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OF ITU

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**GENERAL RECOMMENDATIONS ON TELEPHONE
SWITCHING AND SIGNALLING
FUNCTIONS AND INFORMATION FLOWS
FOR SERVICES IN THE ISDN**

**STAGE 2 DESCRIPTION FOR CHARGING
SUPPLEMENTARY SERVICES**

CLAUSE 2 – ADVICE OF CHARGE (AOC)

ITU-T Recommendation Q.86

(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.

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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.86, 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 Advice of Charge supplementary service. This service allows the served user to be informed of usage-based charging information. The served user may request this information at call set-up time and/or during the call and/or at the end of the call.

STAGE 2 DESCRIPTION FOR CHARGING SUPPLEMENTARY SERVICES

(revised in 1995)

2 Advice of charge (AOC)

2.1 Scope

This Recommendation defines the stage 2 of the Advice of Charge (AOC) 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 defined 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 defines 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 AOC supplementary service provides the served user with usage based charging information.

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

NOTE – This Recommendation is derived from the service descriptions specified in Recommendation I.256.2a (1993): “Advice of charge: Charging information at call set-up time (AOC-S)”, Recommendation I.256.2b (1993): “Advice of charge: Charging information during the call (AOC-D)” and Recommendation I.256.2c (1993): “Advice of charge: Charging information at the end of the call (AOC-E)”.

This Recommendation is applicable to the stage 3 standards for the AOC supplementary services.

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 I.210 (1993), *Principles of telecommunication services supported by an ISDN and the means to describe them*.
- [5] CCITT Recommendation E.164 (1991), *Numbering plan for the ISDN era*.
- [6] ITU-T Recommendation Z.100 (1993), *CCITT Specification and Description Language (SDL)*.
- [7] CCITT Recommendation Q.71 (1993), *ISDN 64 kbit/s circuit mode switched bearer service*.

2.3 Definitions

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

2.3.1 advice of charge (AOC): Information about usage-based charging.

2.3.2 charged number: The number which shall be charged for the call.

2.3.3 dialled number: The destination for the charged call.

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

2.3.5 ISDN number: A number conforming to the numbering plan and structure specified in Recommendation E.164 [5].

2.3.6 service; telecommunication service: See definition 201 of 2.2/I.112 [3].

2.3.7 supplementary service: See 2.4/I.210 [4].

2.4 Symbols and abbreviations

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

AOC	Advice of Charge
CD	Call Deflection
CFB	Call Forwarding Busy
CFNR	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CT	Call Transfer
FEA	Functional Entity Action
ISDN	Integrated Services Digital Network
LE	Local Exchange
PTNX	Private Telecommunications Network exchange
SDL	Specification and Description Language
TE	Terminal Equipment
TP	Terminal Portability

2.5 Description

Advice of Charge (AOC) is a group of supplementary services allowing the served user to be informed of usage-based charging information.

These supplementary services are not meant to replace the charge metering inside the network which is considered to be the correct one in all cases.

The AOC group of supplementary services may include the following:

AOC-S	Charging information at call set-up time
AOC-D	Charging information during the call
AOC-E	Charging information at the end of a call

2.6 Derivation of a functional model

2.6.1 Functional model description

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

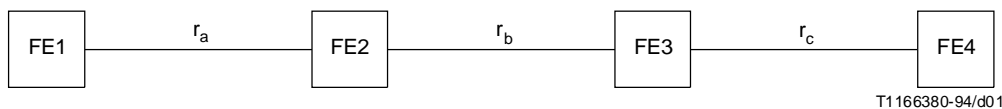


FIGURE 2-1/Q.86

2.6.2 Description of the functional entities

- FE1 AOC served entity
- FE2 AOC information options check
- FE3 AOC controlling entity
- FE4 AOC information formatting

2.6.3 Relationship with a basic service

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

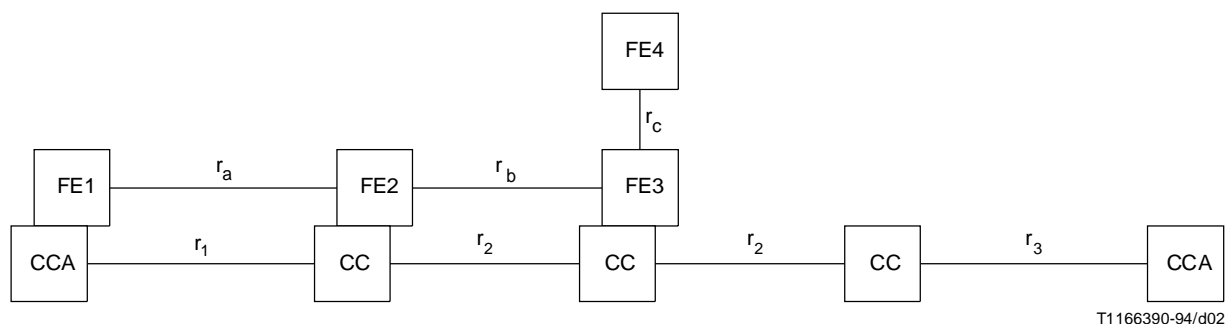


FIGURE 2-2/Q.86

2.7 Information flows

2.7.1 Information flow diagrams

It is assumed that the coding of the AOC-Information is done in such a way that whenever this information is received by a FE1, the content shall be complete in itself.

The flows are intended to show the information flowing for the AOC supplementary service. These flows can in many cases, be combined with the flows for the basic call, depending upon call state. Whether or not this can take place is considered to be a stage 3 matter.

2.7.1.1 Information flows for charging information at call set-up time (AOC-S)

2.7.1.1.1 Receipt of charging information on charging rates (AOC-S)

See Figure 2-3.

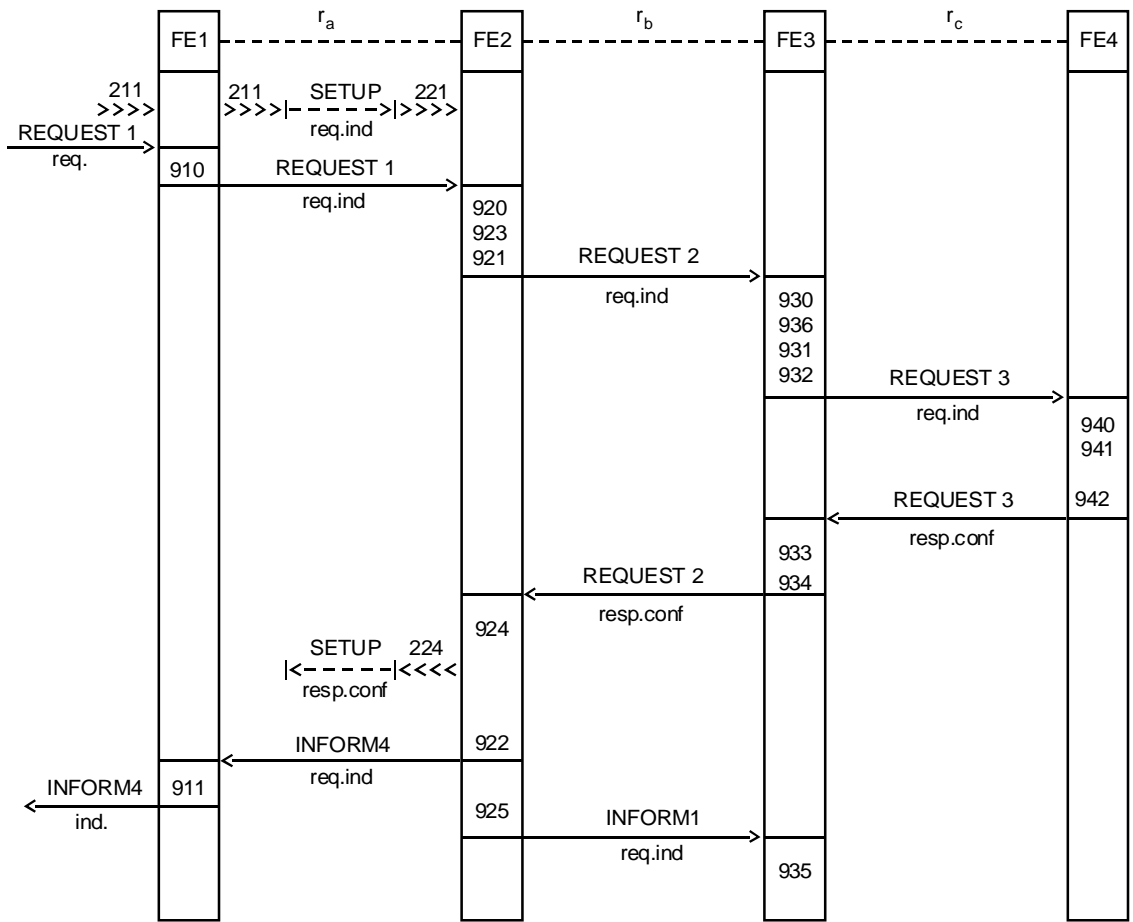
2.7.1.1.2 Change of charging rate during the active state of a call (AOC-S)

See Figure 2-4.

2.7.1.1.3 Receipt of charging rate after TP RETRIEVE (AOC-S)

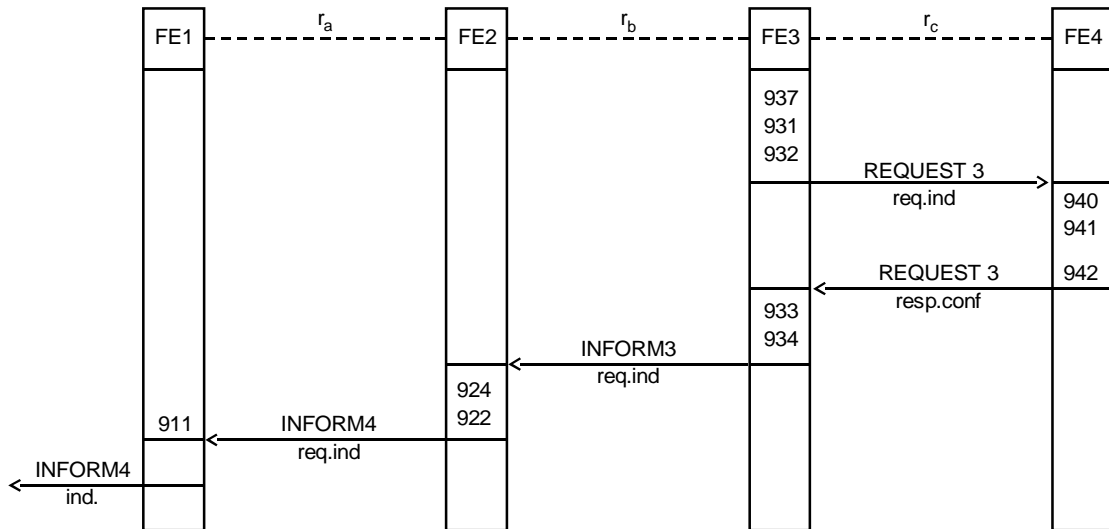
See Figure 2-5.

NOTE – The TP RETRIEVE function is a part of the Terminal Portability (TP) supplementary service and the corresponding FEA numbers refer to this service.



T1181760-96/d03

FIGURE 2-3/Q.86



T1166410-94/d04

FIGURE 2-4/Q.86

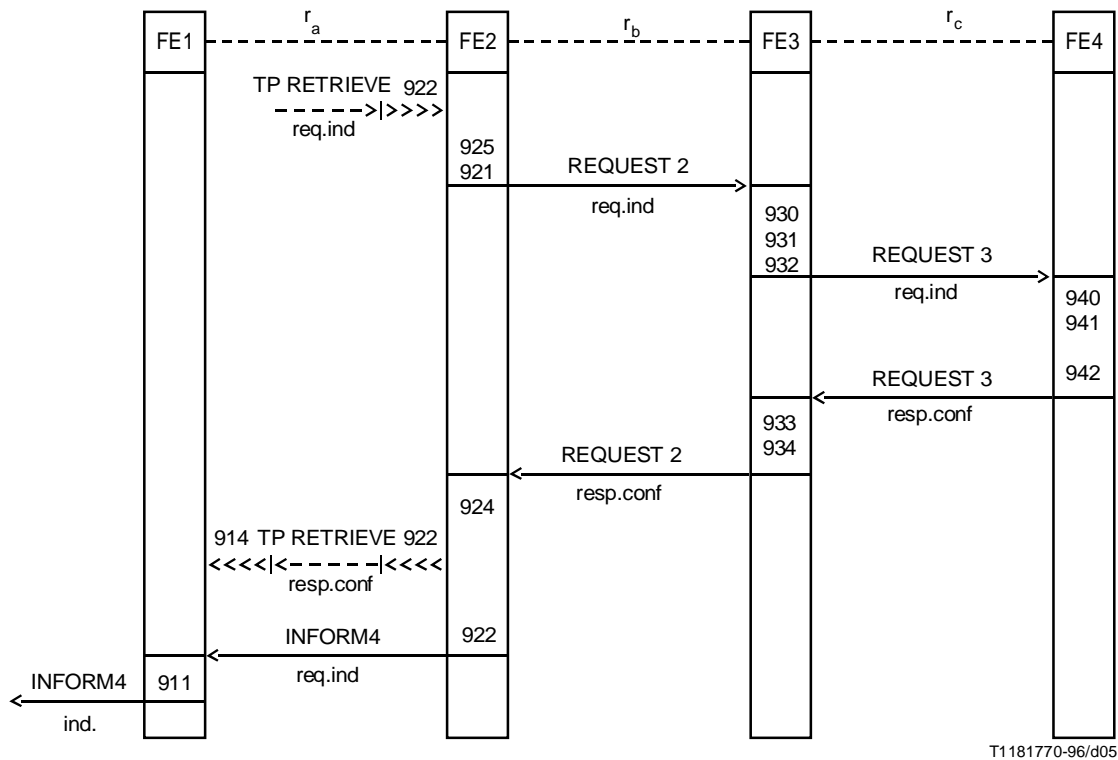


FIGURE 2-5/Q.86

2.7.1.2 Information flows for charging information during a call (AOC-D)

2.7.1.2.1 Transfer of charging information at call establishment (AOC-D)

See Figure 2-6.

2.7.1.2.2 Transfer of charging information during the active state of a call (AOC-D)

See Figure 2-7.

2.7.1.2.3 Transfer of charging information at TP HOLD (AOC-D)

See Figure 2-8.

NOTE – The TP HOLD function is a part of the Terminal Portability (TP) supplementary service and the corresponding FEA numbers refer to this service.

2.7.1.2.4 Transfer of charging information at TP RETRIEVE (AOC-D)

See Figure 2-9.

NOTES

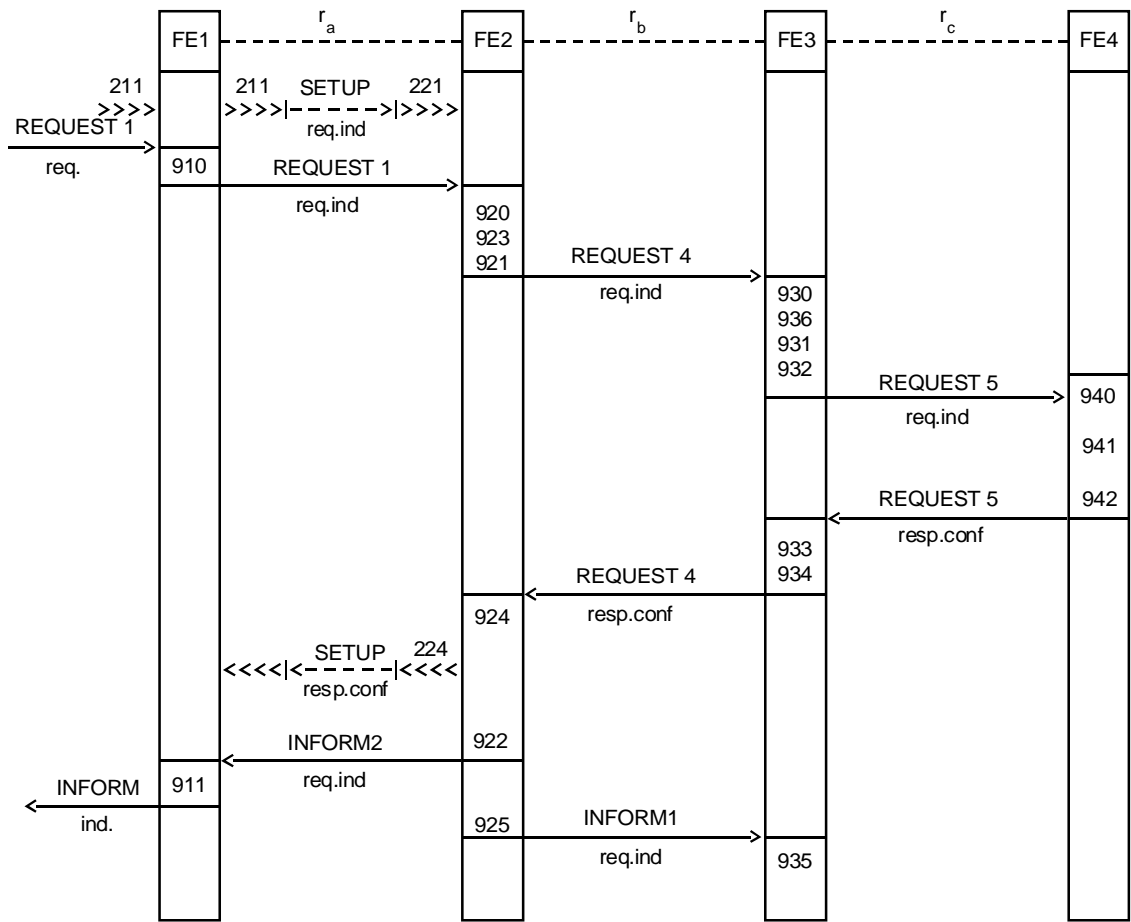
1 The TP RETRIEVE function is a part of the Terminal Portability (TP) supplementary service and the corresponding FEA numbers refer to this service.

2 In the case that the called party clears the call during calling party TP-HOLD state, the INFORM2 shall be associated with the TP REJECT information flow.

2.7.1.2.5 Transfer of charging information at call clearing (AOC-D)

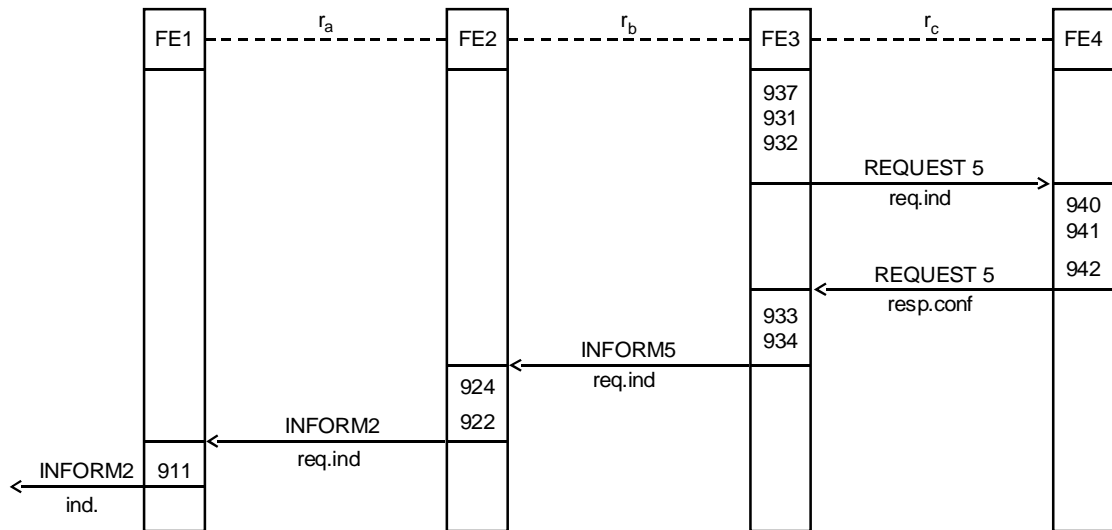
2.7.1.2.5.1 Call clearing in forward direction

See Figure 2-10.



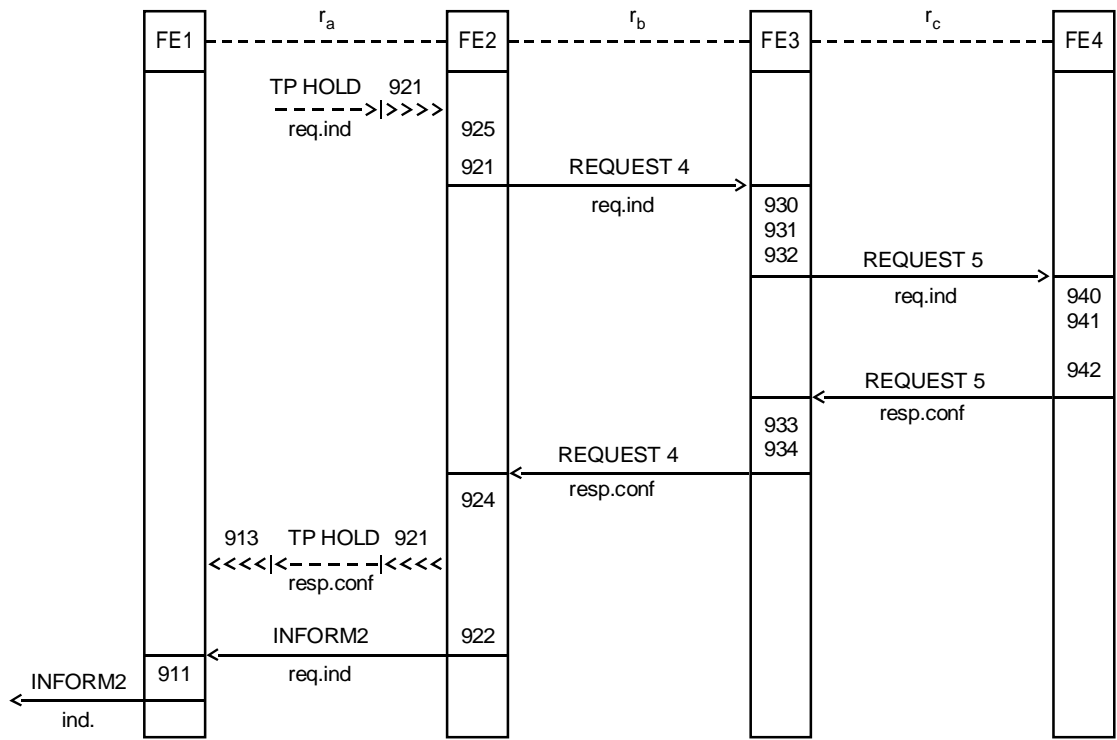
T1181780-96/d06

FIGURE 2-6/Q.86



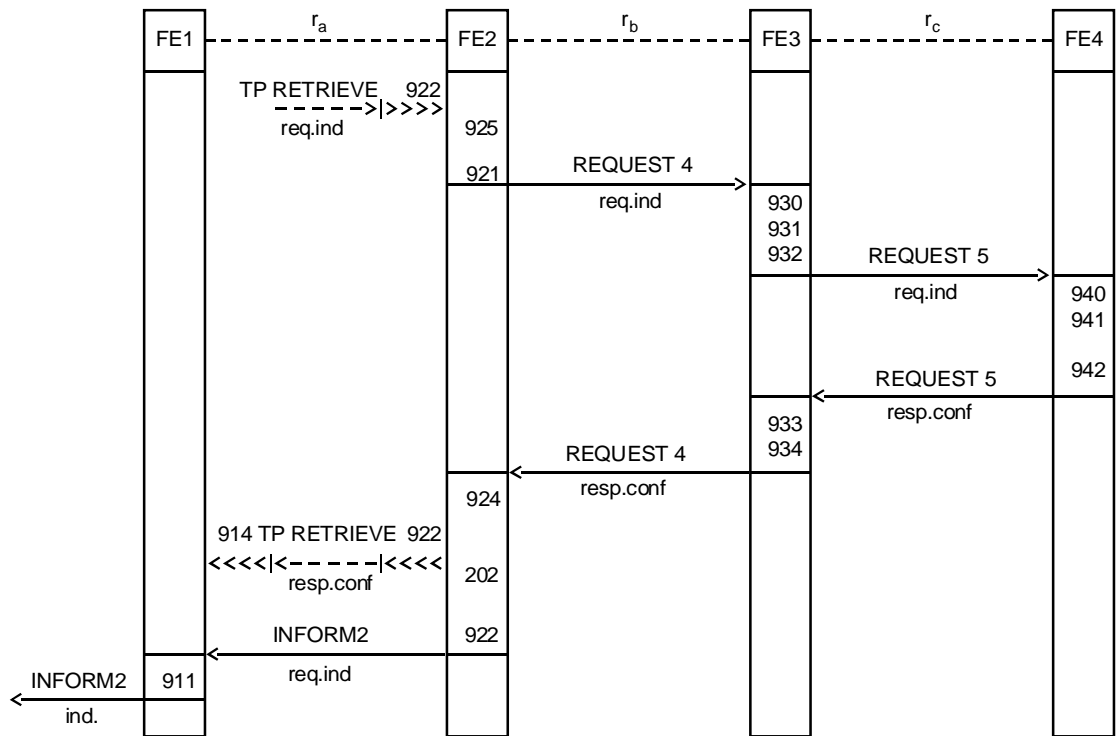
T1181790-96/d07

FIGURE 2-7/Q.86



T1181800-96/d08

FIGURE 2-8/Q.86



T1181810-96/d09

FIGURE 2-9/Q.86

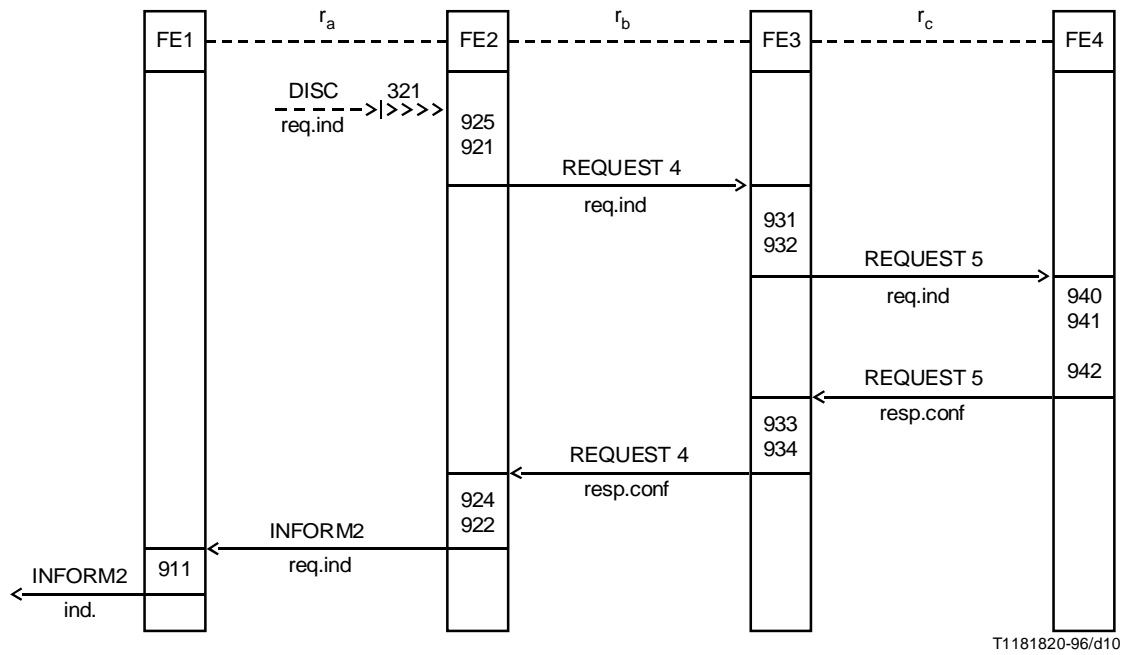


FIGURE 2-10/Q.86

2.7.1.2.5.2 Call clearing in backward direction

See Figure 2-11.

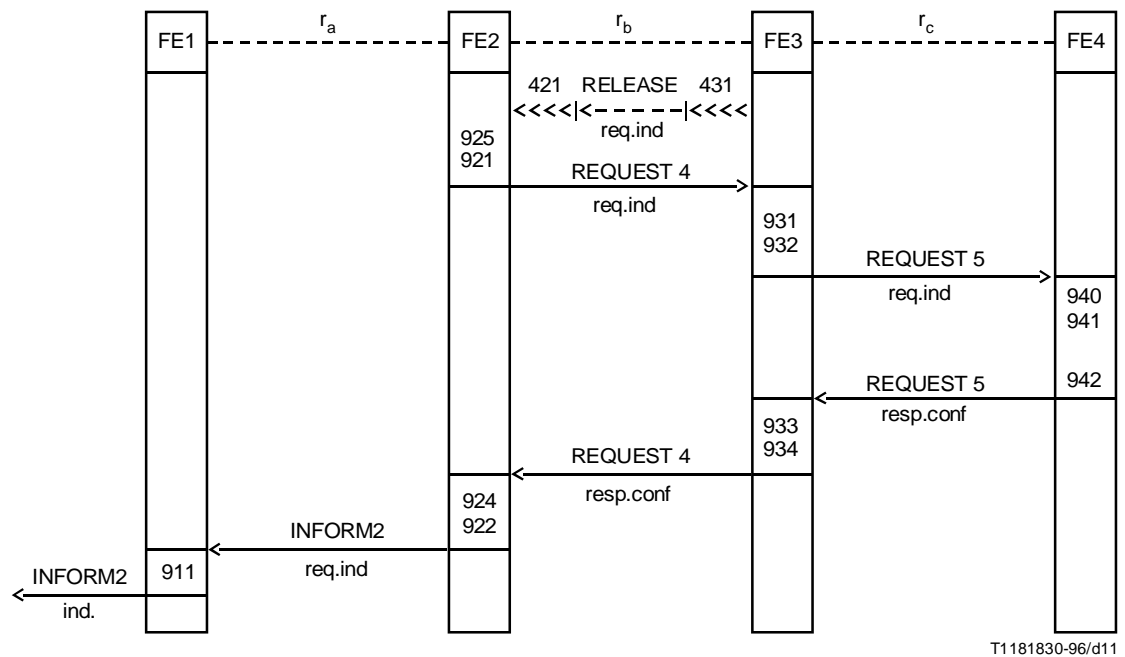


FIGURE 2-11/Q.86

2.7.1.3 Information flows for charging information at the end of a call (AOC-E)

2.7.1.3.1 Request for AOC-E at call set-up time (AOC-E)

See Figure 2-12.

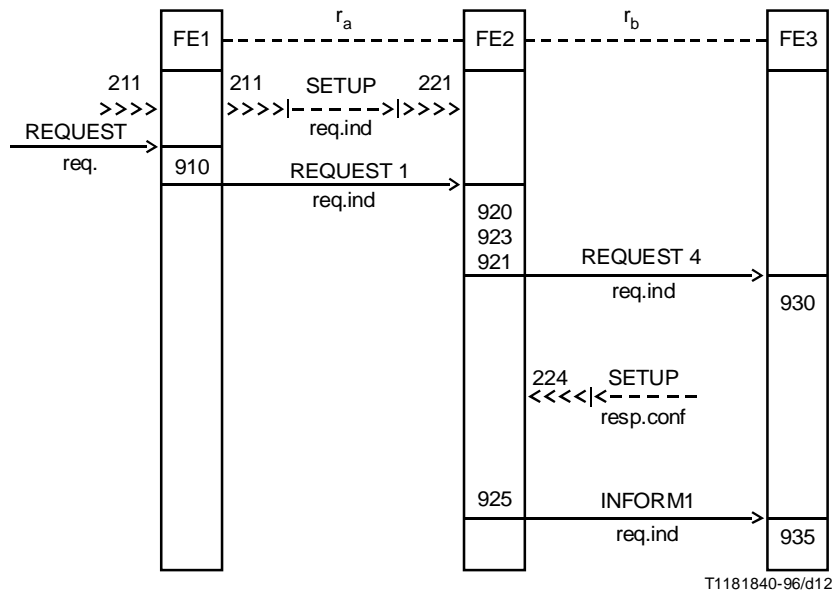


FIGURE 2-12/Q.86

2.7.1.3.2 Information flows for AOC at call clearing (AOC-E)

2.7.1.3.2.1 Call clearing in forward direction (AOC-E)

See Figure 2-13.

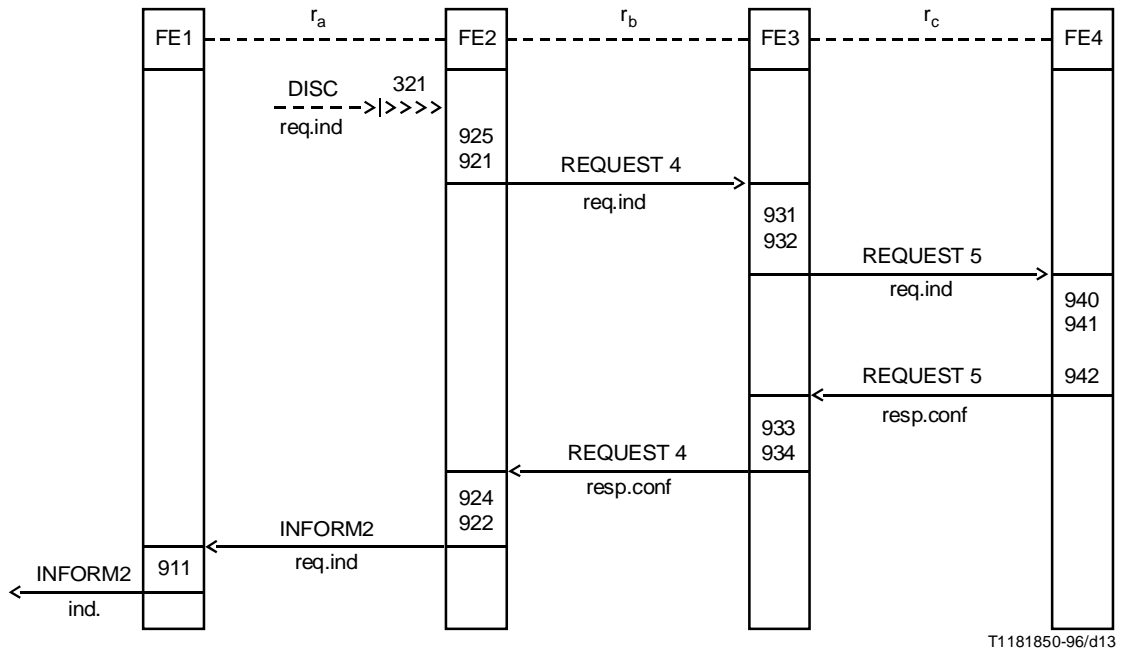
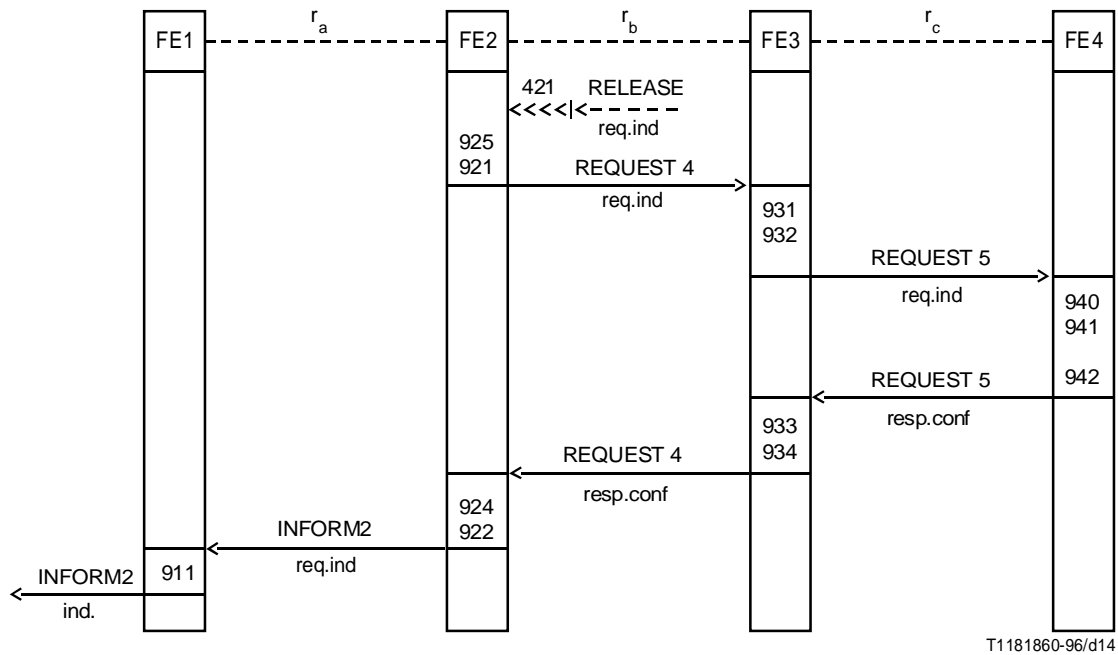


FIGURE 2-13/Q.86

2.7.1.3.2.2 Call clearing in backward direction (AOC-E)

See Figure 2-14.



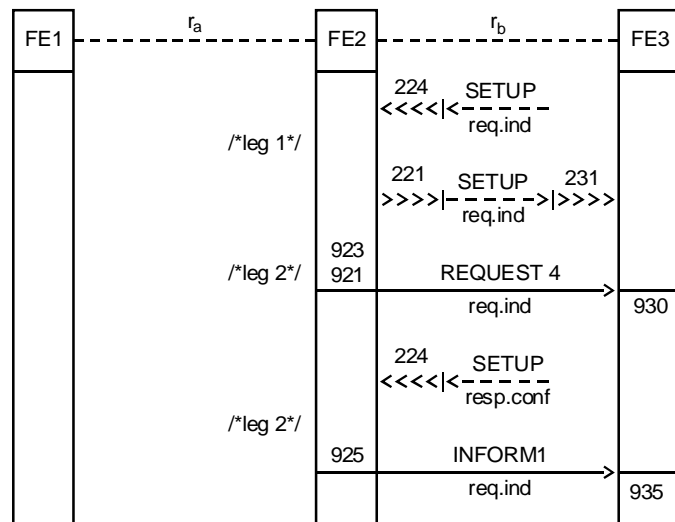
T1181860-96/d14

FIGURE 2-14/Q.86

2.7.1.3.3 Information flows at immediate call diversions (AOC-E)

See Figure 2-15.

Call clearing of the forwarded call in either direction as in 2.7.1.3.2.



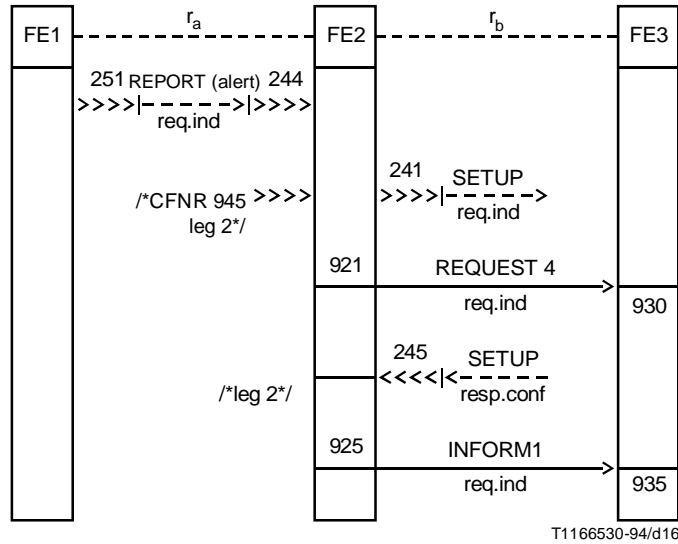
T1166520-94/d15

NOTE – Leg 1 refers to the leg between the calling and the forwarding user.
 – Leg 2 refers to the leg between the forwarding and the forwarded-to user.

FIGURE 2-15/Q.86

2.7.1.3.4 Information flows when diversion of a call occurs after the call has been presented (AOC-E)

See Figure 2-16.



NOTE – Leg 1 refers to the leg between the calling and the forwarding users.
 – Leg 2 refers to the leg between the forwarding and the forwarded-to users.

FIGURE 2-16/Q.86

Call clearing in either direction as in 2.7.1.1.2.

Addressing information indicating the AOC-served user must be included in all cases where the FE1 is not located at a CCA, e.g. when CFU takes place and AOC is given to the user having invoked CFU.

When the AOC-served user is not a part of the basic charged call (i.e. at CFU, CFB, CFNR, CD) or the call has been transferred (CT has been invoked), then the charged number and the dialled number shall be given together with the AOC. The same requirement exists when the AOC-served user is a “third party” (e.g. in hotel PTNXs).

2.7.1.3.5 Information flows for AOC at call failure during call establishment (AOC-E)

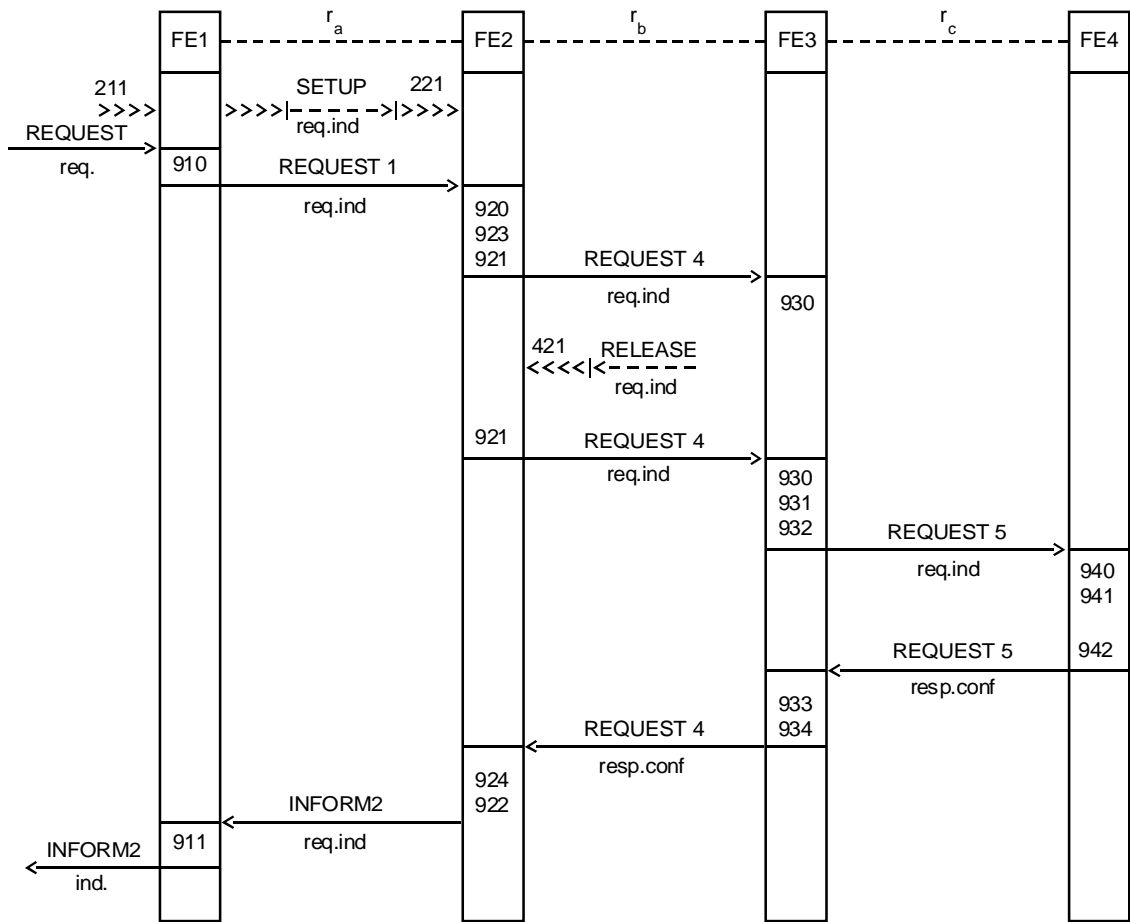
See Figure 2-17.

2.7.2 Definition of individual information flows

NOTE – In the following Tables, M = Mandatory and O = Optional.

2.7.2.1 Relationship ra

See Tables 2-1 to 2-4.



T1181870-96/d17

FIGURE 2-17/Q.86

TABLE 2-1/Q.86

Contents of REQUEST 1 req.ind

Parameter	Allowed value	req.ind
REQUEST for AOC	AOC-S, and/or AOC-D, and/or AOC-E.	M
NOTE – REQUEST 1 applies only in the case where AOC is requested on a per-call basis.		

TABLE 2-2/Q.86

Contents of INFORM2 req.ind

Parameter	Allowed value	req.ind
Type of AOC	AOC-D, or AOC-E	M
Type of charging information	Subtotal charges (AOC-D), or Total charges (AOC-S, AOC-E), or Information not available.	M (Note 1)
Recorded charges	Charging units, or Currency units, or Free of charge, or Not available.	M (Note 2)
If Record charges = charging units Number of charging unit Type of charging units	Integer value Integer 1-16	M O
If Record charges = currency units Currency identifier Currency amount Multiplier (currency)	Integer value 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	M M M
Billing identification	Normal charging (AOC-D, AOC-E), or Reverse charging (AOC-D, AOC-E), or Credit card charging (AOC-D, AOC-E), or Call forwarding unconditional (AOC-E), or Call forwarding busy (AOC-E), or Call forwarding no reply (AOC-E), or Call deflection (AOC-E), or Call transfer (AOC-E).	M
Charged number		O (Note 3)
<p>NOTES</p> <ol style="list-style-type: none"> 1 Some networks may include charges incurred by the use of some supplementary services in "Total charges". 2 If different types of charging units apply, the recorded number of charging units for each type of charging unit may be given. 3 Charged number shall be included when the AOC is provided after the call. 		

TABLE 2-3/Q.86

Contents of AOC REJECT req.ind

Parameter	Allowed value	req.ind
REJECT reason	Not subscribed	M

TABLE 2-4/Q.86

Contents of INFORM4 req.ind

Parameter	Allowed value	req.ind
Type of AOC	AOC-S	M
Type of charging information	Charging rate, or Information not available	M
Charged item	Basic communication and/or Call attempt and/or Call set-up and/or User-to-user information and/or Operation of supplementary services	M (Note)
Special charging arrangements	Integer	M
Charging rate	Duration rate, or Specific rate, or Volume rate	M
If Charging rate = Duration rate: Type of charging	Unit charging, or Continuous charging	M
If Duration rate type = Currency rate: Currency identifier		M
Currency amount	Integer	M
Multiplier	0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	
Length of time unit	Integer	M
Scale (time)	0.01 s, or 0.1 s, or 1.0 s, or 10 s, or 1 minute, or 1 hour, or 24 hours	M
Granularity	Integer	O
Scale (granularity)	0.01 s, or 0.1 s, or 1.0 s, or 10 s, or 1 minute, or 1 hour, or 24 hours	
If Charging rate = Specific rate: Rate type	Free of charge, or Flat rate (currency units), or Special charging code N, or Not available	M

TABLE 2-4/Q.86 (end)

Contents of INFORM4 req.ind

Parameter	Allowed value	req.ind
If Rate type = Flat rate (Currency units): Current identifier Current amount Multiplier (currency)	Integer 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	M M
If Rate type = Special charging code: N	Integer (1-10)	M
If Charging rate = Volume rate: Type of charging	Unit charging, or Currency charging	O
Currency identifier Currency amount Multiplier (currency)	Integer 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000.	M M
Type of volume unit	Octet, or Segment, or Message	M

NOTE – Each of these items will be accompanied by appropriate values from the rest of Table 2-4.

2.7.2.2 Relationship rb

See Tables 2-5 to 2-11.

TABLE 2-5/Q.86

Contents of INFORM1 req.ind

Parameter	Allowed value	req.ind
Call State	Connected or disconnected	M

TABLE 2-6/Q.86

Contents of INFORM3 req.ind

Parameter	Allowed value	req.ind
Type of AOC	AOC-S	M
Type of charging information	Charging rate, or Information not available.	M
Charged item	Basic communication, or Call attempt, or Call set-up, or User-to-user information, or Operation of supplementary services.	M
Special charging arrangements	Integer	M
Charging rate	Duration rate, or Specific rate, or Volume rate	M
If Charging rate = Duration rate: Type of charging	Unit charging, or Continuous charging	M
If Duration rate type = Currency rate: Currency identifier		M
Currency amount	Integer	M
Multiplier	0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	
Length of time unit	Integer	M
Scale (time)	0.01 s, or 0.1 s, or 1.0 s, or 10 s, or 1 minute, or 1 hour or 24 hours	M
Granularity	Integer	O
Scale (Granularity)	0.01 s, or 0.1 s, or 1.0 s, or 10 s, or 1 minute, or 1 hour, or 24 hours	
If Charging rate = Specific rate: rate type	Free of charge, or Flat rate (currency units), or Special charging code N, or Not available	M
If Rate type = Flat rate (currency units): Current identifier		M
Current amount	Integer	M
Multiplier (currency)	0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	

TABLE 2-6/Q.86 (end)

Contents of INFORM3 req.ind

Parameter	Allowed value	req.ind
If Rate type = Special charging code: N	Integer (1-10)	M
If Charging rate = Volume rate: Type of charging	Unit charging, or Currency charging	M
If Volume rate type = Currency rate Currency identifier	Integer 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	M
Currency amount		M
Multiplier (currency)		
Type of volume unit	Octet, or Segment, or Message	M

TABLE 2-7/Q.86

Contents of INFORM5 req.ind

Parameter	Allowed value	req.ind
Type of AOC	AOC-D	M
Type of charging information	Subtotal charges, or Information not available	M
Recorded charges	Charging units, or Currency units, or Free of charge, or Not available	M
If Record charges = Charging units Number of charging unit	Integer value Integer 1-16	M
Type of charging units		O
If Record charges = Currency units Currency identifier	Integer value 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	M
Currency amount		M
Multiplier (currency)		M
Billing identification	Normal charging, or Reverse charging, or Credit card charging	M
Charged number		O (Note)
NOTE – Charged number shall be included when the AOC is provided after the call.		

TABLE 2-8/Q.86

Contents of REQUEST 2 req.ind

Parameter	Allowed value	req.ind
Type of AOC	AOC-S	M
Call state	Establishment, or TP-Retrieve	M

TABLE 2-9/Q.86

Contents of REQUEST 2 resp.conf

Parameter	Allowed value	req.ind
Type of AOC	AOC-S	M
Type of charging information	Charging rate, or Information not available	M
Charged item	Basic communication, or Call attempt, or Call set-up, or User-to-user information, or Operation of supplementary services, or Special charging arrangements	M
Charging rate	Duration rate, or Specific rate, or Volume rate	M
If Charging rate = Duration rate: Type of charging	Unit charging, or Continuous charging	M
If Duration rate type = Currency rate: Currency identifier		M
Currency amount		M
Multiplier	Integer 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	
Length of time unit	Integer	M
Scale (time)	0.01 s, or 0.1 s, or 1.0 s, or 10 s, or 1 minute, or 1 hour, or 24 hour	M
Granularity Scale (granularity)	Integer 0.01 s, or 0.1 s, or 1.0 s, or 10 s, or 1 minute, or 1 hour, or 24 hour	O

TABLE 2-9/Q.86 (end)

Contents of REQUEST 2 resp.conf

Parameter	Allowed value	req.ind
If Charging rate = Specific rate: rate type	Free of charge, or Flat rate (charging units), or Special charging code N, or Not available	M
If Rate type = Flat rate (Currency units): Current identifier Current amount Multiplier (currency)	Integer 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	M M
If Rate type = Special charging code: N	Integer (1-10)	M
If Charging rate = Volume rate: Type of charging	Unit charging, or Currency charging	O
If Volume rate type = Currency rate Currency identifier Currency amount Multiplier (currency)	Integer 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	M M
Type of volume unit	Octet, or Segment, or Message	M

TABLE 2-10/Q.86

REQUEST 4 req.ind

Parameter	Allowed value	req.ind
Type of AOC	AOC-D, or AOC-E	M
Call state	Establishment, or Disconnected, or Failed, or Held, or Retrieved	M

TABLE 2-11/Q.86

Contents of REQUEST 4 resp.conf

Parameter	Allowed value	req.ind
Type of AOC	AOC-D, or AOC-E	M
Type of charging information	Subtotal charges (AOC-D), or Total charges (AOC-D, AOC-E), or Information not available	M (Note 1)
Recorded charges	Charging units, or Currency units, or Free of charge, or Not available	M (Note 2)
If Recorded charges = Charging units Number of charging unit Type of charging units	Integer value Integer 1-16	M O
If Record charges = Currency units Currency identifier Currency amount Multiplier (currency)	Integer value 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	M M M
Billing identification	Normal charging (AOC-D,AOC-E), or Reverse charging (AOC-D,AOC-E), or Credit card charging (AOC-D,AOC-E), or Call forwarding unconditional (AOC-E), or Call forwarding busy (AOC-E), or Call forwarding no reply (AOC-E), or Call deflection (AOC-E), or Call transfer (AOC-E)	M
Charged number		O (Note 3)
<p>NOTES</p> <ol style="list-style-type: none"> 1 Some networks may include charges incurred by the use of some supplementary services in "Total charges". 2 If different types of charging units apply, the recorded number of charging units for each type of charging unit may be given. 3 Charged number shall be included when the AOC is provided after the call. 		

2.7.2.3 Relationship rc

See Tables 2-12 to 2-15.

TABLE 2-12/Q.86

Contents of REQUEST 3 req.ind

Parameter	Allowed value	req.ind
Charging info to be formatted		M (Note)
<p>NOTE –The detailed specification of the content of this flow is outside the scope of this Recommendation. The information transferred is the charging information received from the charging function of the basic call.</p>		

TABLE 2-13/Q.86

Contents of REQUEST 3 resp.conf

Parameter	Allowed value	req.ind
Type of AOC	AOC-S	M
Type of charging information	Charging rate	M
Charged item	Basic communication, or Call attempt, or Call set-up, or User-to-user information, or Operation of supplementary services, or Special charging arrangements	M
Charging rate	Duration rate, or Specific rate, or Volume rate	M
If Charging rate = Duration rate: Type of charging	Unit charging, or Continues charging	M
If Duration rate type = Currency rate: Currency identifier		M
Currency amount	Integer	M
Multiplier	0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	
Length of time unit	Integer	M
Scale (time)	0.01 s, or 0.1 s, or 1.0 s, or 10 s, or 1 minute, or 1 hour, or 24 hour	M
Granularity	Integer	O
Scale (granularity)	0.01 s, or 0.1 s, or 1.0 s, or 10 s, or 1 minute, or 1 hour, or 24 hour	
If Charging rate = Specific rate: Rate type	Free of charge, or Flat rate (currency units), or Special charging code N, or Not available	M

TABLE 2-13/Q.86 (end)

Contents of REQUEST 3 resp.conf

Parameter	Allowed value	req.ind
If Rate type = Flat rate (Currency units): Current identifier Current amount Multiplier (currency)	Integer 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	M M
If Rate type = Special charging code: N	Integer (1-10)	M
If Charging rate = Volume rate: Type of charging	Unit charging, or Currency charging	O
If Volume rate type = Currency rate Currency identifier Currency amount Multiplier (currency)	Integer 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	M M
Type of volume unit	Octet, or Segment, or Message	M

TABLE 2-14/Q.86

Contents of REQUEST 5 req.ind

Parameter	Allowed value	req.ind
Charging info to be formatted		M (Note)
NOTE – The detailed specifications of the content of this flow is outside the scope of this Recommendation. The information transferred is the charging information received from the charging function of the basic call.		

TABLE 2-15/Q.86

Contents of REQUEST 5 resp.conf

Parameter	Allowed value	req.ind
Type of AOC	AOC-D, or AOC-E	M
Type of charging information	Subtotal charges (AOC-D), or Total charges (AOC-D, AOC-E)	M (Note 1)
Recorded charges	Charging units, or Currency units, or Free of charge, or Not available	M (Note 2)
If Recorded charges = Charging units Number of charging unit Type of charging units	Integer value Integer 1-16	M O
If Record charges = Currency units Currency identifier Currency amount Multiplier (currency)	Integer value 0.001, or 0.01, or 0.1, or 1.0, or 10, or 100, or 1000	M M M
Billing identification	Normal charging (AOC-D,AOC-E), or Reverse charging (AOC-D,AOC-E), or Credit card charging (AOC-D,AOC-E), or Call forwarding unconditional (AOC-E), or Call forwarding busy (AOC-E), or Call forwarding no reply (AOC-E), or Call deflection (AOC-E), or Call transfer (AOC-E)	M
Charged number		O (Note 3)
<p>NOTES</p> <ol style="list-style-type: none"> 1 Some networks may include charges incurred by the use of some supplementary services in "Total charges". 2 If different types of charging units apply, the recorded number of charging units for each type of charging unit may be given. 3 Charged number shall be included when the AOC is provided after the call. 		

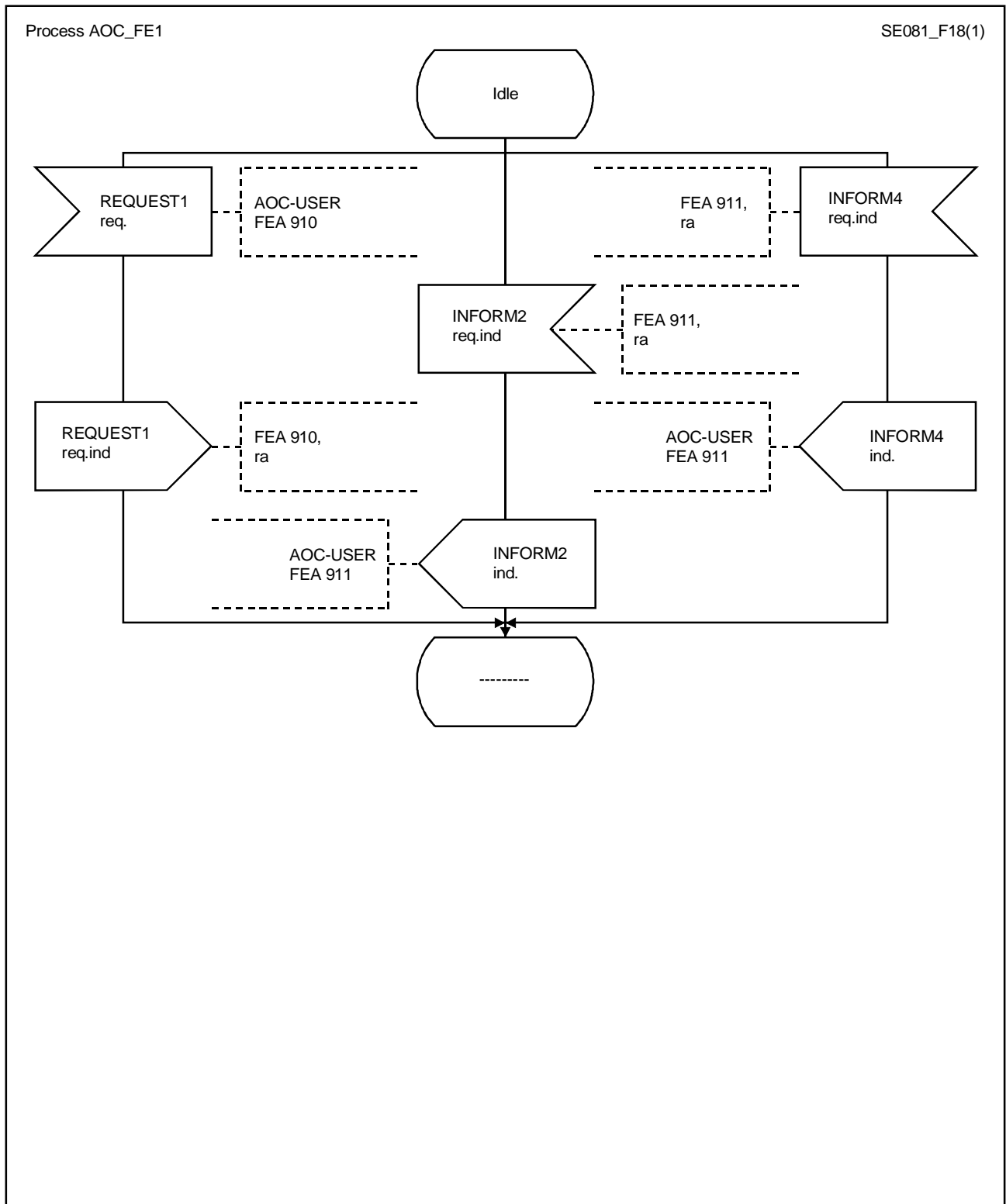
2.8 SDL diagrams for functional entities

The SDLs are provided according to the general principles of Recommendation Z.100 [6].

One instance of the described process shall exist for each AOC supplementary service requested. These instances of the described process shall operate independently of each other. Each request for an AOC supplementary service shall be handled by a separate process and multiple requests for AOC supplementary services can be included in a SETUP message.

2.8.1 FE1

The SDL for FE1 is shown in Figure 2-18.



T1166550-94/d18

FIGURE 2-18/Q.86

2.8.2 FE2

The SDL for FE2 is shown in Figure 2-19.

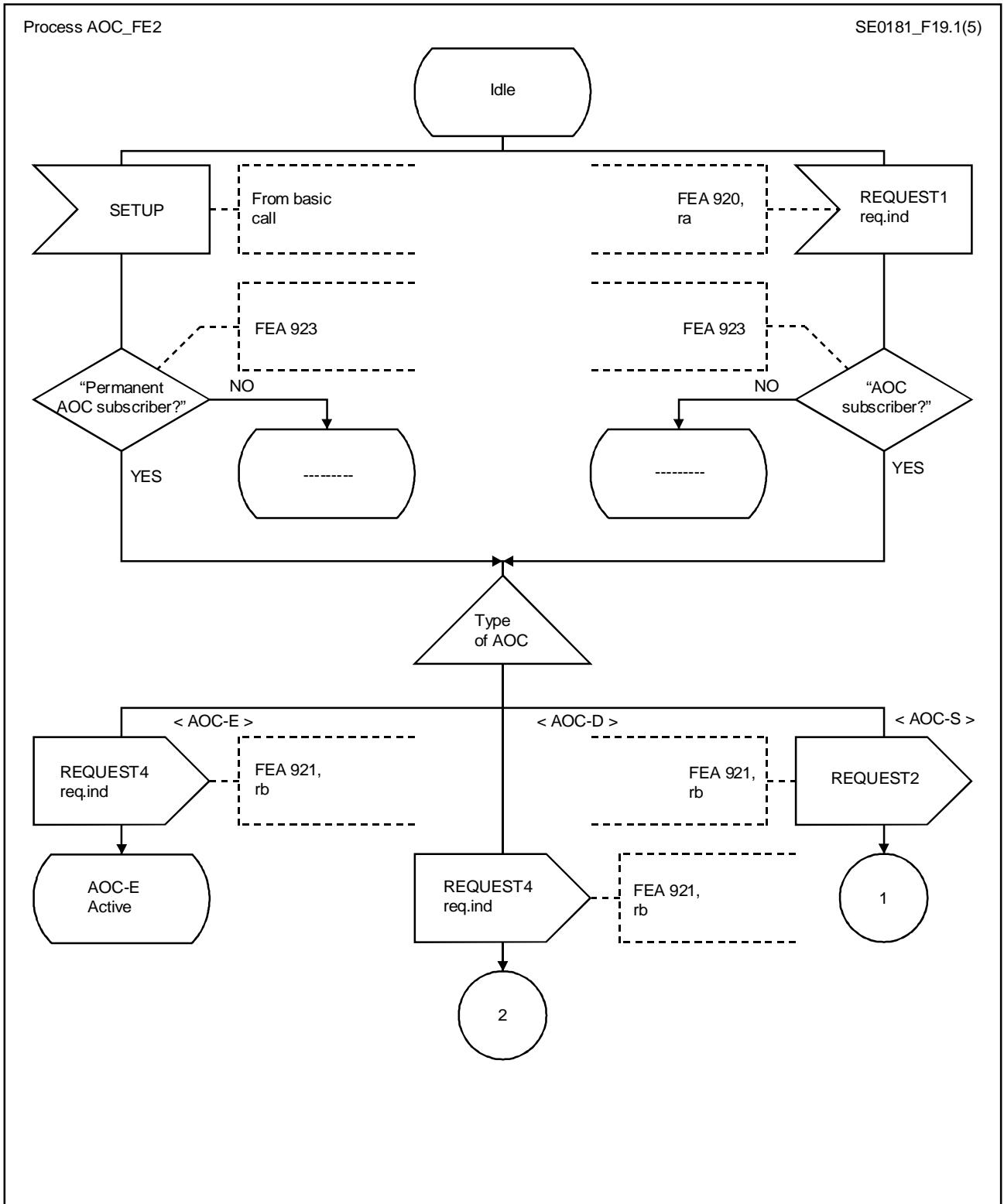
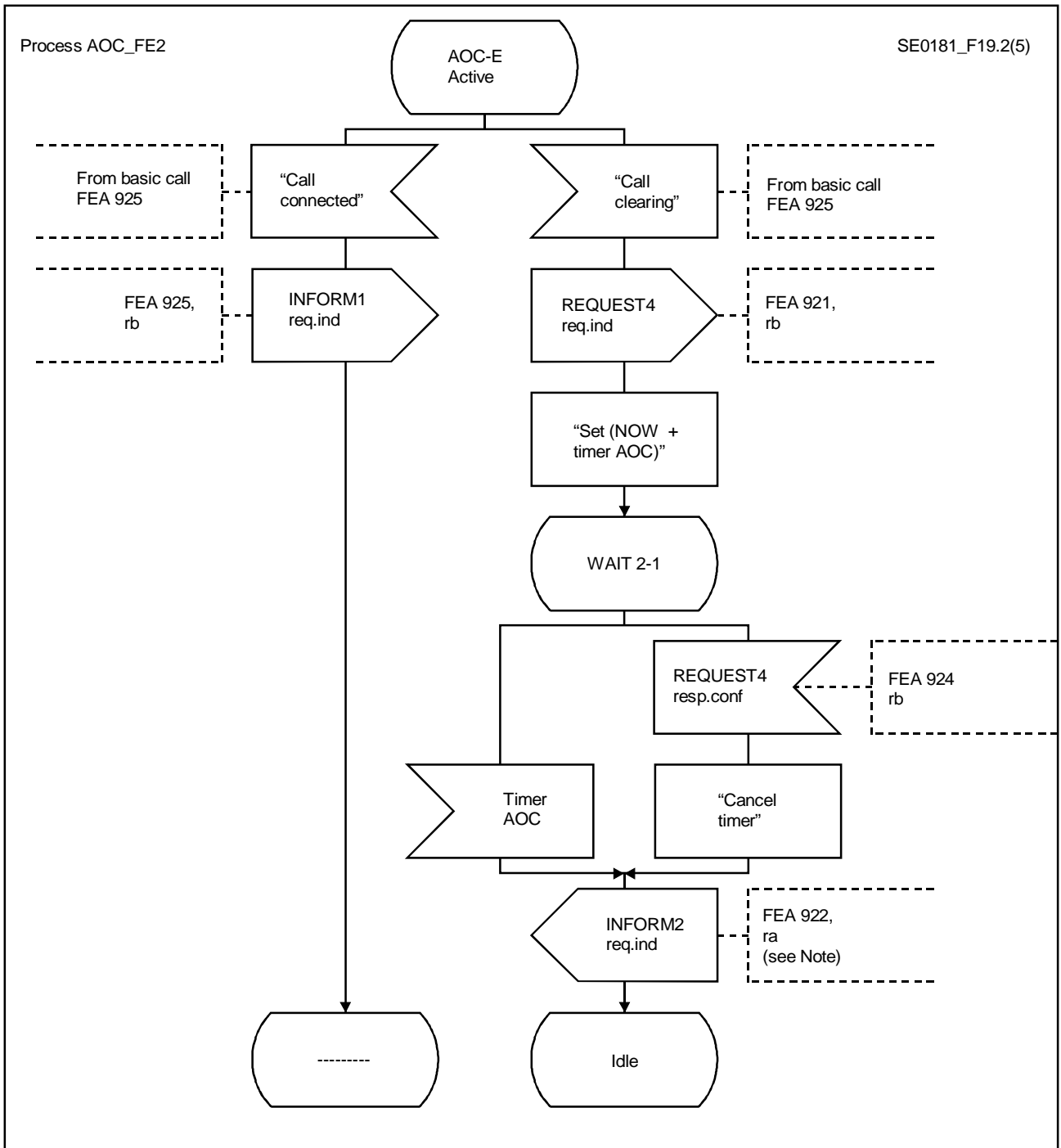
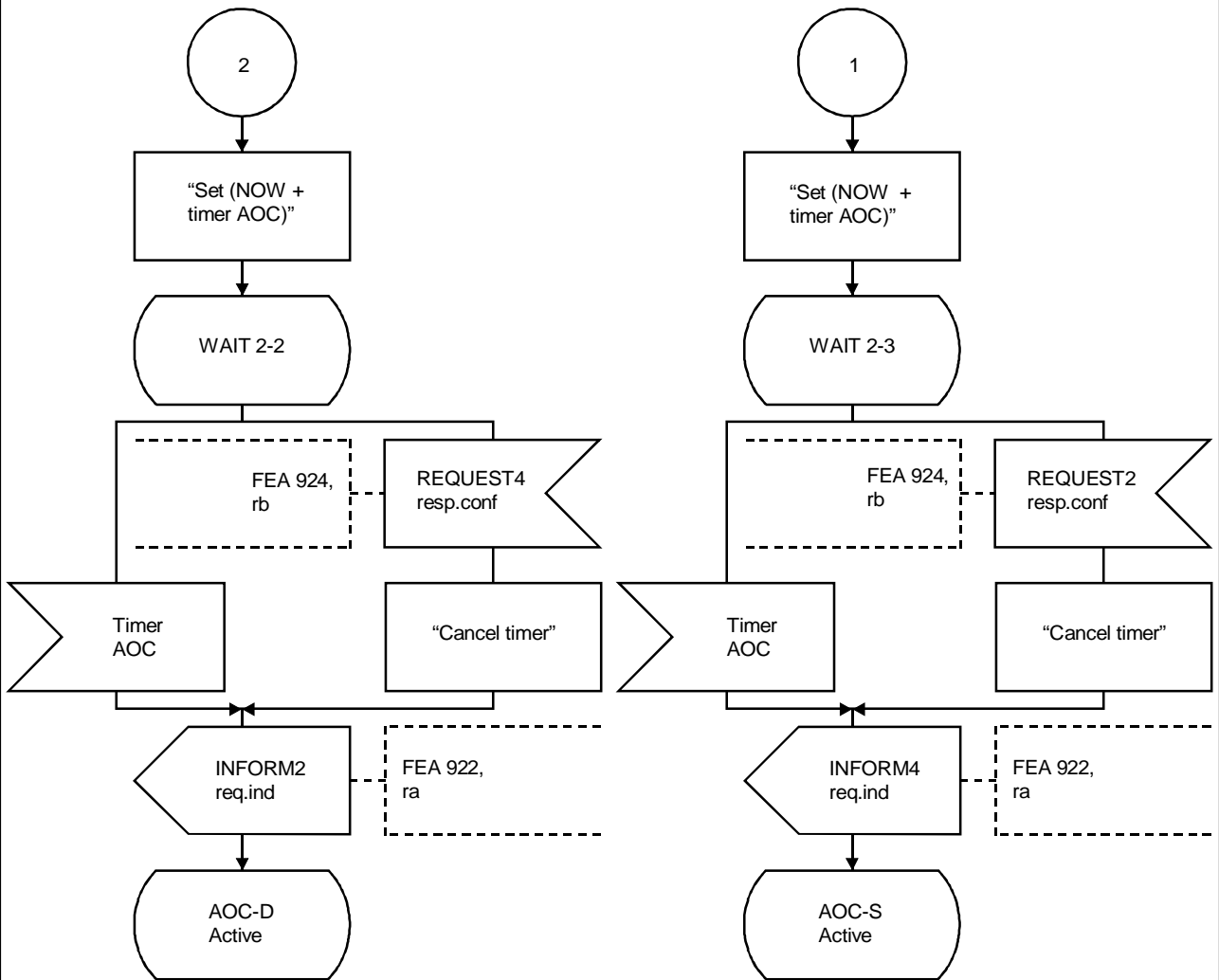


FIGURE 2-19/Q.86 (sheet 1 of 5)



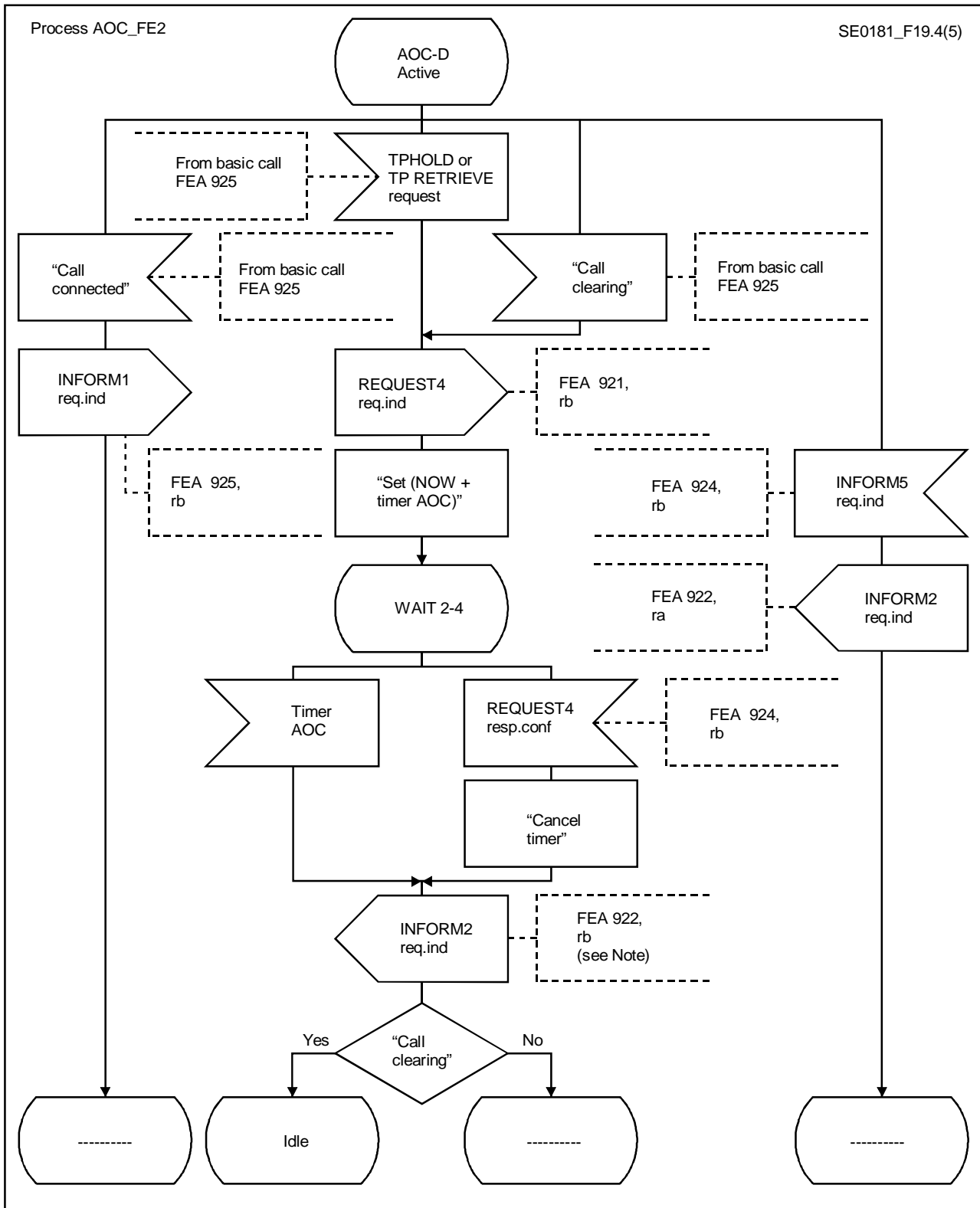
NOTE – In the case that the called party clears the call during calling party TP HOLD state, the INFORM2 shall be associated with the TP REJECT information flow.

FIGURE 2-19/Q.86 (sheet 2 of 5)



T1166580-94/d21

FIGURE 2-19/Q.86 (sheet 3 of 5)



T1181890-96/d22

NOTE – In the case that the called party clears the call during calling party TP HOLD state, the INFORM2 shall be associated with the TP REJECT information flow.

FIGURE 2-19/Q.86 (sheet 4 of 5)

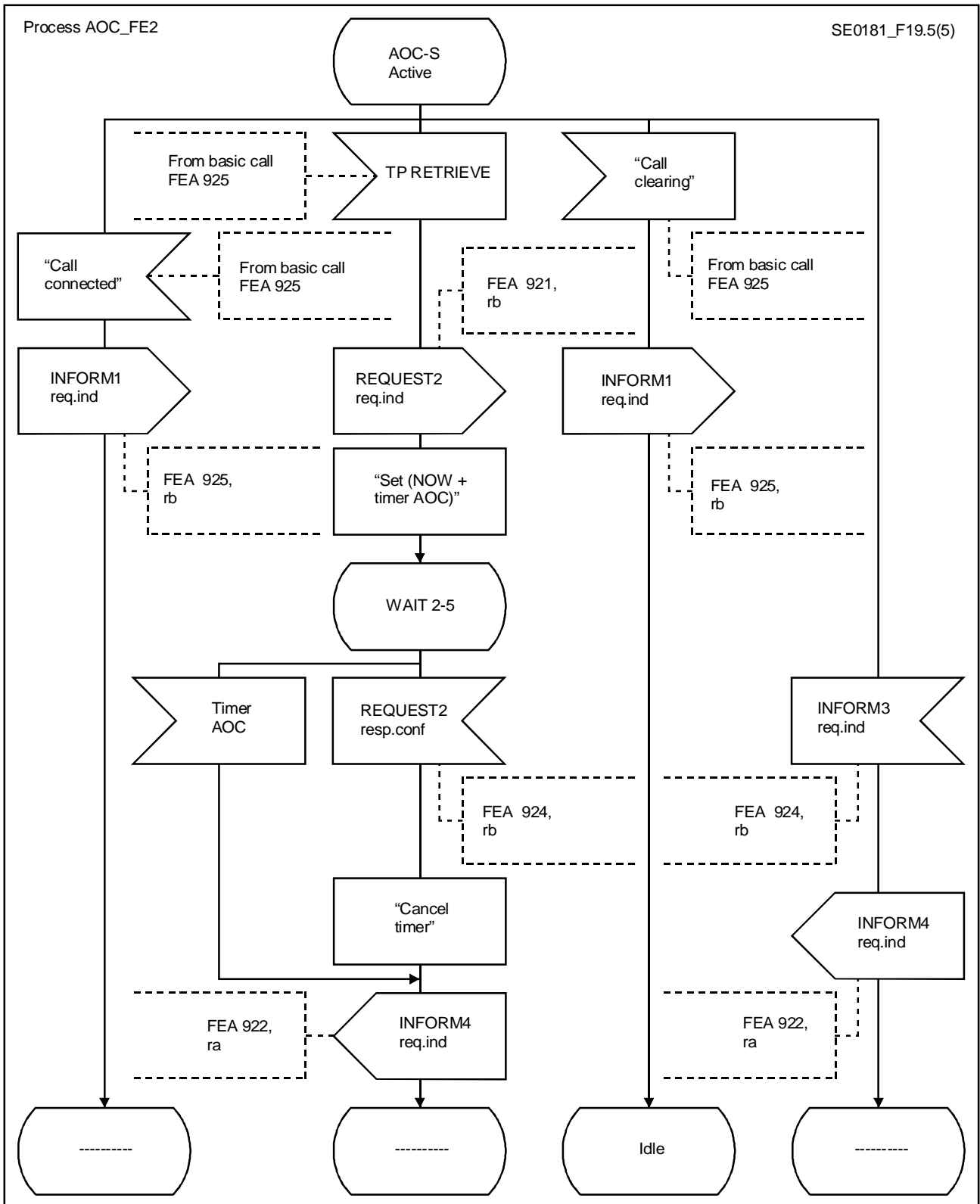
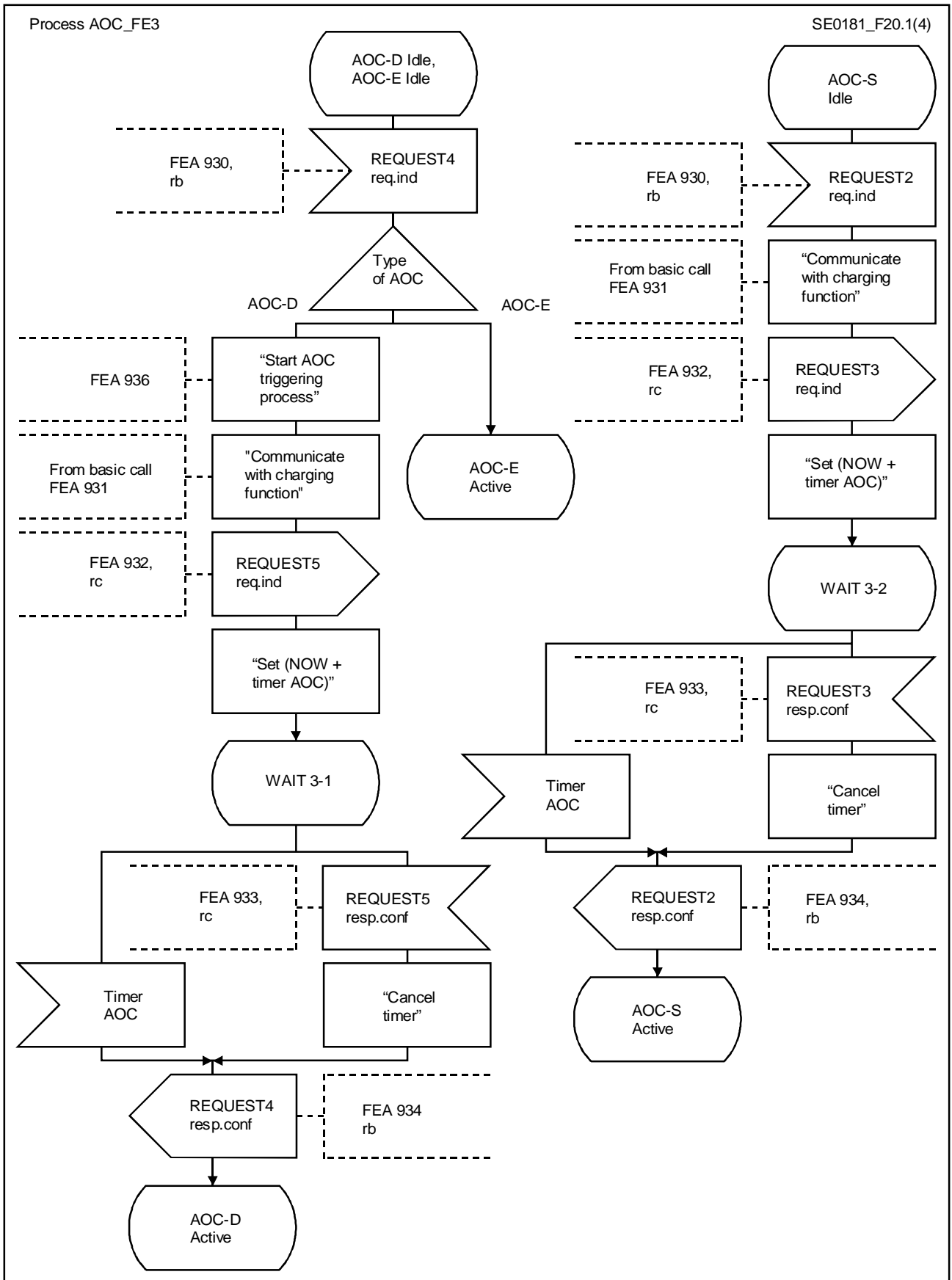


FIGURE 2-19/Q.86 (sheet 5 of 5)

2.8.3 FE3

The SDL for FE3 is shown in Figure 2-20.



T1166610-94/d24

FIGURE 2-20/Q.86 (sheet 1 of 4)

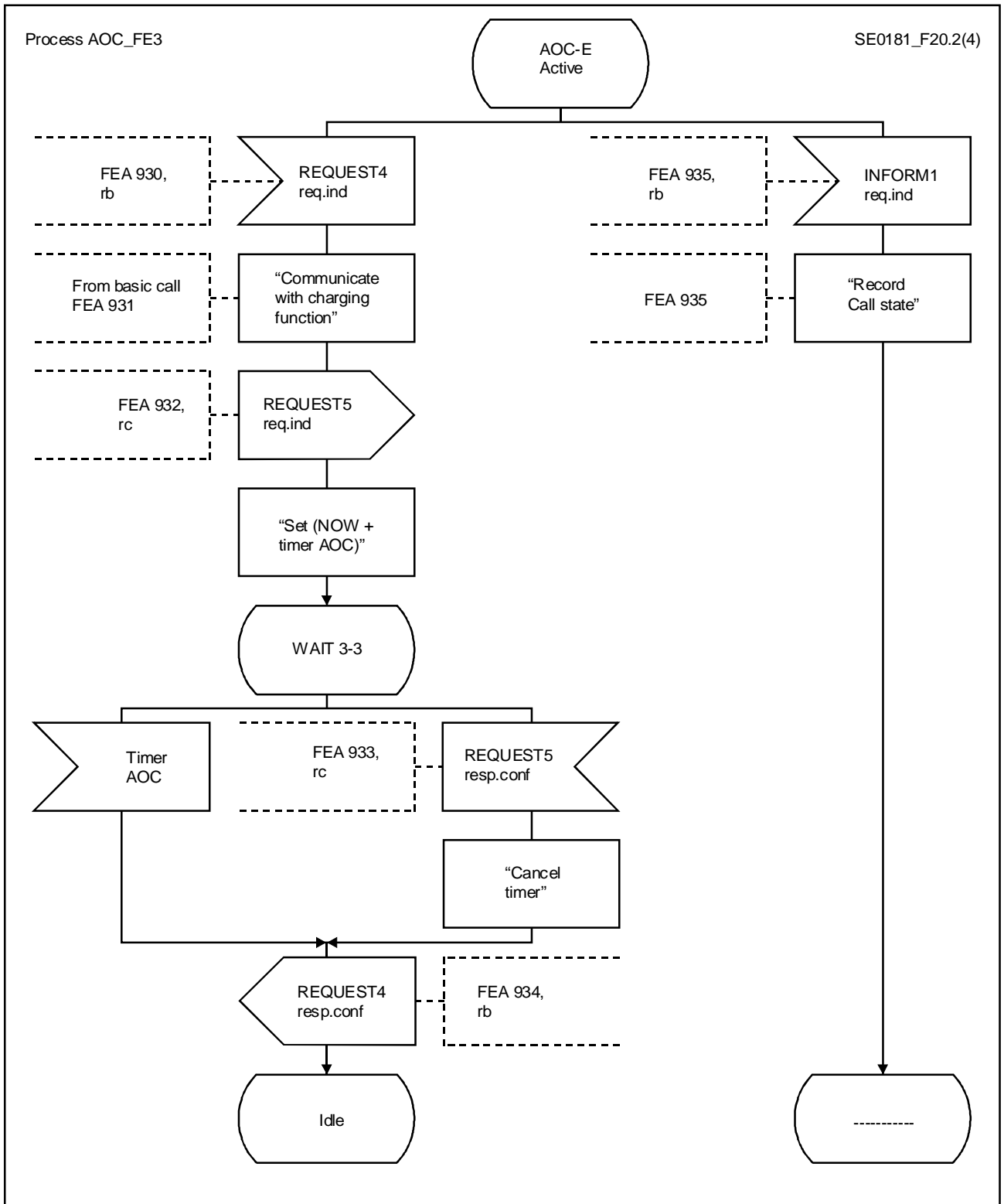
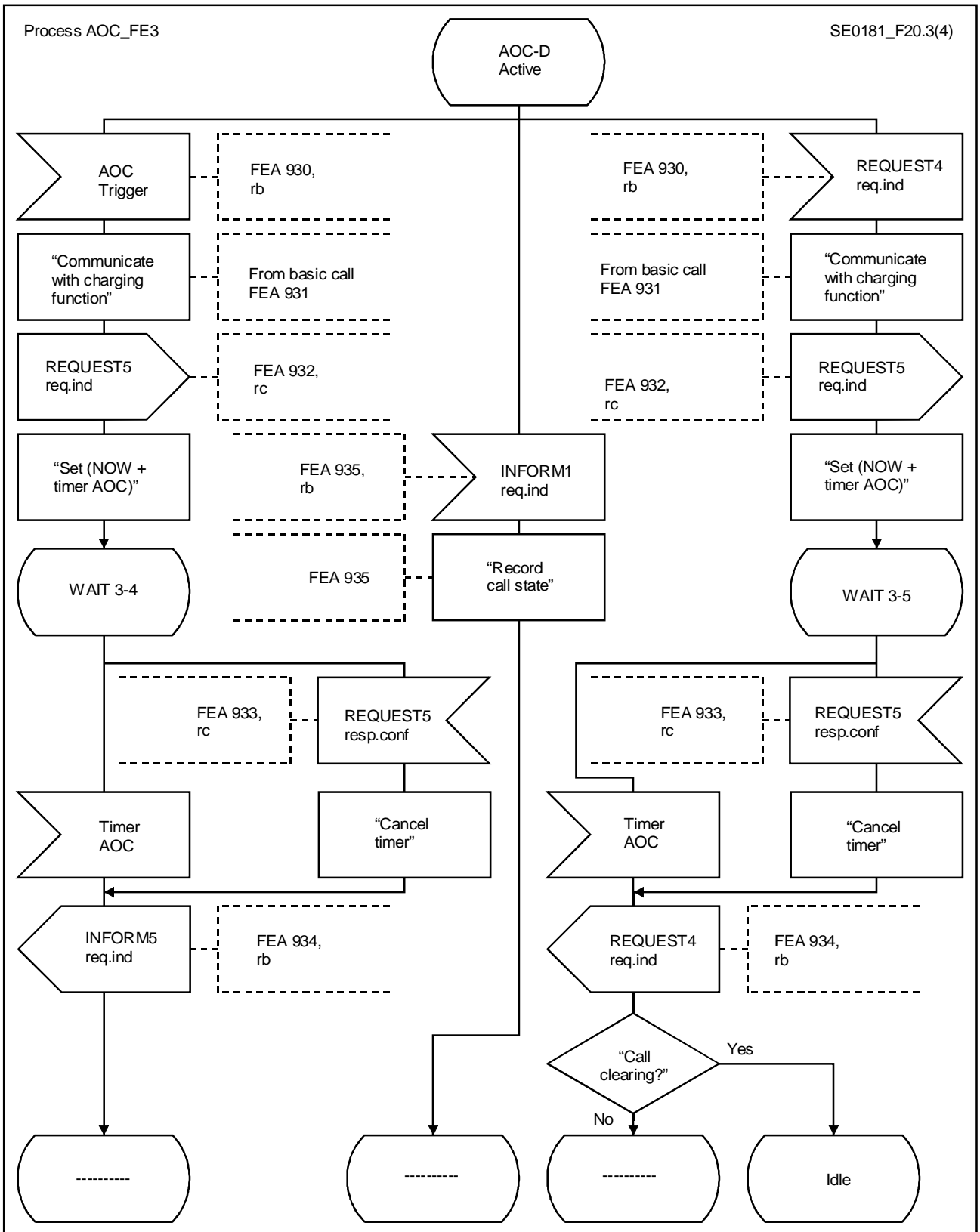


FIGURE 2-20/Q.86 (sheet 2 of 4)



T1166630-94/d26

FIGURE 2-20/Q.86 (sheet 3 of 4)

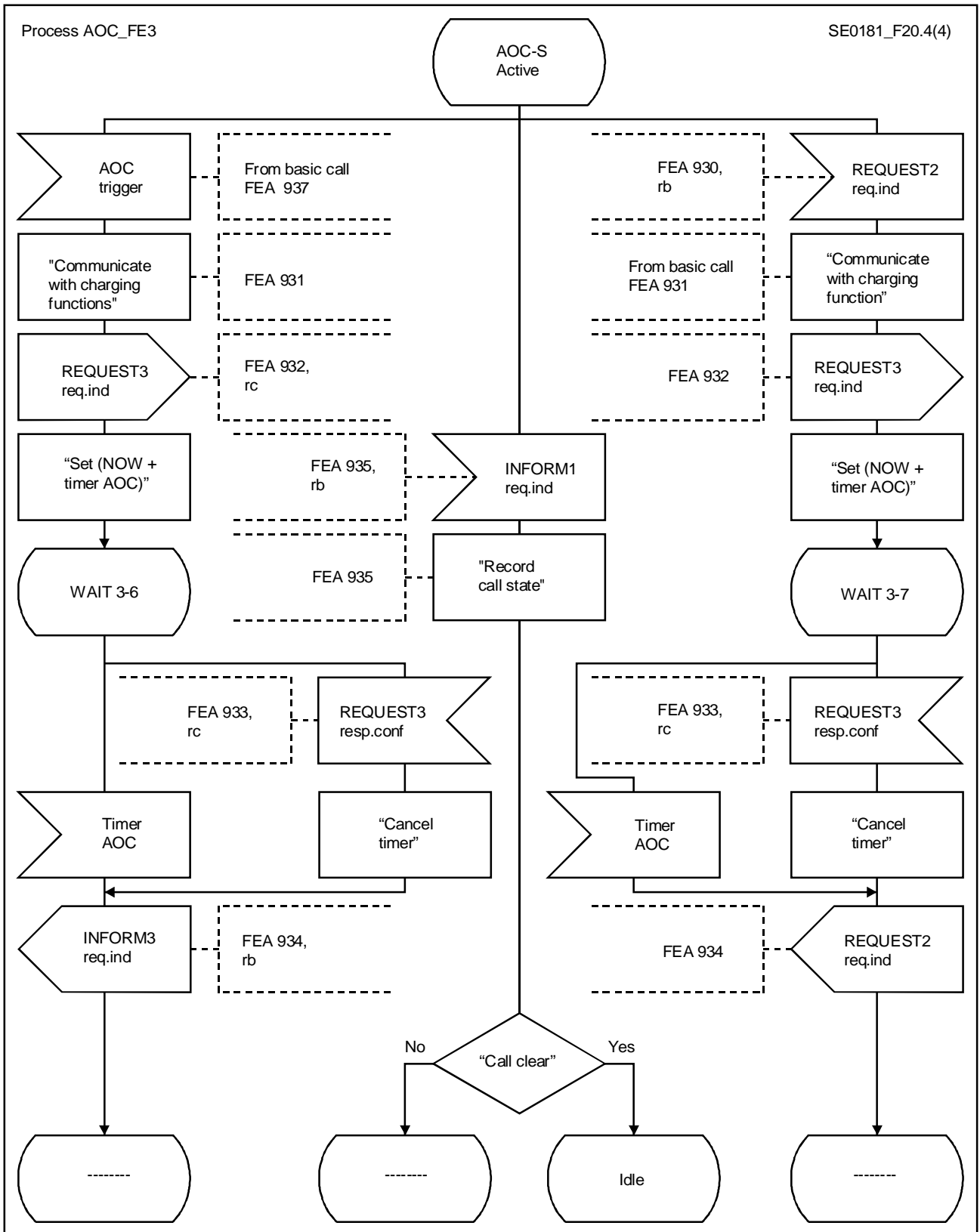
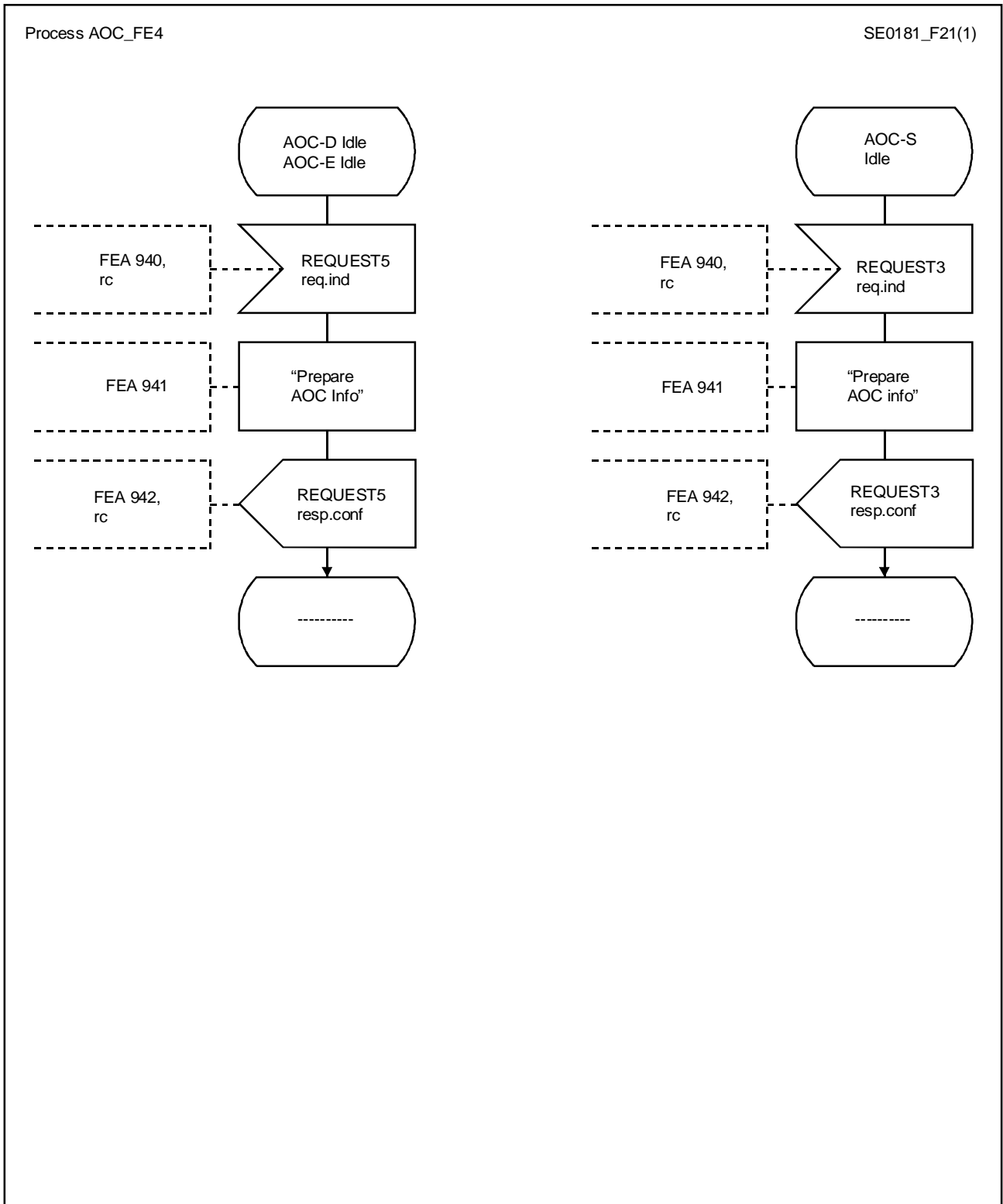


FIGURE 2-20/Q.86 (sheet 4 of 4)

2.8.4 FE4

The SDL for FE4 is shown in Figure 2-21.



T1166650-94/d28

FIGURE 2-21/Q.86

2.9 Functional Entity Actions (FEAs)

2.9.1 FEAs for FE1

- 910: The functional entity shall receive AOC request from the served user and forward the request to FE2.
- 911: The functional entity shall receive AOC information from FE2 and forward the AOC information to the AOC served user.

2.9.2 FEAs for FE2

- 920: The functional entity shall receive AOC requests from FE1.
- 921: The functional entity shall request AOC information from FE3.
- 922: The functional entity shall send AOC information to FE1.
- 923: The functional entity shall check subscription/request options of the service.
- 924: The functional entity shall receive AOC information from FE3.
- 925: The functional entity shall receive info on call state from basic call and send change of call state information to FE3.
- 926: The functional entity shall manage timers and react when they mature.

2.9.3 FEAs for FE3

- 930: The functional entity shall receive AOC requests from FE2.
- 931: The functional entity shall communicate with the charging function of the basic call.
- 932: The functional entity shall request FE4 to prepare the AOC-information.
- 933: The functional entity shall receive AOC information from FE4.
- 934: The functional entity shall send AOC information to FE2.
- 935: The functional entity shall receive call state information from FE2 and record the call state.
- 936: The functional entity shall start the appropriate triggering process for AOC during a call.

NOTE – This triggering process is a network option, e.g. AOC information may be sent every X seconds, or for every Y charge units.
- 937: The functional entity shall receive trigger inputs from the AOC triggering process.
- 938: The functional entity shall manage timers and react when they mature.

2.9.4 FEAs for FE4

- 940: The functional entity shall receive AOC requests from FE3.
- 941: The functional entity prepare the AOC information on the basis of the received charging information from FE3.
- 942: The functional entity shall send AOC information to FE3.

2.10 Allocation of functional entities to physical locations

See Table 2-16.

TABLE 2-16/Q.86

Scenarios	FE1	FE2	FE3	FE4
1	TE	LE		
2	PTNX	LE		
3	TE	LE	TR	
4	PTNX	LE	TR	
5	TE	LE	Charging centre	
6	PTNX	LE	Charging centre	

NOTE – Scenarios 7, 8 and 9 show the cases where AOC is completely provided by private network.

Appendix I

Interworking between two charging domains

(This appendix does not form an integral part of this Recommendation)

Explanatory model for the interworking between two charging domains (see Figure I-1).

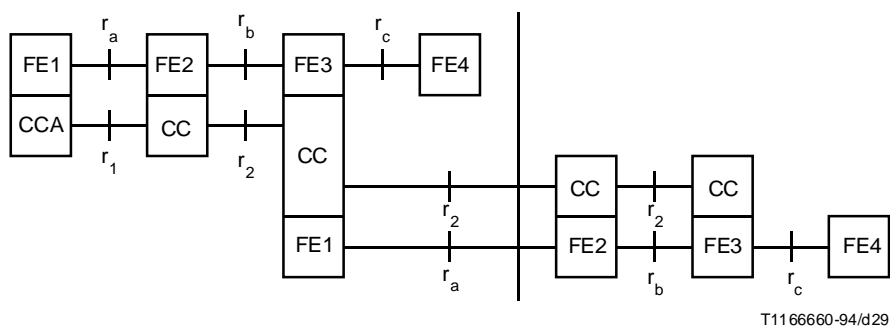


FIGURE I-1/Q.86

Example basic model for interworking between public and private charging domains

NOTE – This model is included for information on how the interworking between a public and a private charging domain takes place. It shows that the interworking between the public and the private domain takes place at the level of the basic call.