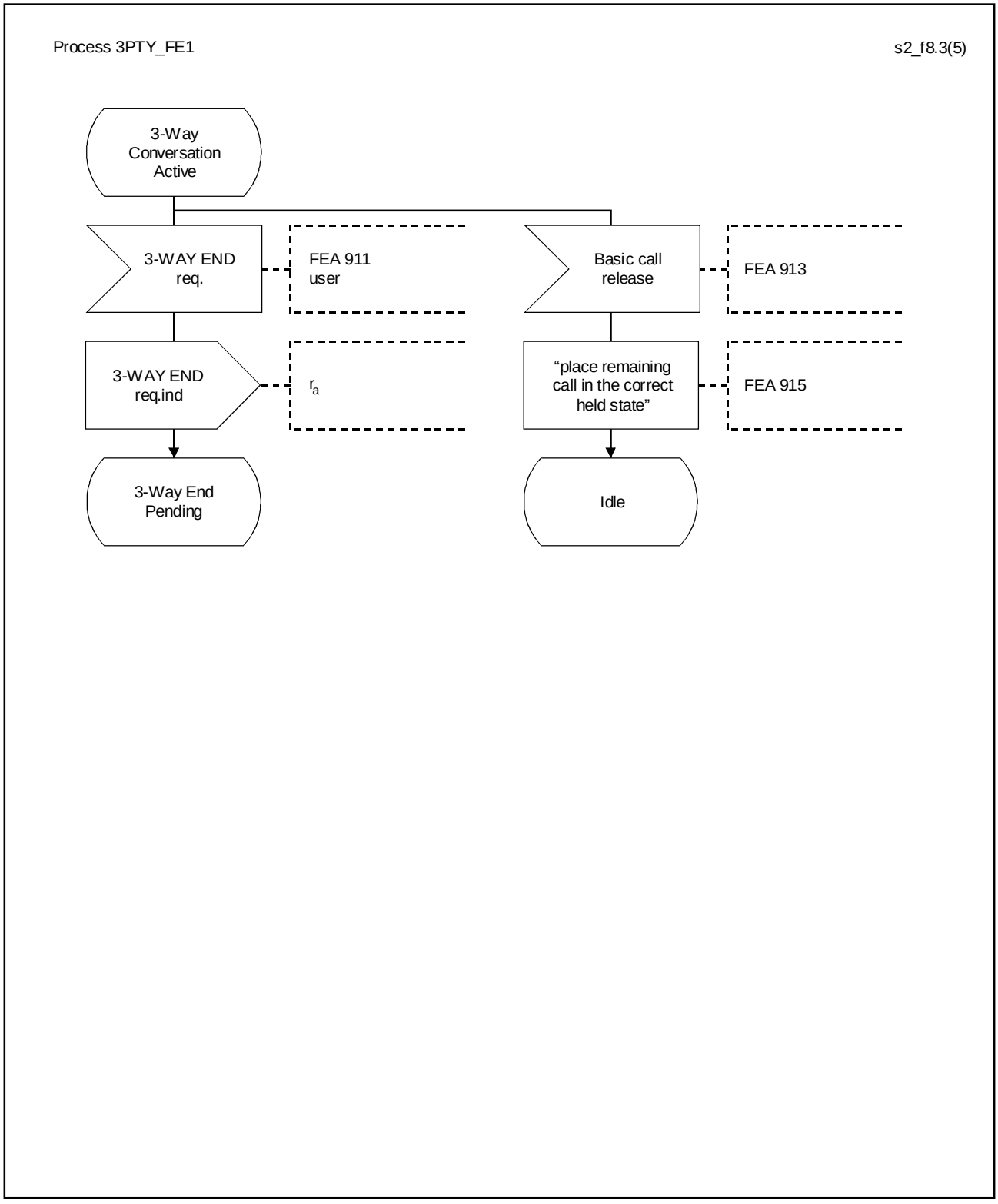


FIGURE 2-8/Q.84 (sheet 3 of 5)

SDL diagrams for FE1

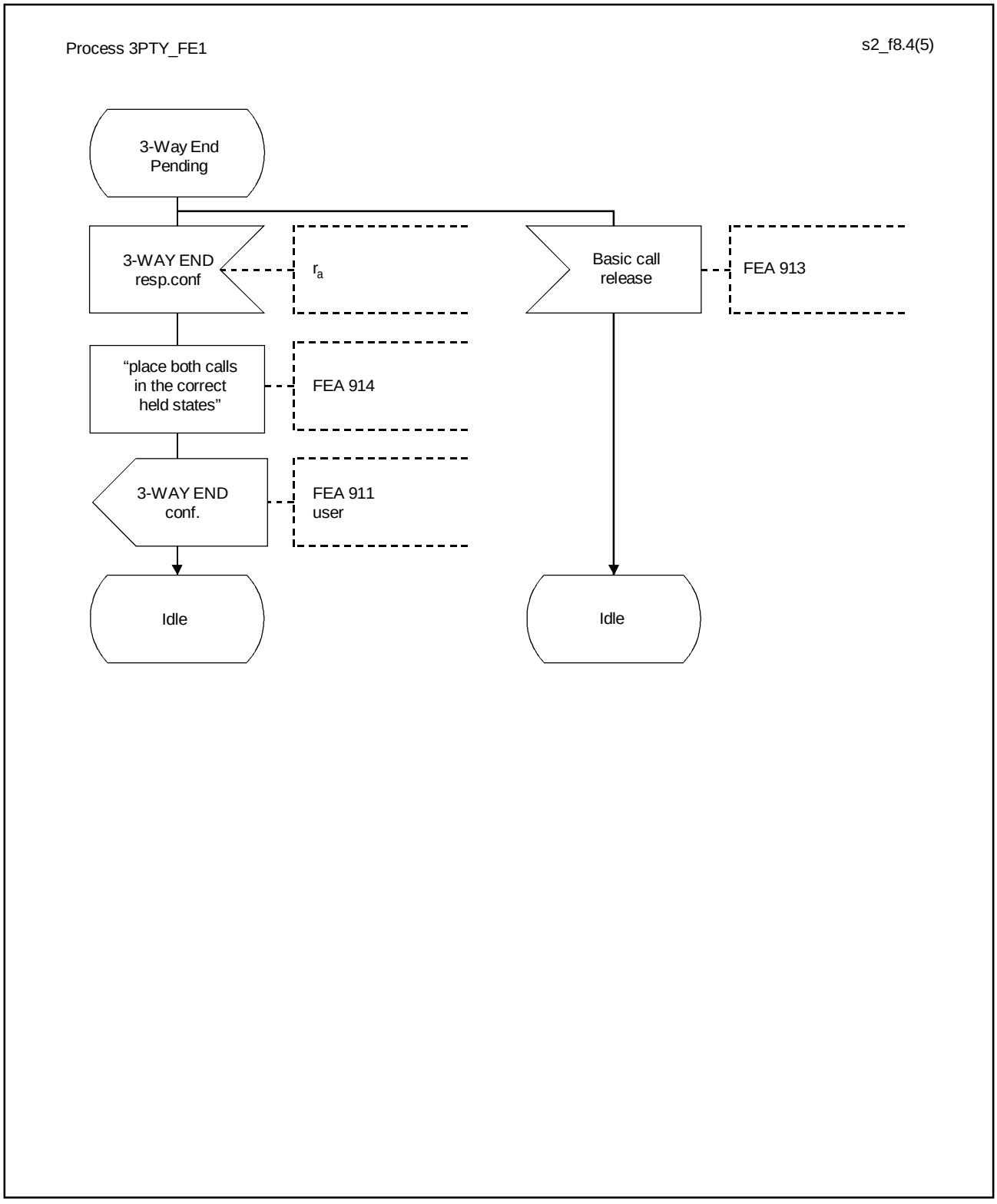
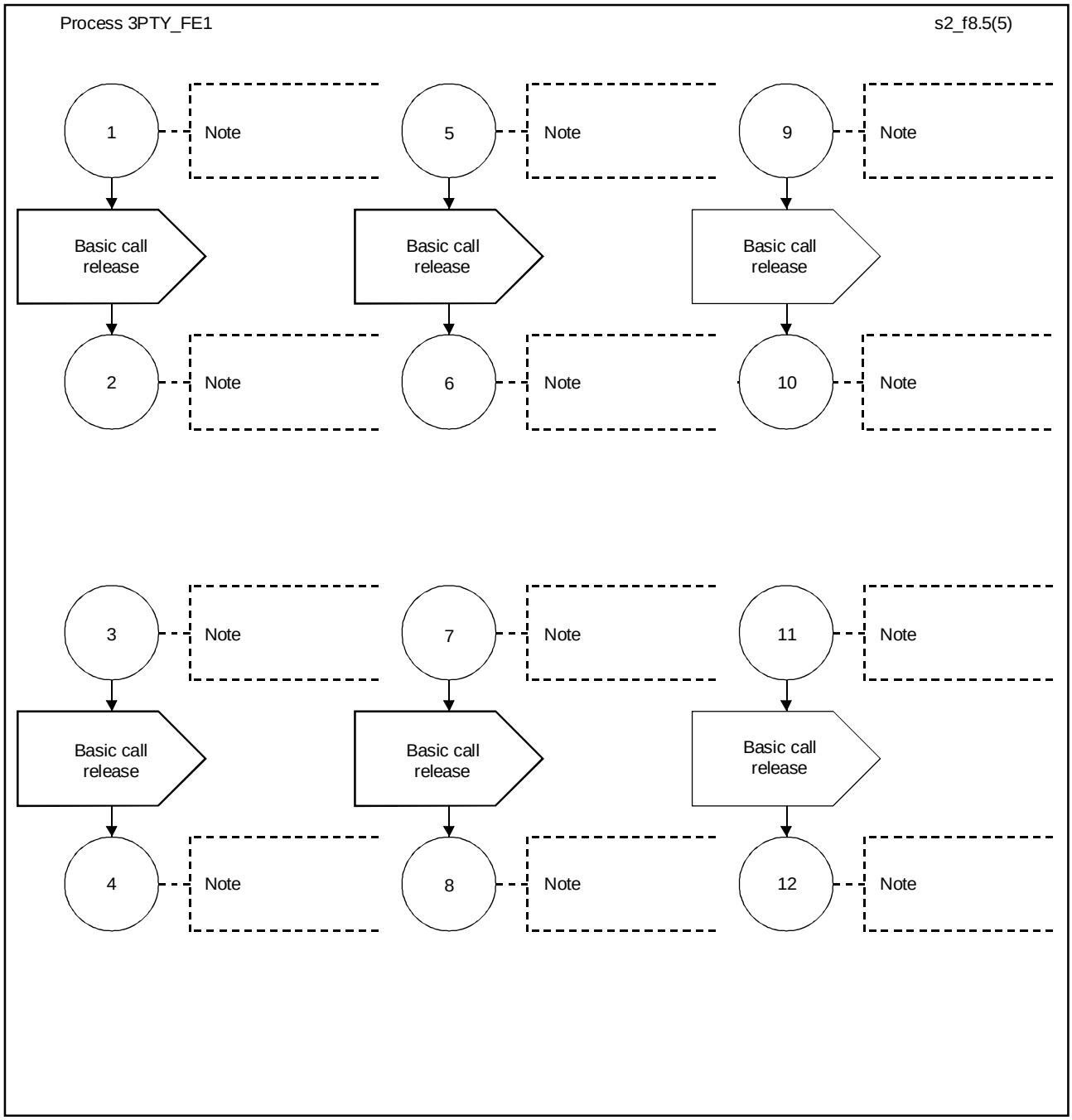


FIGURE 2-8/Q.84 (sheet 4 of 5)

SDL diagrams for FE1



NOTE – This breaks the basic call CCA functionality at the following points:

– for 3PTY1 and 3PTY2, in Figure 2-13/Q.71 [4] (sheet 2 of 5), in state "AWAIT RELEASE CONF (0)" following the input "RELEASE resp.conf" (see FEA413);

– for 3PTY3 and 3PTY4, in Figure 2-13/Q.71 [4] (sheet 3 of 5), in state "AWAIT RELEASE (0)" following the input "RELEASE req.ind" (see FEA312);

– for 3PTY5 and 3PTY6, in Figure 2-13/Q.71 [4] (sheet 3 of 5), in state "AWAIT USER DISCONNECT (0)" following the input "DISCONNECT req";

– for 3PTY7 and 3PTY8, in Figure 2-17/Q.71 [4] (sheet 2 of 4), in state "AWAIT RELEASE (T)" following the input "RELEASE req.ind" (see FEA452);

– for 3PTY9 and 3PTY10, in Figure 2-17/Q.71 [4] (sheet 3 of 4), in state "AWAIT USER DISCON (T)" following the input "DISCONNECT req";

– for 3PTY11 and 3PTY12, in Figure 2-17/Q.71 [4] (sheet 4 of 4), in state "AWAIT RELEASE CONF (T)" following the input "RELEASE resp.conf" (see FEA353).

FIGURE 2-8/Q.84 (sheet 5 of 5)

SDL diagrams for FE1

2.8.2 FE2

The SDL diagrams for FE2 are shown in Figure 2-9.

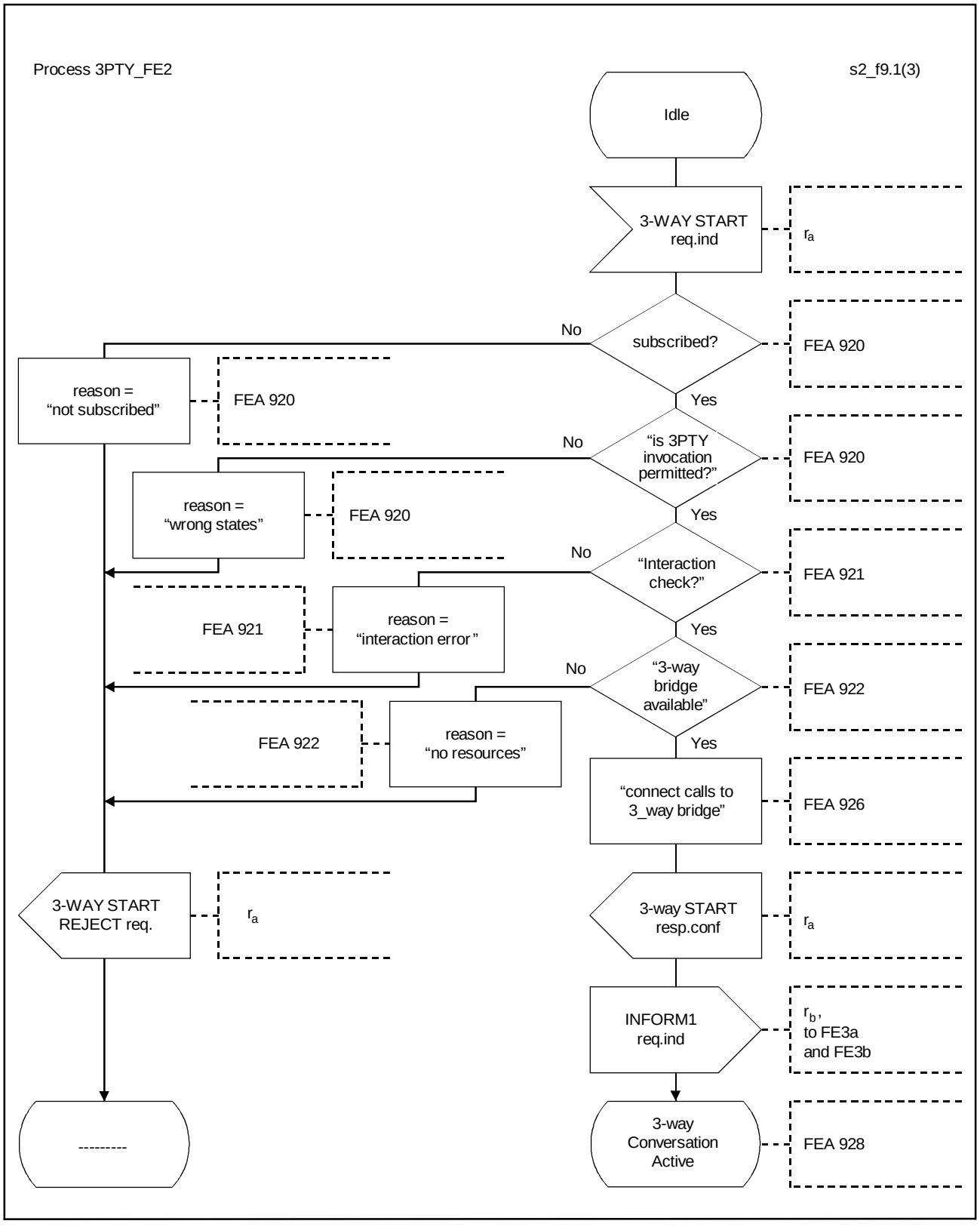


FIGURE 2-9/Q.84 (sheet 1 of 3)

SDL diagrams for FE2

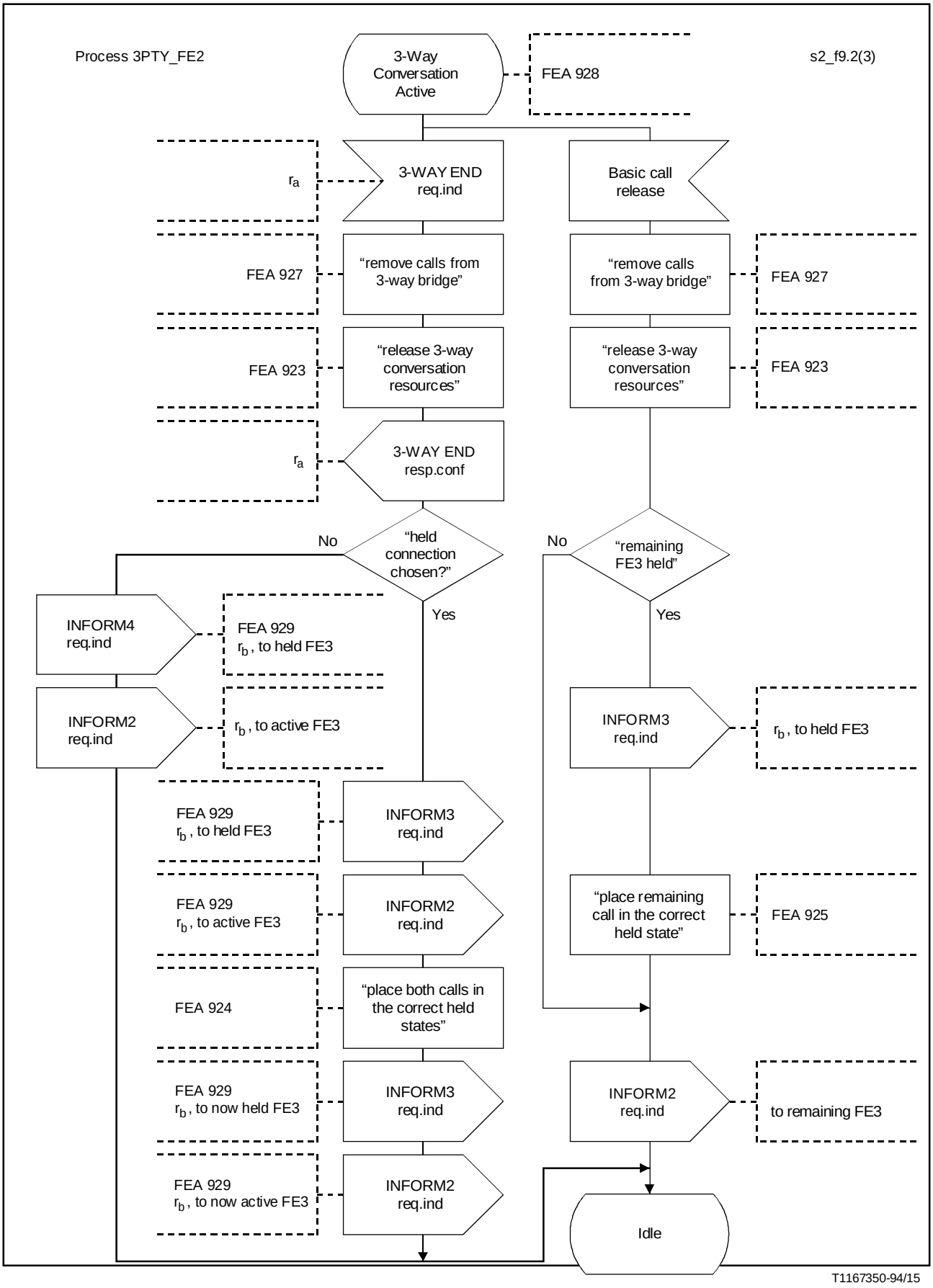
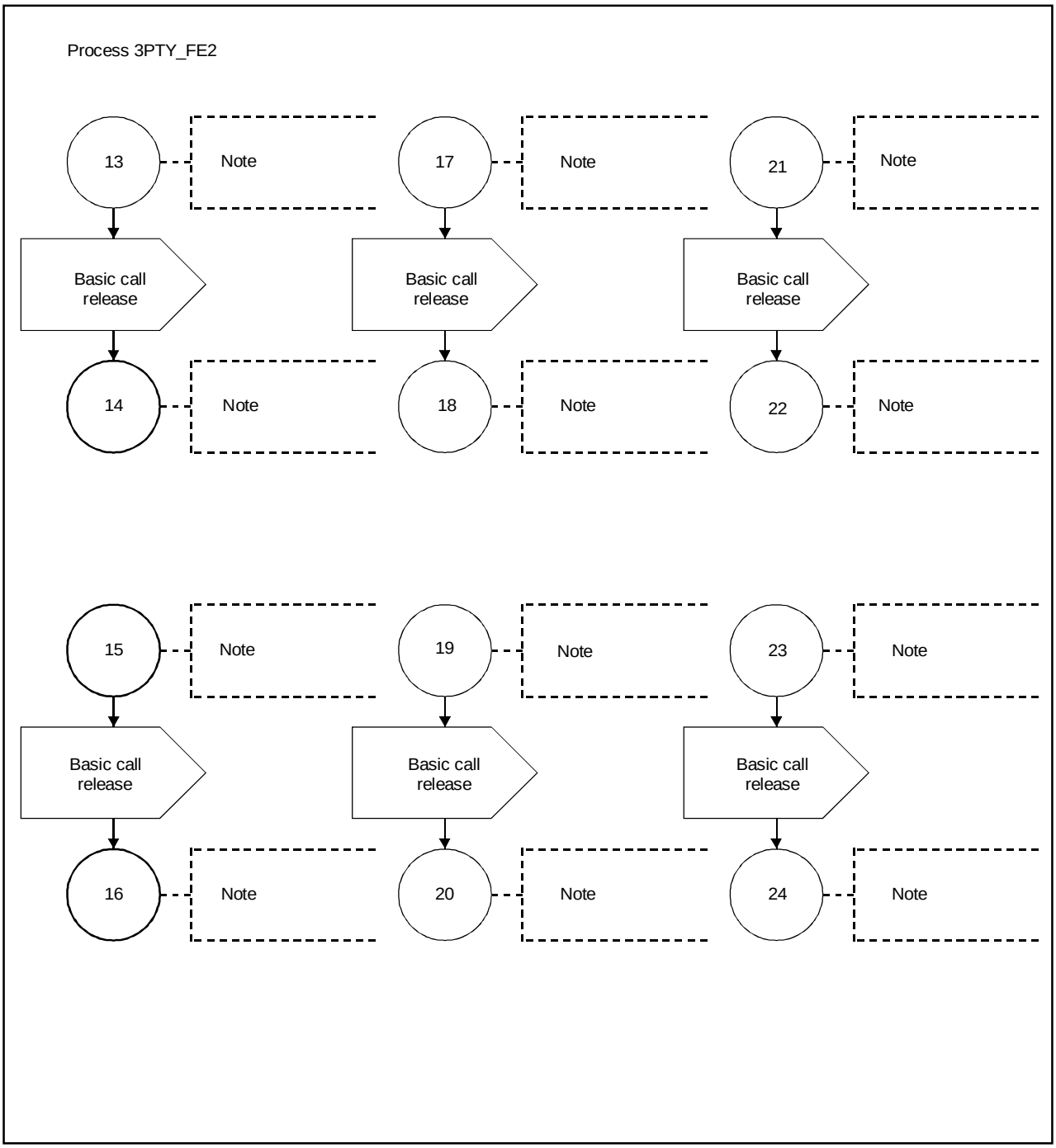


FIGURE 2-9/Q.84 (sheet 2 of 3)

SDL diagrams for FE2



NOTE – This breaks the basic call CC functionality at the following points:

- for 3PTY13 and 3PTY14, in Figure 2-14/Q.71 [4] (sheet 5 of 7), in state "r_2-REL (F)" following the input "RELEASE resp.conf." from r_1 (see FEA322);
- for 3PTY15 and 3PTY16, in Figure 2-14/Q.71 [4] (sheet 5 of 7), in state "r_1- REL (B)" following the input "RELEASE resp.conf" (see FFA322);
- for 3PTY17 and 3PTY18, in Figure 2-14/Q.71 [4] (sheet 5 of 7), in state "r_1-DISCON (B)"preceding the output "RELEASE resp.conf" to r_1 in the transition commenced by input "RELEASE req.ind" (see FEA422);
- for 3PTY19 and 3PTY20, in Figure 2-16/Q.71 [4] (sheet 4 of 5), in state "r_2-REL (B)" following the input "RELEASE esp.conf" from r_1 (see FFA442);
- for 3PTY21 and 3PTY22, in Figure 2-16/Q.71 [4] (sheet 5 of 5), in state "r_3-REL (F)" following the input "RELEASE esp.conf" (see FEA442);
- for 3PTY23 and 3PTY24, in Figure 2-16/Q.71 [4] (sheet 5 of 5), in state "r_3-DISCON (F)" preceding the output "RELEASE resp.conf" to r_1 in the transition commenced by input "RELEASE req.ind" (see FFA342).

FIGURE 2-9/Q.84 (sheet 3 of 3)

SDL diagrams for FE2

2.8.3 FE3a and FE3b

The SDL diagrams for FE3a and FE3b are shown in Figure 2-10.

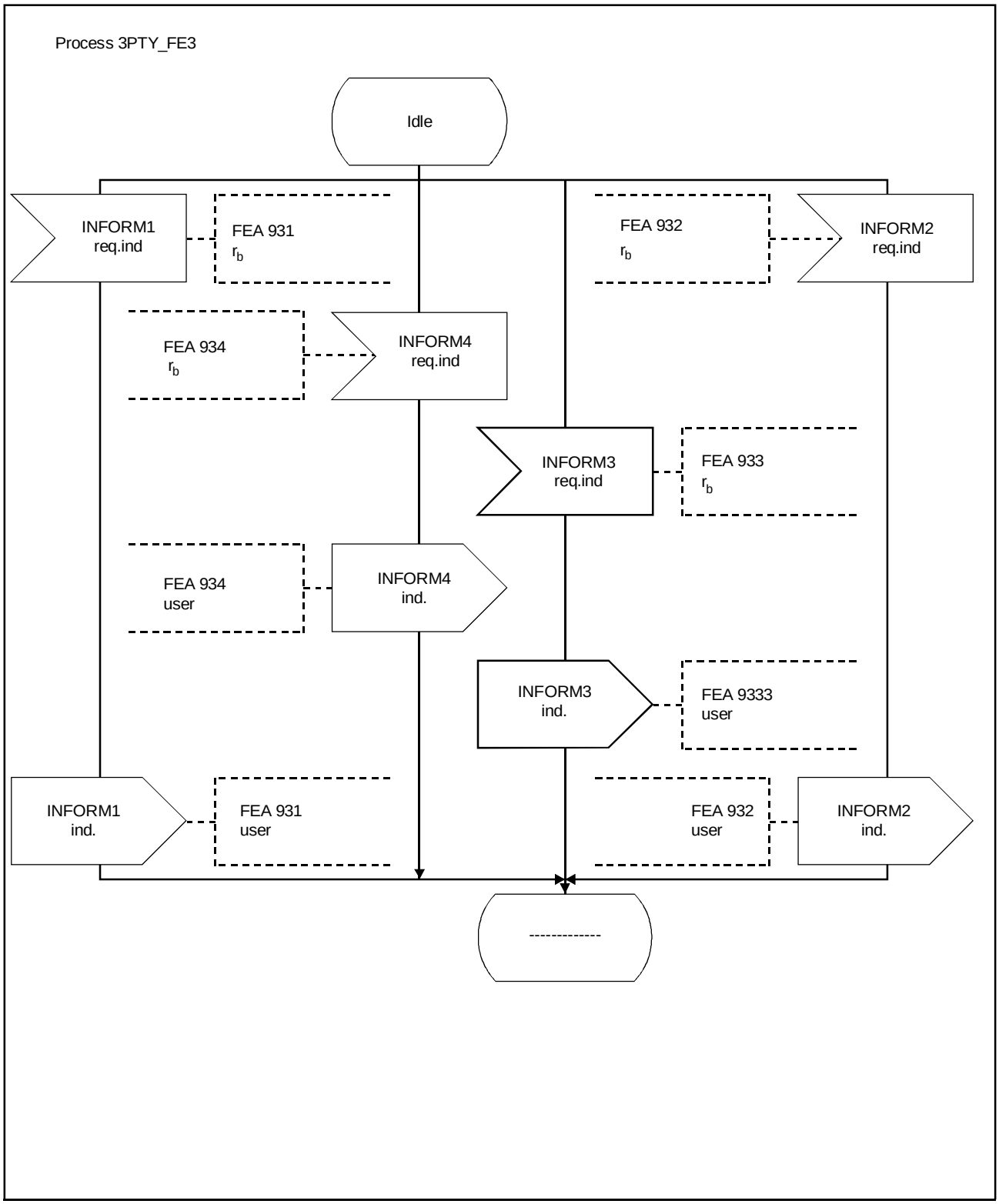


FIGURE 2-10/Q.84

SDL diagram for FE3a and FE3b

2.9 Functional entity actions (FEAs)

2.9.1 FEAs of FE1

910: The functional entity shall:

- recognize a user request for 3-WAY START req.;
- generate and transfer a 3-WAY START req.ind to FE2 or reject the user request if not valid;
- recognize a 3-WAY START resp.conf from FE2;
- transfer a service confirmation towards the user.

911: The functional entity shall:

- recognize a user for 3-WAY END req.;
- generate and transfer a 3-WAY END req.ind to FE2;
- recognize a 3-WAY END resp.conf from FE2;
- transfer a service confirmation towards the user.

912: The functional entity shall check the states of the two calls involved.

913: The functional entity shall recognize a remote or local clearing request of either one of the calls or the entire 3-way conversation call.

914: The functional entity shall place both connections in the correct held states.

915: The functional entity shall place the remaining connection in the correct held state.

2.9.2 FEAs of FE2

920: The functional entity shall:

- recognize a 3-WAY START req.ind from FE1;
- check for a valid start condition.

921: The functional entity shall:

- check for unauthorized interaction with other supplementary services (e.g. interaction with CONF supplementary service);
- check for authorized interaction with other supplementary services (e.g. matching of CUG-information).

922: The functional entity shall seize resources (e.g. three-way bridge).

923: The functional entity shall release resources (e.g. three-way bridge).

924: The functional entity shall place both connections in the correct held states.

925: The functional entity shall place the remaining connection in the correct held state.

926: The functional entity shall connect the two calls to the bridge.

927: The functional entity shall remove the two calls from the bridge.

928: The functional entity shall control interaction with other supplementary services whilst in the 3-Way conversation Active state.

929: The functional entity shall notify the remote users of either the establishment or clearing of a three-way conversation, and/or the occurrence of one single held connection.

2.9.3 FEAs of FE3 (i.e. FE3a and FE3b)

931: FE3 shall accept an INFORM1 req.ind and relay it to the user.

932: FE3 shall accept an INFORM2 req.ind and relay it to the user.

933: FE3 shall accept an INFORM3 req.ind and relay it to the user.

934: FE3 shall accept an INFORM4 req.ind and relay it to the user.

2.10 Allocation of functional entities to physical locations

The possible locations of functional entities FE1, FE2, FE3a and FE3b are shown in Table 2-2.

TABLE 2-2/Q.84

Possible location of functional entities

	FE1	FE2	FE3a	FE3b
Scenario 1	TE	LE	TE	TE
Scenario 2	TE	PTNX	TE	TE
NOTE – These allocations constrain FE1 and FE2 to be at opposite ends of a basic call (r_1 or r_3) relationship.				