INTERNATIONAL TELECOMMUNICATION UNION

CCITT

Q.81

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN

STAGE 2 DESCRIPTION FOR NUMBER IDENTIFICATION SUPPLEMENTARY SERVICES

SECTION 2 – MULTIPLE SUBSCRIBER NUMBER
SECTION 8 – SUB-ADDRESSING (SUB)

Addenda to:
Recommendation Q.81

Geneva, 1992

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT 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 Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation Q.81, § 2 and 8 was prepared by Study Group XI and was approved under the Resolution No. 2 procedure on the 4th of February 1992.

CCITT NOTE

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

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Recommendation Q.81

STAGE 2 DESCRIPTION FOR NUMBER IDENTIFICATION SUPPLEMENTARY SERVICES

2 Multiple Subscriber Number

2.1 *Scope*

This Recommendation defines the stage 2 of the Multiple Subscriber Number (MSN) supplementary service for the integrated services digital network (ISDN) as provided by telecommunications operators. Stage 2 identifies the functional capabilities and the information flows needed to support the stage 1 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.

The MSN supplementary service provides the possibility for assigning multiple numbers to a single public or private access.

Note – This allows e.g.:

1) a calling user to select, via the public network, one or multiple distinct terminals out of a multiple choice;

2) to identify the terminal to the network for the application of other supplementary services.

It is considered:

– that in the case of a basic access some service providers may not have knowledge or control over what is connected, e.g. a private ISDN or a terminal configuration;

– that service providers have differing numbering methods.

The MSN supplementary service is applicable to all telecommunication services.

This Recommendation is applicable to the stage 3 Recommendations for the ISDN MSN supplementary service as defined in Recommendation I.130 [1].

2.2 *References*

This Recommendation incorporates, by dated or undated reference, provisions from other publications. These 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 Recommendation only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

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

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

[3] CCITT Rec. I.112 – *Vocabulary of terms for ISDNs,* 1988.

[4] CCITT Rec. E.164 – *Numbering plan for the ISDN era*, 1991.

[5] CCITT Rec. Q.71[1)] – *ISDN 64 kbit/s circuit mode switched bearer services*, 1993.

[6] CCITT Rec. I.210 – *Principles of telecommunication services supported by an ISDN and the means used to describe them*, 1988.

[7] CCITT Rec. Z.100 – *Specification and description language (SDL)*, 1988.

2.3 *Definitions*

For the purposes of this Recommendation the following definitions apply:

Integrated Services Digital network (ISDN)

See Recommendation I.112 [3], § 2.3, definition 308.

Service: telecommunications service

See Recommendation I.112 [3], § 2.2, definition 201.

Supplementary service

See Recommendation I.210 [6], § 2.4.

ISDN number

A number conforming to the numbering plan and structure specified in Recommendation E.164 [4].

2.4 *Symbols and abbreviations*

CC	Call control
CCA	Call control agent
FE	Functional entity
FEA	Functional entity action
ISDN	Integrated services digital network
LE	Local exchange
MSN	Multiple subscriber number
SDL	Specification and description language
TE	Terminal equipment.

2.5 *Description*

Not applicable.

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1) Recommendation Q.71 will be submitted for approval at the CCITT Plenary Assembly in March, 1993.

2.6 *Derivation of the functional model*

2.6.1 *Functional model description*

The functional model for the MSN supplementary service is shown in Figure 2-1/Q.81.

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Note – No relationship is required between FE1 and FE2 because the MSN supplementary service only influences basic call information.

FIGURE 2-1/Q.81

2.6.2 *Description of the functional entities*

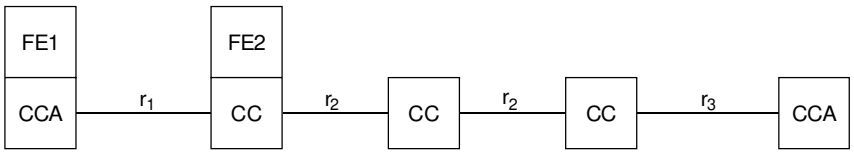
The functional entities required by the MSN supplementary service above those of the basic call are as follows:

FE1 Served user's service agent

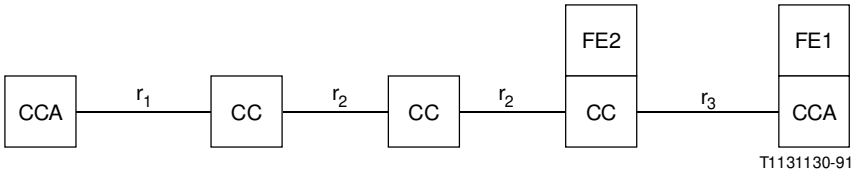
FE2 MSN service control entity.

2.6.3 *Relationship with a basic service*

The relationship with a basic service is shown in Figure 2-2/Q.81



a) Originating service



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b) Terminating service

FIGURE 2-2/Q.81

2.7 *Information flows*

2.7.1 *Information flow diagrams*

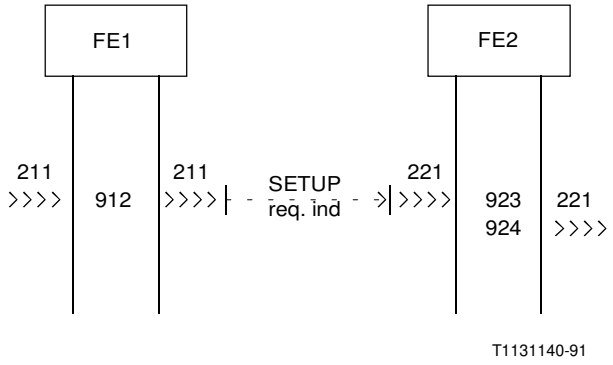


FIGURE 2-3/Q.81

MSN supplementary service operations on an outgoing call

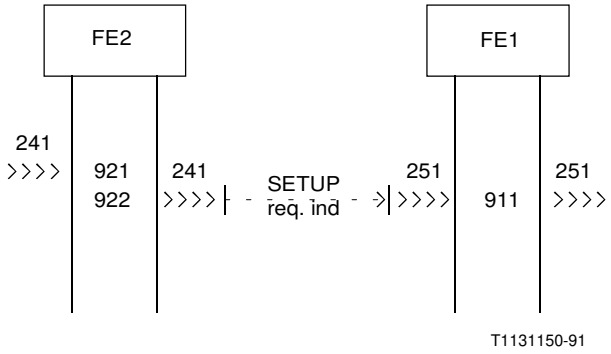


FIGURE 2-4/Q.81

MSN supplementary service operations on an incoming call

2.7.2 *Definition of individual information flows*

There are no information flows specific to this service.

Note – The contents for SETUP in basic call are as specified for basic call (see Recommendation Q.71 [5]).

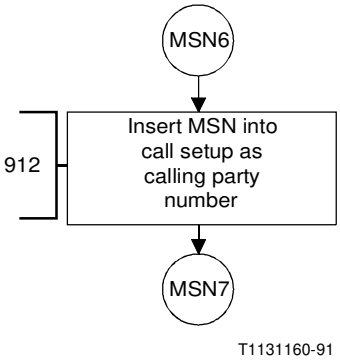
2.8 *SDL diagrams for functional entities*

The SDLs are provided according to Recommendation Z.100 [7].

4 **Recommendation Q.81**

2.8.1 *FE1*

The SDLs for FE1 are shown in Figure 2-5/Q.81.

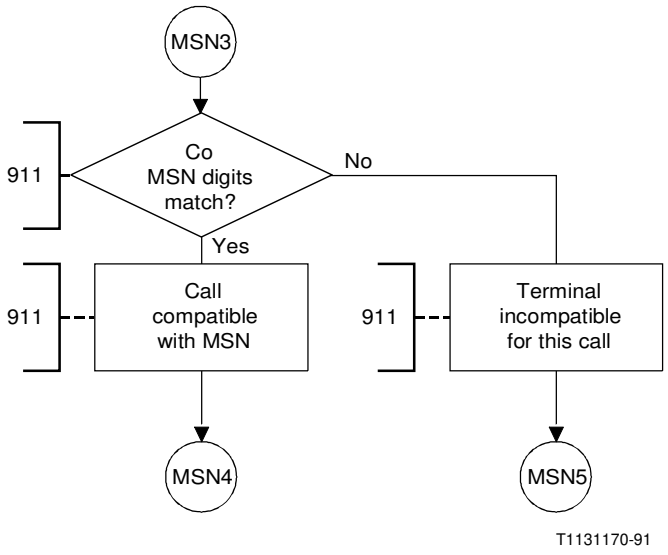


Normal call setup proceeds

Note – MSN6 and MSN7 break the basic call between connectors S1/1 and S1/2 (see Recommendation Q.71 [5]).

FIGURE 2-5/Q.81 (sheet 1 of 2)

MSN supplementary service functions in originating FE1



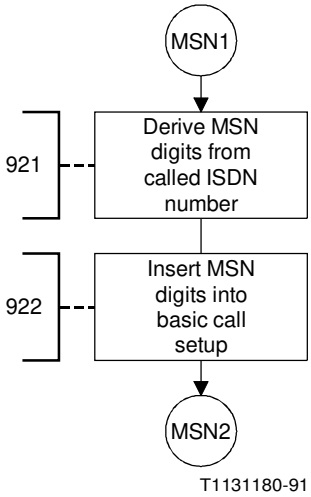
Note – MSN3, MSN4 and MSN5 break the basic call between connectors S5/1, S5/2 and S5/3 (see Recommendation Q.71 [5]).

FIGURE 2-5/Q.81 (sheet 2 of 2)

MSN supplementary service functions in destination FE1

2.8.2 *FE2*

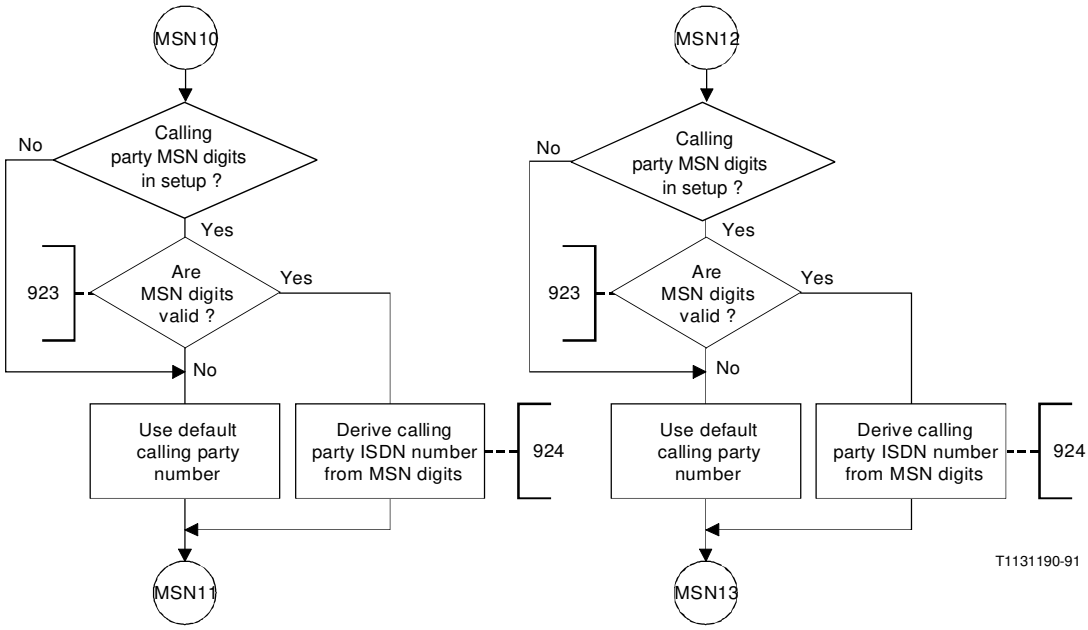
The SDL for FE2 is shown in Figure 2-6/Q.81.



Note – MSN1 and MSN2 break the basic call between connectors S4/3 and S4/4 (see Recommendation Q.71 [5]).

FIGURE 2-6/Q.81 (sheet 1 of 2)

MSN supplementary service functions in destination FE2



Note 1 – MSN10 and MSN11 break the basic call between connectors S2/1 and S2/2 (see Recommendation Q.71 [5]).

Note 2 – MSN12 and MSN13 break the basic call between connectors S2/5 and S2/6 (see Recommendation Q.71 [5]).

FIGURE 2-6/Q.81 (sheet 2 of 2)

MSN supplementary service functions in originating FE2

2.9 *Functional entity actions (FEAs)*

The FEAs of FE1 shall be optional for the basic call but shall be mandatory for the MSN supplementary service.

2.9.1 *FEAs of FE1*

For an incoming call:

– 911: the functional entity shall analyse the multiple subscriber number digits in the call set-up information and compare them with the configured multiple subscriber digits for use in the basic call.

For an outgoing call:

– 912: the functional entity shall insert the multiple subscriber number digits in the call set-up information as the calling party number.

2.9.2 *FEAs of FE2*

For an incoming call:

– 921: the functional entity shall check and validate subscription options and derive the multiple subscriber number digits from the ISDN number.

– 922: the functional entity shall insert the multiple subscriber number digits into the call set-up information for transmission over the interface.

For an outgoing call:

– 923: the functional entity shall check and validate subscription options and obtain and screen the digits from the call set-up information.

– 924: the functional entity shall derive the ISDN number from the multiple subscriber number digits.

2.10 *Allocation of functional entities to physical locations*

The possible locations of functional entities FE1 and FE2 are shown in Table 2-1/Q.81.

TABLE 2-1/Q.81

	FE2	FE1
Scenario 1	LE	TE

Note – FE2 and FE1 are always allocated at opposite ends of the same access.

8 Sub-addressing (SUB)

8.1 *Scope*

This Recommendation defines the stage 2 description of the Sub-addressing (SUB) supplementary service for the integrated services digital network (ISDN) as provided by public telecommunications operators. Stage 2 description identifies the functional capabilities and the information flows needed to support the stage 1 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 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.

The Sub-addressing (SUB) supplementary service allows the called (served) user to expand his addressing capacity beyond the one given by the public or private ISDN number.

The SUB supplementary service is applicable to all telecommunication services.

This Recommendation is applicable to the stage 3 description Recommendation for the ISDN Sub-addressing supplementary service. The term “stage 3” is also defined in Recommendation I.130 [1].

8.2 *References*

The 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 Recommendation only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

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

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

[3] CCITT Rec. E.164 — *Numbering plan for the ISDN era*, 1991.

[4] CCITT Rec. I.251.8 — *Sub-addressing (SUB)*.

[5] CCITT Rec. Q.71[1)] — *ISDN 64 kbit/s circuit mode switched bearer service*, 1993.

[6] CCITT Rec. I.210 — *Principles of telecommunication services supported by an ISDN and the means used to describe them*, 1988.

[7] CCITT Rec. I.112 — *Vocabulary of terms for ISDNs*, 1988.

[8] CCITT Rec. Z.100 — *Specification and description language (SDL)*, 1988.

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1) Recommendation Q.71 will be submitted for approval at the CCITT Plenary Assembly in March, 1993.

8.3 *Definitions*

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

Integrated services digital network (ISDN)

See Recommendation I.112 [7], § 2.3 definition 308.

Service: telecommunications service

See Recommendation I.112 [7], § 2.2, definition 201.

Supplementary service

See Recommendation I.210 [6], § 2.4.

Called party sub-address

The called party sub-address is the sub-address of the called party ISDN address.

ISDN number:

A number conforming to the numbering plan and structure specified in Recommendation E.164 [3].

8.4 *Symbols and abbreviations*

CC	Call control
CCA	Call control agent
CDSA	Called party sub-address
FE	Functional entity
FEA	Functional entity action
ISDN	Integrated services digital network
LE	Local exchange
OLE	Originating local exchange
PN	Private network
SDL	Specification and description language
SUB	Sub-addressing
TE	Terminal equipment
TLE	Terminating local exchange.

8.5 *Description*

The general description of the SUB supplementary service is specified in Recommendation I.251.8 [4], § 5.

The relation of the called party sub-address to the ISDN number is given in Recommendation E.164 [3].

8.6 *Derivation of the functional model*

8.6.1 *Functional model description*

The functional model for the SUB supplementary service is shown in Figure 8-1/Q.81.

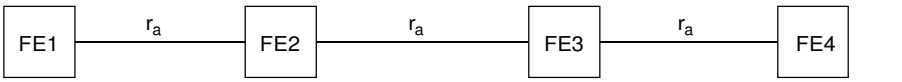


FIGURE 8-1/Q.81

Functional model for sub-addressing

8.6.2 *Description of the functional entities*

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

FE1 CDSA insertion entity

FE2 CDSA length controlling entity

FE3 SUB supplementary service controlling entity

FE4 CDSA using entity.

8.6.3 *Relationship with a basic service*

The relationship of the SUB supplementary service with a basic service is shown in Figure 8-2/Q.81.

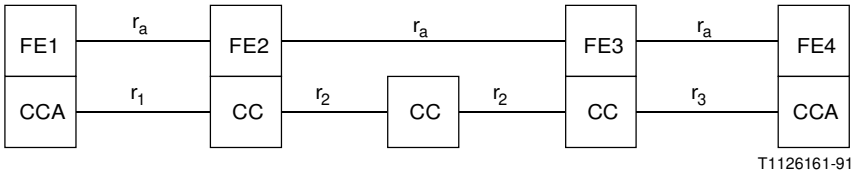


FIGURE 8-2/Q.81

Relationship of sub-addressing with a basic service

8.7 *Information flows*

8.7.1 *Information flow diagrams*

The information flow diagrams for the SUB supplementary service are shown in Figures 8-3/Q.81 and 8-4/Q.81.

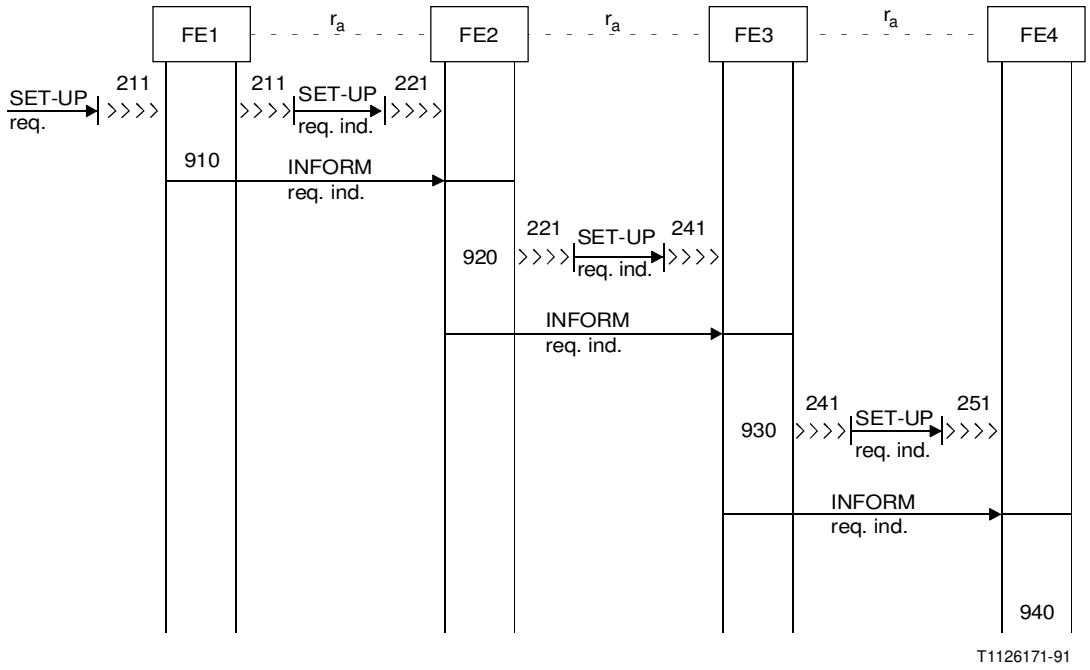
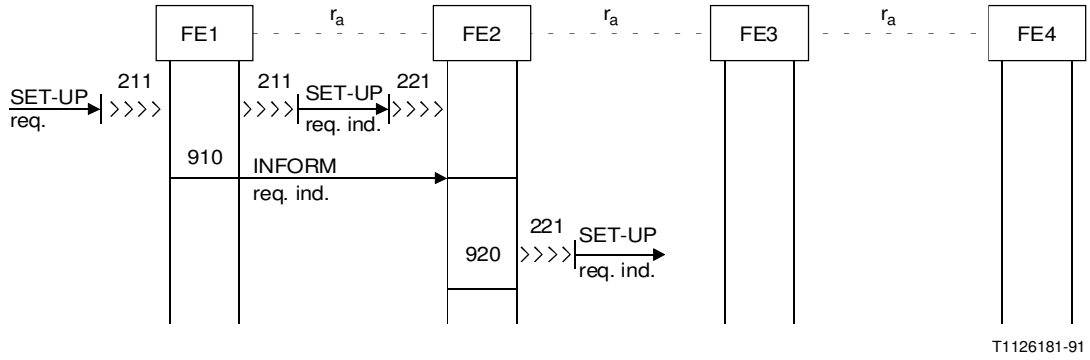


FIGURE 8-3/Q.-81

Called party sub-address accepted



Note – The CDSA has to be sent at the time of call establishment.

FIGURE 8-4/Q.-81

Called party sub-address doscarded

8.7.2 *Definition of individual information flows*

8.7.2.1 *Relationship r_a*

8.7.2.1.1 *INFORM*

The contents of the INFORM information flow are shown in Table 8-1/Q.81.

TABLE 8-1/Q.81

Parameter	Allowed value	req. ind.
Called party sub-address	≤ 20 octets	Mandatory

8.8 *SDL diagrams for functional entities*

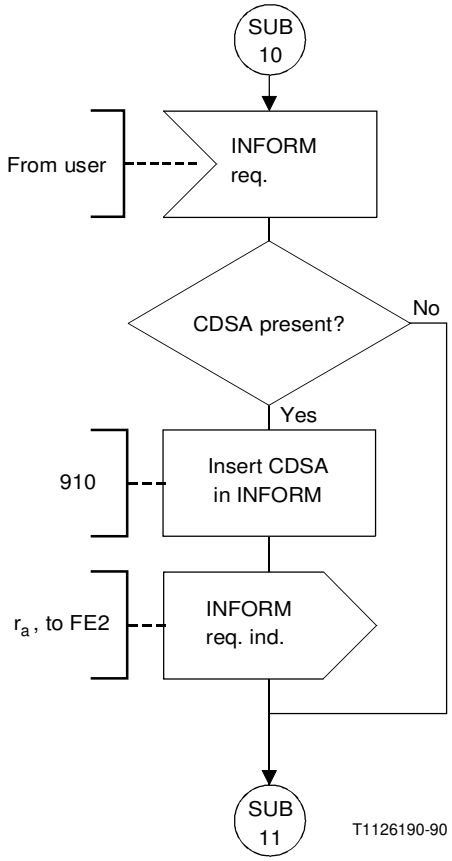
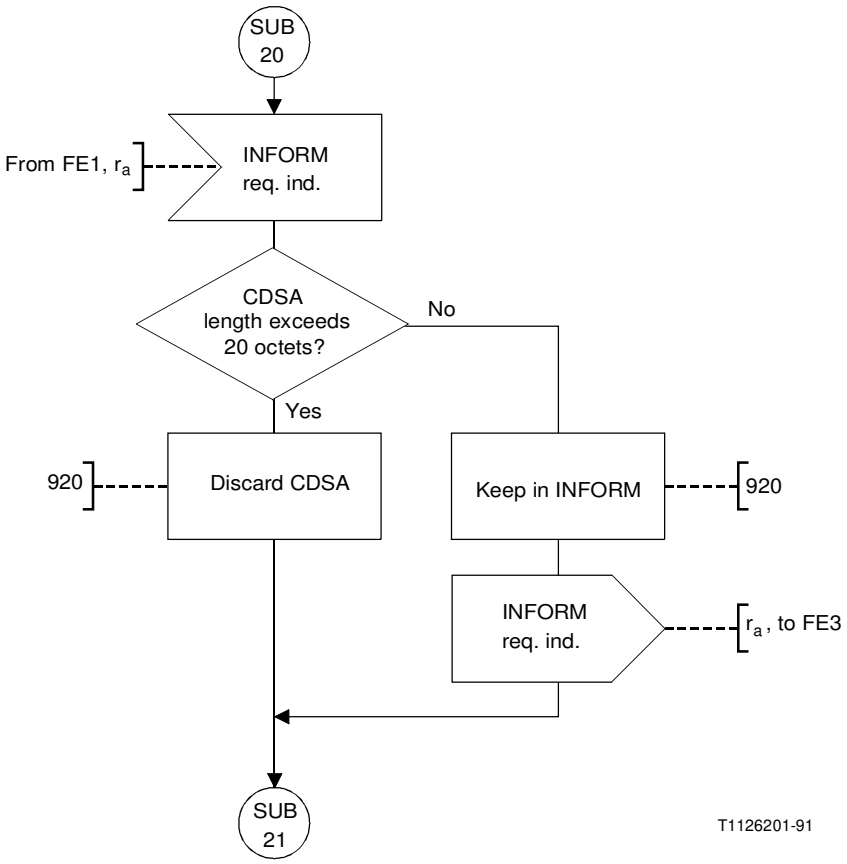


FIGURE 8-5/Q.81

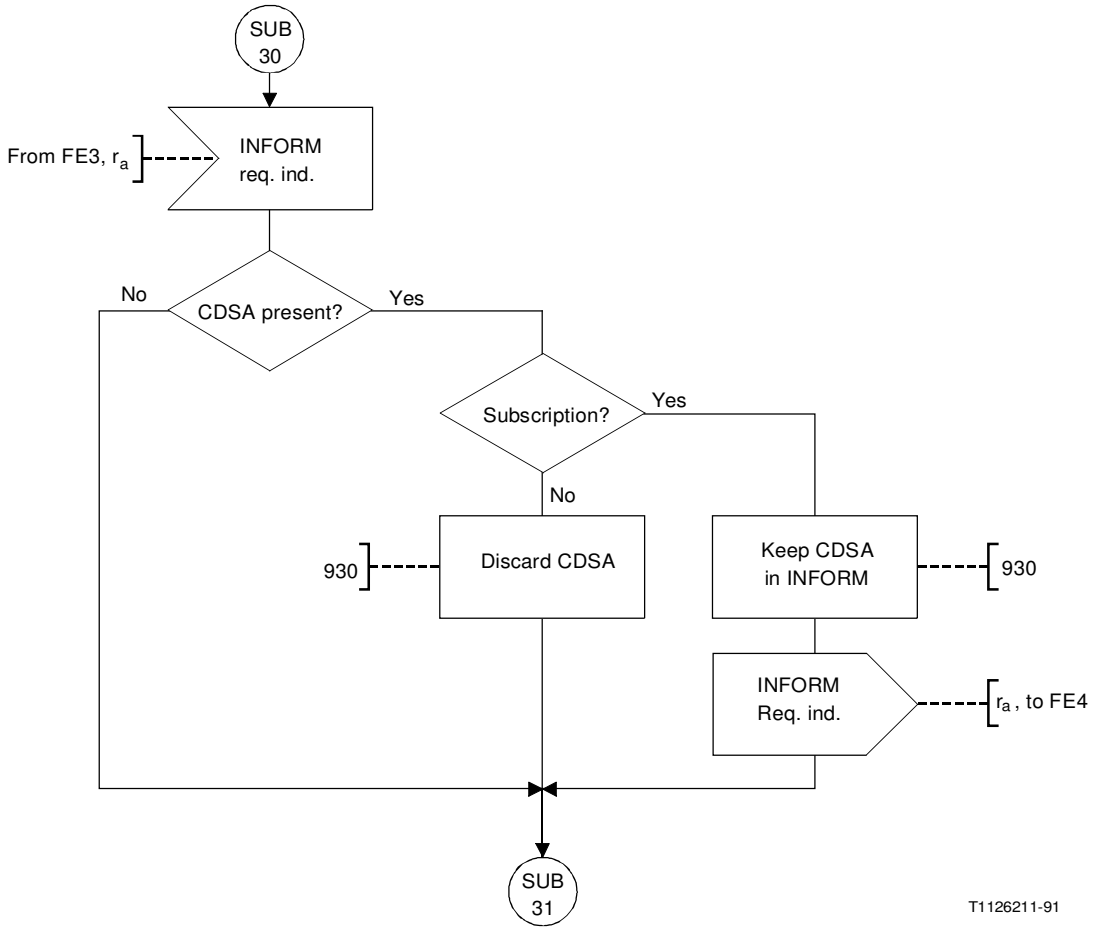
SUB, FE1



Note – SUB20 and SUB21 break the basic call transition between connectors S2/1 and S2/2 (see Recommendation Q.71 [5]).

FIGURE 8-6/Q.81

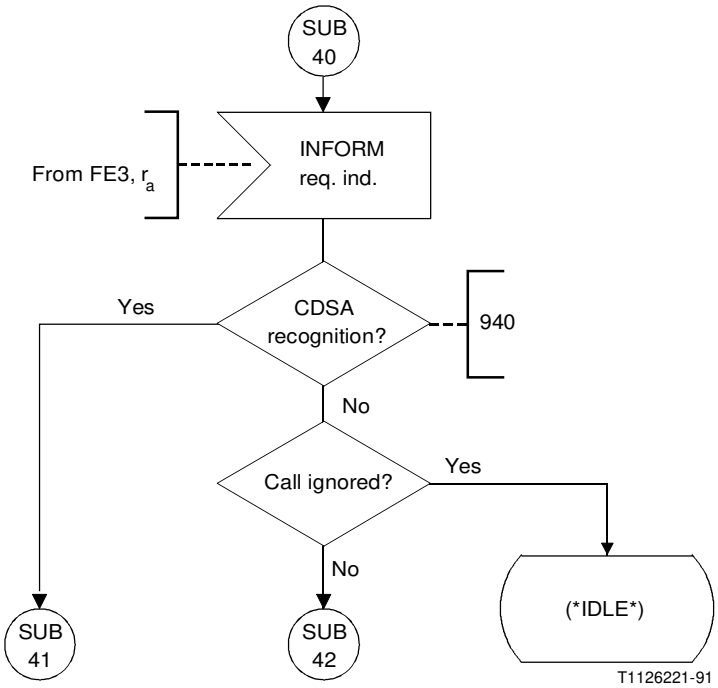
SUB, FE2



Note – SUB30 and SUB31 break the basic call transition between connectors S4/3 and S4/4 (see Recommendation Q.71 [5]).

FIGURE 8-7/Q.81

SUB, FE3



Note – SUB40 and SUB41 break the basic call transition between connectors S5/1 and S5/2 (see Recommendation Q.71 [5]). SUB 42 joins at the connector S5/3.

FIGURE 8-8/Q.81

SUB, FE4

8.9 *Functional entity actions*

8.9.1 *FEAs of FE1*

— 910: the functional entity shall accept called party sub-address from the calling party.

The functional entity shall insert called party sub-address in the INFORM and forward it to FE2.

8.9.2 *FEAs of FE2*

— 920: the functional entity shall accept called party sub-address.

The functional entity shall compare the length of the called party sub-address and shall send called party sub-address if length does not exceed 20 octets; otherwise FE2 shall discard called party sub-address.

8.9.3 *FEAs of FE3*

— 930: the functional entity shall accept and forward called party sub-address if subscription is valid, otherwise the functional entity shall discard called party sub-address.

8.9.4 *FEAs of FE4*

— 940: the functional entity shall receive called party sub-address.

The functional entity shall check called party sub-address, and

— if recognized: shall continue call handling;

— if not recognized: shall ignore the call.

8.10 *Allocation of functional entities to physical locations*

The possible locations of functional entities FE1, FE2, FE3 and FE4 are shown in Table 8-2/Q.81.

TABLE 8-2/Q.81

Scenarios	FE1	FE2	FE3	FE4
Scenario 1	TE	LE	LE	TE
Scenario 2	TE a)	<--------- PN -------->		TE a)
Scenario 3	TE a)	<-------- PN --------> & LE LE		TE
Scenario 4	TE	LE LE & <-------- PN -------->		TE a)
Scenario 5	TE a)	<-------- PN --------> & LE LE & <-------- PN -------->		TE a)

a) This TE (terminal equipment) is connected to a PN (private network).

Note 1 — All functional entities above "&" are provided with appropriate relationships and are followed subsequently, by functional entities below the "&".

Note 2 — Other combinations of networks are also permitted, within the constraint that each network shall provide an FE2 and an FE3.