INTERNATIONAL TELECOMMUNICATION UNION

# ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

# Q.698

(03/93)

## INTERWORKING OF SIGNALLING SYSTEMS

# INTERWORKING OF SIGNALLING SYSTEM No. 7 ISUP, TUP AND SIGNALLING SYSTEM No. 6 USING ARROW DIAGRAMS

## ITU-T Recommendation Q.698

(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.698 was prepared by the ITU-T Study Group XI (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

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## 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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.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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**Recommendation Q.698**


# INTERWORKING OF SIGNALLING SYSTEM No. 7 ISUP, TUP AND SIGNALLING SYSTEM No. 6 USING ARROW DIAGRAMS

*(Helsinki, 1993)*


## 1        General


### 1.1        Introduction

This Recommendation defines the use of arrow diagrams to provide a comprehensive view of the signalling handshake between ISDN-UP and other common channel signalling systems. The use of primitives as defined in Recommendation Q.699 is also included to gain a further level of understanding in an interworking situation. Detailed signalling interworking information still has to refer to the signalling procedures defined in respective Recommendations.


### 1.2        Scope

This Recommendation provides arrow diagrams for basic calls in which ISDN-UP interworks with other common channel signalling systems. National options are not covered whereas supplementary services are for further study. Typical selective interworking cases are dealt with and references are made to relevant Recommendations. Mapping tables are used to cover interworking situations where there is no one to one correspondence between signals of different common channel signalling systems.


### 1.3        Relationship to other Recommendations

References to other Recommendations are made to clarify the procedures in a number of interworking cases. The following Recommendations are referred to in this Recommendation: Q.118, Q.254-Q.268, Q.699, Q.722-Q.725, Q.762-Q.764.


## 2        Methodology

The interworking model used in this Recommendation is essentially the same as defined in 2.2/Q.699. The use of primitives is also consistent with that interworking model. The symbols used in this Recommendation are described in Table 1.


## 3        Interworking arrow diagrams for successful call set-up


### 3.1        Signalling System No. 6 to Signalling System No. 7 ISUP


#### 3.1.1        Normal call with calling party disconnect

Figure 1 shows normal call set-up. When the calling party sends a CLF, the call is cleared. An REL message (Cause 16) is sent to the succeeding exchange indicating normal clearing.


#### 3.1.2        Normal call with called party disconnect

Figure 2 shows normal call set-up. When the called party hangs up, a CLB1 signal is sent to the preceding exchange indicating normal call clearing.

TABLE 1/Q.698

**Symbols used**

| Symbol | Description |
|---|---|
| ◯ | Reservation of an incoming/outgoing circuit without through connection |
| ⊗ | Disconnection of path through the exchange |
| ⬤ | Through connection of path in both directions |
| ✕ | Release of circuit |
| ⌐ | Indicates I/C and O/G primitives are unconditionally related |
| ⊙ / ⊘ | Continuity check transceiver |
| T ↕ R | Loop for continuity check |
| (CI) | Continuity check required in nature of connection indicators |
| (NI) | Network initiated in suspend/resume indicators |

T1141660-92/d01

## 3.2 ISUP to Signalling System No. 6

### 3.2.1 Normal call with calling party disconnect

Figure 3 shows normal call set-up. When an REL message (Cause 16) is received from the preceding exchange, a CLF signal is sent to the succeeding exchange to indicate normal call clearing.

### 3.2.2 Normal call with called party disconnect

Figure 4 shows normal call set-up. When the called party hangs up, a CLB1 signal is received from the succeeding exchange. An SUS message is then sent to the preceding exchange to indicate normal call clearing.

## 3.3 Signalling System No. 7 TUP to ISUP

### 3.3.1 Normal call with calling party disconnect

Figure 5 shows normal call set-up. When the calling party sends a CLF, the call is cleared. An REL message (Cause 16) is sent to the succeeding exchange indicating normal clearing.

### 3.3.2 Normal call with called party disconnect

Figure 6 shows normal call set-up. When the called party hangs up, a CLB signal is sent to the preceding exchange indicating normal call clearing.

## 3.4 Signalling System No. 7 ISUP to TUP

### 3.4.1 Normal call with calling party disconnect

Figure 7 shows normal call set-up. When the calling party sends a Release Message (REL), the call is cleared. A CLF message is sent to the succeeding exchange indicating normal clearing.

### 3.4.2 Normal call with called party disconnect

Figure 8 shows normal call set-up. When the called party hangs up, an SUS signal is sent to the preceding exchange indicating normal call clearing.
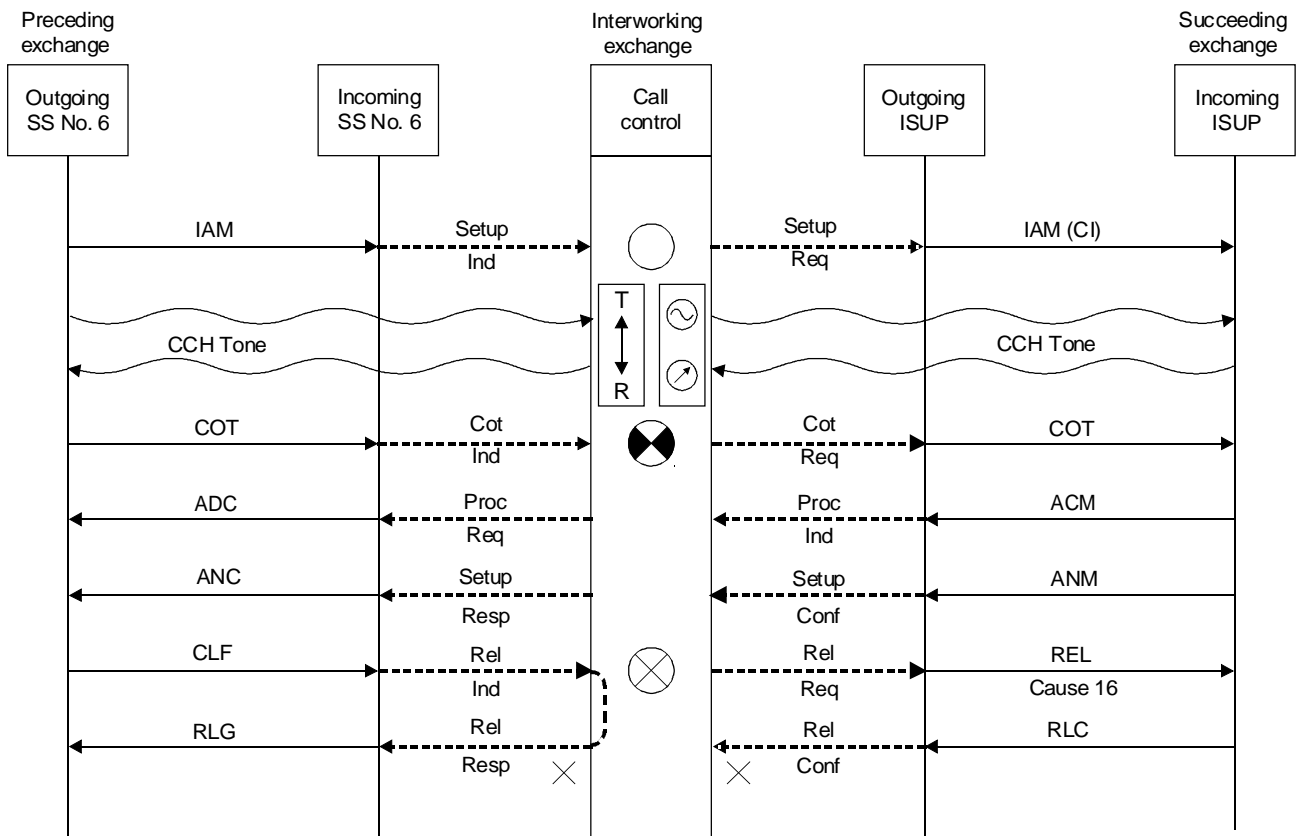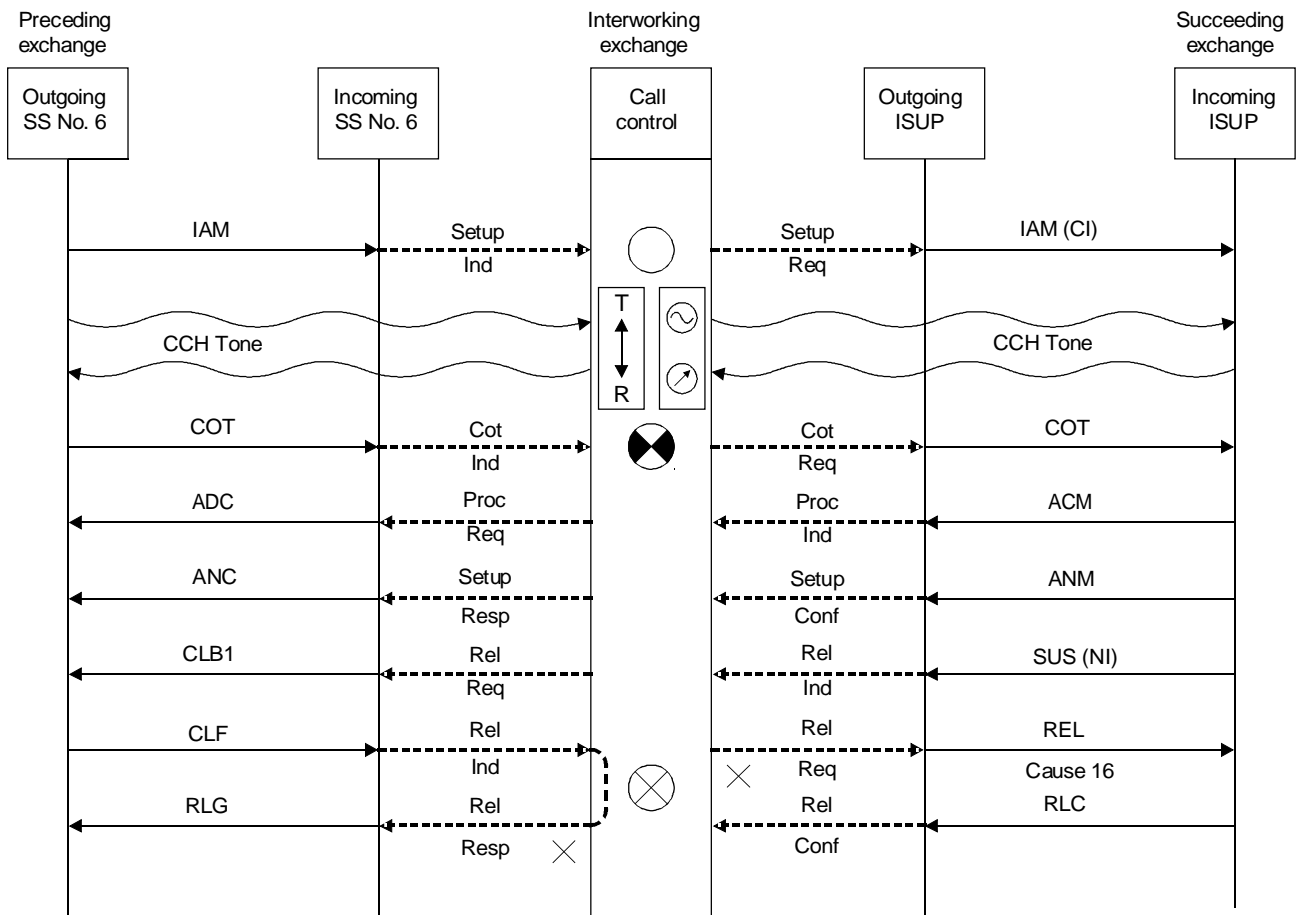


NOTE – Cause 16 = Normal clearing.

FIGURE 1/Q.698

**SS No. 6 to ISDN-UP**
**Normal call with calling party disconnect**

Preceding exchange — Interworking exchange — Succeeding exchange

| Outgoing SS No. 6 | Incoming SS No. 6 | Call control | Outgoing ISUP | Incoming ISUP |

IAM → Setup Ind → Setup Req → IAM (CI)

CCH Tone ← CCH Tone

COT → Cot Ind → Cot Req → COT

ADC ← Proc Req ← Proc Ind ← ACM

ANC ← Setup Resp ← Setup Conf ← ANM

CLB1 ← Rel Req ← Rel Ind ← SUS (NI)

CLF → Rel Ind → Rel Req → REL / Cause 16

RLG ← Rel Resp ← Rel Conf ← RLC

T1141680-92/d03

NOTE – Cause 16 = Normal clearing.

FIGURE  2/Q.698

**SS No. 6 to ISDN-UP**
**Normal call with called party disconnect**

Preceding exchange      Interworking exchange      Succeeding exchange
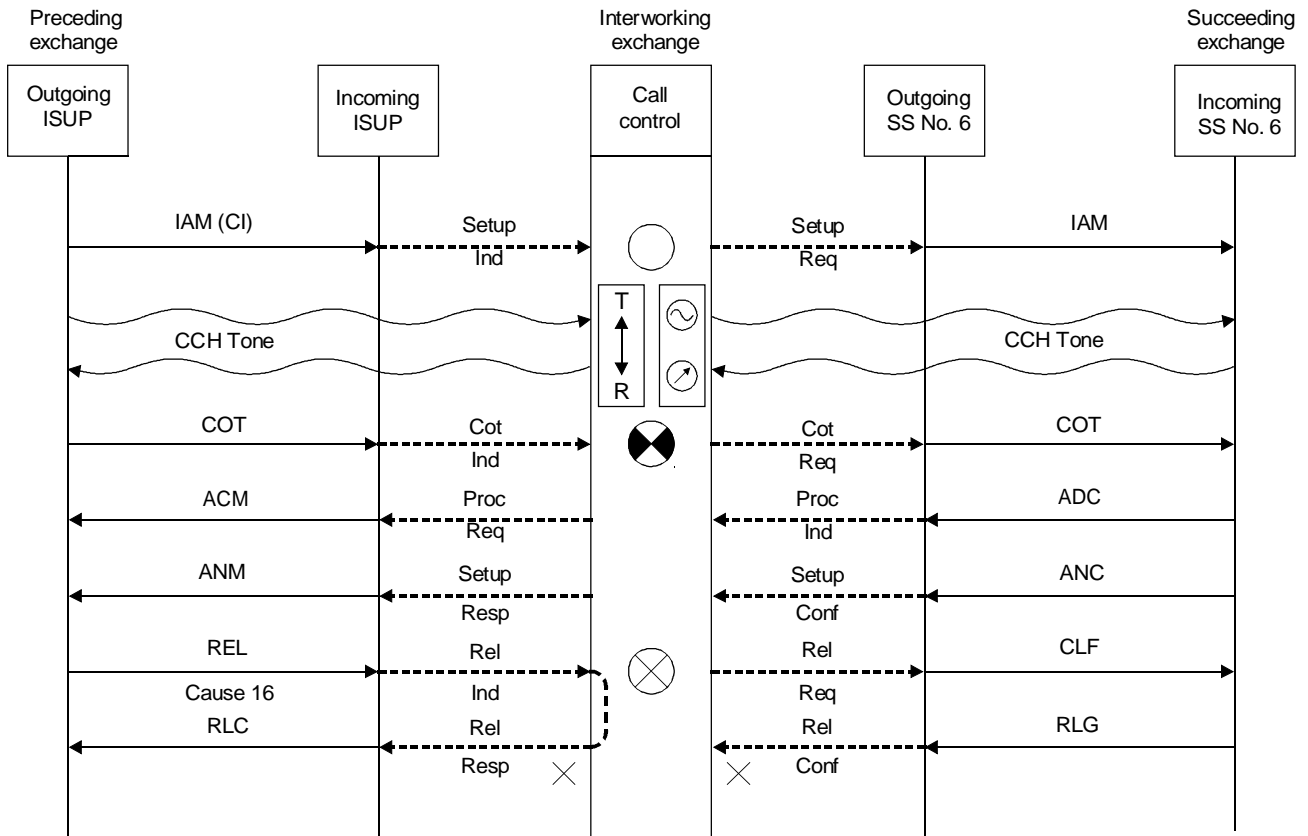
T1141690-92/d04

NOTE – Cause 16 = Normal clearing.

FIGURE  3/Q.698

**ISDN-UP to SS No. 6**
**Normal call with calling party disconnect**

NOTE – Cause 16 = Normal clearing by calling party before $T_6$ expires [2.5.1.3 c)/Q.767].

FIGURE 4/Q.698

**ISDN-UP to SS No. 6**
**Normal call with called party disconnect**

NOTE – Cause 16 = Normal clearing.

FIGURE 5/Q.698

**SS No. 7 TUP to ISUP**
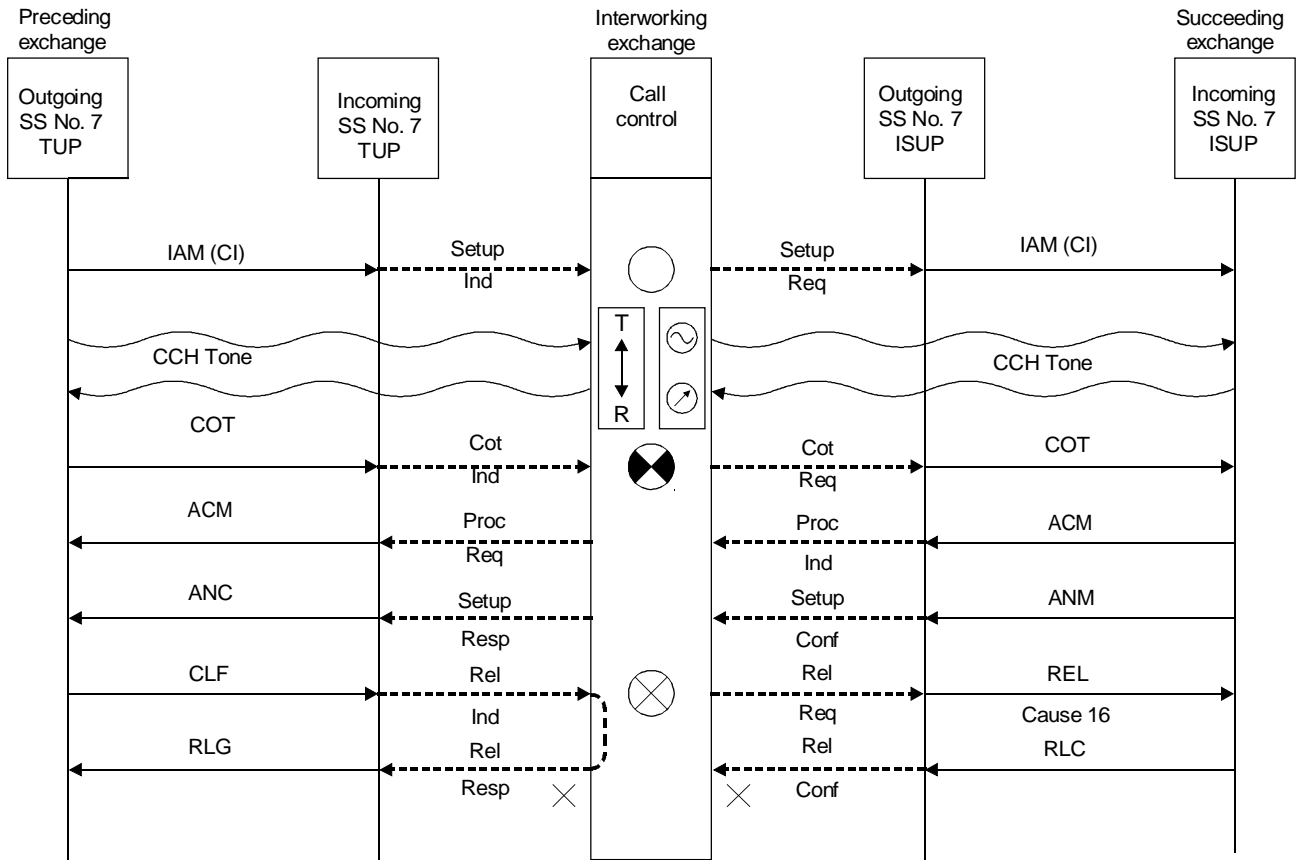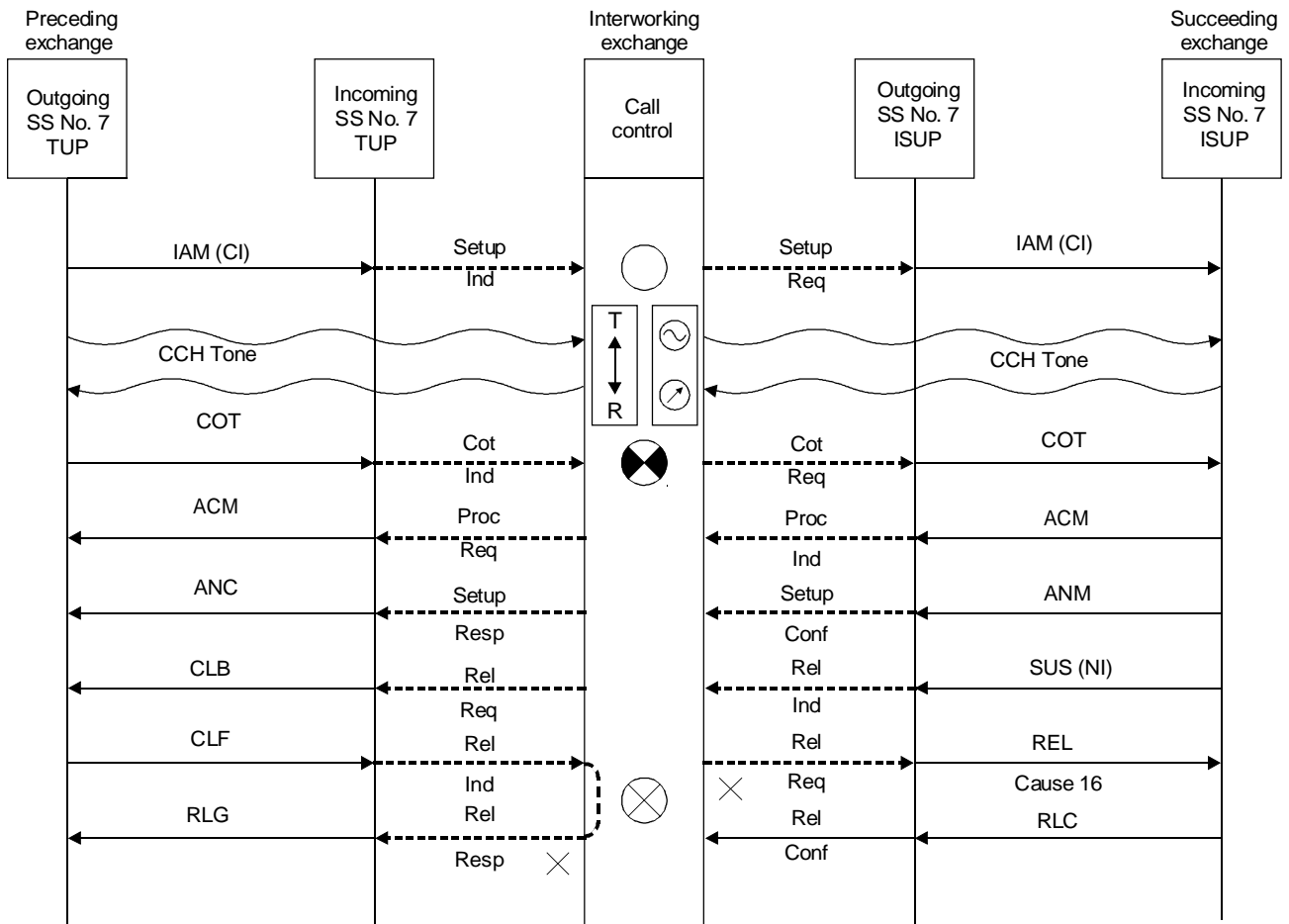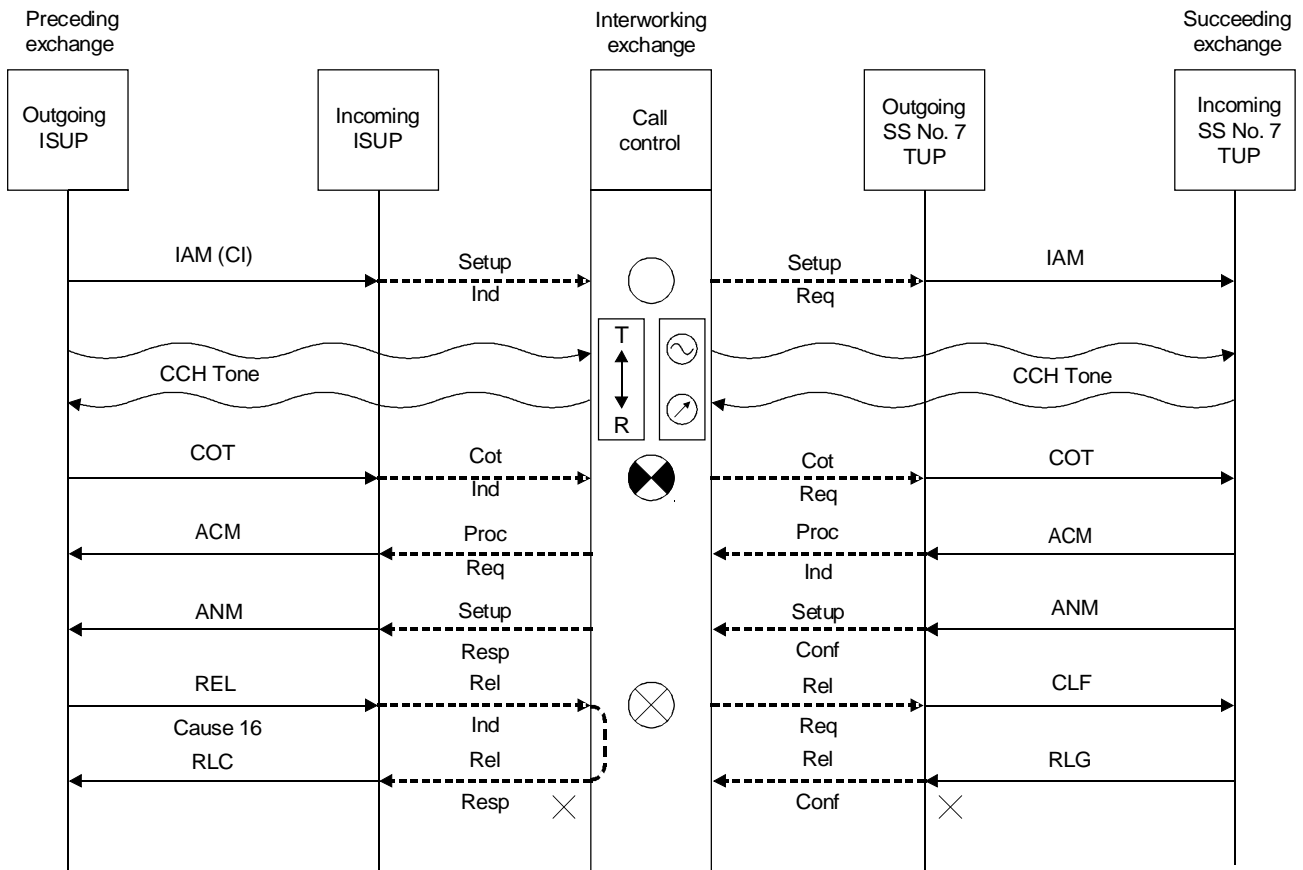**Normal call with calling party disconnect**

NOTE – Cause 16 = Normal clearing.

T1141720-92/d07

FIGURE 6/Q.698

**SS No. 7 TUP to ISUP**
**Normal call with called party disconnect**

Preceding exchange | Interworking exchange | Succeeding exchange

Outgoing ISUP | Incoming ISUP | Call control | Outgoing SS No. 7 TUP | Incoming SS No. 7 TUP

IAM (CI) — Setup Ind — Setup Req — IAM

CCH Tone — CCH Tone

COT — Cot Ind — Cot Req — COT

ACM — Proc Req — Proc Ind — ACM

ANM — Setup Resp — Setup Conf — ANM

REL — Rel Ind — Rel Req — CLF

Cause 16

RLC — Rel Resp — Rel Conf — RLG

T1141730-92/d08

NOTE – Cause 16 = Normal clearing.

FIGURE 7/Q.698

**Interworking of Signalling System No. 7 ISUP to No. 7 TUP**
**Normal call with calling party disconnect**
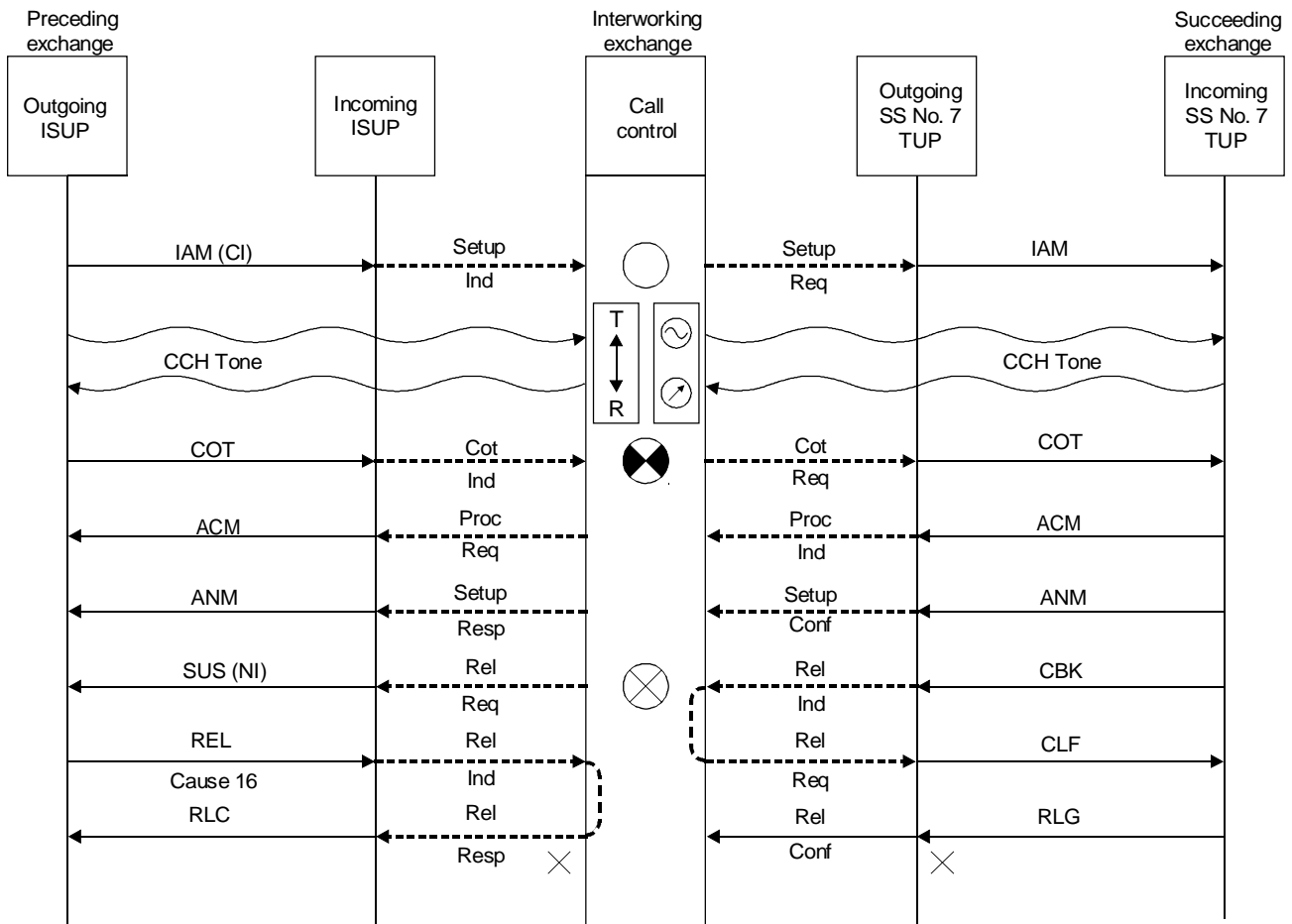
NOTE – Cause 16 = Normal clearing by called party before $T_6$ expires (2.5.1.3. c)/Q.767.

FIGURE 8/Q.698

**Interworking of Signalling System No. 7 ISUP to No. 7 TUP**
**Normal call with calling party disconnect**

# 4 Interworking arrow diagrams for unsuccessful call set-up

## 4.1 Signalling System No. 6 to ISUP

### 4.1.1 Continuity failure on an incoming No. 6 circuit

Figure 9 shows the check-tone not being looped within its timeout period of two seconds. A BLO signal is issued by the preceding exchange. After the reception of a BLA signal, the CLF/RLG sequence is exchanged. On the outgoing side, an REL message (Cause 127) is sent to the succeeding exchange. The RLC message completes the release sequence. A repeat attempt is made on another circuit by the preceding exchange.

### 4.1.2 Continuity failure on an outgoing ISDN-UP circuit

Figure 10 shows the failure to receive the continuity check-tone from the succeeding exchange within its timeout period of two seconds. A COT (failure) message is sent to the succeeding exchange. A repeat attempt will be made on another circuit and it is assumed that the repeat attempt also fails. In such a case of double failure, a CFL (call failure) signal is sent to the preceding exchange. On the incoming side, a CLF/RLG sequence completes the signalling sequence.

### 4.1.3 Release signal received before address complete

Figure 11 shows the REL message received from the succeeding exchange. The cause value in the message will determine which CCITT No. 6 signal will be sent to the preceding exchange. The mapping table in the same figure shows this information. An RLC message is sent to the succeeding exchange. On the incoming side, a CLF/RLG sequence completes the signalling sequence.

### 4.1.4 Timeout on address complete message

Figure 12 shows the failure to receive an ACM signal within its 20-30 second timeout. A REL message (Cause 31) is sent to the succeeding exchange indicating the failure condition. On the incoming side, a CFL (call failure) signal is sent to the preceding exchange. Then, a CLF/RLG sequence completes the signalling sequence.

### 4.1.5 Timeout on answer message

Figure 13 shows the failure to receive an ANM message within its 1.5-3 minute timeout. After the timeout period, the call is cleared in both directions. A call failure message (CFL) is sent to the preceding exchange and the REL message (Cause 19) is sent to the succeeding exchange. An RLC message is then returned by the succeeding exchange. On the incoming side, RLG signal is returned on receipt of CLF signal.

### 4.1.6 Reset circuit received before ACM

Figure 14 shows the RSC signal received before the succeeding exchange sends back the ACM message. An RLC message is sent to the succeeding exchange and a repeat attempt is made on another circuit.

### 4.1.7 Reset circuit received after ACM

Figure 15 shows the RSC message received after the succeeding exchange sends back the ACM message. An RLC message is sent to the succeeding exchange. On the incoming side, a CFL signal is sent to the preceding exchange. Then, a CLF/RLG sequence completes the signalling sequence.

### 4.1.8 Dual seizure (controlling exchange)

Figure 16 shows the IAM message received from the succeeding exchange in a dual seizure situation. The incoming IAM message is ignored and call set-up continues as if it were a normal call.

### 4.1.9 Dual seizure (non-controlling exchange)

Figure 17 shows the IAM message received from the succeeding exchange in a dual seizure situation. The incoming IAM message is processed as a normal call. The non-controlling exchange backs off and attempts to set up a call on other circuits of the same or an alternate route.

## 4.2 ISUP to Signalling System No. 6

### 4.2.1 Continuity failure on an incoming ISUP circuit

Figure 18 shows the check-tone timing out after its two second timeout period. The preceding exchange issues a COT (failure) message. On the outgoing side, a CLF/RLG sequence completes the signalling sequence.

### 4.2.2 Continuity failure on an outgoing No. 6 circuit

Figure 19 shows the failure to receive the continuity check-tone from the succeeding exchange within its two second timeout. A BLO signal is sent to the succeeding exchange. When a BLA signal is received, the CLF/RLG sequence is exchanged. A repeat attempt is made on another circuit and it is assumed that the reattempt also fails. In such a case of double continuity failure an REL message (Cause 127) is sent to the preceding exchange. An RLC message completes the signalling sequence.

### 4.2.3 Congestion signal received after address complete

Figure 20 shows the CGC signal received after ADC signal. On the incoming side an REL message (Cause value 34) is sent to the preceding exchange indicating the congestion condition. An RLC message completes the signalling sequence.

### 4.2.4 Timeout on address complete message

Figure 21 shows the failure to receive an ADC signal within its 20-30 second timeout. An CLF is sent to the succeeding exchange to clear the call. An RLG is then returned by the succeeding exchange. On the incoming side an REL message (Cause 127) is sent to the preceding exchange to indicate the failure. An RLC message is returned by the preceding exchange to complete the signalling sequence.

### 4.2.5 Timeout on answer message

Figure 22 shows the failure to receive an ANC message within its 1.5-3 minute timeout. After the timeout period, an REL message (Cause 19) is sent to the preceding exchange and an RLC message is received by the interworking transit to complete the signalling sequence. In parallel, a CLF is sent towards the succeeding exchange.

### 4.2.6 Reset circuit received before ADC

Figure 23 shows the RSC signal received before the ADC signal is sent back by the succeeding exchange. A CLF signal is sent to the succeeding exchange. After an RLG signal is received, a repeat attempt is made on another circuit.

### 4.2.7 Reset circuit received after ADC

Figure 24 shows the RSC signal received after the succeeding exchange sends back the ADC signal. A CLF/RLG sequence is exchanged. On the incoming side, an REL message (Cause 31) is sent to the preceding exchange. An RLC message received from the preceding exchange completes the signalling sequence.

### 4.2.8 Dual seizure (controlling exchange)

Figure 25 shows an IAM signal received from the succeeding exchange in a dual seizure situation. The incoming IAM signal is ignored and call set-up continues as if it were a normal call.

### 4.2.9 Reset circuit (non-controlling exchange)

Figure 26 shows an IAM signal received from the succeeding exchange in a dual seizure situation. The incoming IAM signal is processed as a normal call. The non-controlling exchange backs off and attempts to set up a call on other circuits of the same or an alternate route.

## 4.3 Signalling System No. 7 TUP to ISUP

### 4.3.1 Continuity failure on an incoming Signalling System No. 7 TUP circuit

Figure 27 shows the check-tone not being looped within its timeout period of two seconds. On the outgoing side, an REL message (Cause 31) is sent to the succeeding exchange. The RLC message completes the release sequence. A repeat attempt is made on another circuit by the preceding exchange. On the incoming side, a CCF message is received.

### 4.3.2 Continuity failure on an outgoing ISDN-UP circuit

Figure 28 shows the failure to receive the continuity check-tone from the succeeding exchange within its timeout period of two seconds. A COT (failure) message is sent to the succeeding exchange. A repeat attempt will be made on another circuit and it is assumed that the repeat attempt also fails. In such a case of double failure, a CFL (call failure) signal is sent to the preceding exchange. On the incoming side, a CLF/RLG sequence completes the signalling sequence.

### 4.3.3 Release signal received before address complete

Figure 29 shows the REL message received from the succeeding exchange. The cause value in the message will determine which Signalling System No. 7 TUP message will be sent to the preceding exchange. The mapping table in the same figure shows this information. An RLC message is sent to the succeeding exchange. On the incoming side, a CLF/RLG sequence completes the signalling sequence.

### 4.3.4 Timeout on address complete message

Figure 30 shows the failure to receive an ACM signal within its 20-30 second timeout. An REL message (Cause 31) is sent to the succeeding exchange indicating the failure condition. On the incoming side, a CFL (call failure) signal is sent to the preceding exchange. Then, a CLF/RLG sequence completes the signalling sequence.

### 4.3.5 Timeout on answer message

Figure 31 shows the failure to receive an ANM message within its 1.5-3 minute timeout. After the timeout period the call is cleared in both directions. A call failure message (CFL) is sent to the preceding exchange and the REL message (Cause 19) is sent to the succeeding exchange. An RLC message is then returned by the succeeding exchange. On the incoming side, RLG signal is returned on receipt of CLF signal.

### 4.3.6 Reset circuit received before ACM

Figure 32 shows the RSC signal received before the succeeding exchange sends back the ACM message. An RLC message is sent to the succeeding exchange and a repeat attempt is made on another circuit.

### 4.3.7 Reset circuit received after ACM

Figure 33 shows the RSC message received after the succeeding exchange sends back the ACM message. An RLC message is sent to the succeeding exchange. On the incoming side, a CFL signal is sent to the preceding exchange. Then, a CLF/RLG sequence completes the signalling sequence.

### 4.3.8 Dual seizure (controlling exchange)

Figure 34 shows the IAM message received from the succeeding exchange in a dual seizure situation. The incoming IAM message is ignored and call set-up continues as if it were a normal call.

### 4.3.9 Dual seizure (non-controlling exchange)

Figure 35 shows the IAM message received from the succeeding exchange in a dual seizure situation. The incoming IAM message is processed as a normal call. The non-controlling exchange backs off and attempts to set up a call on other circuits of the same or an alternate route.

## 4.4 Signalling System No. 7 ISUP to TUP

### 4.4.1 Continuity failure on incoming ISUP circuit

Figure 36 shows the check-tone timing out after its two second timeout period. The preceding exchange issues a COT (failure) message. On the outgoing side, a CLF/RLG sequence completes the signalling sequence.

### 4.4.2 Continuity failure on an outgoing No. 7 TUP circuit

Figure 37 shows the failure to receive the continuity check-tone from the succeeding exchange within its two second timeout. A CCF signal is sent to the succeeding exchange. A repeat attempt is made on another circuit and it is assumed that the reattempt also fails. In such a case of double continuity failure, an REL message (Cause 127) is sent to the preceding exchange. An RLC message completes the signalling sequence.

### 4.4.3 Congestion signal received after address complete

Figure 38 shows the CGC signal received after ADC signal. On the incoming side an REL message (Cause value 34) is sent to the preceding exchange indicating the congestion condition. An RLC message completes the signalling sequence.

### 4.4.4 Timeout on address complete message

Figure 39 shows the failure to receive an ADC signal within its 20-30 second timeout. A CLF is sent to the succeeding exchange to clear the call. An RLG is then returned by the succeeding exchange. On the incoming side an REL message (Cause 127) is sent to the preceding exchange to indicate the failure. An RLC message is returned by the preceding exchange to complete the signalling sequence.

### 4.4.5 Timeout on answer message

Figure 40 shows the failure to receive an ANC message within its 1.5-3 minute timeout. After the timeout period an REL message (Cause 19) is sent to the preceding exchange and an RLC message is received by the interworking transit to complete the signalling sequence. In parallel, a CLF is sent towards the succeeding exchange.

### 4.4.6 Reset circuit received before ADC

Figure 41 shows the RSC signal received before the ADC signal is sent back by the succeeding exchange. A CLF signal is sent to the succeeding exchange. After an RLG signal is received, a repeat attempt is made on another circuit.

### 4.4.7 Reset circuit received after ADC

Figure 42 shows the RSC signal received after the succeeding exchange sends back the ADC signal. A CLF/RLG sequence is exchanged. On the incoming side, an REL message (Cause 31) is sent to the preceding exchange. An RLC message received from the preceding exchange completes the signalling sequence.

### 4.4.8 Dual seizure (controlling exchange)

Figure 43 shows an IAM signal received from the succeeding exchange in a dual seizure situation. The incoming IAM signal is ignored and call set-up continues as if it were a normal call.

### 4.4.9 Reset circuit (non-controlling exchange)

Figure 44 shows an IAM signal received from the succeeding exchange in a dual seizure situation. The incoming IAM signal is processed as a normal call. The non-controlling exchange backs off and attempts to set up a call on other circuits of the same or an alternate route.
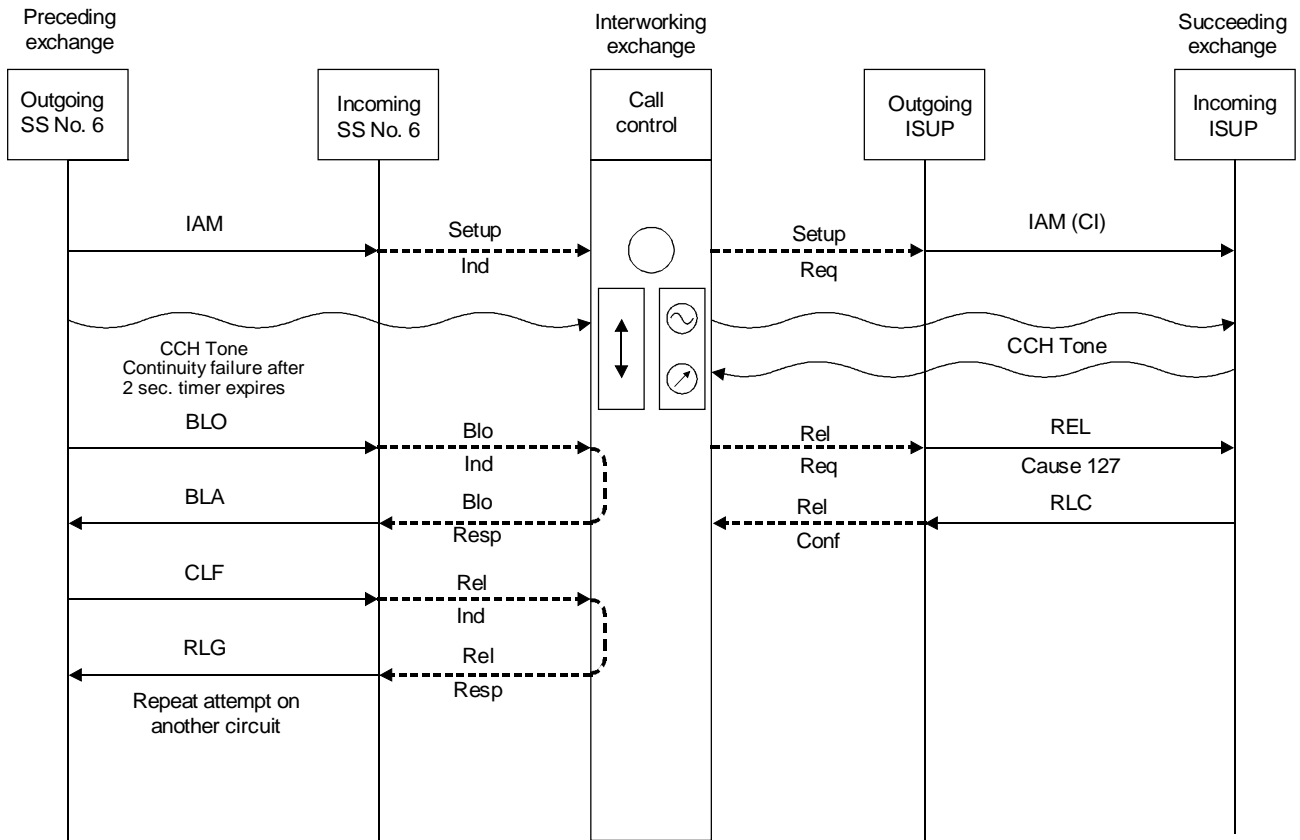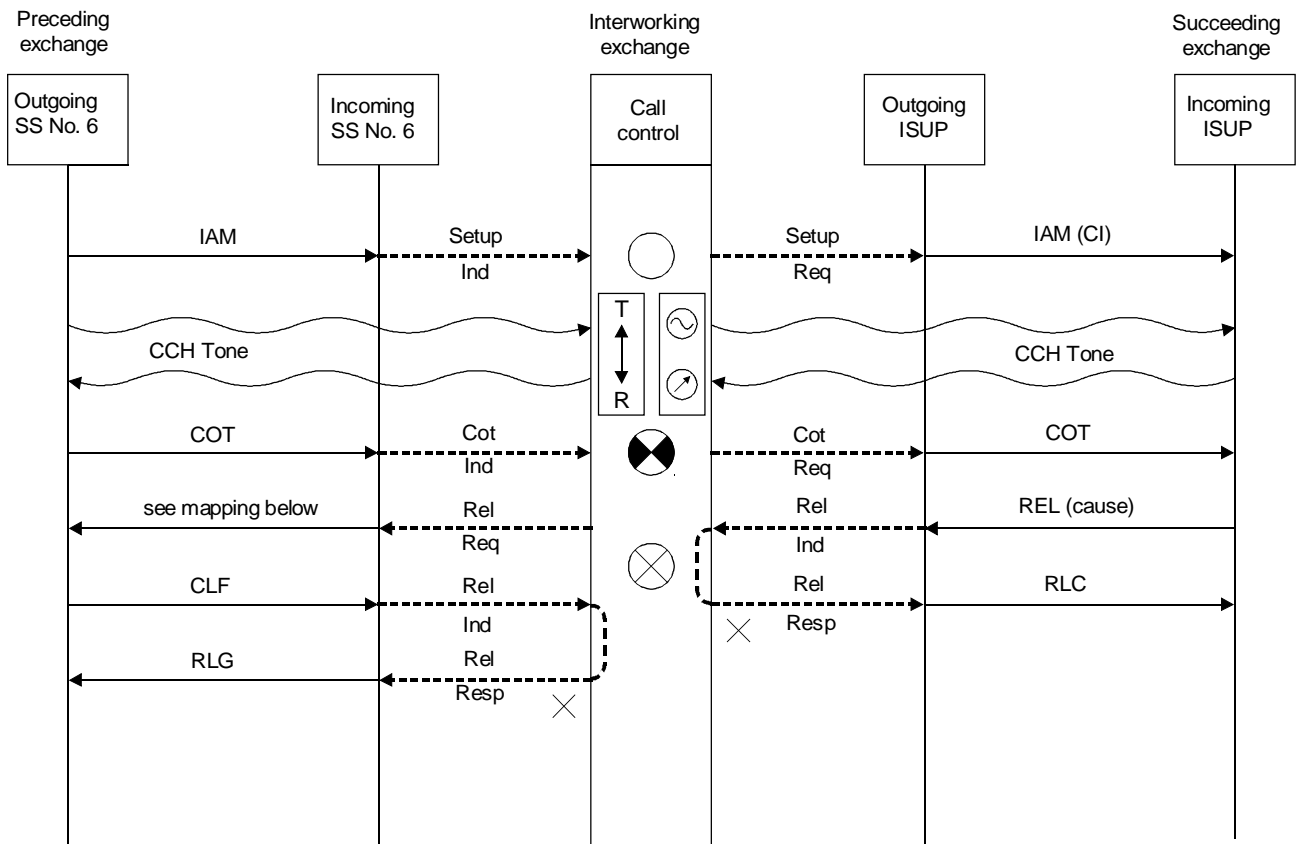
NOTE – Cause 127 = Interworking unspecified.

FIGURE 9/Q.698

**SS No. 6 to ISDN-UP**
**Continuity failure on I/C No. 6 circuit**
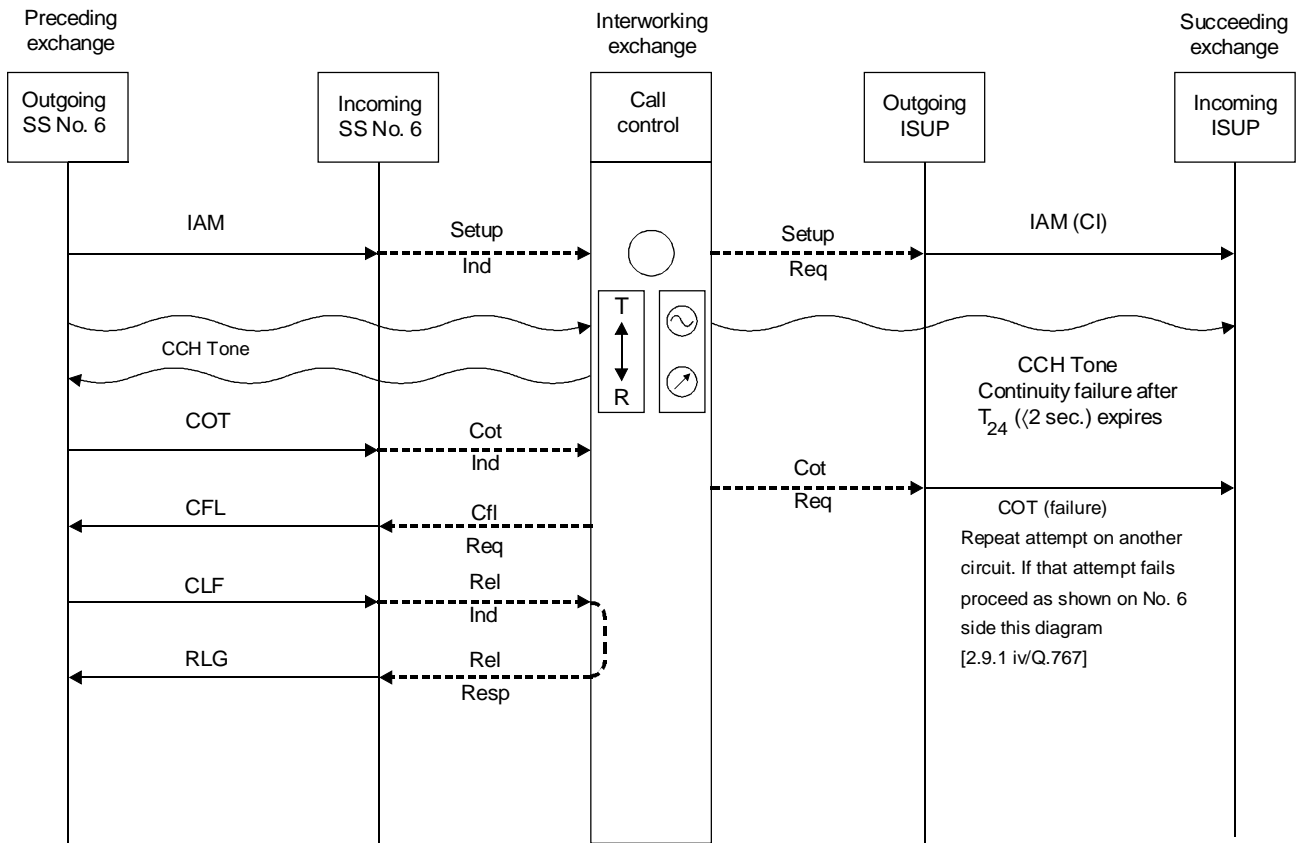
FIGURE  10/Q.698
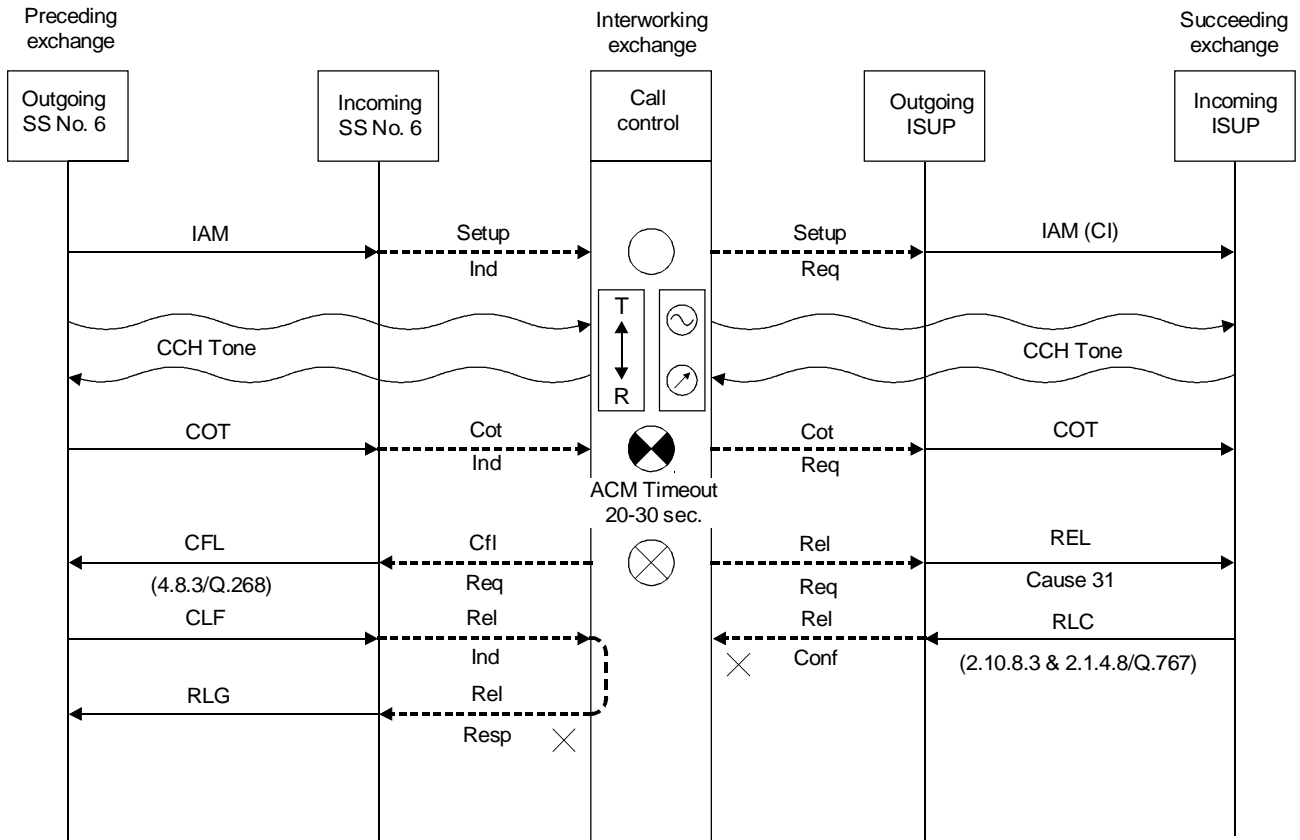
**SS No. 6 to ISDN-UP**
**Continuity failure on outgoing No. 7 circuit**

FIGURE 11/Q.698

**SS No. 6 to ISDN-UP**
**Release signal received before address complete**

Preceding exchange     Interworking exchange     Succeeding exchange

| Outgoing SS No. 6 | Incoming SS No. 6 | Call control | Outgoing ISUP | Incoming ISUP |

IAM — Setup Ind — Setup Req — IAM (CI)

CCH Tone — CCH Tone

COT — Cot Ind — Cot Req — COT

ACM Timeout 20-30 sec.

CFL — Cfl Req — Rel Req — REL Cause 31

(4.8.3/Q.268)

CLF — Rel Ind — Rel Conf — RLC

RLG — Rel Resp — (2.10.8.3 & 2.1.4.8/Q.767)

T1141780-92/d13

NOTE – Cause 31 = Normal unspecified.

FIGURE  12/Q.698

**SS No. 6 to ISDN-UP**
**Timeout on address complete message (ACM)**

Preceding exchange      Interworking exchange      Succeeding exchange
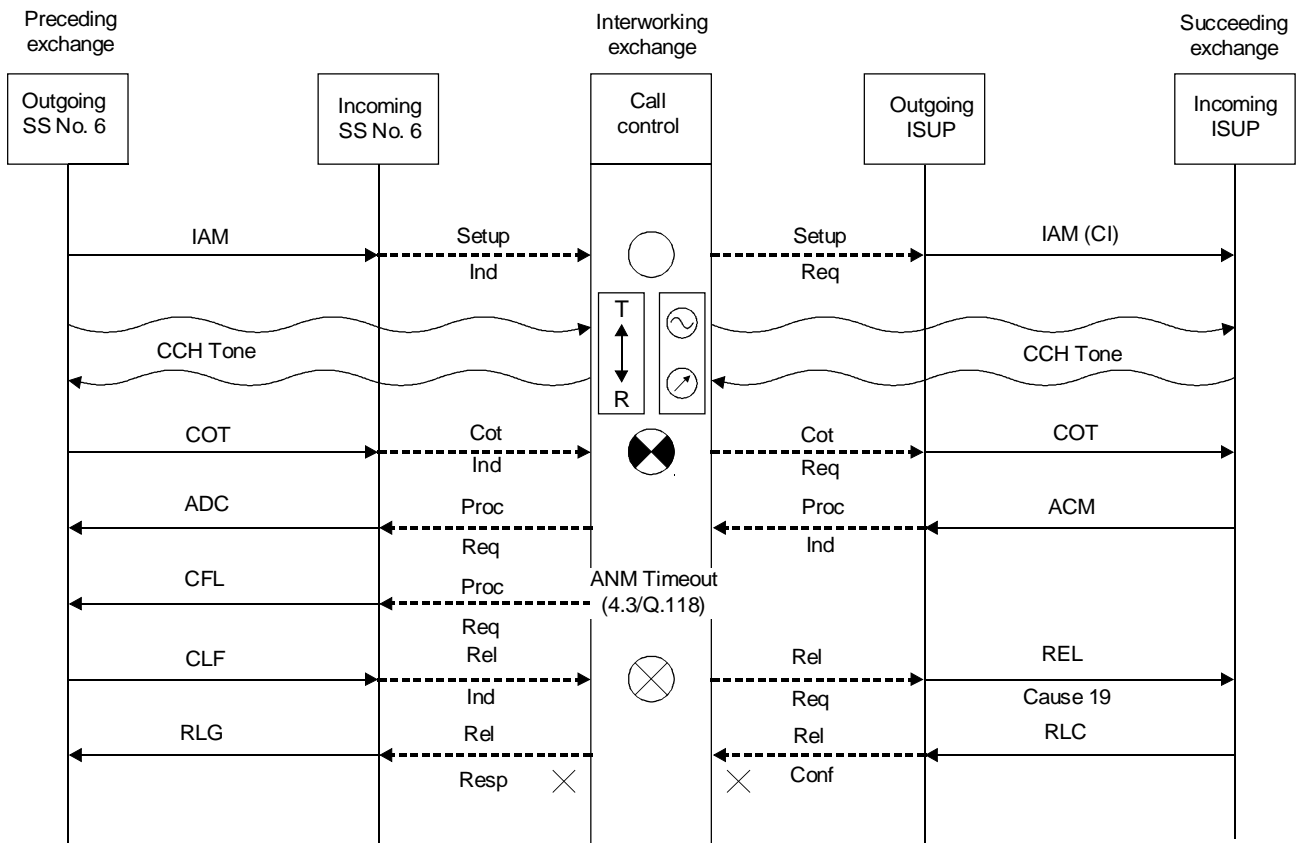
T1141790-92/d14

NOTE – Cause 19 = No answer from user.

FIGURE  13/Q.698

**SS No. 6 to ISDN-UP**
**Timeout on answer message**

FIGURE 14/Q.698

**SS No. 6 to ISDN-UP**
**Reset circuit received before ACM**
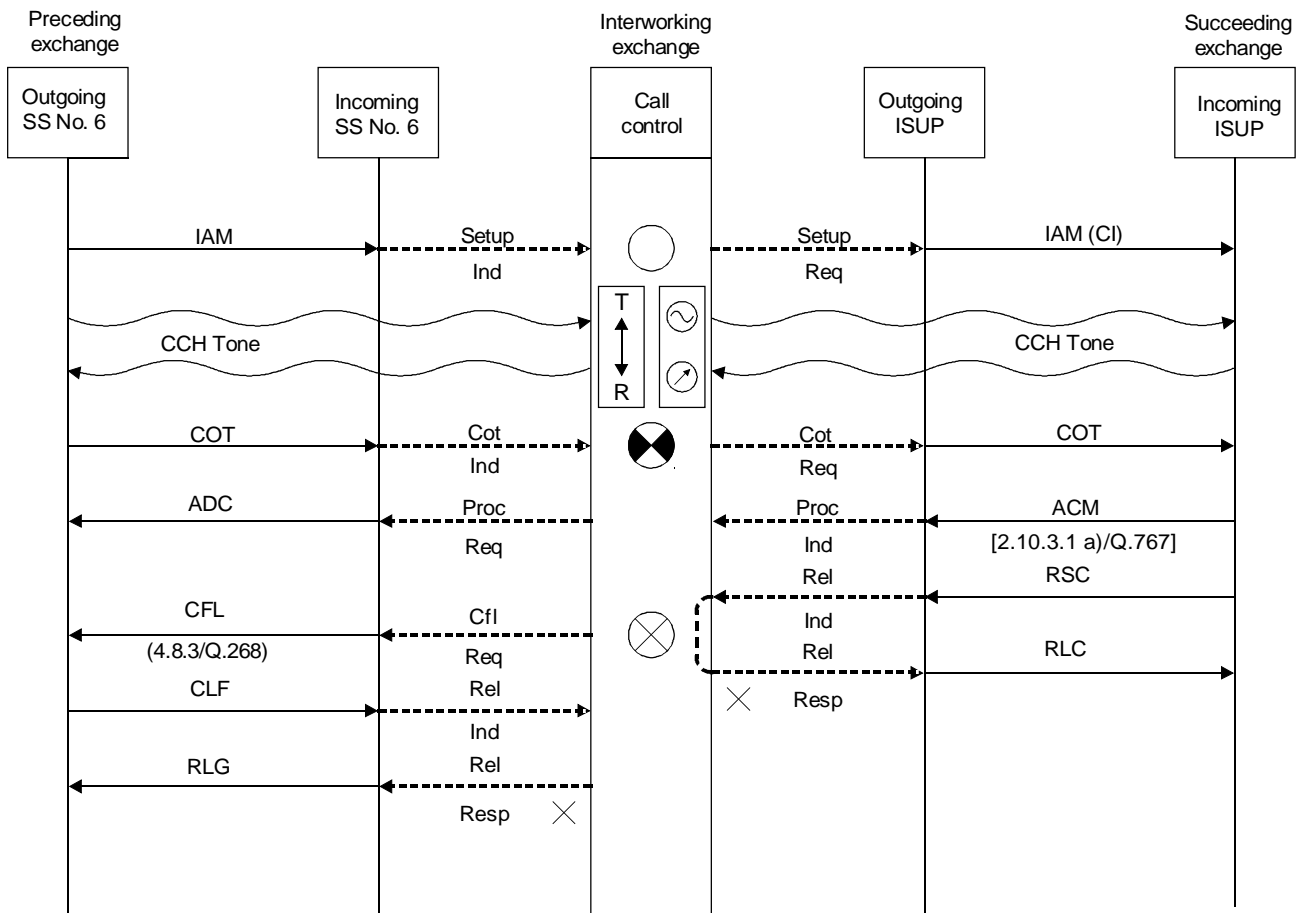
FIGURE 15/Q.698

**SS No. 6 to ISDN-UP**
**Reset circuit received after ACM**
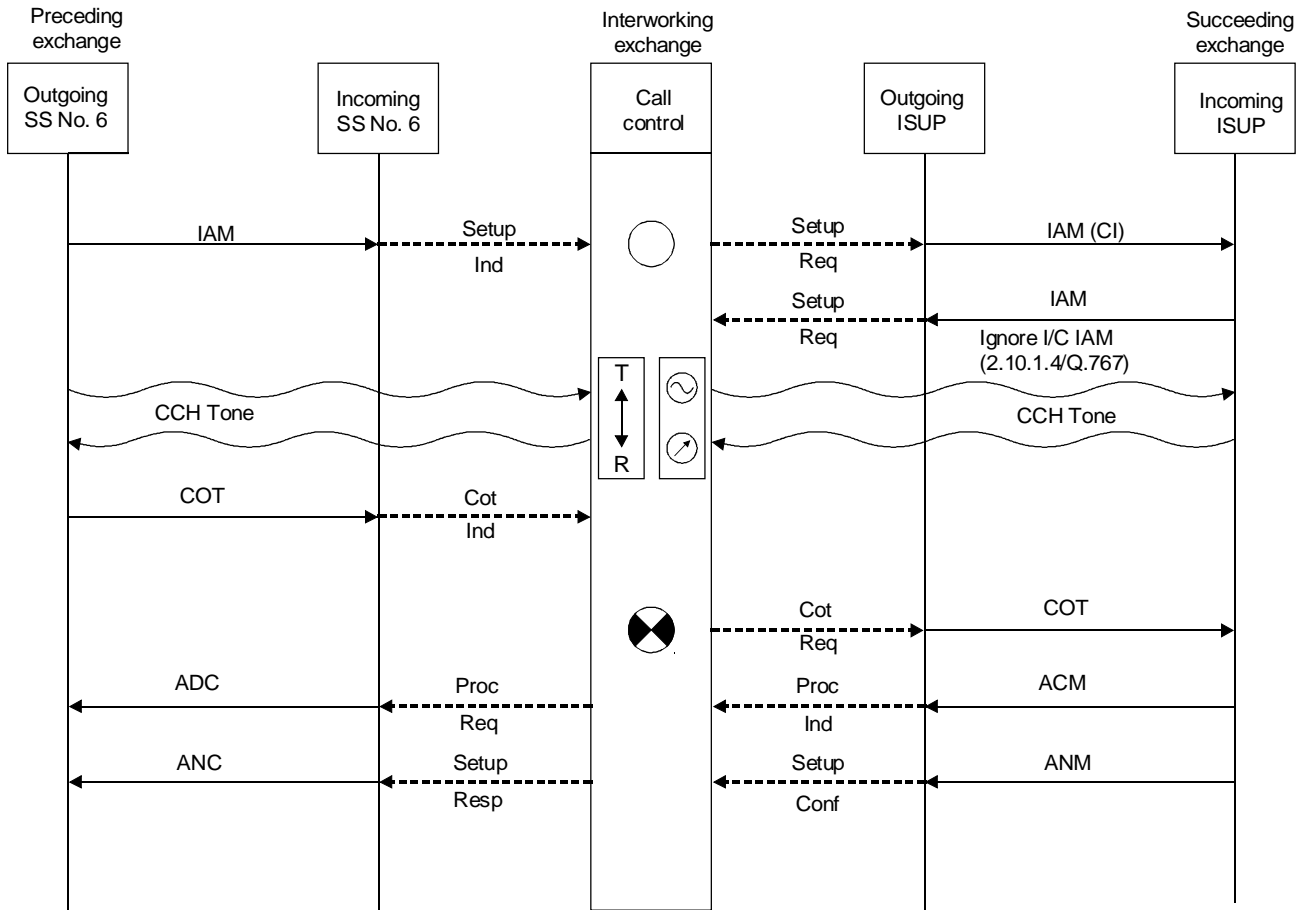
FIGURE 16/Q.698

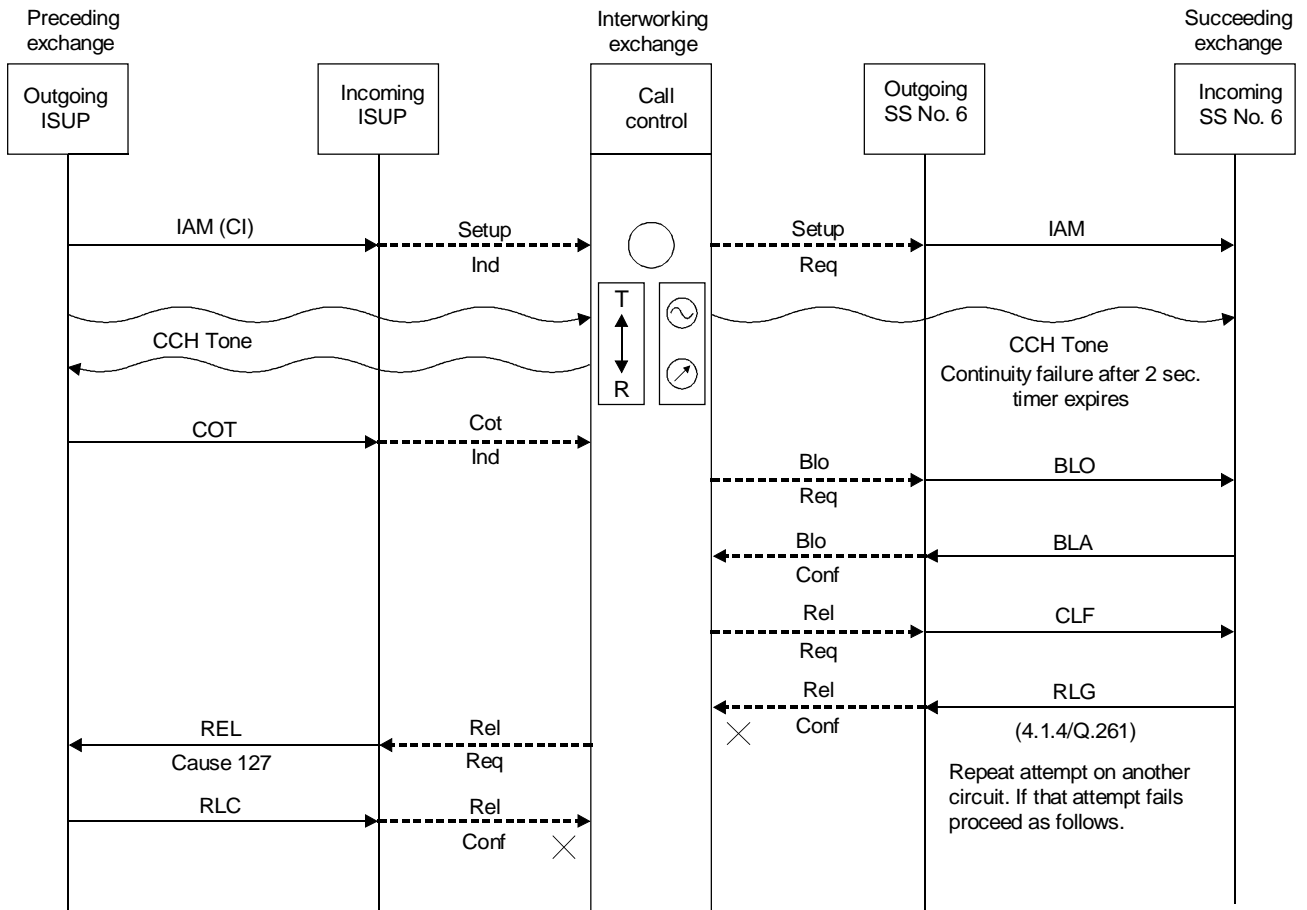**SS No. 6 to ISDN-UP**
**Dual seizure (controlling exchange)**
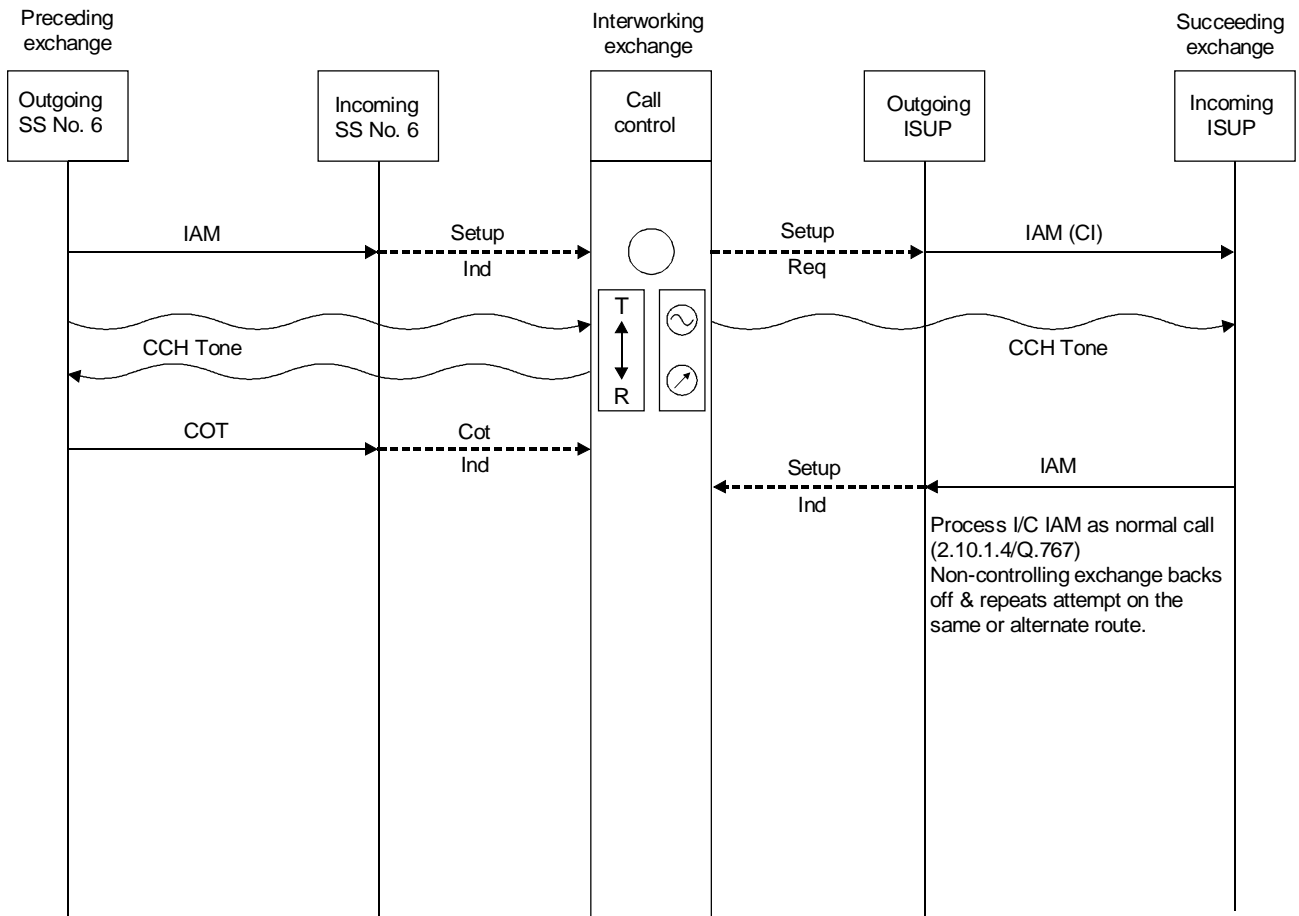
FIGURE 17/Q.698

**SS No. 6 to ISDN-UP**
**Dual seizure (non-controlling exchange)**
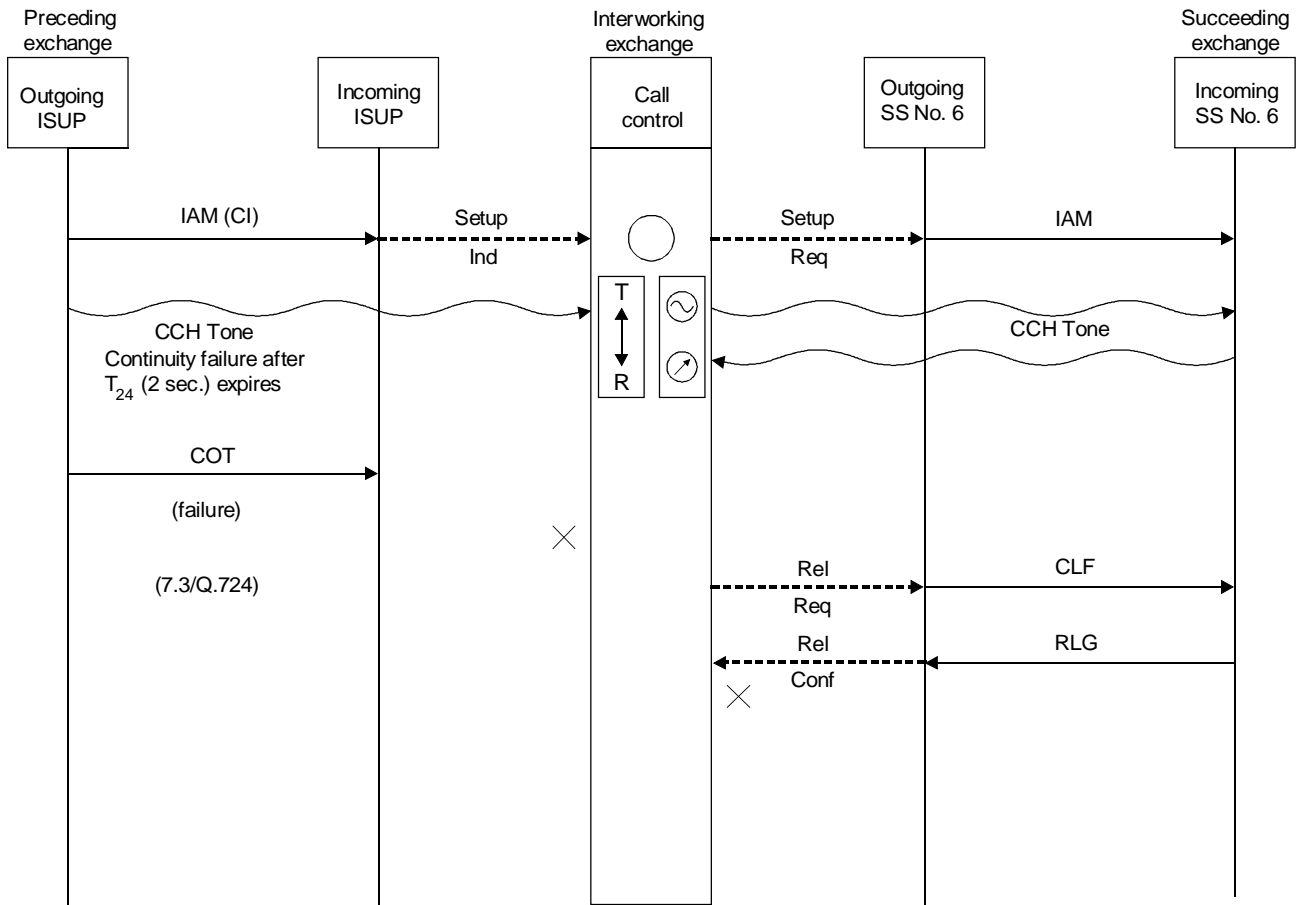
FIGURE 18/Q.698

**ISDN-UP to SS No. 6**
**Continuity failure on I/C No. 7 circuit**

Preceding exchange · Interworking exchange · Succeeding exchange

Outgoing ISUP | Incoming ISUP | Call control | Outgoing SS No. 6 | Incoming SS No. 6

IAM (CI) → Setup Ind → Setup Req → IAM →

CCH Tone ~~~~~ CCH Tone
Continuity failure after 2 sec. timer expires

COT → Cot Ind →

Blo Req → BLO →

Blo Conf ← BLA ←

Rel Req → CLF →

Rel Conf ← RLG ←

(4.1.4/Q.261)

REL Cause 127 ← Rel Req ←

RLC → Rel Conf →

Repeat attempt on another circuit. If that attempt fails proceed as follows.

T1141850-92/d20

NOTE – Cause 127 = Interworking unspecified.

FIGURE 19/Q.698

**ISDN-UP to SS No. 6**
**Continuity failure on outgoing No. 6 circuit**

Preceding exchange — Interworking exchange — Succeeding exchange

Outgoing ISUP | Incoming ISUP | Call control | Outgoing SS No. 6 | Incoming SS No. 6

IAM (CI) → Setup Ind → Setup Req → IAM

CCH Tone ← ... CCH Tone

COT → Cot Ind → Cot Req → COT

ACM ← Proc Req ← Proc Ind ← ADC

REL ← Rel Req ← Cgc Ind ← CGC
Cause 34

RLC → Rel Conf → Rel Req → CLF

Rel Conf ← Rel ← RLG
(4.1.7/Q.261)
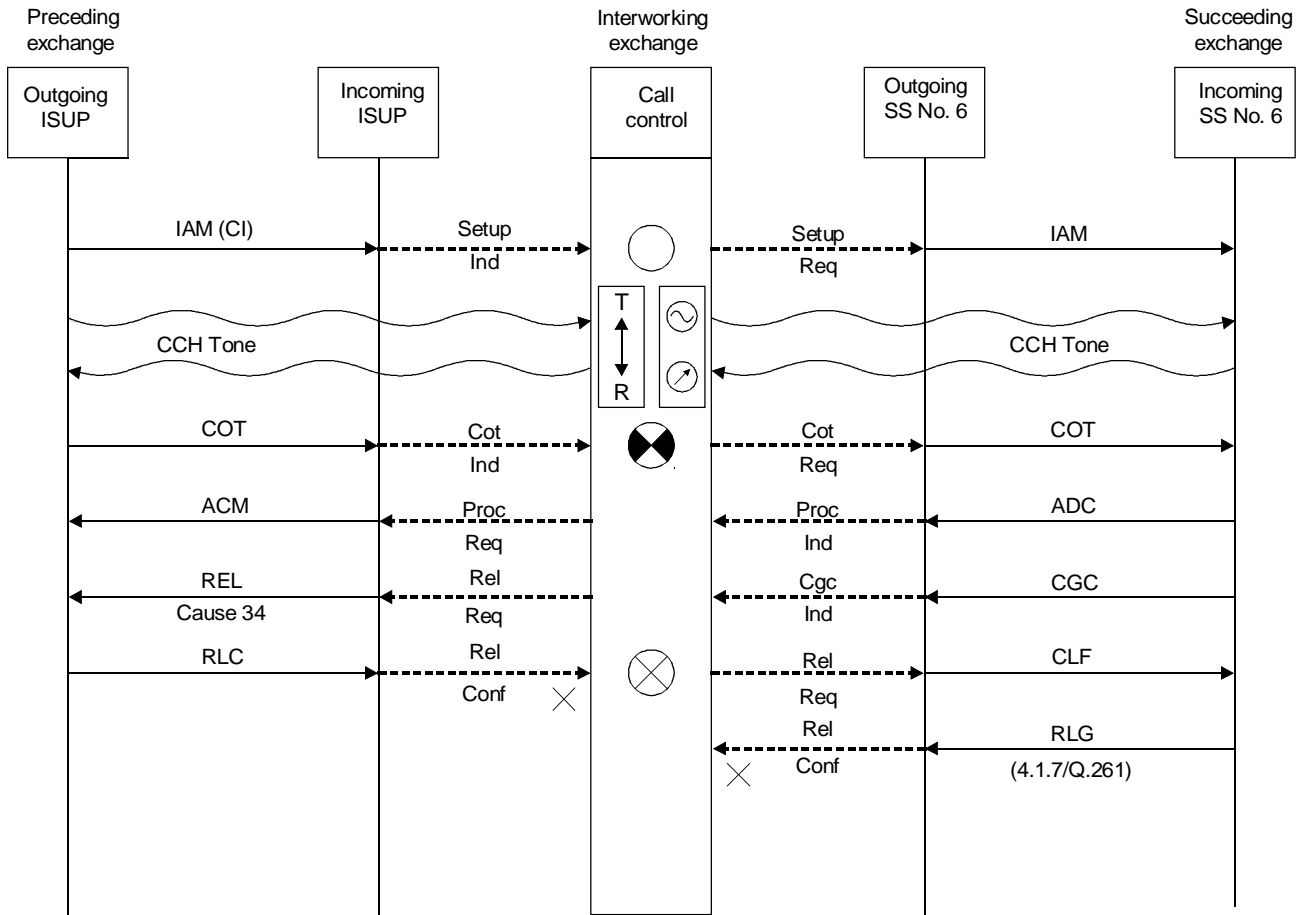
T1141860-92/d21

NOTE – Cause 34 = No circuits available.

FIGURE  20/Q.698

**ISDN-UP to SS No. 6**
**Congestion signal received after address complete**

Preceding exchange | Interworking exchange | Succeeding exchange

Outgoing ISUP | Incoming ISUP | Call control | Outgoing SS No. 6 | Incoming SS No. 6

IAM (CI) → Setup Ind → Setup Req → IAM

CCH Tone ← CCH Tone

COT → Cot Ind → Cot Req → COT

ADC Timeout 20-30 sec.

REL ← Rel Req ← Rel Req → CLF
Cause 127
RLC → Rel Conf | Rel Conf ← RLG

(4.8.1.1 & 4.8.5/Q.268)
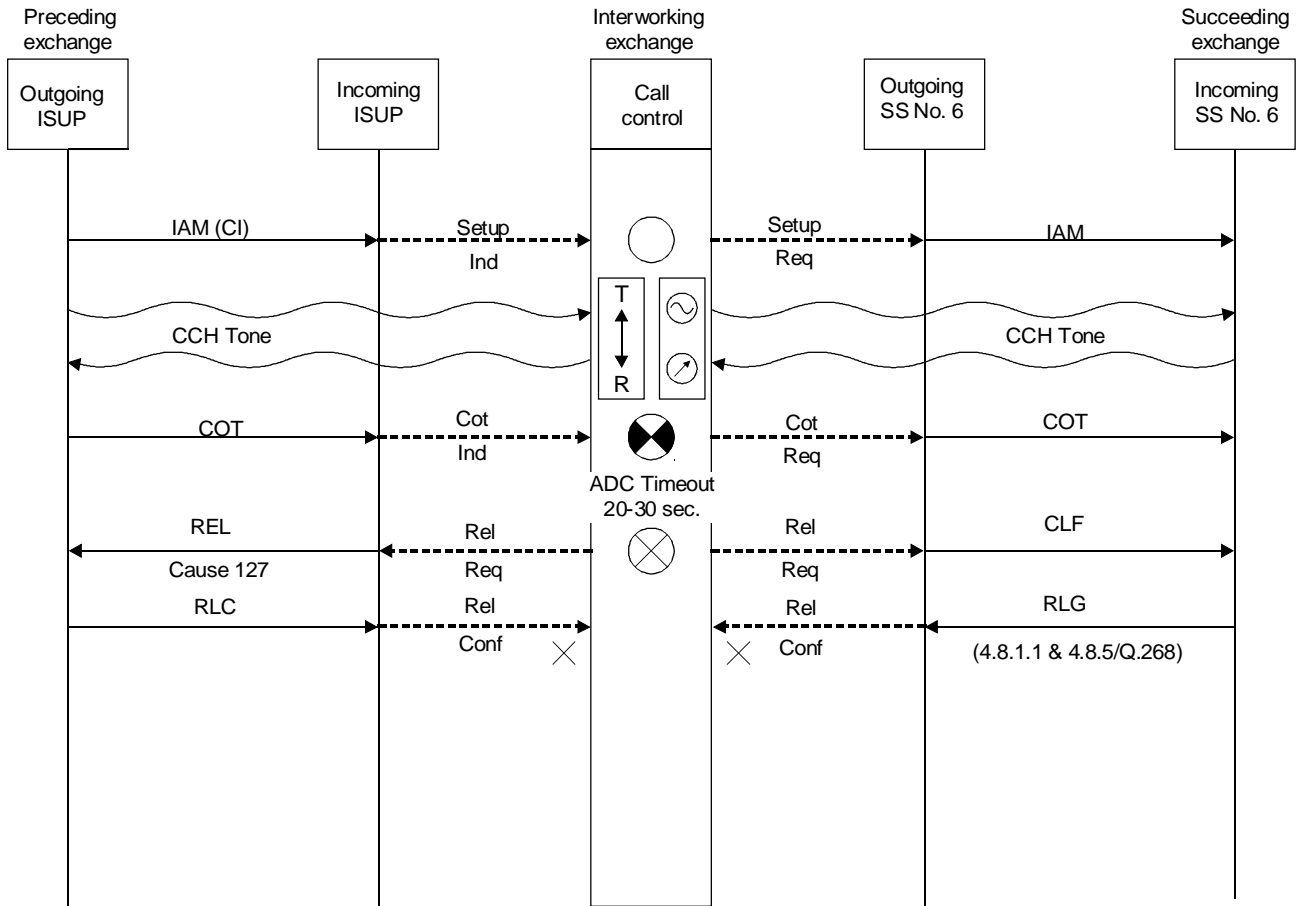
T1141870-92/d22

NOTE – Cause 127 = Interworking unspecified.

FIGURE 21/Q.698

**ISDN-UP to SS No. 6**
**Timeout on address complete message (ADC)**
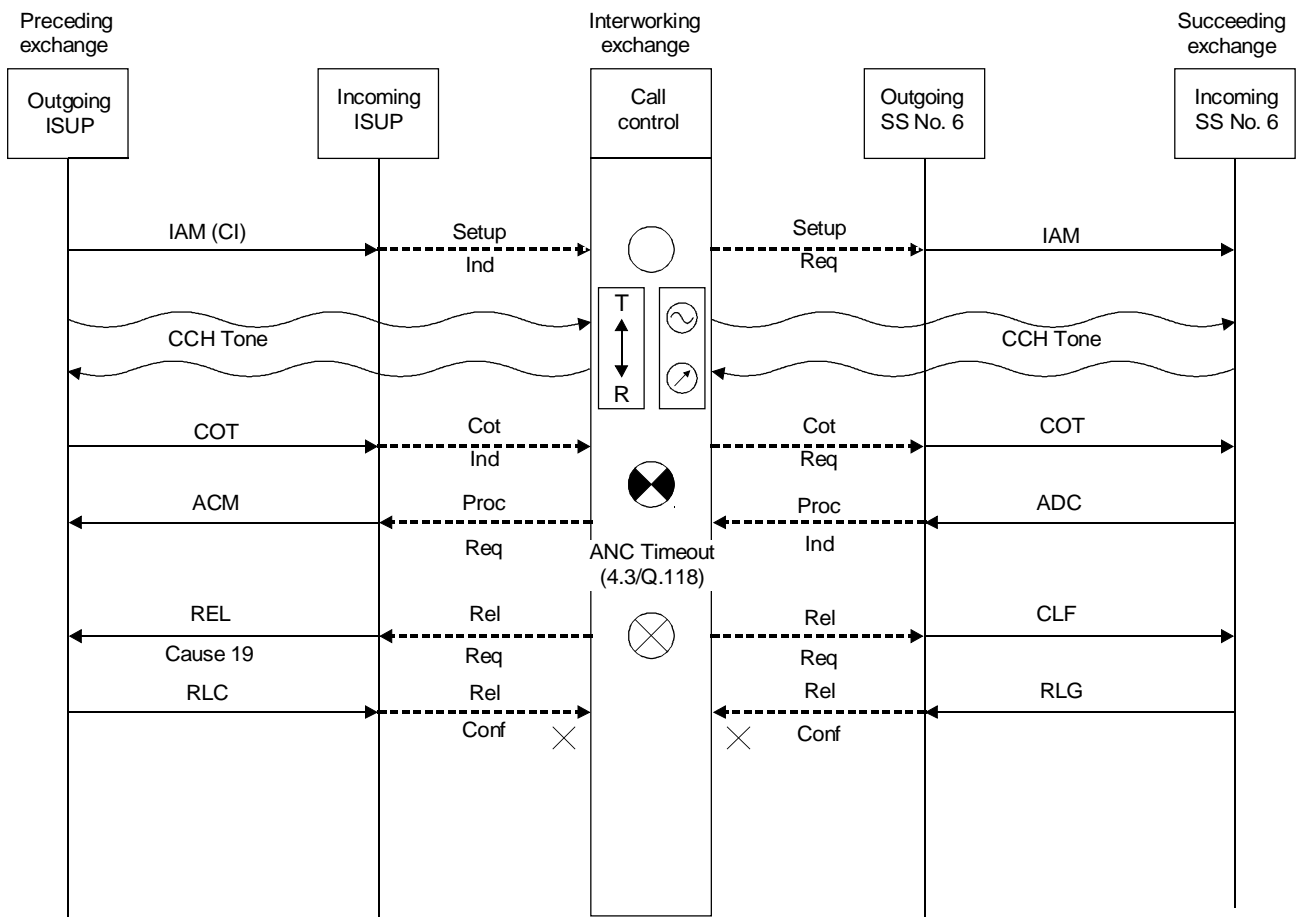
NOTE – Cause 19 = No answer from user.

FIGURE  22/Q.698

**ISDN-UP to SS No. 6**
**Timeout on answer message**
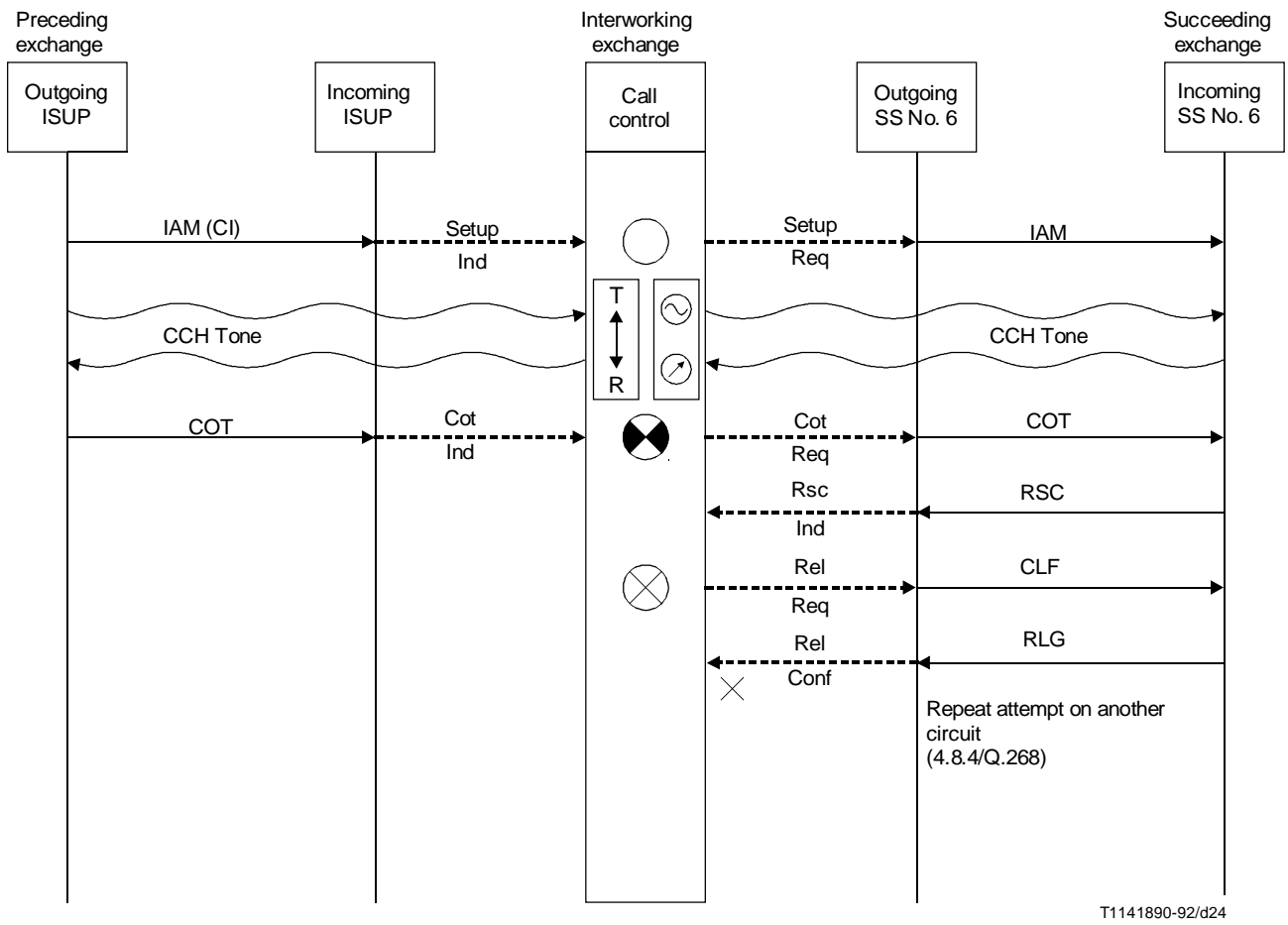
FIGURE 23/Q.698

**ISDN-UP to SS No. 6
Reset circuit received before ADC**
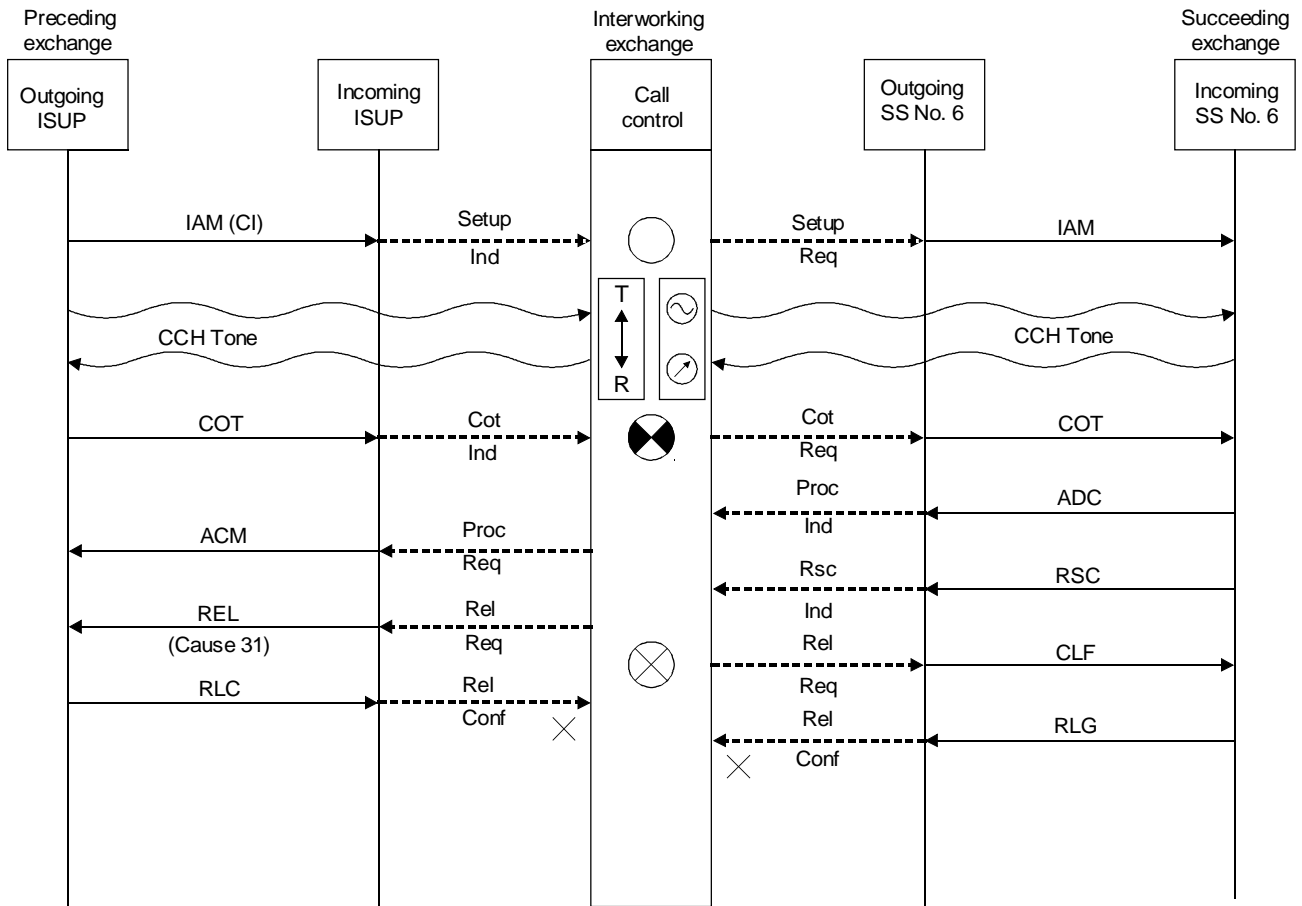
NOTE – Cause 31 = Normal unspecified.

FIGURE 24/Q.698

**ISDN-UP to SS No. 6**
**Reset circuit received after ADC**
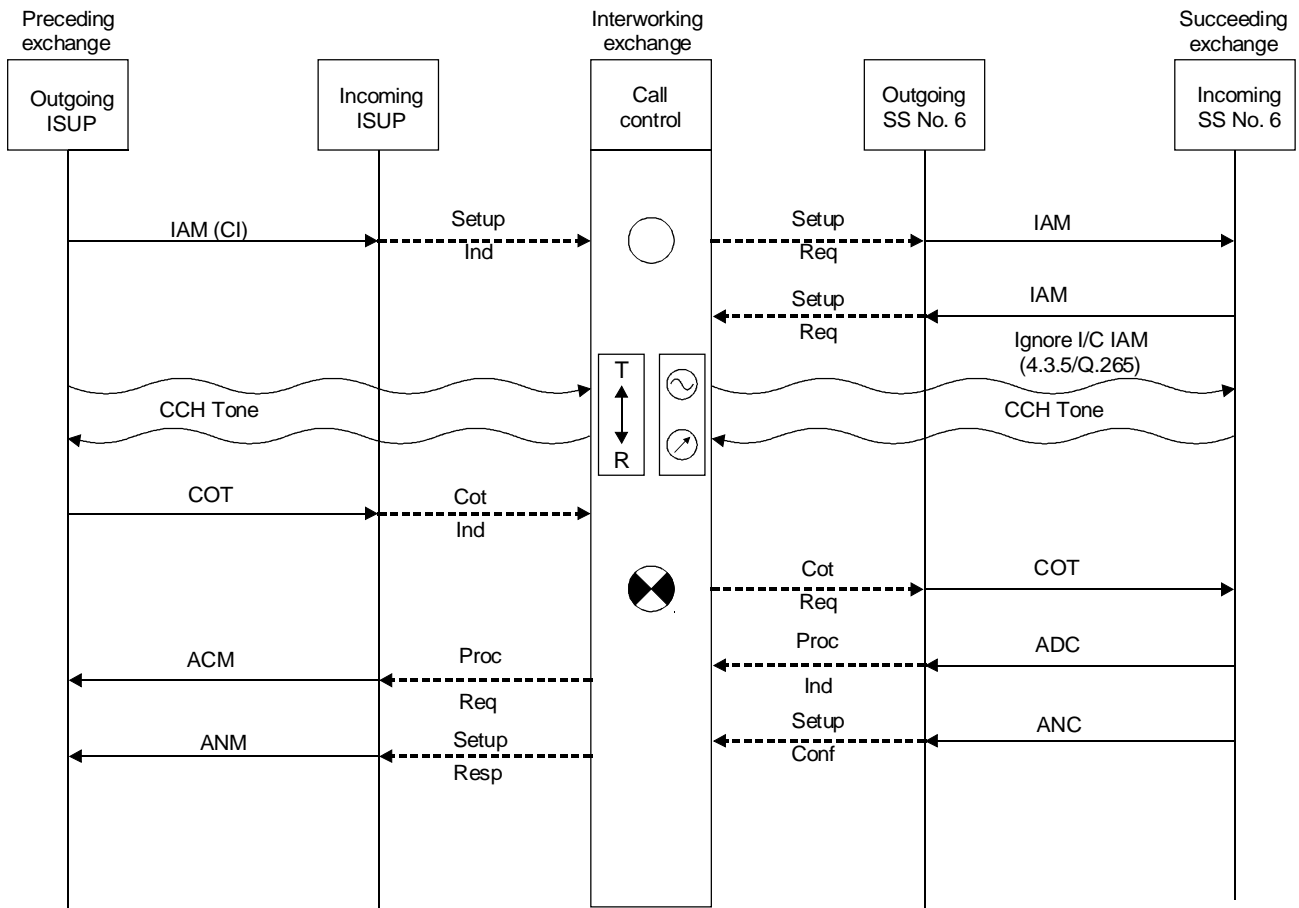
FIGURE  25/Q.698

**ISDN-UP to SS No. 6**
**Dual seizure (controlling exchange)**
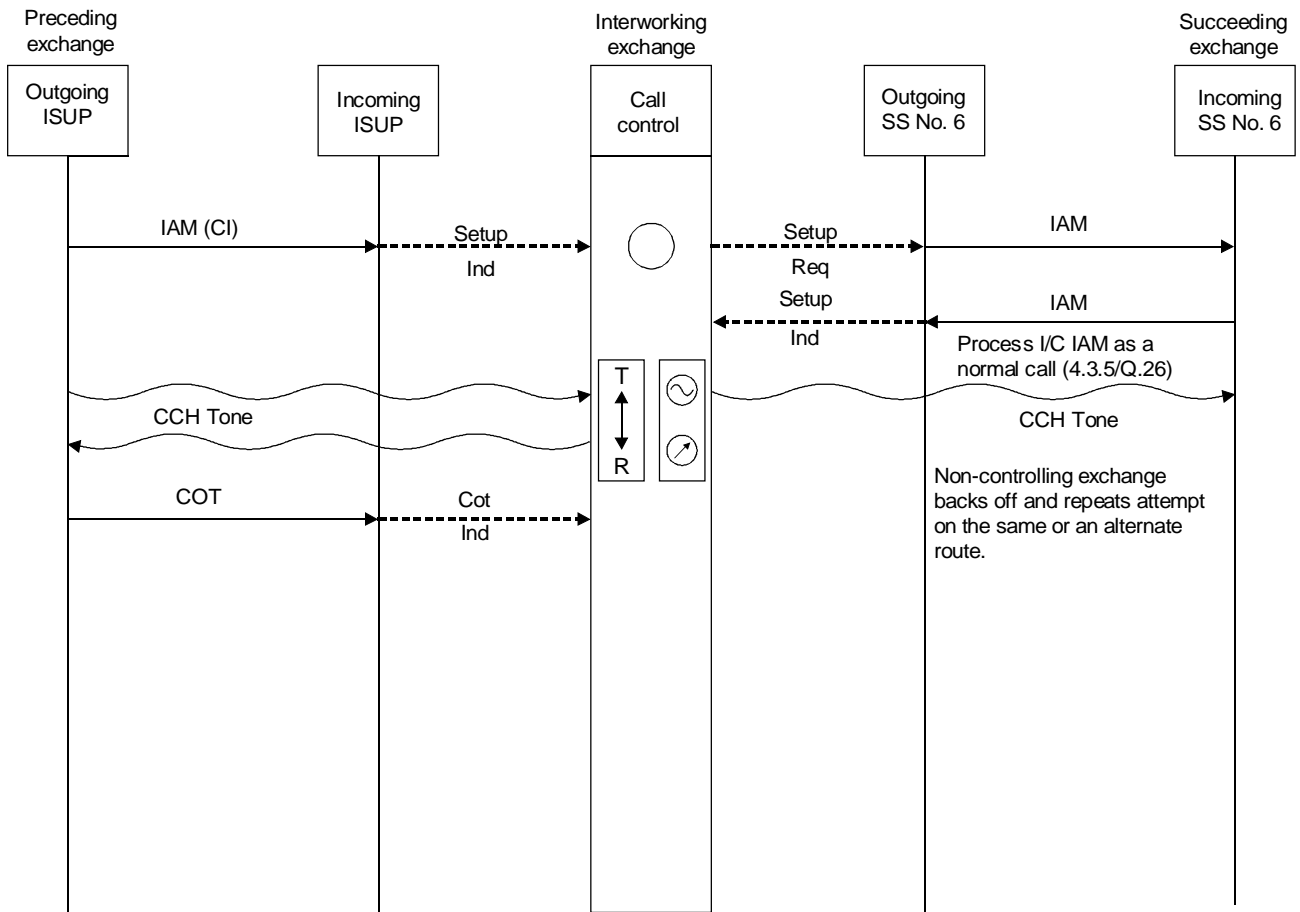
FIGURE 26/Q.698

**ISDN-UP to SS No. 6**
**Dual seizure (non-controlling exchange)**
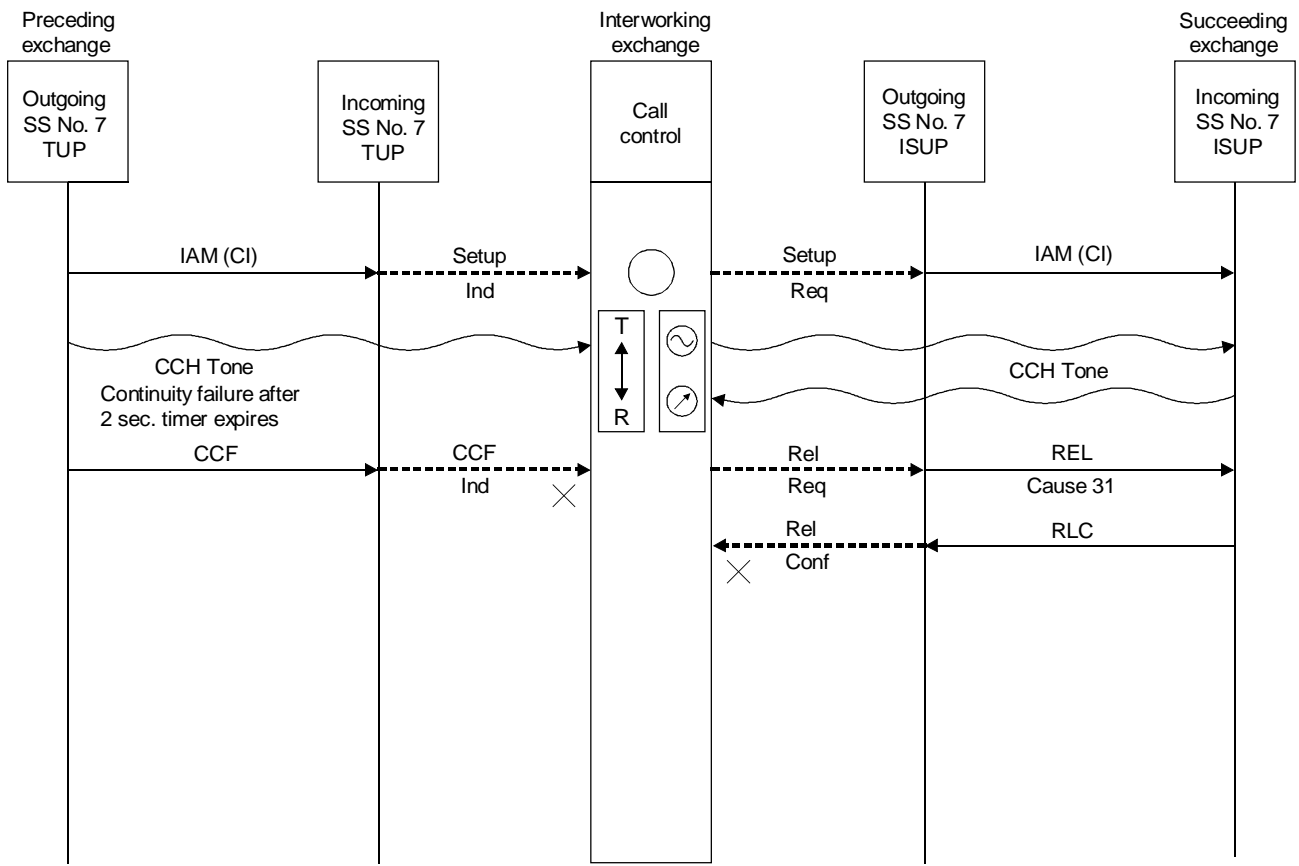
NOTE – Cause 31 = Normal unspecified.

FIGURE  27/Q.698

**Signalling System No. 7 TUP to ISUP
Continuity failure on incoming TUP circuit**
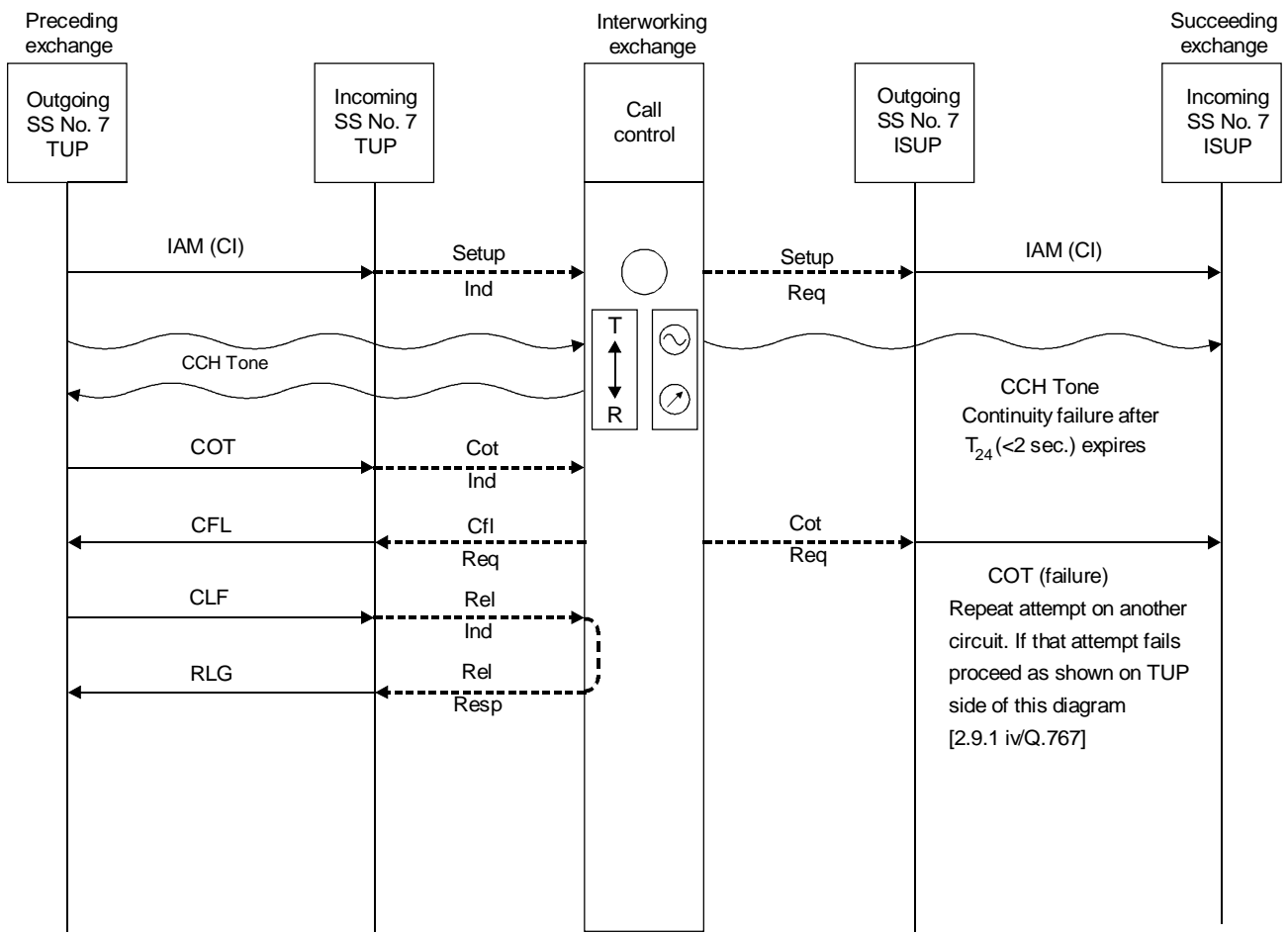
FIGURE 28/Q.698

**SS No. 7 TUP to ISUP**

**Continuity failure on outgoing ISUP circuit**

| Preceding exchange | | Interworking exchange | Succeeding exchange | |
|---|---|---|---|---|
| Outgoing SS No. 7 TUP | Incoming SS No. 7 TUP | Call control | Outgoing SS No. 7 ISUP | Incoming SS No. 7 ISUP |

IAM (CI) — Setup Ind — Setup Req — IAM (CI)

CCH Tone — T / R — CCH Tone

COT — Cot Ind — Cot Req — COT

see mapping below — Rel Req — Rel Ind — REL Cause

CLF — Rel Ind — Rel Resp — RLC

RLG — Rel Resp
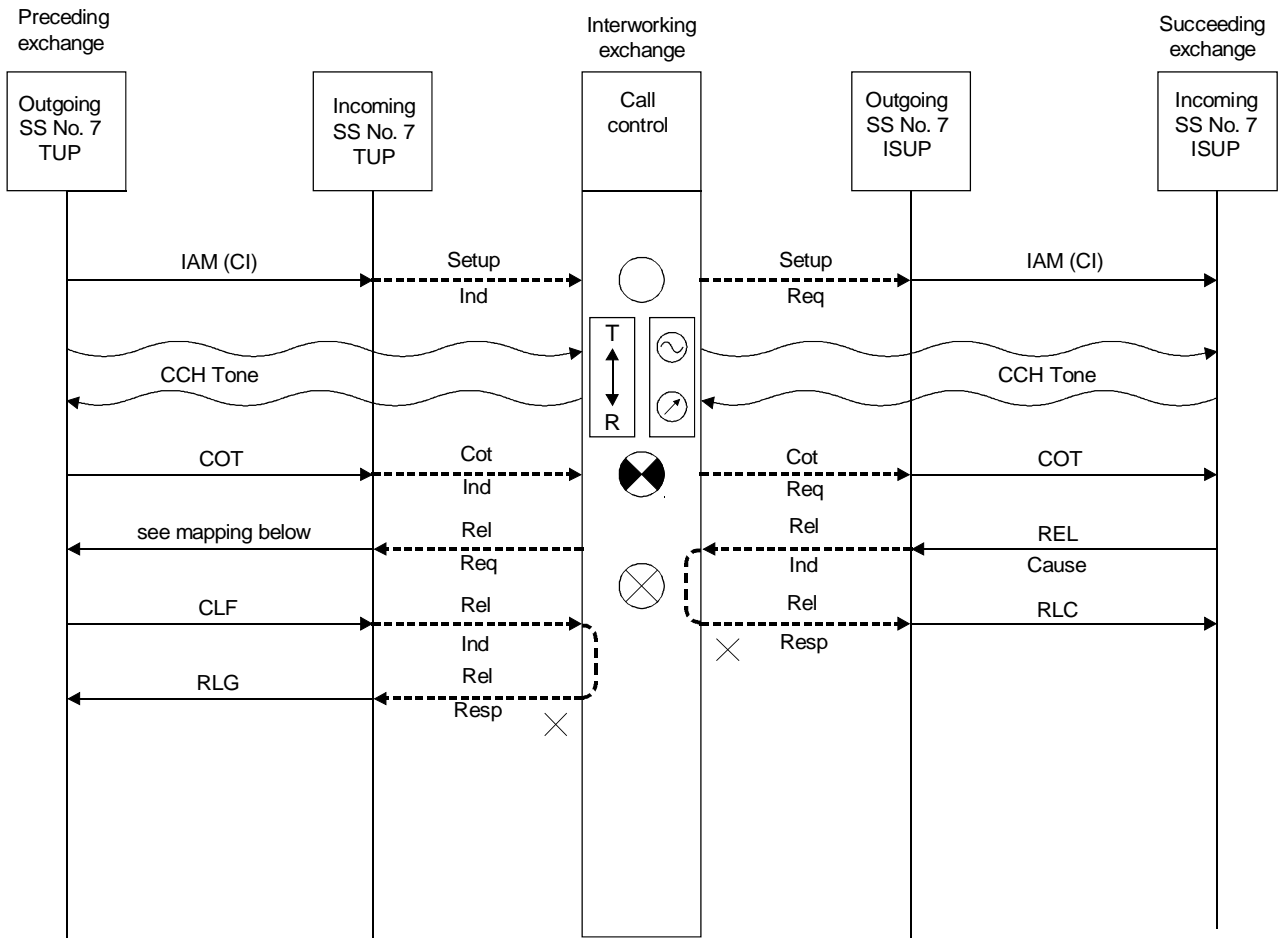
T1141950-92/d30

| Cause value in REL message | SS No. 7 TUP signal |
|---|---|
| 42 | SEC |
| 34 | CGC |
| 28 | ADI |
| 1 | UNN |
| 17 | SSB |
| 27 | LOS |
| 4 | SST |
| 65 | DPN |
| Other | CFL |

FIGURE 29/Q.698

**SS No. 7 TUP to ISUP**
**Release signal received before address complete**
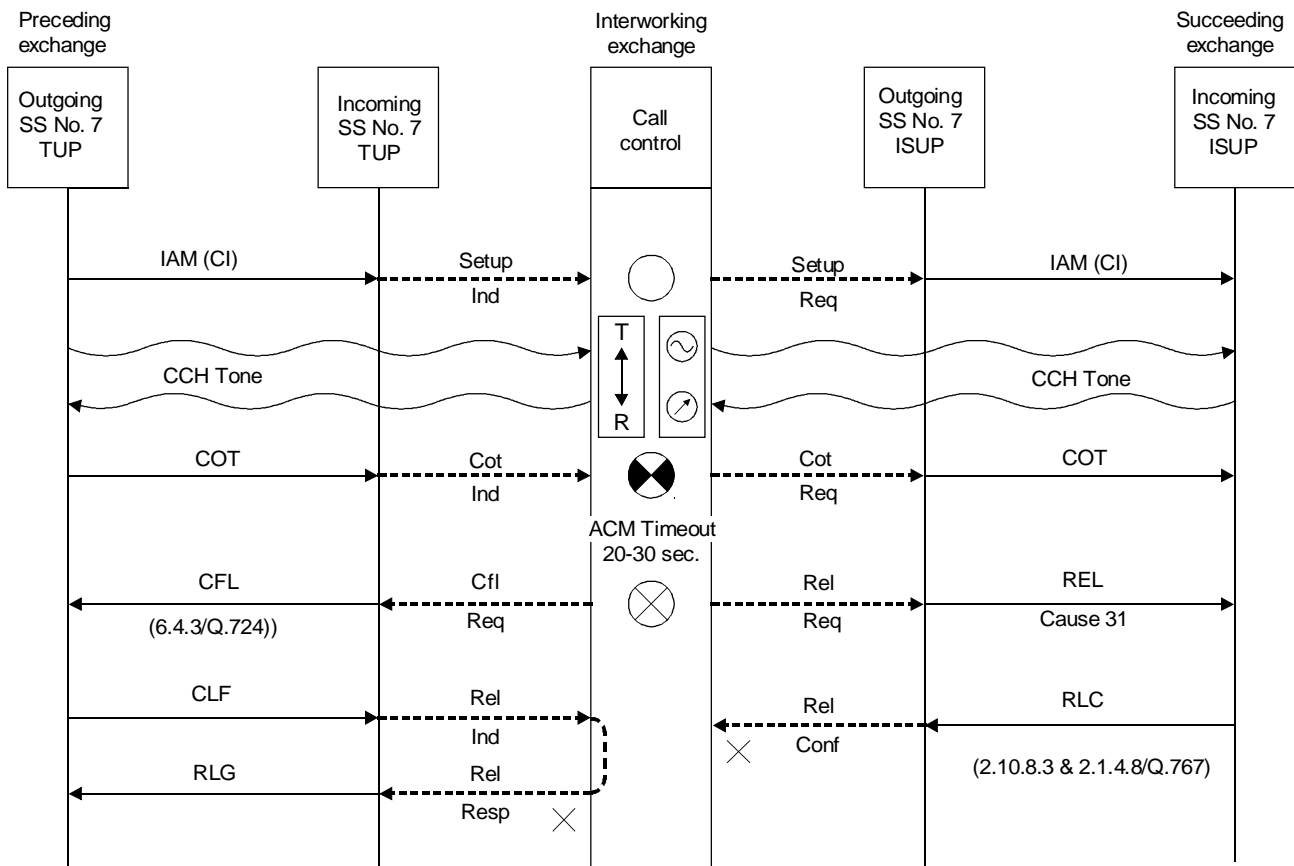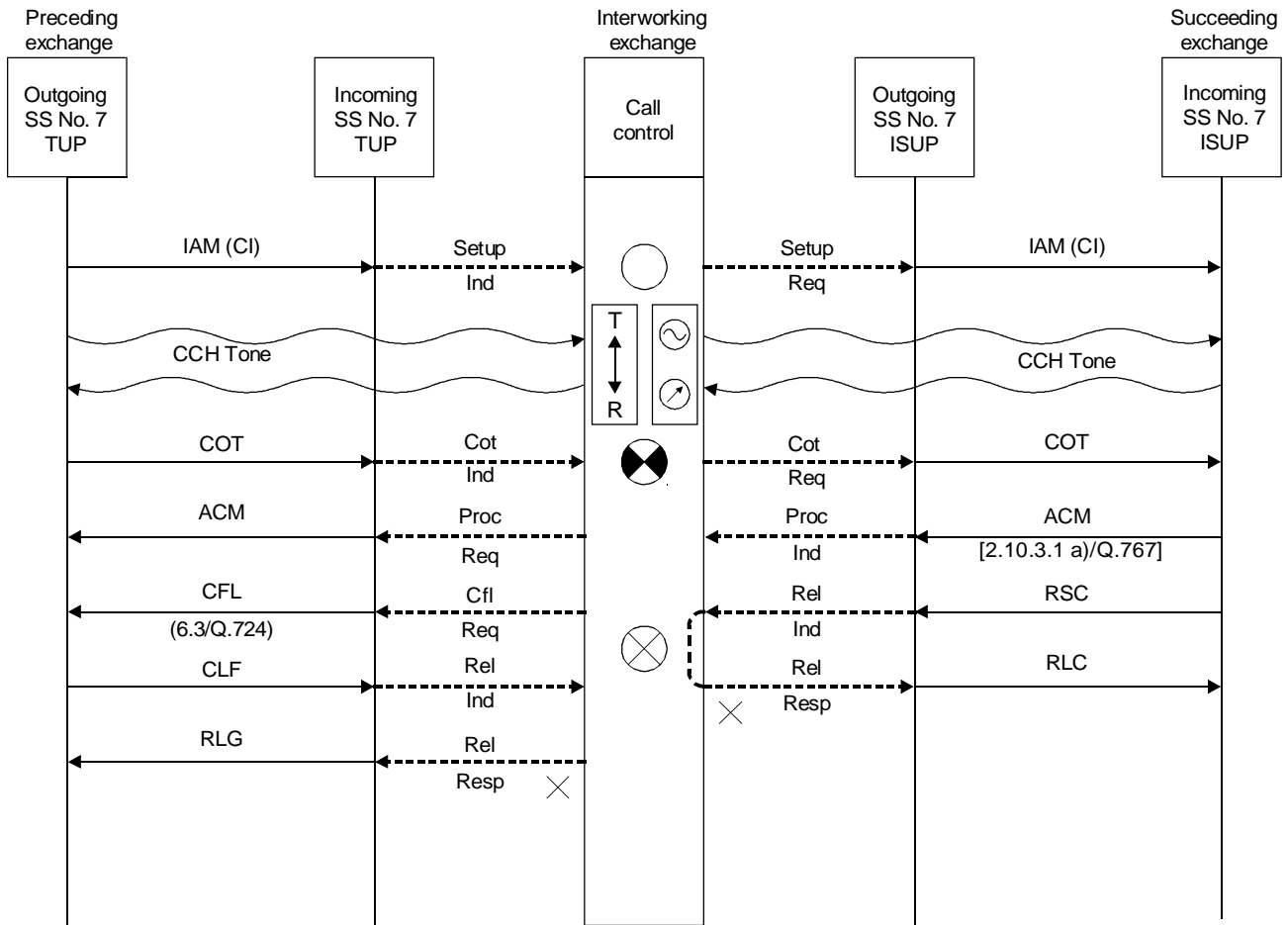
NOTE – Cause 31 = Normal unspecified.

FIGURE  30/Q.698

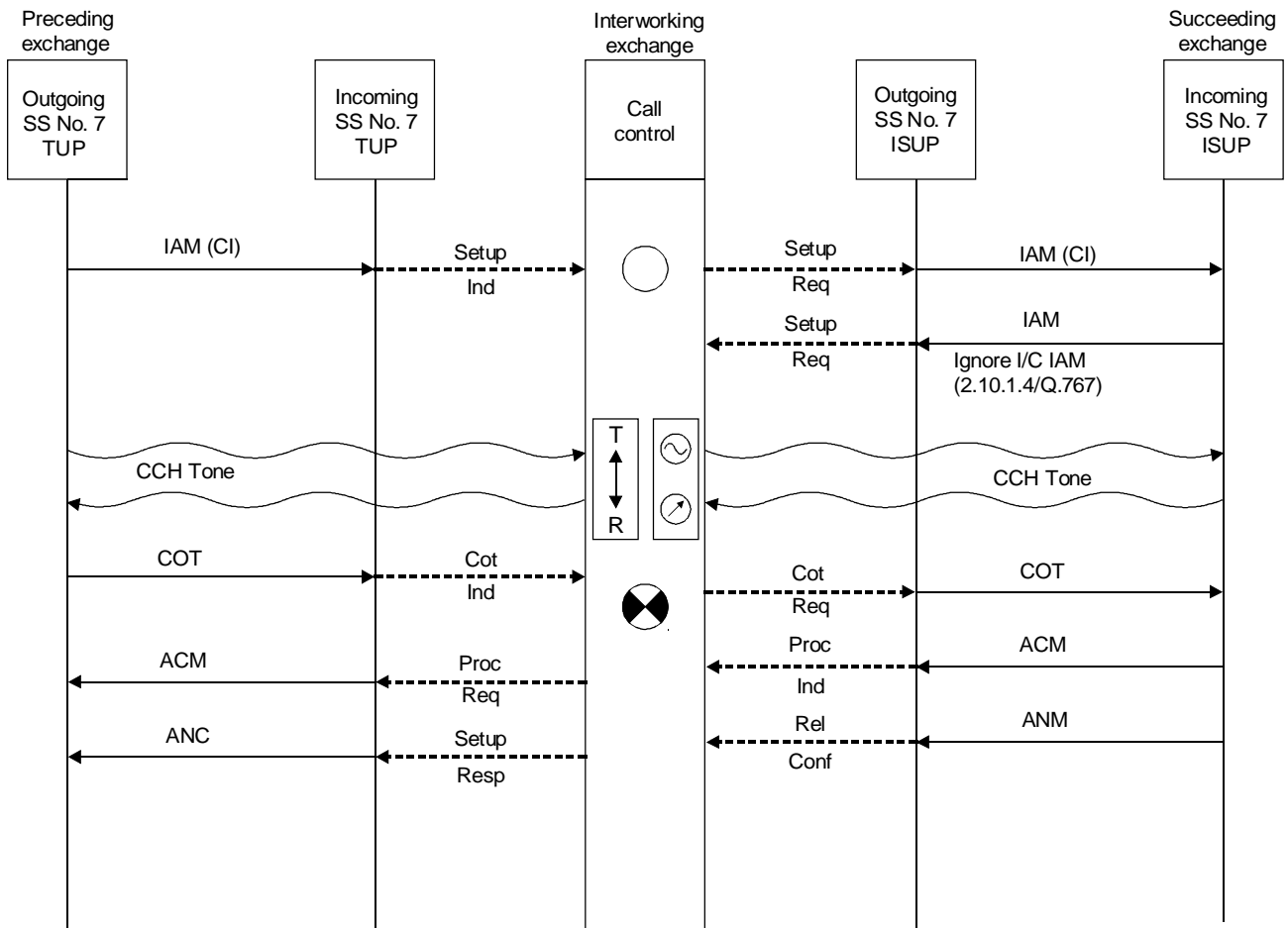**SS No. 7 TUP to ISUP**
**Timeout on address complete message (ACM)**

NOTE – Cause 19 = No answer from user.

FIGURE  31/Q.698

**SS No. 7 TUP to ISUP**
**Timeout on answer message**
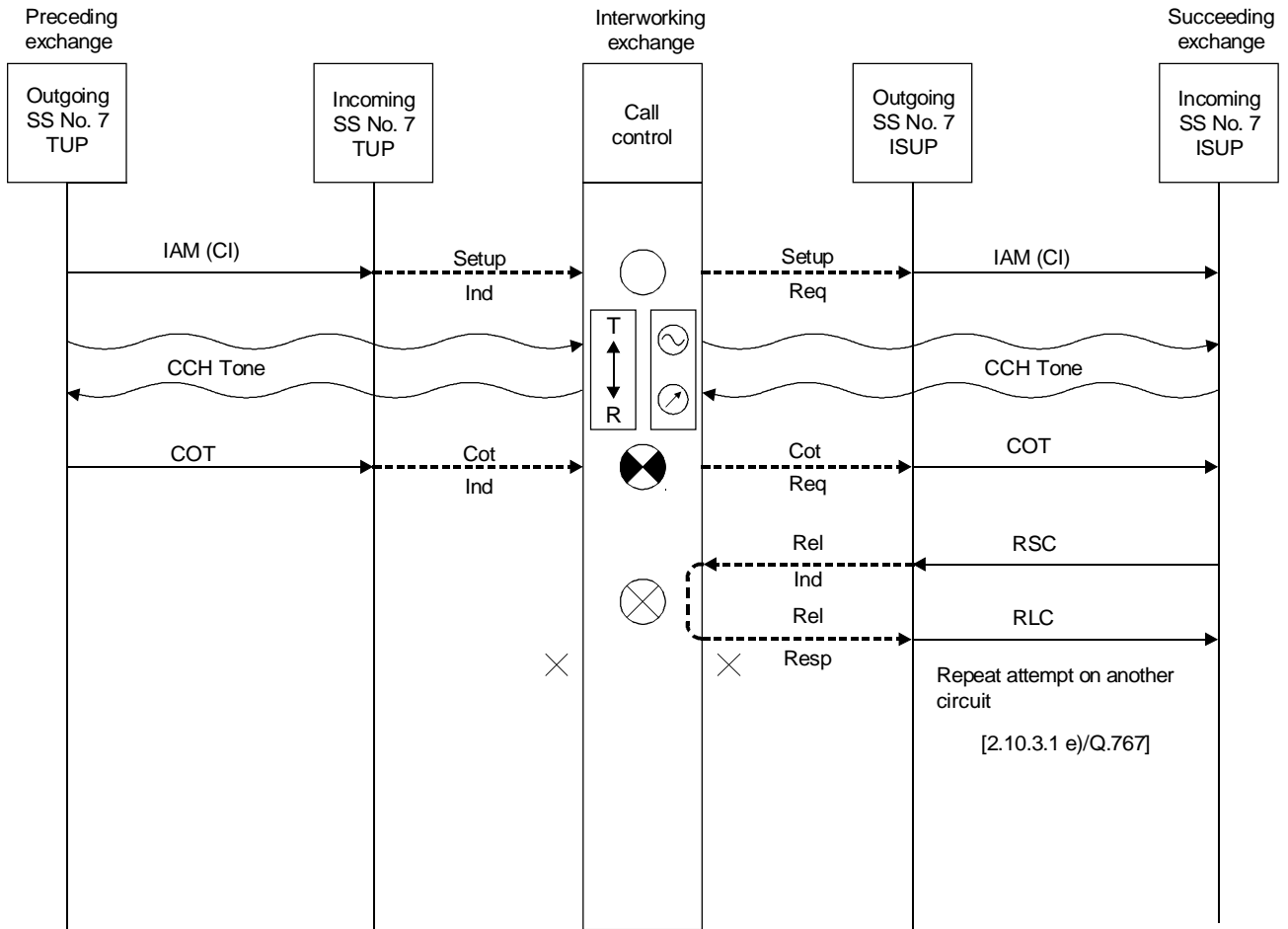
FIGURE 32/Q.698

**SS No. 7 TUP to ISUP**
**Reset circuit received before ACM**

FIGURE  33/Q.698

**SS No. 7 TUP to ISUP**
**Reset circuit received after ACM**

FIGURE 34/Q.698

**SS No. 7 TUP to ISUP**
**Dual seizure (controlling exchange)**
**Reset circuit received after ACM**
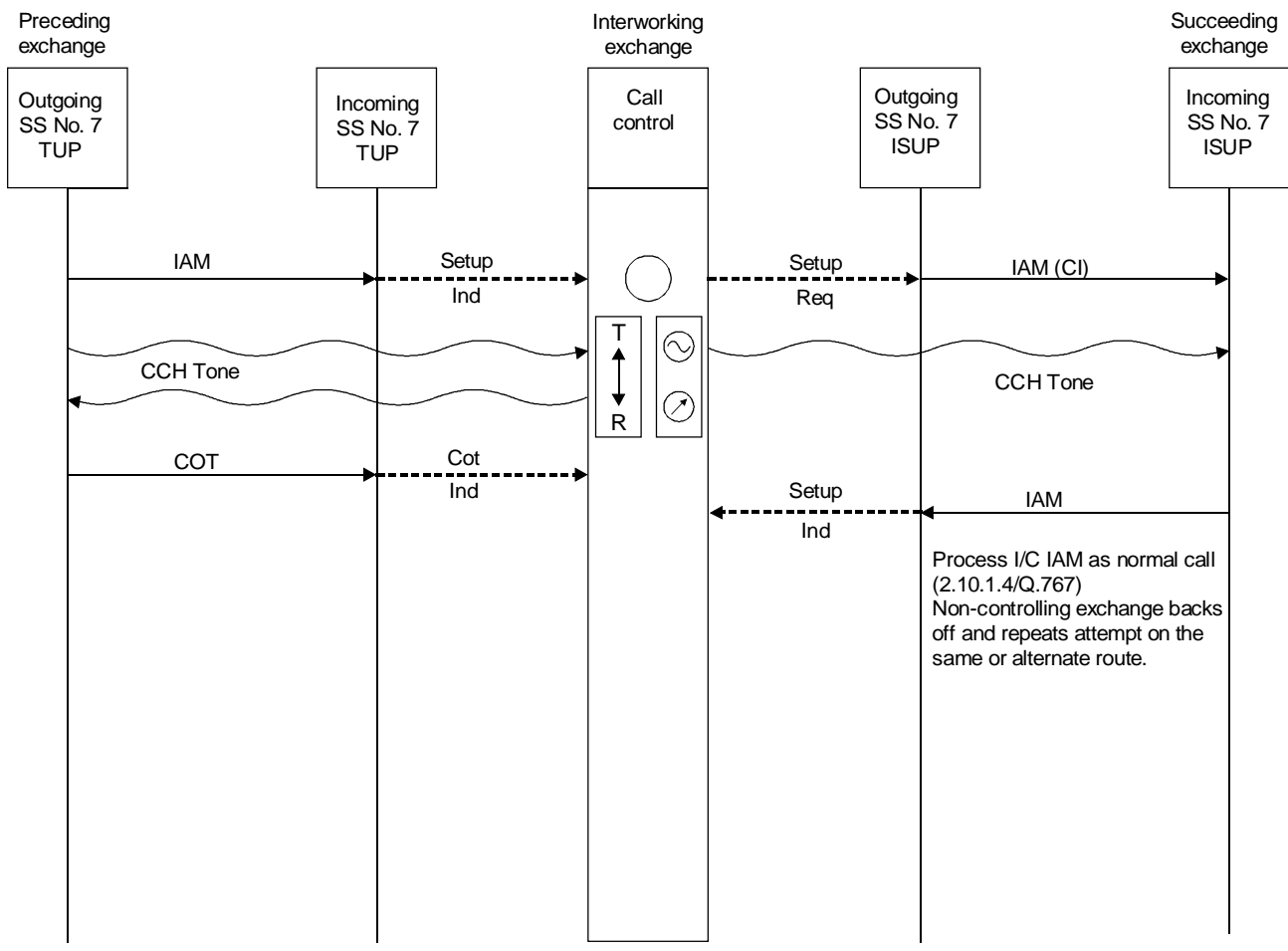
FIGURE 35/Q.698

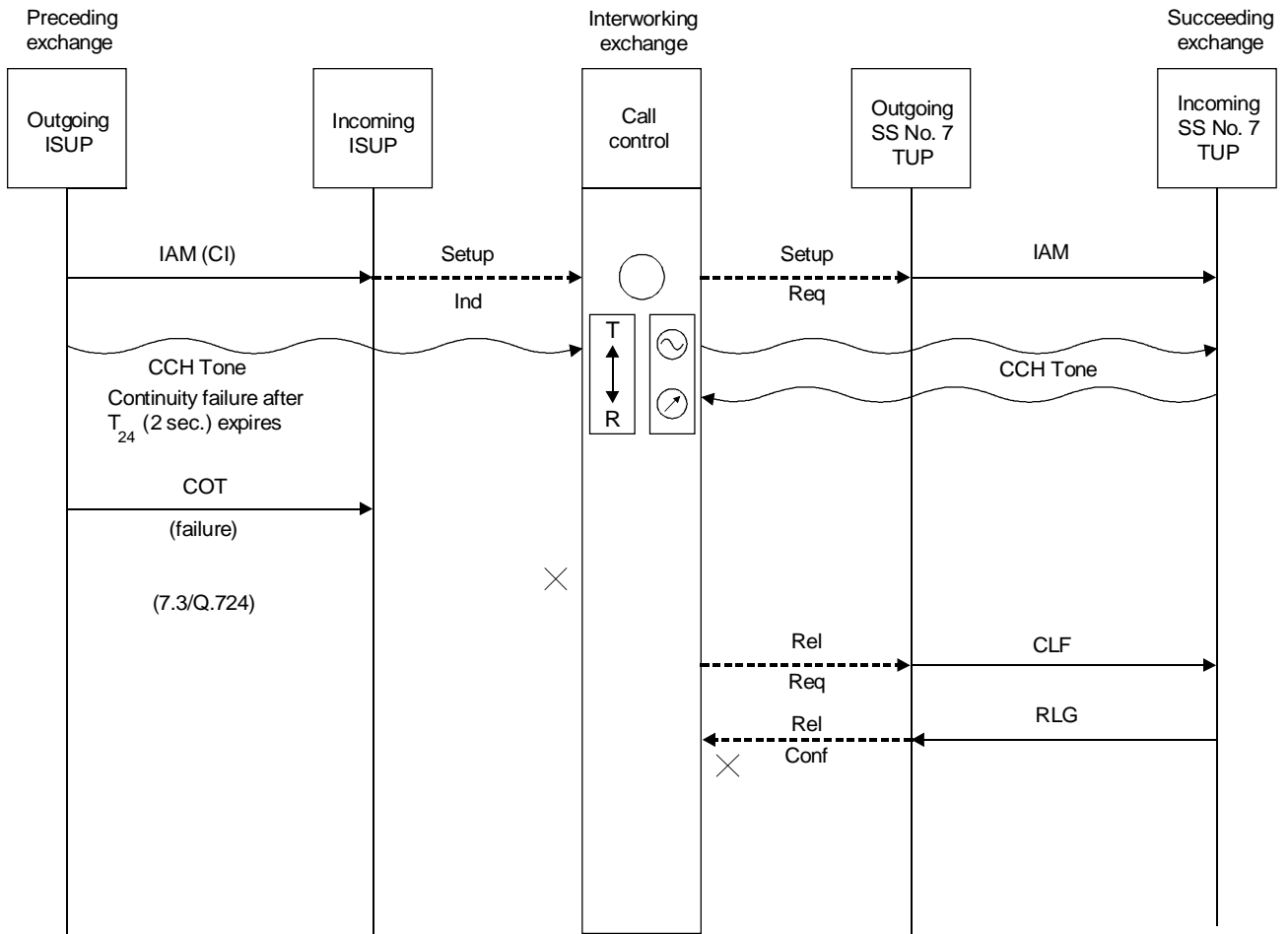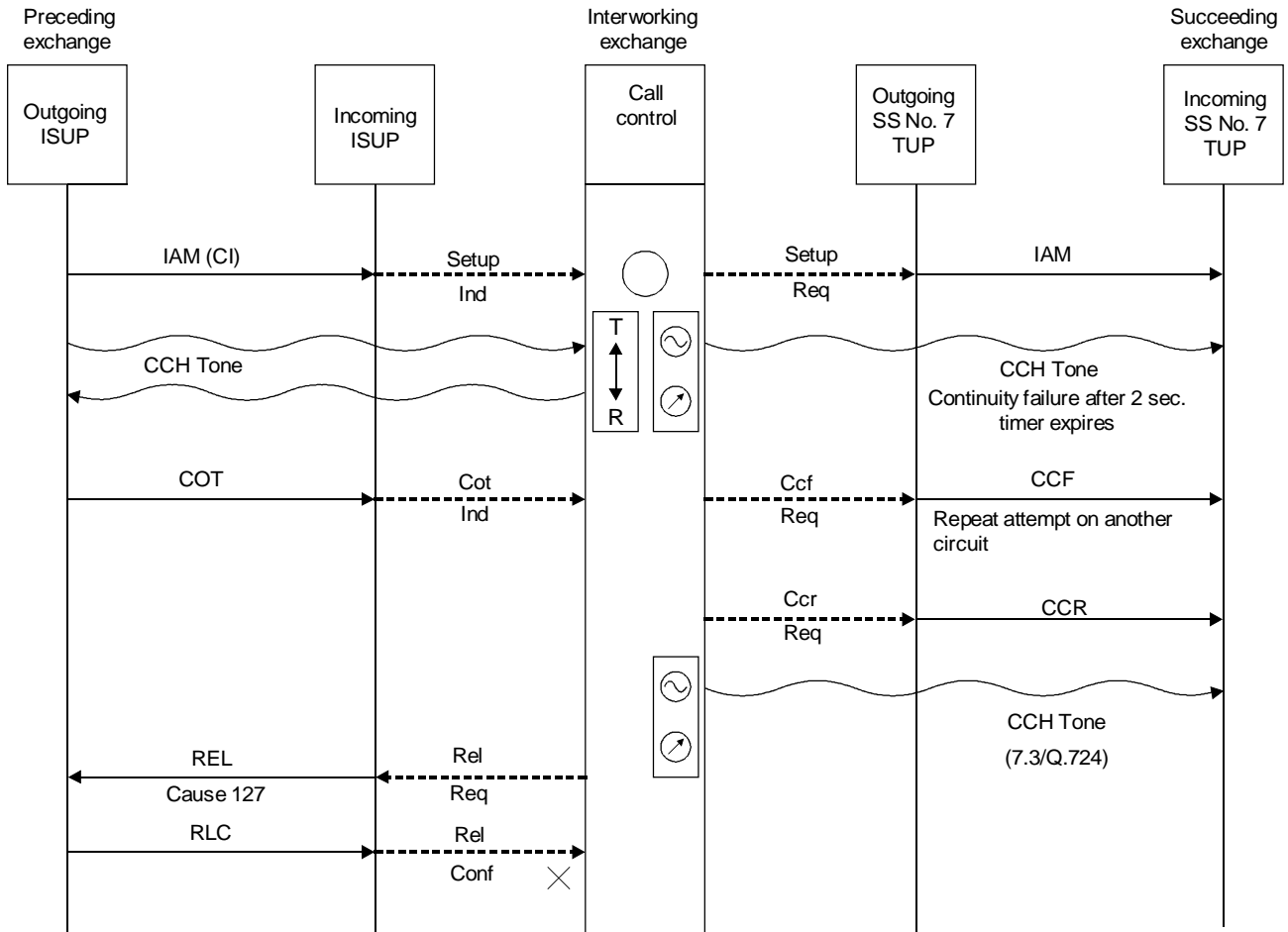**SS No. 7 TUP to ISUP**
**Dual seizure (non-controlling exchange)**

FIGURE 36/Q.698

**Interworking of Signalling System No. 7 ISUP to No. 7 TUP
Continuity failure on incoming ISUP circuit**

Preceding exchange | Interworking exchange | Succeeding exchange

Outgoing ISUP — Incoming ISUP — Call control — Outgoing SS No. 7 TUP — Incoming SS No. 7 TUP

IAM (CI) → Setup Ind → Setup Req → IAM →

CCH Tone

CCH Tone
Continuity failure after 2 sec. timer expires

COT → Cot Ind → Ccf Req → CCF

Repeat attempt on another circuit

Ccr Req → CCR →

CCH Tone

REL ← Rel Req ←
Cause 127

CCH Tone
(7.3/Q.724)

RLC → Rel Conf →

T1142030-92/d38

NOTES

1    Cause 127 = Interworking unspecified.
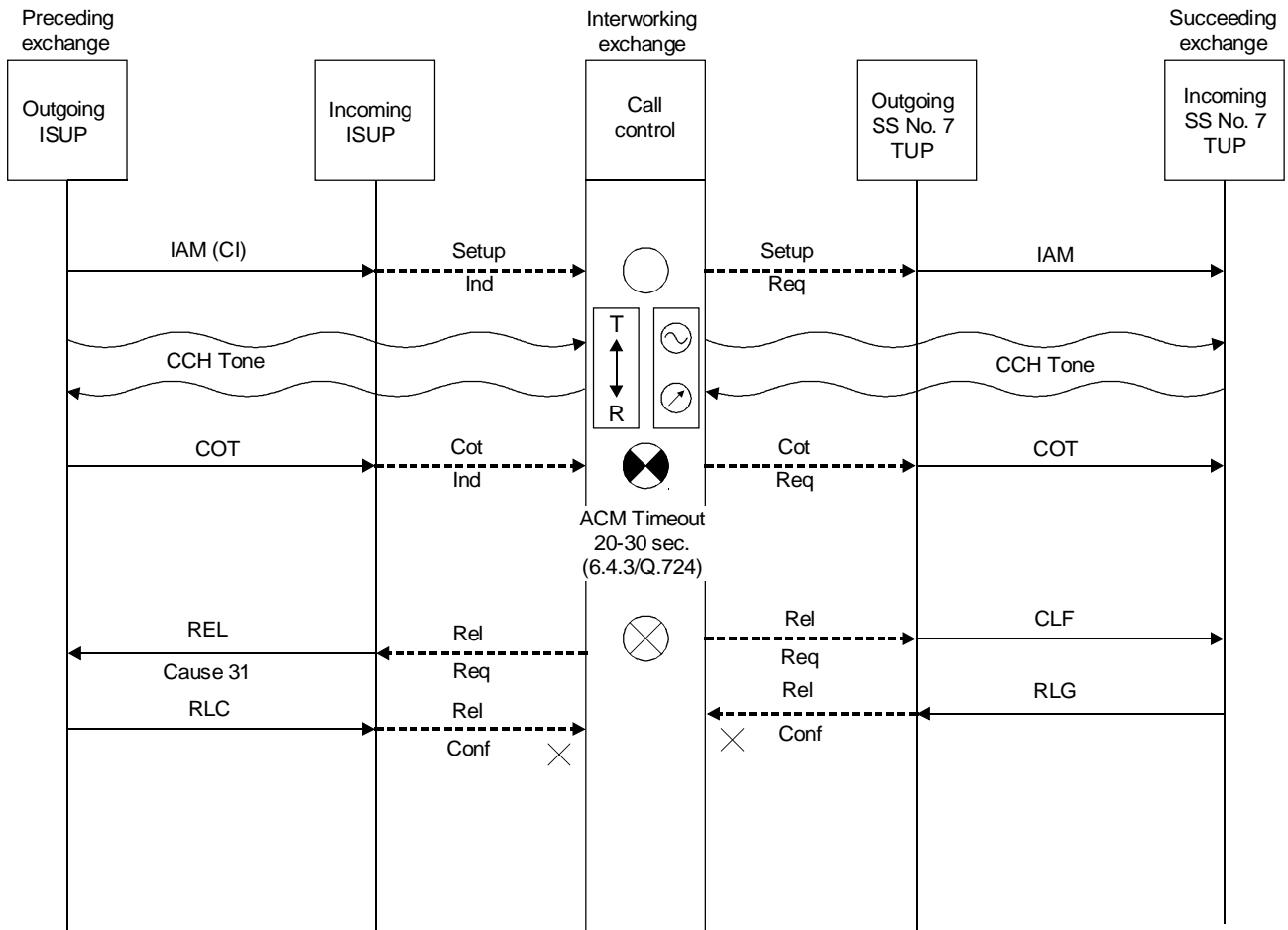
2    CCR is sent to 1-10 s after failure detection.

FIGURE  37/Q.698

**Interworking of Signalling System No. 7 ISUP to No. 7 TUP**
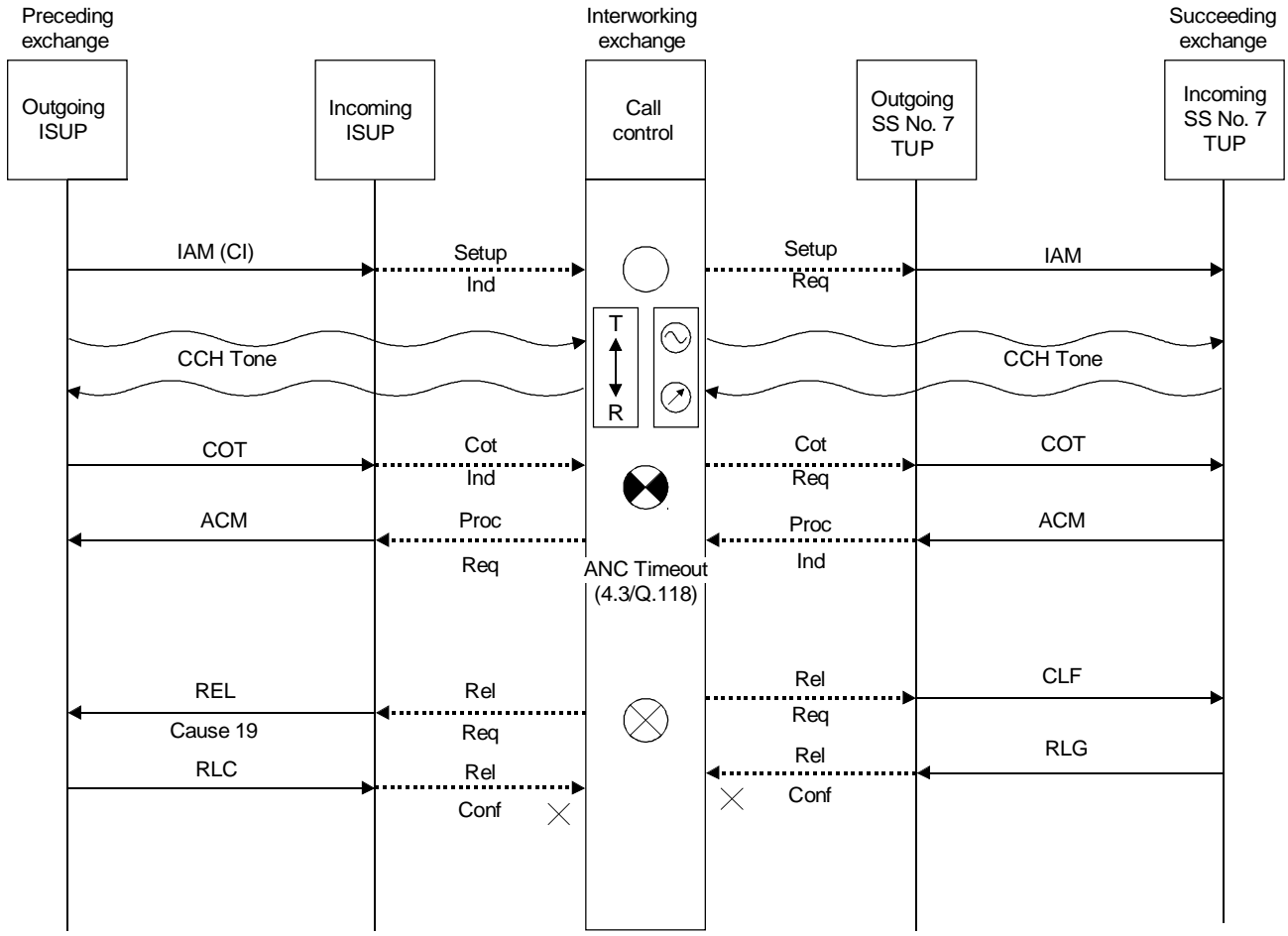**Continuity failure on outgoing TUP circuit**
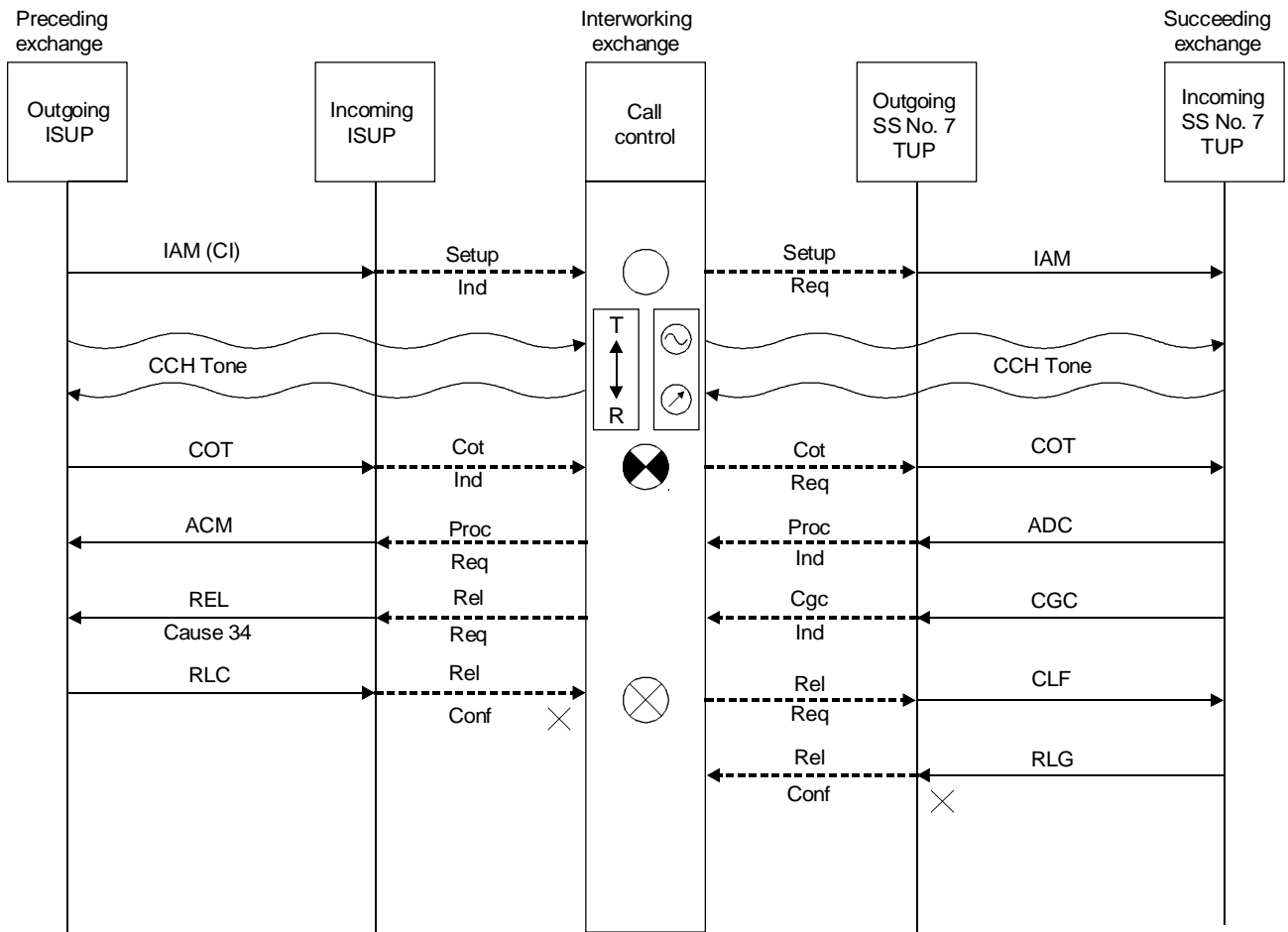
NOTE – Cause 34 = No circuits available.

FIGURE 38/Q.698

**Interworking of Signalling System No. 7 ISUP to No. 7 TUP**
**Congestion signal received after address complete**

NOTE – Cause 127 = Interworking unspecified.

FIGURE 39/Q.698
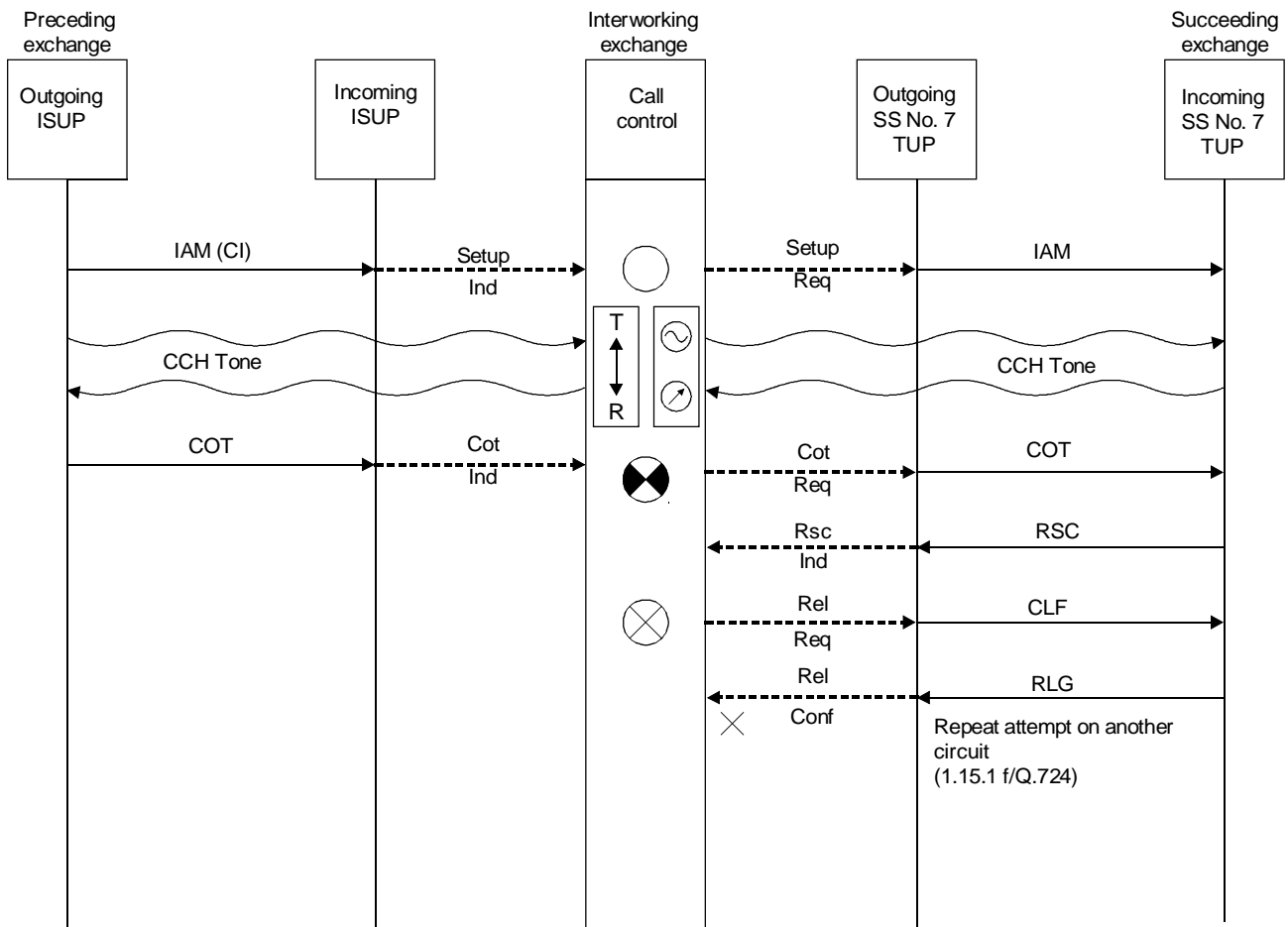
**Interworking of Signalling System No. 7 ISUP to No. 7 TUP**
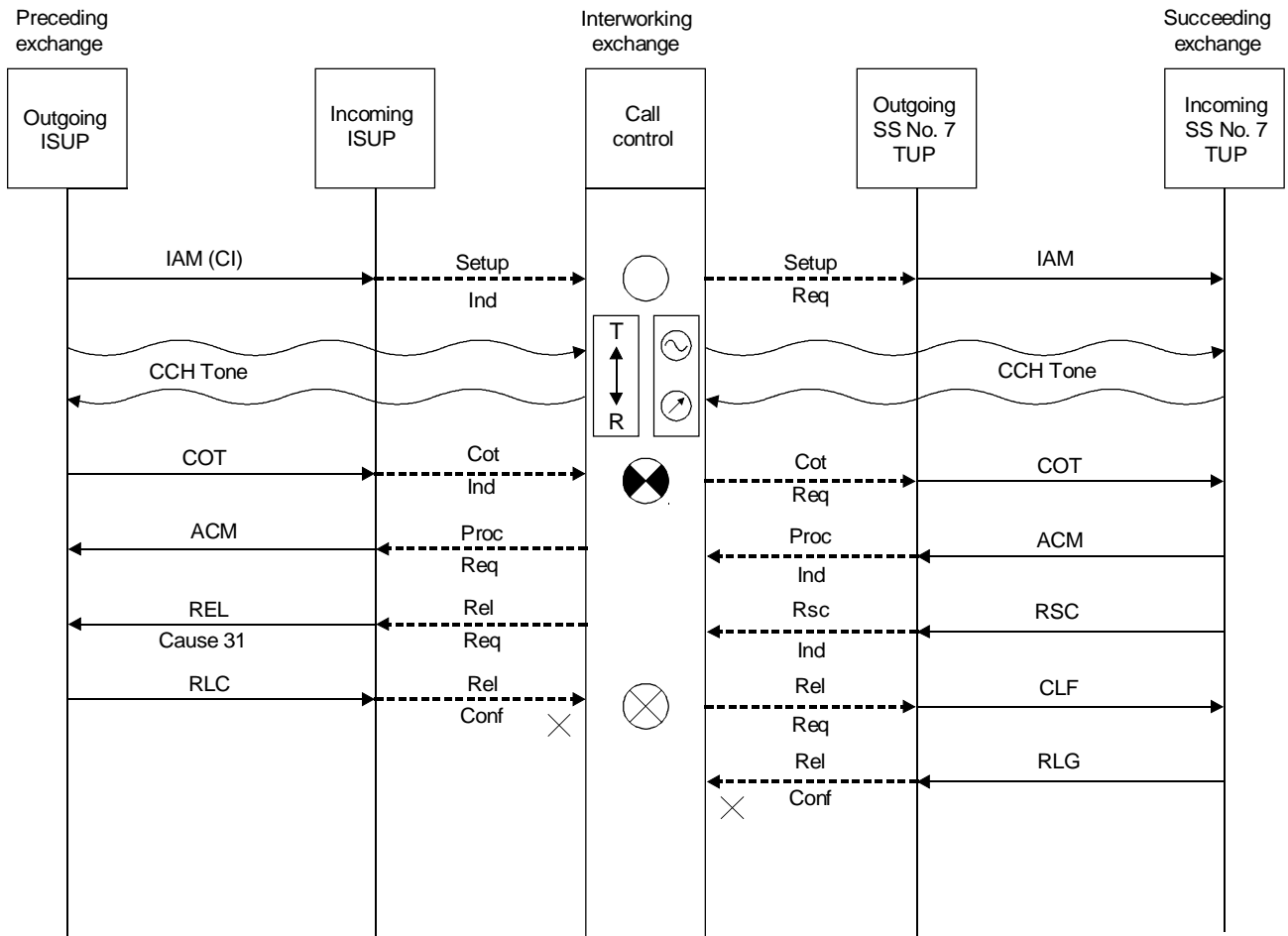**Timeout on address complete message (ACM)**

NOTE – Cause 19 = No answer from user.

FIGURE 40/Q.698

**Interworking of Signalling System No. 7 ISUP to No. 7 TUP**
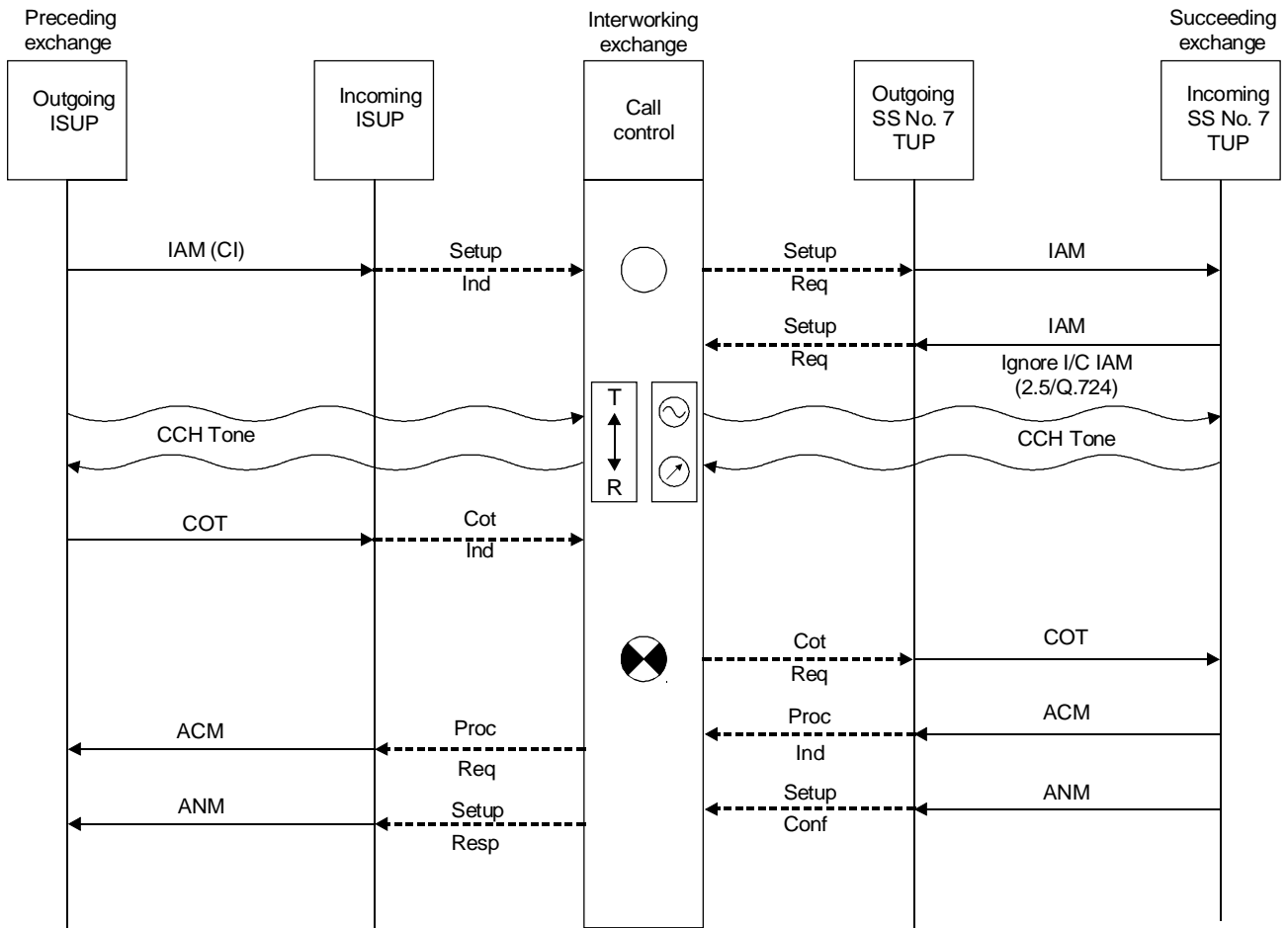**Timeout on answer message**

FIGURE 41/Q.698

**Interworking of Signalling System No. 7 ISUP to No. 7 TUP**
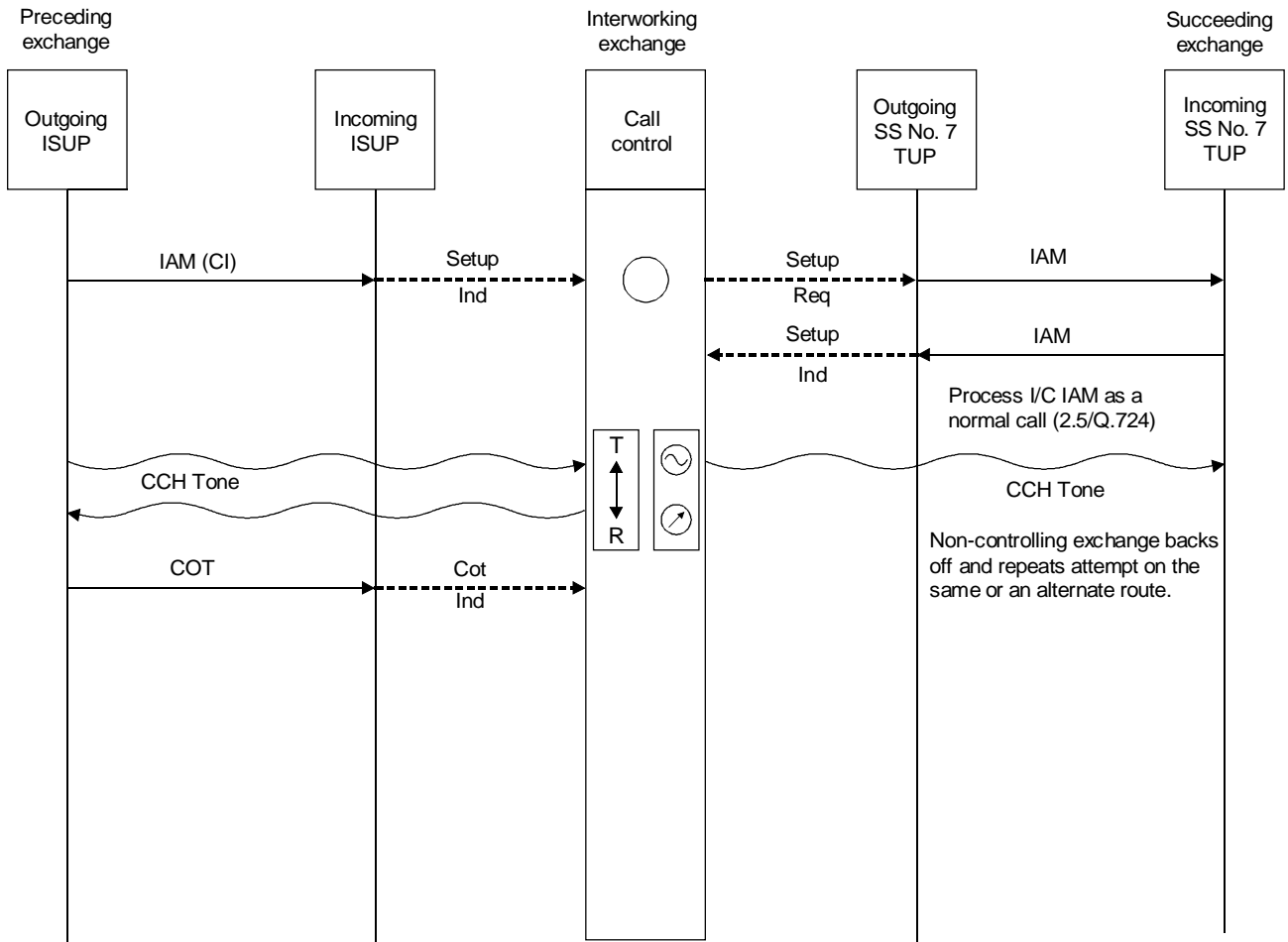**Reset circuit received before ACM**

NOTE – Cause 31 = Normal unspecified.

FIGURE 42/Q.698

**Interworking of Signalling System No. 7 ISUP to No. 7 TUP**
**Reset circuit received after ACM**

FIGURE  43/Q.698

**Interworking of Signalling System No. 7 ISUP to No. 7 TUP**
**Dual seizure (controlling exchange)**

Preceding exchange — Outgoing ISUP

Incoming ISUP

Interworking exchange — Call control

Outgoing SS No. 7 TUP

Succeeding exchange — Incoming SS No. 7 TUP

IAM (CI)

Setup Ind

Setup Req

IAM

Setup Ind

IAM

Process I/C IAM as a normal call (2.5/Q.724)

CCH Tone

CCH Tone

Non-controlling exchange backs off and repeats attempt on the same or an alternate route.

COT

Cot Ind

T1142100-92/d45

FIGURE 44/Q.698

**Interworking of Signalling System No. 7 ISUP to No. 7 TUP**
**Dual seizure (non-controlling exchange)**