INTERNATIONAL TELECOMMUNICATION UNION

ITU-T Q.1112

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(03/93)

INTERWORKING WITH SATELLITE MOBILE SYSTEMS

PROCEDURES FOR INTERWORKING BETWEEN INMARSAT STANDARD-B SYSTEM AND THE INTERNATIONAL PUBLIC SWITCHED TELEPHONE NETWORK/ISDN

ITU-T Recommendation Q.1112

(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.1112 was revised by the ITU-T Study Group XI (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

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

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

© ITU 1994

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the ITU.

CONTENTS

		Page
1	Introduction	1
2	Conversion of information elements	1
	2.1 Signalling System No. 7 (TUP)	1
	2.2 Signalling System R2	4
	2.3 Signalling System No. 7 (ISUP)	4
	2.4 Signalling System No. 5	4
3	Incoming INMARSAT procedures (ship-to-shore calls)	8
4	Outgoing INMARSAT procedures (shore-to-ship calls)	19
5	Interworking of incoming INMARSAT to outgoing INMARSAT	25
6	Interworking of Signalling System R2 to outgoing INMARSAT	25
7	Interworking of incoming INMARSAT to Signalling System R2	25
8	Interworking of Signalling System No. 7 TUP to outgoing INMARSAT	32
9	Interworking of incoming INMARSAT to Signalling System No. 7 TUP	32
10	Interworking of Signalling System No. 5 to outgoing INMARSAT	38
11	Interworking of incoming INMARSAT to Signalling System No. 5	38
12	Interworking of Signalling System No. 7 ISUP to outgoing INMARSAT-B	38
13	Interworking of incoming INMARSAT to Signalling System No. 7 ISUP	38

PROCEDURES FOR INTERWORKING BETWEEN INMARSAT STANDARD-B SYSTEM AND THE INTERNATIONAL PUBLIC SWITCHED TELEPHONE NETWORK/ISDN

(Melbourne 1988, modified at Helsinki, 1993)

1 Introduction

This Recommendation presents the detailed procedures for interworking between INMARSAT Standard-B system and signalling systems of the fixed network. For a brief description of INMARSAT Standard-B system, see Appendix I/Q.1111.

2 Conversion of information elements

Tables 1 to 16 give the relationship between signals of the fixed network signalling systems and the INMARSAT Standard-B system.

2.1 Signalling System No. 7 (TUP)

2.1.1 Table 1 gives the relationship between forward signals in Signalling System No. 7 TUP and messages and information elements sent on the radio path in INMARSAT Standard-B signalling system for shore to ship calls, i.e. interworking of Signalling System No. 7 TUP to INMARSAT Standard-B. In the comment column actions taken by the MSSC are indicated, in particular for signals of TUP which have no equivalent message or information element in INMARSAT Standard-B.

Table 2 shows the relationship between messages and information elements in INMARSAT Standard-B signalling system and forward signals in Signalling System No. 7 TUP for ship-to-shore calls, i.e. interworking of INMARSAT Standard-B to Signalling System No. 7 TUP.

The signal numbers for forward signals of Signalling System No. 7 TUP are those given in Table A.5 *bis*/Q.601-Q.608.

2.1.2 Table 3 gives the relationship between messages and information elements in INMARSAT Standard-B signalling system and backward signals in Signalling System No. 7 TUP for shore-to-ship calls, i.e, interworking of Signalling System No. 7 to INMARSAT Standard-B.

Backward signals in Signalling System No. 7 TUP generated by the MSSC for unsuccessful shore-to-ship calls are given in Table 3 *bis*. These signals are not related to any specific message or information element received from the ship earth station.

Table 4 gives the relationship between backward signals in Signalling System No. 7 TUP and messages and information elements in INMARSAT Standard-B signalling system for ship-to-shore calls, i.e. interworking of INMARSAT Standard-B to Signalling System No. 7 TUP. The comments column indicates specific actions taken by the MSSC.

The signal numbers for backward signals of Signalling System No. 7 TUP are those given in Table A.9 *bis*/Q.601-Q.608.

TABLE 1/Q.1112

Conversion of forward signals in Signalling System No. 7 TUP and INMARSAT Standard-B Signalling System shore-to-ship calls

Signalling System No. 7		INMARSAT Standard-B	
Signal No.	Signal name	Message: info element: value	Comments
1	Address signals	Request for call announcement; SES ID, terminal	Sent if SES auth., after 13 or 14 received
2	Nature of address indicator national significant number	–	Interpreted and used by MSSC
3	Nature of address indicator international number	–	Interpreted and used by MSSC
4	Nature of circuit indicator no satellite in connection	–	Ignored by MSSC
5	Nature of circuit indicator one satellite in connection	–	Ignored by MSSC
6	Echo suppressor indicator out-going half-echo suppressor not included	–	MSSC will insert echo control device if needed
7	Echo suppressor indicator out-going half-echo suppressor included	–	Interpreted and used by MSSC
8-12	Calling party's category indicator, language digit	–	–
13	Calling party's category indicator, ordinary calling subscriber	Request for call announcement; priority: routine	–
14	Calling party's category indicator, calling subscriber with priority	Request for call announcement; priority: distress or routine	–
15	Calling party's category indicator, data call	–	Not applicable
16	Clear forward signal	Channel release message	–
17	Forward transfer signal	–	Not applicable
18	Continuity proved	–	Interpreted and used by MSSC
19	Continuity check failure	Channel release message	–
20	Continuity check required on this circuit	–	Interpreted by MSSC
21	Continuity check not required on this circuit	–	Interpreted by MSSC
22	Continuity check performed on previous circuit	–	Interpreted and used by MSSC
23	Service information	–	Interpreted by MSSC
24	General setup message	–	Interpreted by MSSC

TABLE 2/Q.1112

Conversion of forward signals in Signalling System No. 7 TUP and INMARSAT Standard-B Signalling System ship-to-shore calls

INMARSAT Standard-B	Signalling System No. 7	
Message: info element: value	Signal name	Signal No.
Service address message: (reception of complete number)	Address signals: Nature of address indicator	1 2 or 3
Access request message: – priority: routine – service: telephone or 3.1 kHz audio	Calling party's category indicator, ordinary calling subscriber	13
Access request message: – priority: urgency, safety or distress – service: telephone or 3.1 kHz audio	Calling party's category indicator, calling subscriber with priority	14
Channel release message	Clear forward signal	16
Return carrier identifier message	Continuity check performed on previous circuit	22
NOTE – Nature of circuit indicator, one satellite in connection (Signal No. 5) is generated by the MSSC.		

TABLE 3/Q.1112

Conversion of backward signals in Signalling System No. 7 TUP and INMARSAT Standard-B Signalling System shore-to-ship calls

INMARSAT Standard-B	Signalling System No. 7	
Message: info element: value	Signal name	Signal No.
Return carrier identifier message	AFC: Address complete subscriber free, charge	4
Connect message	ANC: Answer charge	16
Channel release message	CLB: Clear back	19
Call failure indication message: Cause code – 1 8 1 1 – 1 8 A 1 – 1 8 5 1 – Others	 SGB: Subscriber busy UNN: Unallocated number NNC: National network congestion CFL: Call failure OR SST: Send special info tone	 12 11 9 15 OR 14

TABLE 3 *bis*/Q.1112

Unsuccessful call events and backward signals in Signalling System No. 7 TUP shore-to-ship calls

INMARSAT Standard-B	Signalling System No. 7	
Event in INMARSAT system	Signal name	Signal No.
Congestion in MSSC	SEC: Switching equipment congestion	7
Continuity test failure	LOS: Line out of service	13
SES barred for incoming access	ACB: Access barred signal	21
SES unauthorized	ACB: Access barred signal	21

2.2 Signalling System R2

2.2.1 Tables 5 and 6 are similar to Tables 1 and 2, respectively, and apply to forward signals in Signalling System R2.

The signal numbers for forward signals of Signalling System R2 are those of Table A.7/Q.601-Q.608.

2.2.2 Tables 7, 7 *bis* and 8 are similar to Tables 3, 3 *bis* and 4, respectively, and appy to backward signals in Signalling System R2.

The signal numbers for backward signals in Signalling System R2 are those of Table A.11/Q.601-Q.608.

2.3 Signalling System No. 7 (ISUP)

The relationship between forward and backward signals of Signalling System No. 7 ISUP and messages and information elements of INMARSAT Standard-B signalling system is for further study.

Tables 9 through 12 are reserved for this purpose.

2.4 Signalling System No. 5

2.4.1 Tables 13 and 14 are similar to Tables 1 and 2, respectively, and apply to forward signals in Signalling System No. 5.

The signal numbers for forward signals in Signalling System No. 5 are those given in Table A.4/Q.601-Q.608.

TABLE 4/Q.1112

Conversion of backward signals in Signalling System No. 7 TUP and INMARSAT Standard-B Signalling System ship-to-shore calls

Signalling System No. 7		INMARSAT Standard-B	
Signal No.	Signal name	Message: info element: value	Comments
1	ADC: Address complete, charge	_	Connect through circuit
2	ADN: Address complete, no charge	_	No-charge information used by MSSC only
3	ADX: Address complete, coinbox	_	Connect through circuit
4	AFC: Address complete, subscriber free, charge	_	Connect through circuit
5	AFN: Address complete, subscriber free, no charge	–	No-charge information used by MSSC only
6	AFX: Address complete, subscriber free, coinbox	_	Connect through circuit
7	SEC: Switching equipment congestion	Call result message: 1F 61	_
8	CGC: Circuit-group congestion	Call result message: 1F 61	–
9	NNC: National network congestion	Call result message: 1F 61	_
10	ADI: Address incomplete	–	For further definition
11	UNN: Unallocated number	–	For further definition
12	SGB: Subscriber busy	Call result message: 1F 11	–
13	LOS: Line out of service	Call result message: 1F 61	–
14	SST: Send special information tone	Call result message: 15 B1	_
15	CFL: Call failure	Call result message: 15 B1	–
16	ANC: Answer, charge	Connect message	–
17	ANN: Answer, no charge	Connect message	No-charge information used by MSSC only
18	RAN: Reanswer	_	Clearback supervision done by MSSC
19	CLB: Clearback	Channel release	Clearback supervision done by MSSC
20	GRQ: General request message	–	Interpreted by MSSC
21	Call unsuccessful access barred	–	For further definition
22	DPN: Call unsuccessful digital path not provided	_	For further definition

TABLE 5/Q.1112

Conversion of forward signals in Signalling System R2 and INMARSAT Standard-B Signalling System shore-to-ship calls

Signalling System R2		INMARSAT Standard-B	
Signal No.	Signal name	Message: info element: value	Comments
1	Address signals	Request for call announcement: SES ID, terminal number	Sent if SES auth., after 12, 14, and 15 received. Ignored by MSSC
2-7	Language digit, discriminating digit	–	Ignored by MSSC
8	I-11: Country code indicator, outgoing half-echo suppressor required	–	MSSC will suppress the country code and insert echo control device if needed
9	I-12: Country code indicator, no echo suppressor required	–	The MSSC will suppress the country code
10	I-14: Country code indicator, incoming half-echo suppressor required	–	The MSSC will suppress the country code
11	I-14: Incoming half-echo suppressor required	–	Interpreted by MSSC
12	II-7: Calling party's category, subscriber or operation without forward transfer facility	Request for call announcement: – priority: routine	–
13	II-8: Calling party's category, data transmission control	–	Not applicable
14	II-9: Calling party's category, subscriber with priority	Request for call announcement: – priority: distress or routine	–
15	II-10: Calling party's category, operator with forward transfer facility	Request for call announcement: – priority: distress or routine	–
16	Clear forward signal	Channel release message	–
17	Forward transfer signal	–	Not applicable
18	First digit I-1, . . . , I-10	–	Interpreted and used by MSSC
19	Reply to A-14	–	Not applicable
20-21	Reply to A-13	–	Not applicable

TABLE 6/Q.1112

Conversion of forward signals in Signalling System R2 and INMARSAT Standard-B Signalling System ship-to-shore calls

INMARSAT Standard-B	Signalling System R2	
Message: info element: value	Signal name	Signal No.
Service address message: (complete set)	Address signals: Country code indicator	1 10
Access request message: – priority: routine – service: telephone or 3.1 kHz audio	II-7: Calling party's category, subscriber or operator without forward transfer facility	12
Access request message: – priority: distress – service: telephone or 3.1 kHz audio	II-9: Calling party's category, subscriber with priority	14
Channel release message	Clear forward signal	16
Return carrier identifier message	Not applicable	–

TABLE 7/Q.1112

Conversion of backward signals in Signalling System R2 and INMARSAT Standard-B Signalling System shore-to-ship calls

INMARSAT Standard-B	Signalling System R2	
Message: info element: value	Signal name	Signal No.
Return carrier identifier message	Address complete, subscriber free, charge	13
Connect message	Answer, subscriber free	11
Channel release message	Clear back signal	12
Call failure indication message: cause code: – 1 8 1 1 – 1 8 5 1 – 1 8 A 1 – Others	 Subscriber line busy Congestion on the national network Unallocated number International, send special info tone	 5 1 10 14

TABLE 7 *bis*/Q.1112

Unsuccessful call events and backward signals in Signalling System R2 shore-to-ship calls

INMARSAT Standard-B	Signalling System R2	
Event in INMARSAT system	Signal name	Signal No.
Congestion in MSSC	A-4: Congestion on the national network or B-4: Congestion	1 or 6
Unallocated SES number	B-5: Unallocated number	7
Continuity test failure (no return carrier identifier)	B-8: Subscriber line out of order	10 Out of order
SES barred for incoming access	B-2: Send special information tone	4
SES unauthorized	B-2: Send special information tone	4

2.4.2 Tables 15, 15 *bis* and 16 are similar to Tables 3, 3 *bis* and 4, respectively, and apply to backward signals in Signalling System No. 5.

The signal numbers for backward signals in Signalling System No. 5 are those given in Table A.8/Q.601-Q.608.

3 Incoming INMARSAT procedures (ship-to-shore calls)

Figure 1 contains the procedures for the incoming INMARSAT Standard-B system.

This description only includes those aspects of the INMARSAT Standard-B system which have to be implemented for interworking purposes. Internal procedures, such as those required for setting up/clearing the satellite channel, are not shown. This also applies to pre-emption procedures for assigning channels to distress calls.

The following details should be noted.

3.1 A call is initiated by a ship earth station (SES), by means of an "access request" message. The coast earth station (CES) begins to set up a channel for the voice communication, upon receipt of this message. The call may be aborted at this point, if the requested service is not available, a satellite circuit is not available, or the calling SES is not authorized. The SES is informed of the call abortion by means of a "call result" message.

3.2 The called address and other information required for call set-up is contained in the service address message received from the ship.

Digit analysis (SPITE 12) commences when the service address has been received. This includes also check of address validity, and translation of prefixes to the appropriate destination number.

Unsuccessful events, shown as SPITEs 13, 15, 16, 17, 18 and 19, are indicated to the ship earth station by call result message with the cause field set as shown in Table 17.

The calling party's category indications used are related to information elements of the request message as shown in Table 18.

TABLE 8/Q.1112

Conversion of backward signals in Signalling System R2 and INMARSAT Standard-B Signalling System ship-to-shore calls

Signalling System R2		INMARSAT Standard-B	
Signal No.	Signal name	Message: info element: value	Comments
1	A-4: Congestion on the national network	Call failure indication: Cause code: 1F 61	–
2	A-6: Address complete charge, set up speech conditions	–	Connect through circuit
3	A-15: Congestion in an international exchange or at its output	Call failure indication: Cause code: 1F 61	–
4	B-2: Send special information tone	Call failure indication: Cause code: 15 B1	–
5	B-3: Subscriber line busy	Call failure indication: Cause code: 1F 11	–
6	B-4: Congestion	Call failure indication: Cause code: 1F 61	–
7	B-5: Unallocated number	–	For further definition
8	B-6: Subscriber line free, charge	–	Connect through circuit
9	B-7: Subscriber line free, no charge	–	No-charge information used by MSSC only
10	B-8: Subscriber line out of order	Call failure indication: Cause code: 1F 61	–
11	Answer signal	Connect message	Clearback supervision by MSSC
12	Clear back signal	Channel release	–
13	B-1: International, subscriber line free, charge	–	Connect through circuit
14	B-9, B-10: International, send special information tone	Call failure indication: Cause code: 15 B1	–
15	B-11 to B-15	Call failure indication: Cause code: 1F 61	–

TABLE 9/Q.1112

Conversion of forward signals in Signalling System No. 7 ISUP and INMARSAT Standard-B Signalling System shore-to-ship calls

For further study.

TABLE 10/Q.1112

Conversion of forward signals in Signalling System No. 7 ISUP and INMARSAT Standard-B Signalling System ship-to-shore calls

For further study.

TABLE 11/Q.1112

Conversion of forward signals in Signalling System No. 7 ISUP and INMARSAT Standard-B Signalling System shore-to-ship calls

For further study.

TABLE 11 *bis*/Q.1112

Unsuccessful call events and backward signals in Signalling System No. 7 ISUP and INMARSAT Standard-B Signalling System shore-to-ship calls

For further study.

TABLE 12/Q.1112

Conversion of backward signals in Signalling System No. 7 ISUP and INMARSAT Standard-B Signalling System ship-to-shore calls

For further study.

TABLE 13/Q.1112

Conversion of forward signals in Signalling System No. 5 and INMARSAT Standard-B Signalling System shore-to-ship calls

Signalling System No. 5		INMARSAT Standard-B	
Signal No.	Signal name	Message: info element: value	Comments
1	Address signal	Call announcement message: – SES ID, terminal number	–
2-16	Language digit	–	Interpreted by MSSC
7	Discriminating digit 0	Call announcement message: – service telephone	–
8	Start of pulsing KP1	–	Interpreted by MSSC
9	Start of pulsing KP2	–	Interpreted by MSSC
10	Clear forward	Channel release message	–
11	Forward transfer	–	Not applicable

TABLE 14/Q.1112

Conversion of forward signals in Signalling System No. 5 and INMARSAT Standard-B Signalling System ship-to-shore calls

INMARSAT Standard-B	Signalling System No. 5	
Message: info element: value	Signal name	Signal No.
Address Message (reception of complete set)	Address signals start of pulsing KP1 or start of pulsing KP2	1 8 9
Return carrier identifier message	Not applicable	–
Channel release message	Clear forward	10
Access request message: – priority: routine – service: telephone or 3.1 kHz audio	Discriminating digit 0	7
Access request message: – priority: distress – service: telephone or 3.1 kHz audio	Discriminating digit 0	7

TABLE 15/Q.1112

Conversion of backward signals in Signalling System No. 5 and INMARSAT Standard-B Signalling System shore-to-ship calls

INMARSAT Standard-B	Signalling System No. 5	
Message: info element: value	Signal name	Signal No.
Return carrier identifier message	Inform that ST has been sent	5
Connect message	Answer signal	2
Channel release message	Clear back	3
Call failure indication: Cause code – 1 8 1 1 – Others	 Busy flash signal Busy flash signal OR Information tone (Note)	 1 1 –
NOTE – May include appropriate recorded announcement.		

TABLE 15 *bis*/Q.1112

Unsuccessful call events and backward signals in Signalling System No. 5 shore-to-ship calls

Events in INMARSAT System	Signalling System No. 5	
Message: info element: value	Signal name	Signal No.
Congestion in MSSC	Busy flash	1
Continuity test failure (no return carrier identifier)	Information tone (Note)	–
SES barred	Information tone (Note)	–
SES unauthorised	Information tone (Note)	–
NOTE – May include appropriate recorded announcement.		

TABLE 16/Q.1112

Conversion of backward signals in Signalling System No. 5 and INMARSAT Standard-B Signalling System ship-to-shore calls

Signalling System No. 5		INMARSAT Standard-B	
Signal No.	Signal name	Message: info element: value	Comments
1	Busy flash	Call failure indication: Cause code: 1F 61	
2	Answer signal	Connect	
3	Clear back	Channel release message	
4	Proceed to send	–	
5	Inform that ST has been sent	–	

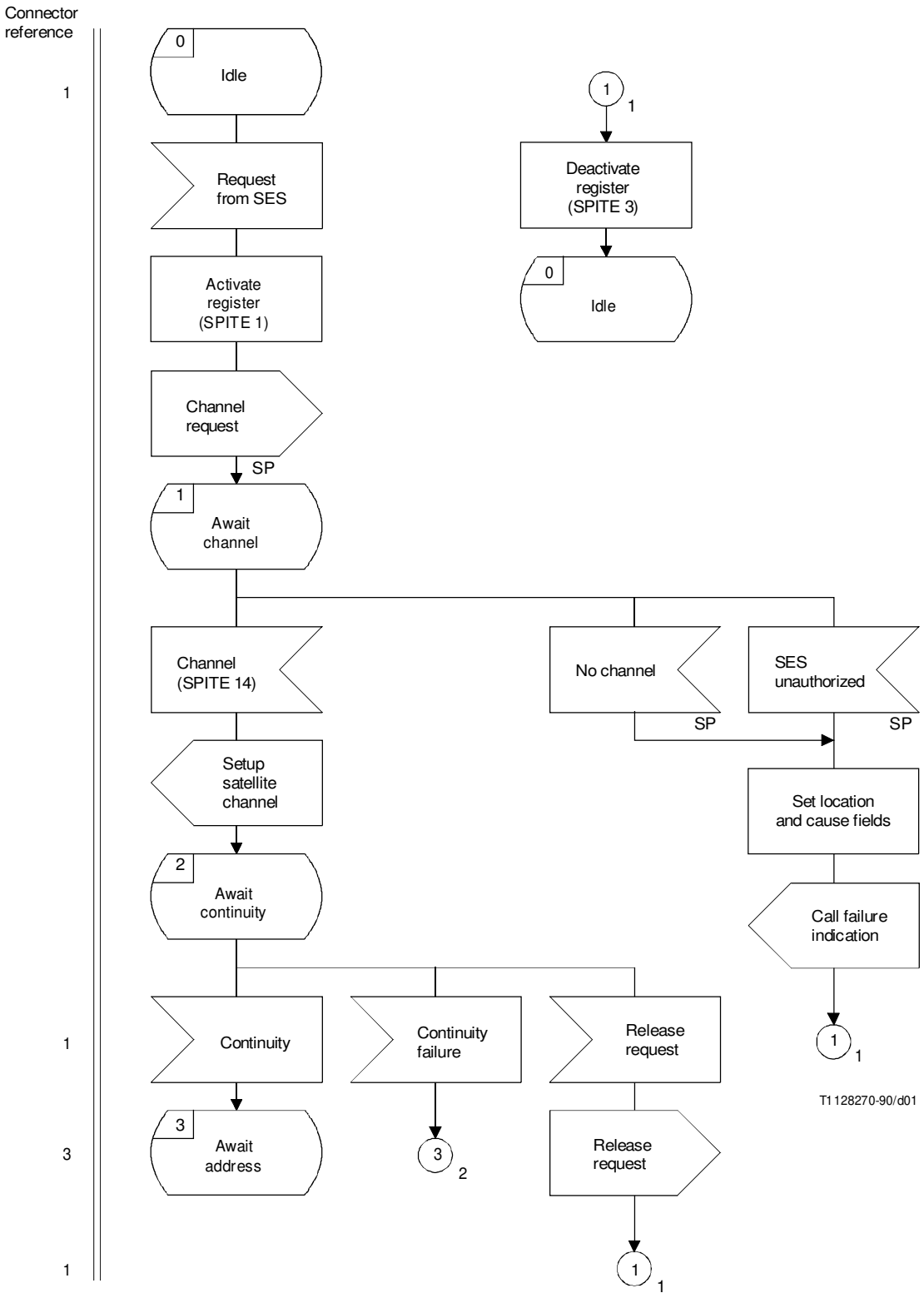


FIGURE 1/Q.1112 (sheet 1 of 5)

Logic procedures for incoming INMARSAT Standard-B signalling (ship-to-shore calls)

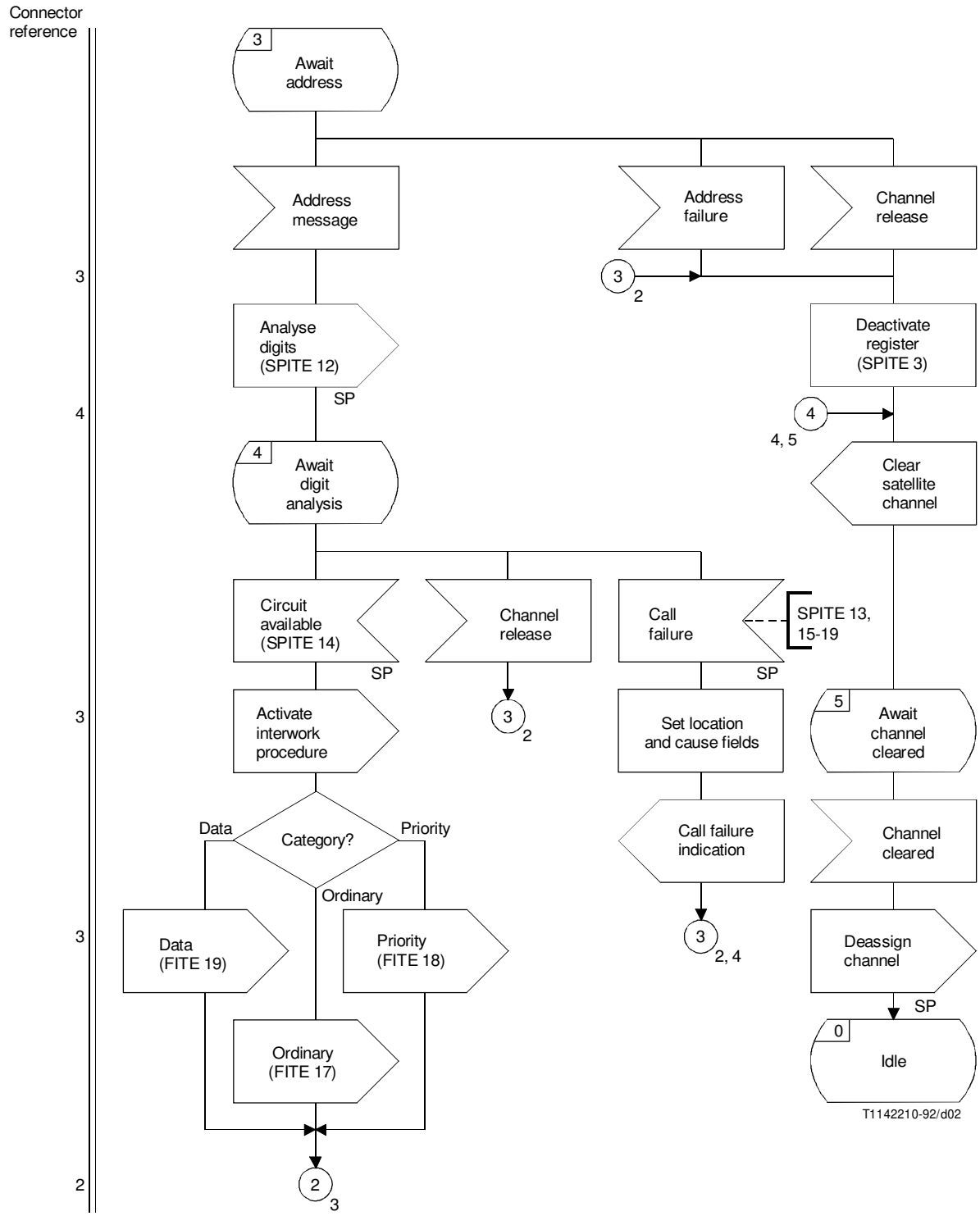


FIGURE 1/Q.1112 (sheet 2 of 5)

Logic procedures for incoming INMARSAT Standard-B signalling (ship-to-shore calls)

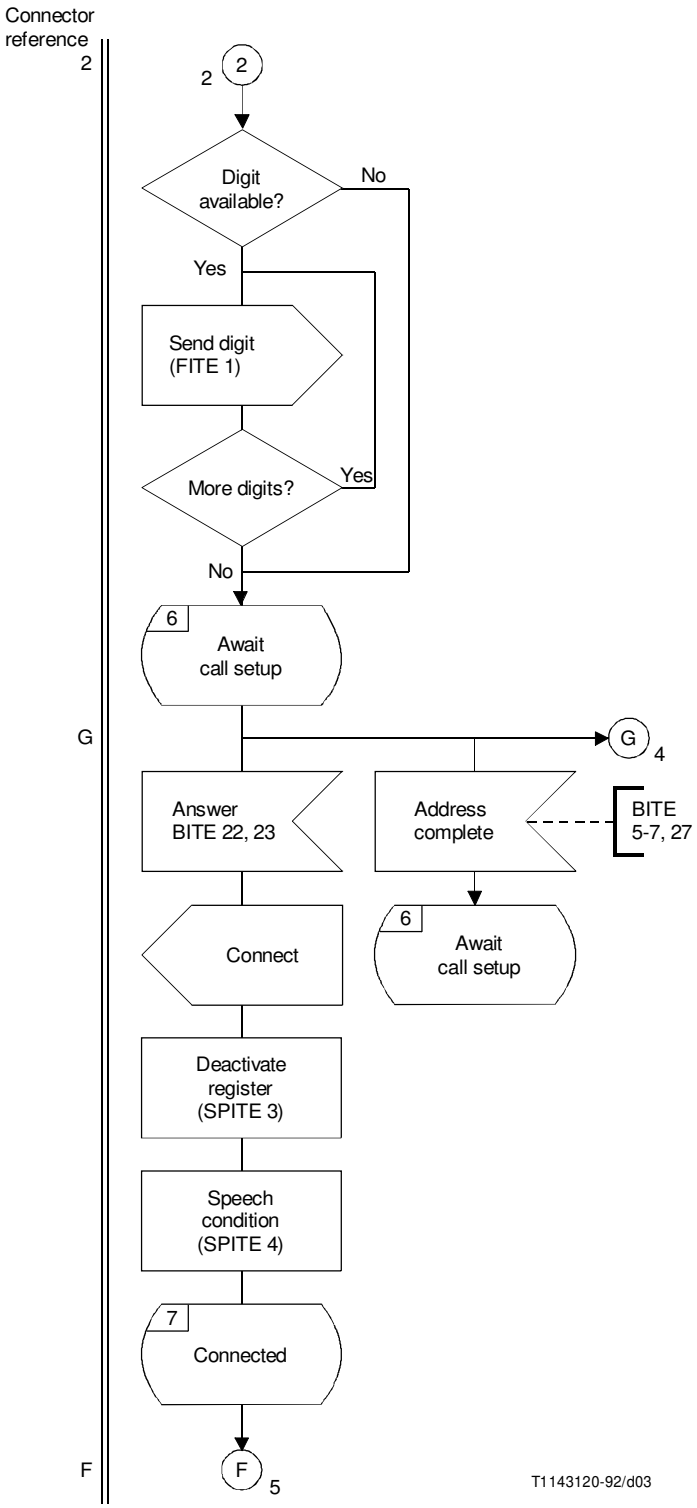


FIGURE 1/Q.1112 (sheet 3 of 5)

Logic procedures for incoming INMARSAT Standard-B signalling (ship-to-shore calls)

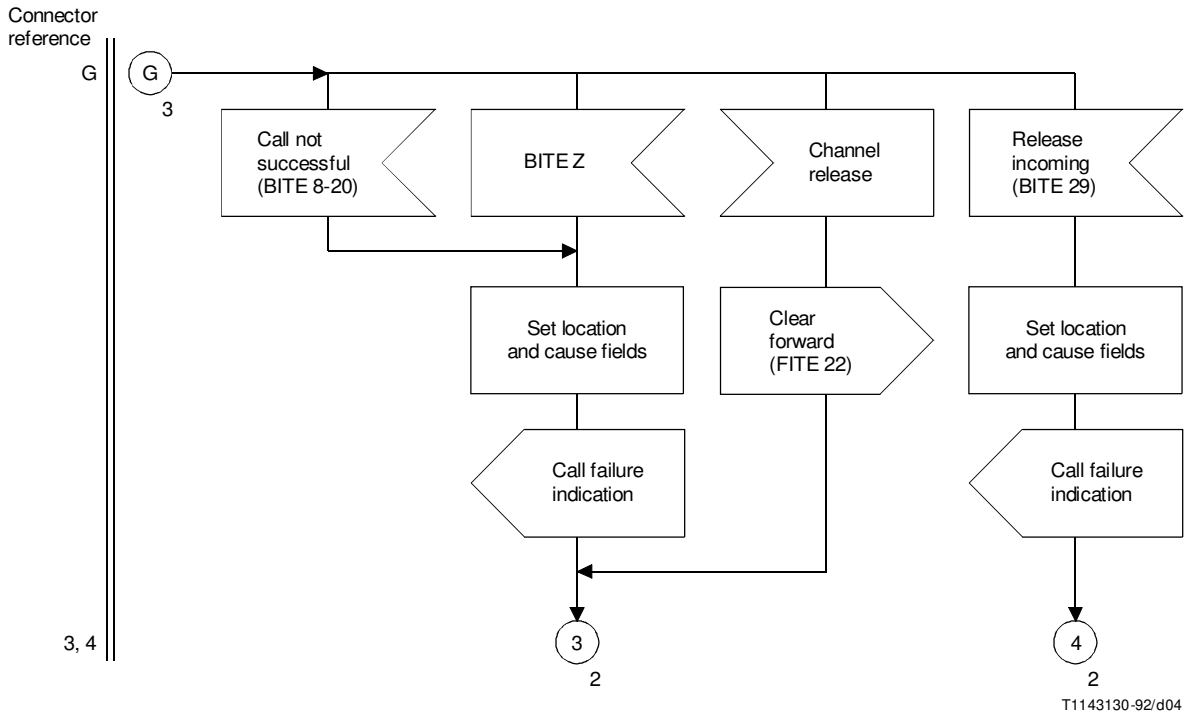


FIGURE 1/Q.1112 (sheet 4 of 5)

Logic procedures for incoming INMARSAT Standard-B signalling (ship-to-shore calls)

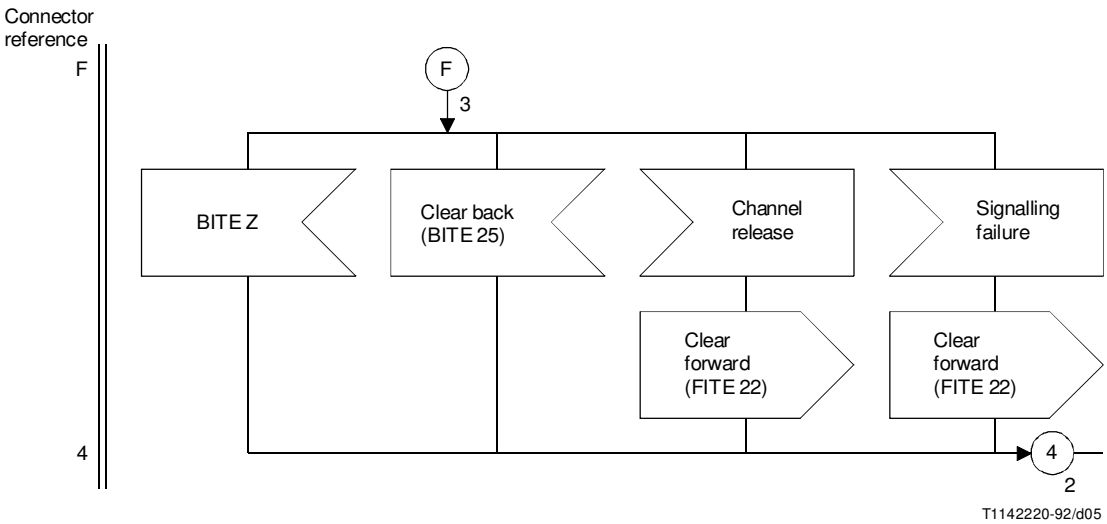


FIGURE 1/Q.1112 (sheet 5 of 5)

Logic procedures for incoming INMARSAT Standard-B signalling (ship-to-shore calls)

TABLE 17/Q.1112

Relationship between result of digit analysis and cause field in call result messages

SPITE	Cause field
13: Digit analysis	Local network, invalid number format
15: Unallocated number	Local network, unassigned number
16: Unprovided routing	Local network, no route to destination
17: Barred routing	Local network, call rejected
18: Switching equipment congestion	Local network, switching equipment congestion
19: Circuit group congestion	Local network, no circuit available

TABLE 18/Q.1112

Calling Party's category indications used for calls in INMARSAT Standard-B Signalling System

INMARSAT information elements	Calling party's category FITE
Priority: routine Service: telephone or 3.1 kHz audio	17: Subscriber, ordinary call
Priority: urgency, safety or distress Service: telephone or 3.1 kHz audio	18: Subscriber, call with priority

3.3 The interworking procedure is activated when continuity of the satellite circuit has been established. If there is no outgoing circuit available in the MSSC at that time, the satellite circuit is cleared by a call result message with the cause field set to "local network, no circuit available".

3.4 Upon receipt of an address complete indication (BITE 27) or an address complete, subscriber free signal (BITEs 5, 6 or 7) the circuit is through-connected in the MSSC in order to allow supervisory tones to be passed to the ship earth station.

3.5 For unsuccessful call set-up one of the following BITEs may be received from the interworking procedure: BITEs 9 through 17, 19 and 20. The corresponding cause indicated in the call result message sent to the ship earth station should be as shown in Table 19.

TABLE 19/Q.1112

Relationship between unsuccessful call BITEs and cause field in call result messages

BITE	Cause field
9: Switching equipment congestion	International network, switching equipment congestion
10: Circuit group congestion	International network, no channel available
11: Switching equipment congestion or circuit group congestion	International network, switching equipment congestion
12: National network congestion	Remote public network, switching equipment congestion
13: Address complete, national network congestion	Remote public network, switching equipment congestion
14: Address incomplete	Remote public network, invalid number format
15: Unallocated number	Remote public network, unassigned number
16: Address complete, subscriber busy	Remote public network, user busy
17: Address complete, line out of service	Remote public network, destination out of service
19: Call failure	International network, unspecified
20: Send special information tone	International network, unspecified
NOTE – See also Tables 4, 8 and 16.	

3.6 The connect message is sent when an answer signal is received.

3.7 Clear back from the fixed network is not immediately relayed to the ship earth station. However, clear-back supervision is done by the interworking procedure.

Normal clearing takes place when a channel release signal is received from the ship earth station or a clear-back indication (BITE 25) is received from the interworking procedure. BITE 25 is generated when the timer defined in 4.3.2/Q.118 expires, (see the various interworking procedures defined below).

3.8 Additional procedures required for interworking with ISUP are for further study.

4 Outgoing INMARSAT procedures (shore-to-ship calls)

Figure 2 contains the procedures for the outgoing INMARSAT Standard-B Signalling System.

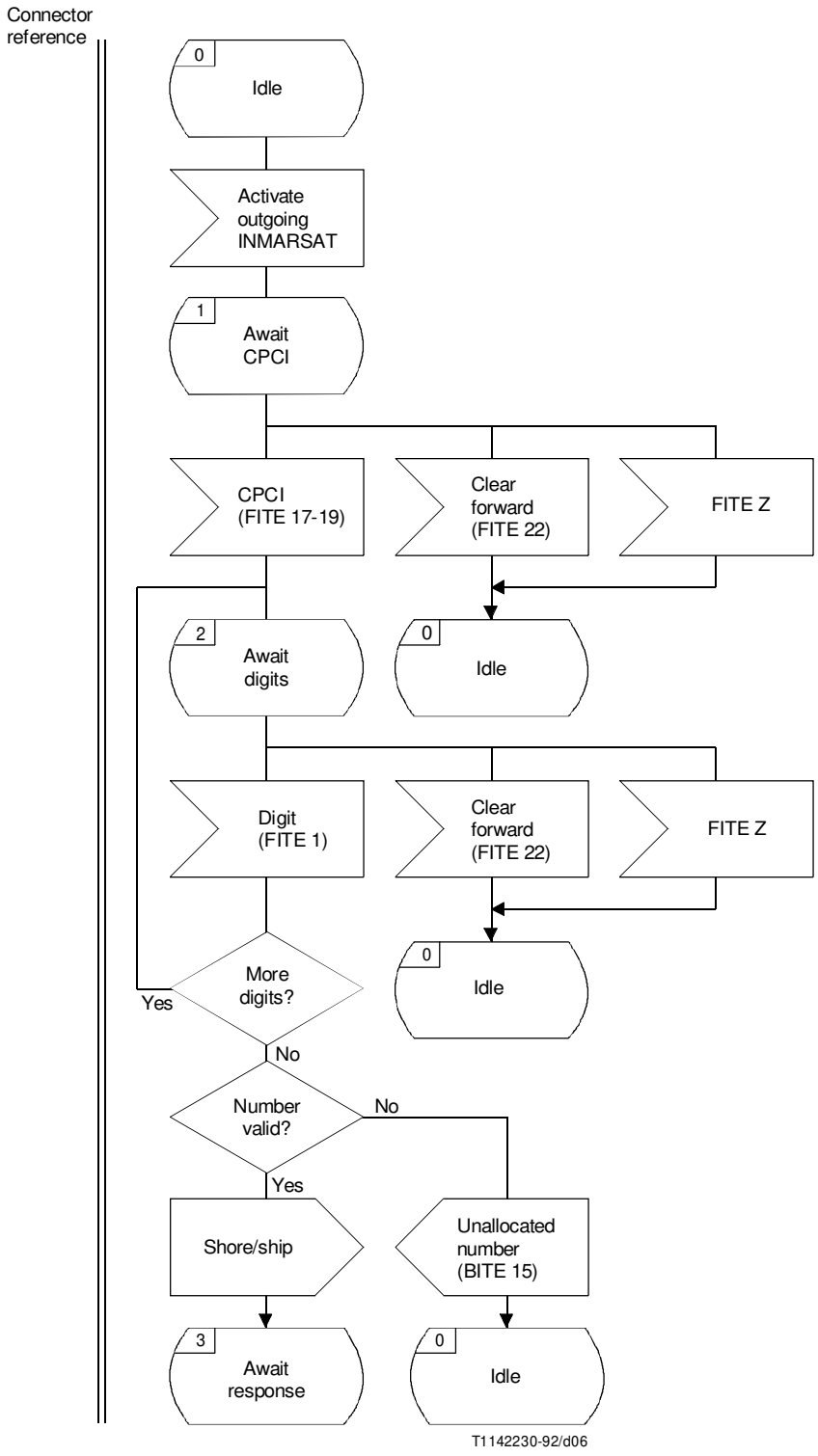


FIGURE 2/Q.1112 (sheet 1 of 4)

Logic procedures for outgoing INMARSAT Standard-B signalling (shore to ship calls)

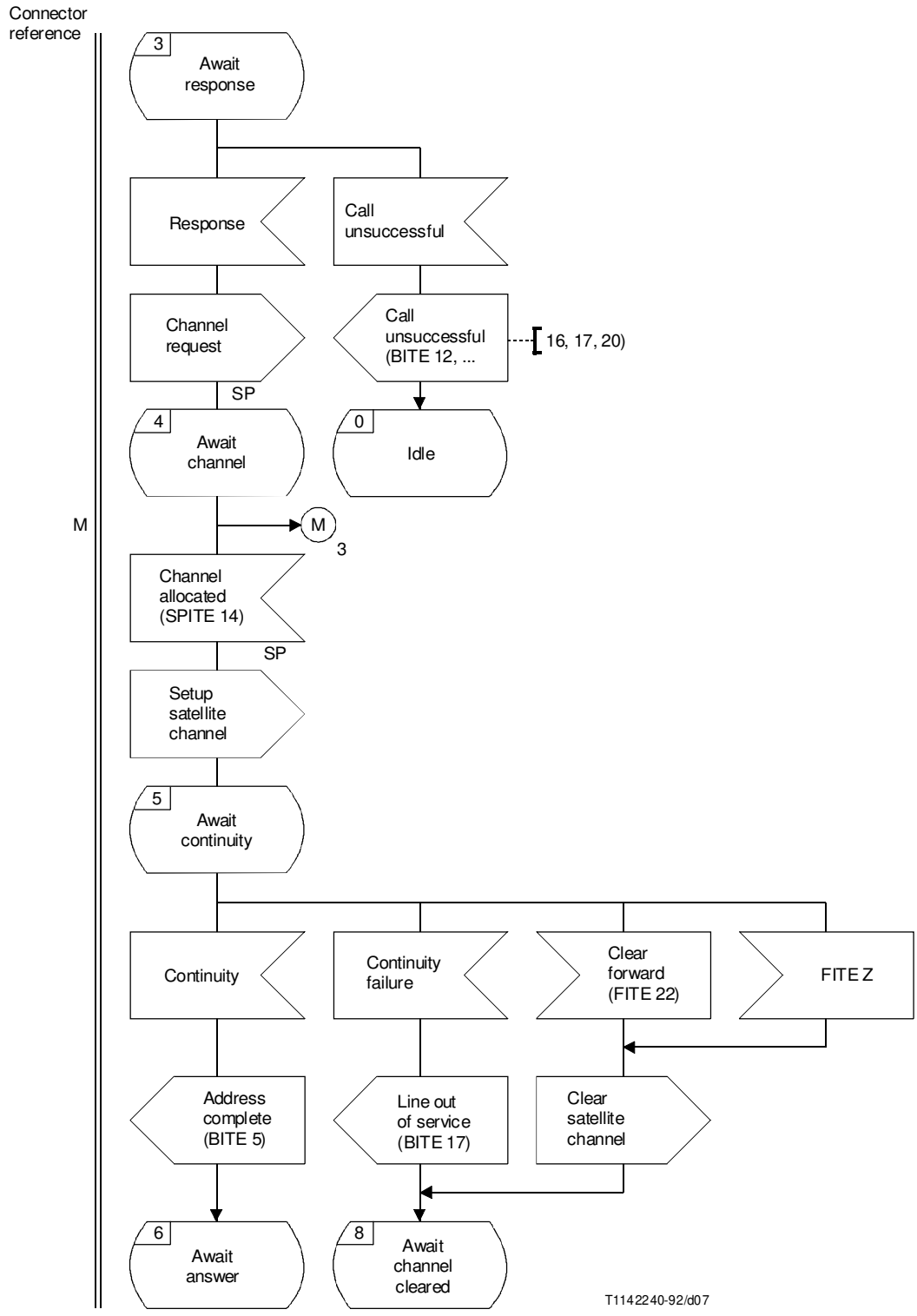


FIGURE 2/Q.1112 (sheet 2 of 4)

Logic procedures for outgoing INMARSAT Standard-B signalling (shore to ship calls)

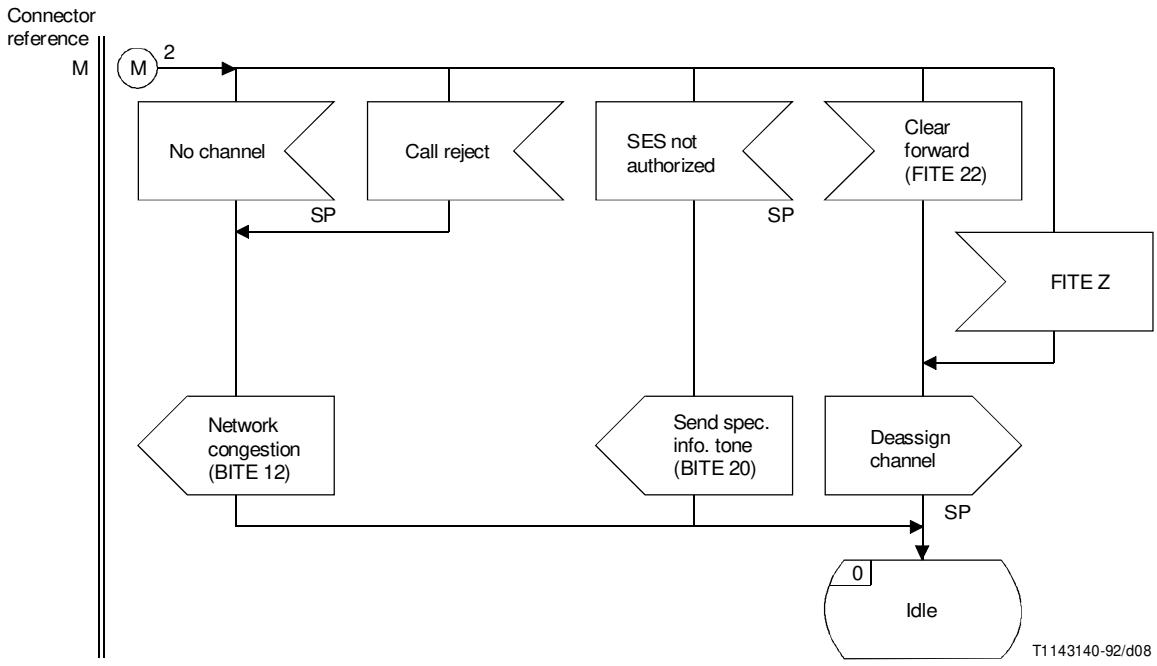


FIGURE 2/Q.1112 (sheet 3 of 4)

Logic procedures for outgoing INMARSAT Standard-B signalling (shore to ship calls)

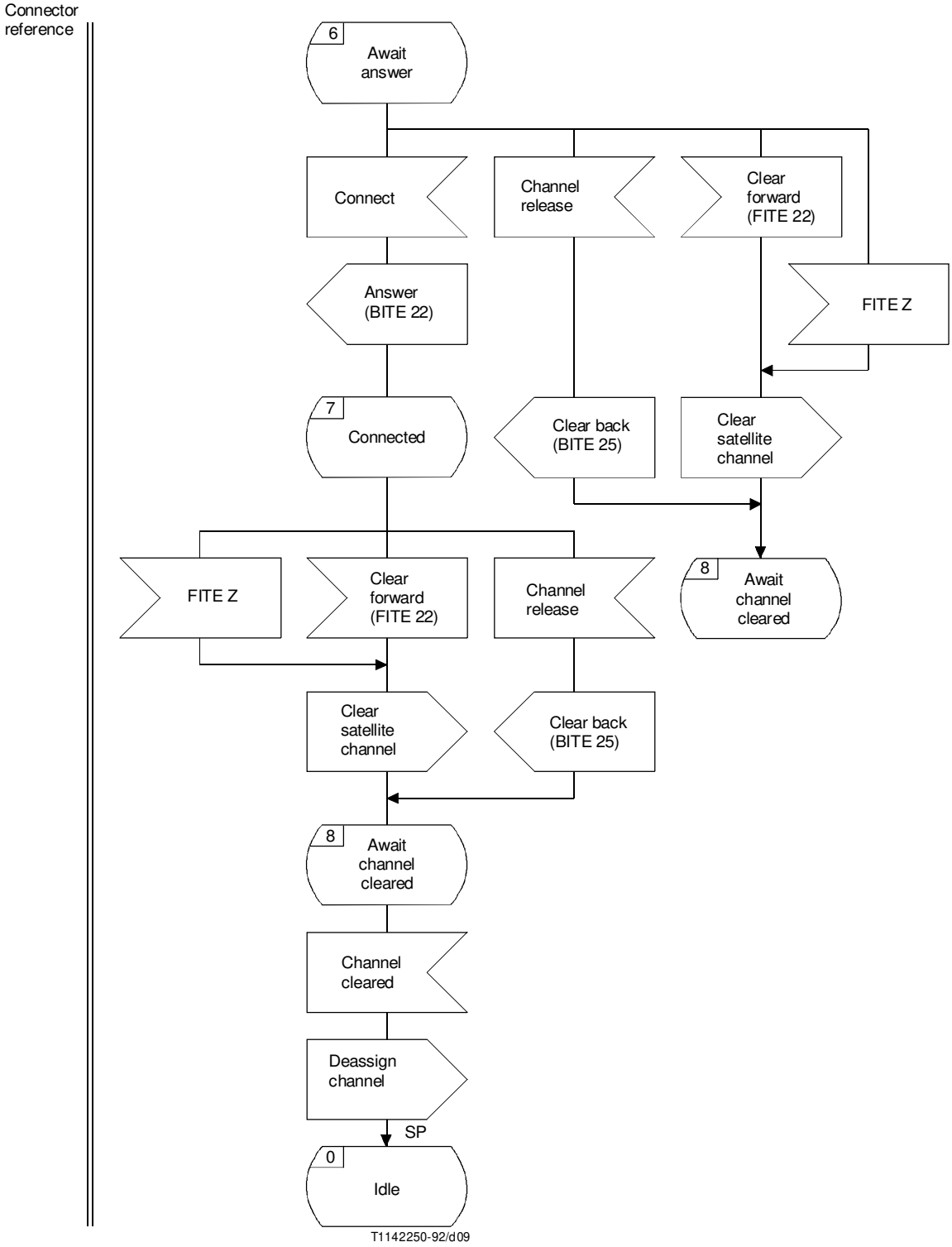


FIGURE 2/Q.1112 (sheet 4 of 4)

Logic procedures for outgoing INMARSAT Standard-B signalling (shore to ship calls)

This description only includes those aspects of the INMARSAT Standard-B system which have to be implemented for interworking purposes. Internal procedures, such as those required for setting up and clearing the satellite channel, are not shown. This also applies to preemption procedures for assigning channels to distress calls.

The following details should be noted.

4.1 The satellite circuit is established when all digits of the SES number have been received. The MSSC will check if the SES is barred for incoming calls or busy. This may involve information exchange with the Network Coordination Station. Call barring is indicated to the fixed network by use of BITE 20: send special information tone. For ISDN interworking (Signalling System No. 7) the cause may be indicated more precisely.

4.2 Calling party's category indicators are converted to information elements in INMARSAT Standard B signalling system as shown in Table 20.

TABLE 20/Q.1112

Conversion of calling party's category indicators to information elements in INMARSAT Standard-B Signalling System

Calling party's category indicator FITE	Information elements in INMARSAT
9-13: Operator, language indication	
14: Operator with forward transfer facility	
15: Subscriber	Priority: routine
16: Subscriber or operator with forward transfer facility	Service: telephone
17: Subscriber, ordinary call	
18: Subscriber, call with priority	Priority: for further study Service: telephone
19: Data call	Priority: routine Service: telephone (3.1 kHz audio)
NOTE – FITEs 9-16 are converted to FITE 17 by the interworking procedure.	

4.3 The following events may occur during call set-up:

- the SES is busy (BITE 16); this is indicated by the NCS during call set-up;
- there is no available satellite channel for the requested service; in this case network congestion indication (BITE 12) is provided back to the fixed network;
- the continuity test may fail; in this case the subscriber line out of service indication (BITE 17) is used.

If the called terminal on the ship is not available (even though the SES could make the connection) or does not support the requested service type, the SES will indicate this by a call result message. This is for further study.

4.4 When a clear forward signal is received from the fixed network, the MSSC will clear the satellite circuit with a channel release message.

The ship earth station may clear the satellite circuit by sending a channel release message to the MSSC. When receiving such a message, the MSSC will initiate clearing of the satellite circuit and provide a clear-back signal to the fixed network.

Precautions should be taken at the ship earth station in order to avoid unintentional clearing by the user. This could be done by allowing some time (e.g. five seconds) for a reanswer signal to appear before the channel release message is sent to the MSSC.

The MSSC may also release the circuit if problems are detected on the radio path. In this case also a clear-back signal should be provided to the fixed network.

4.5 Additional procedures required for interworking with ISUP are for further study.

5 Interworking of incoming INMARSAT to outgoing INMARSAT

5.1 Figure 3 contains the procedures for interworking between incoming and outgoing procedures of INMARSAT Standard-B signalling system.

These procedures may also apply for interworking with the INMARSAT Standard-B and Standard-A systems.

5.2 The interworking procedure supervises the answer time (timer t1). The value of timer t1 is two to four minutes in compliance 4.3.1/Q.118.

6 Interworking of Signalling System R2 to outgoing INMARSAT

6.1 Figure 4 contains the procedures for interworking of Signalling System R2 to INMARSAT Standard-B signalling system.

6.2 The ringing tone towards the calling subscriber of the fixed network is intitiated by the interworking procedure. The tone should have characteristics in accordance with Recommendation Q.35.

7 Interworking of incoming INMARSAT to Signalling System R2

7.1 Figure 5 contains the procedure for interworking of Signalling System R2 to INMARSAT Standard-B signalling system.

7.2 If the call is destined to a country whose ISC has direct connection to the MSSC (result of SPITE 22, transit connection following?), the country code not included indication (FITE 2) is provided to the outgoing Signalling System R2 procedure. This indication is followed by an echo- suppressor indicator (FITE 4 or FITE 5). FITE 4 is used when an incoming echo control device is not required for the call (e.g. data call); otherwise FITE 5 should be used.

For calls requiring a transit ISC the country code indicator FITE 7 or FITE 8 should be used. FITE 7 is used when an incoming echo control device is not required at the remote end and FITE 8 when such a device is to be inserted.

See also Recommendation Q.1111 for control of echo control devices.

7.3 The interworking procedure supervises the answer time and the clear-back time (timers t1 and t2, respectively).

Timers t1 and t2 take values as follows:

t1 = two to four minutes, 4.3.1/Q.118;

t2 = one to two minutes, 4.3.2/Q.118.

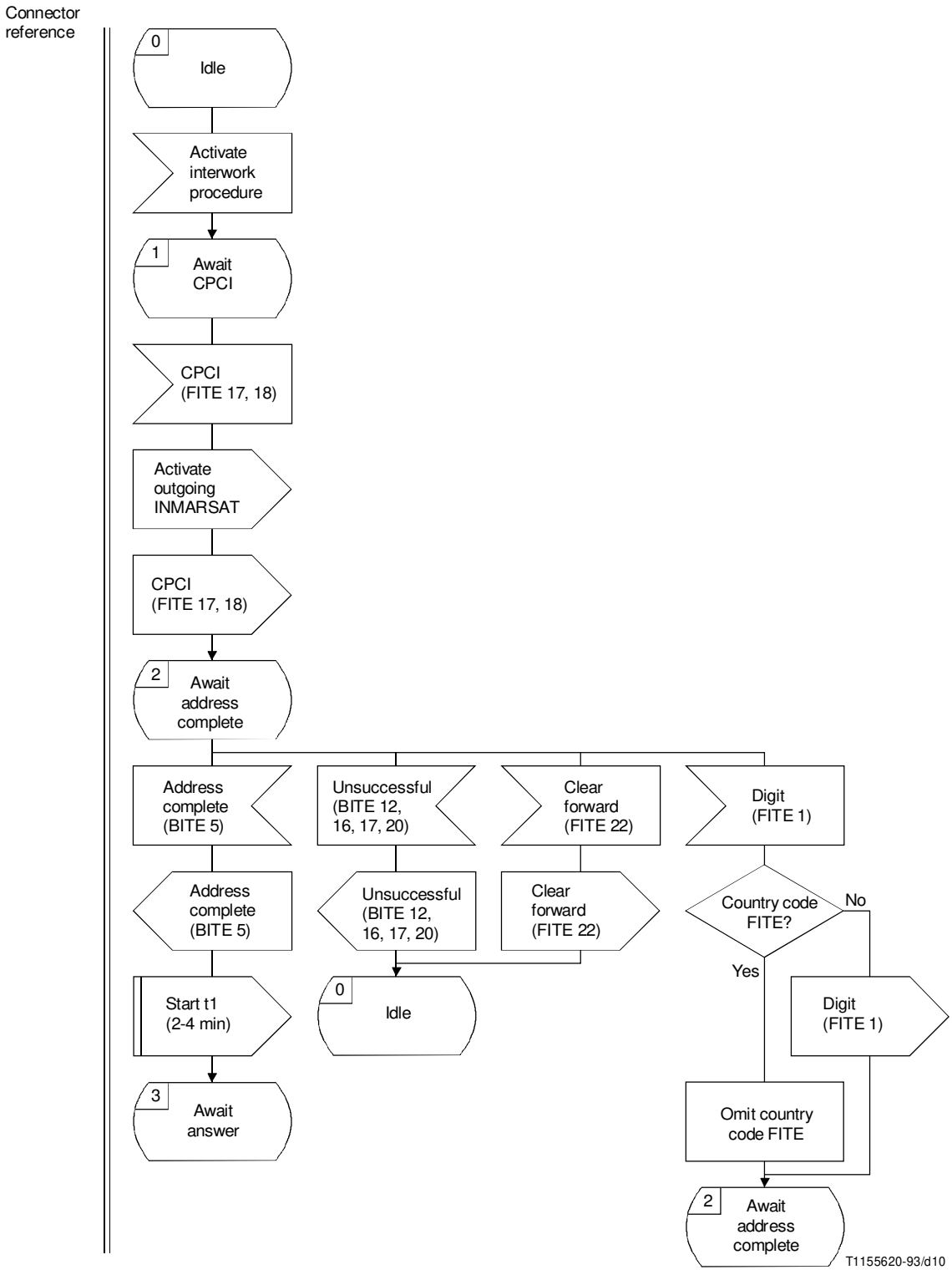


FIGURE 3/Q.1112 (sheet 1 of 2)

Interworking of INMARSAT Standard B System with itself

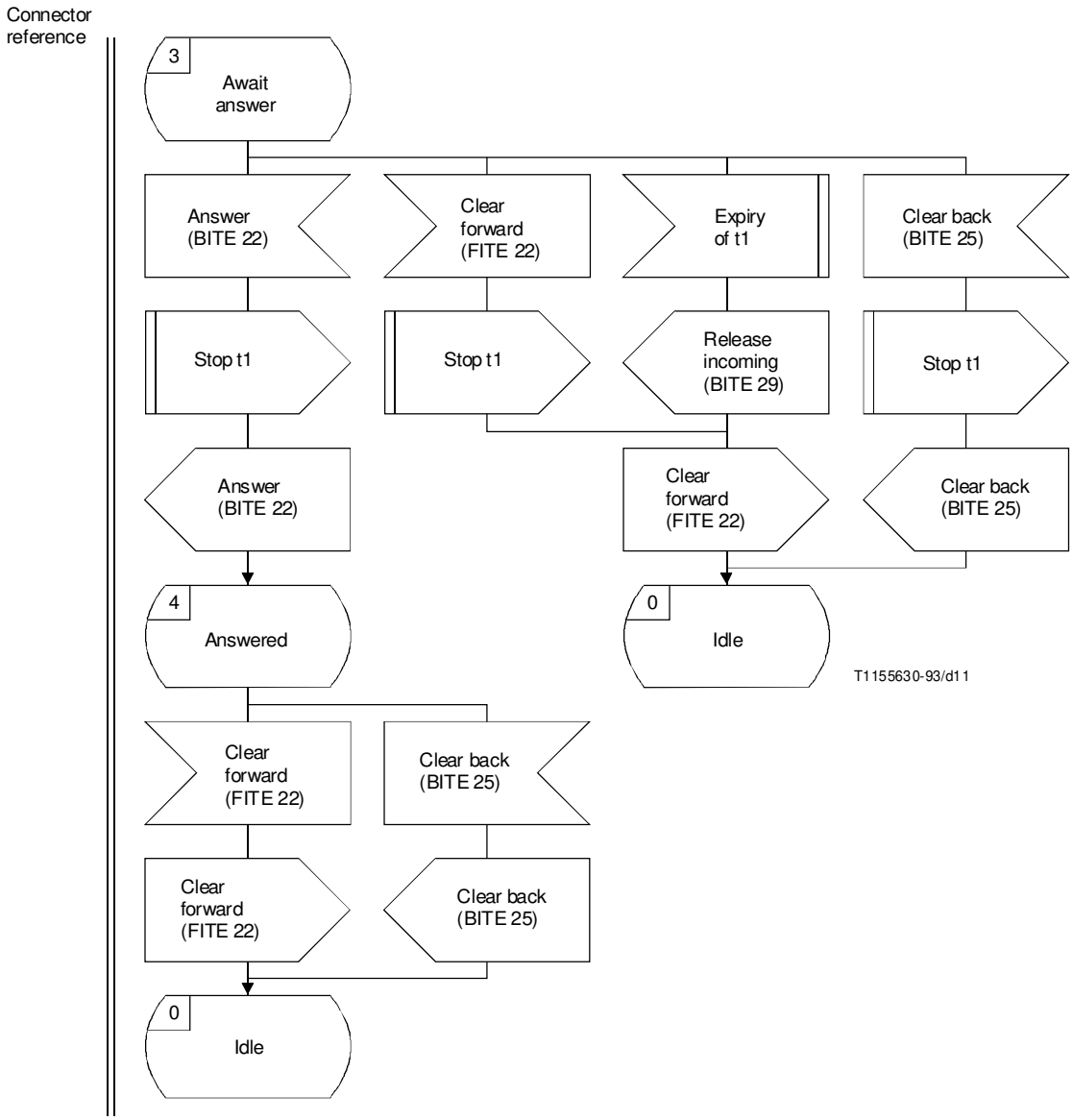


FIGURE 3/Q.1112 (sheet 2 of 2)

Interworking of INMARSAT Standard B System with itself

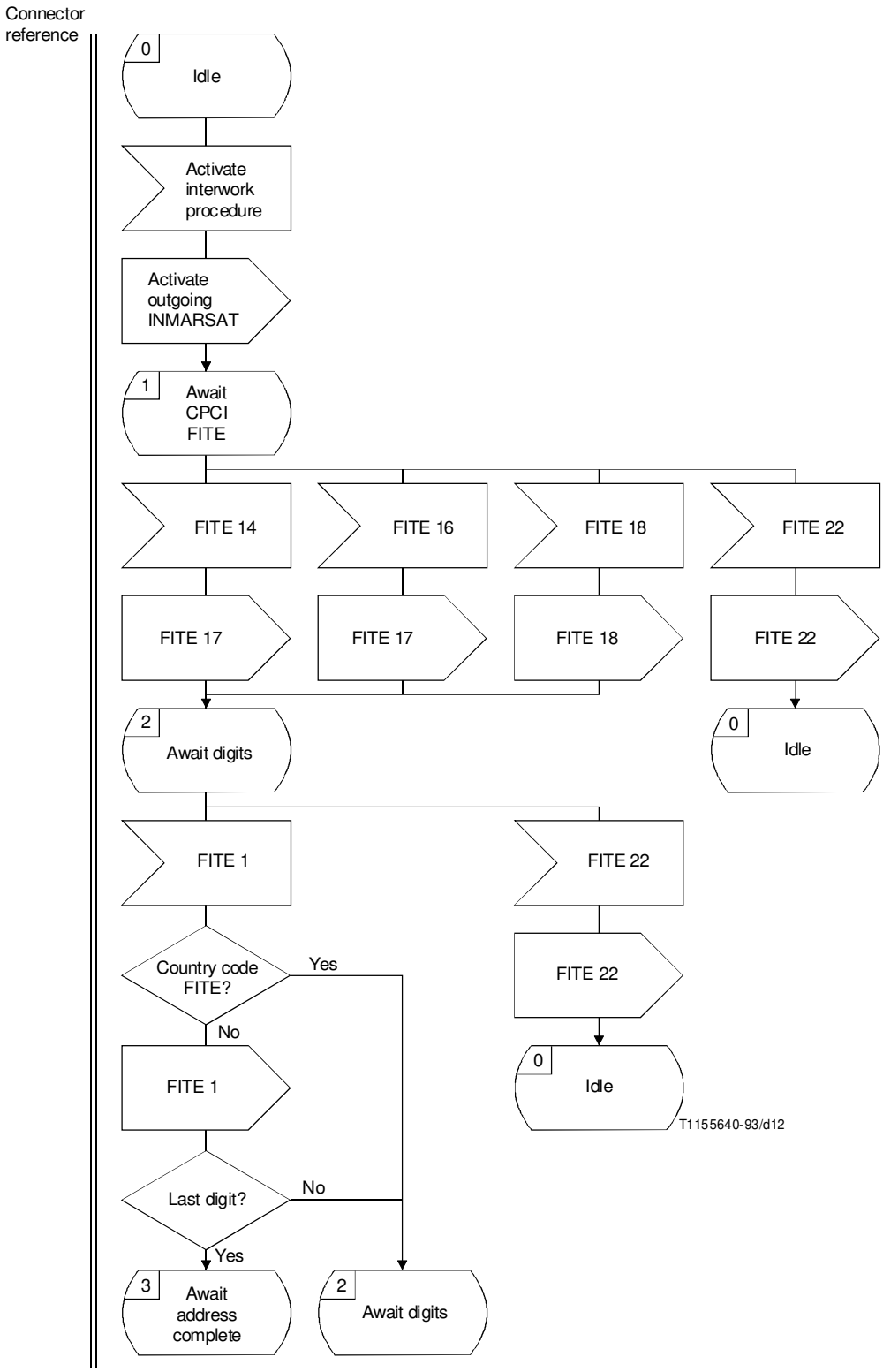


FIGURE 4/Q.1112 (sheet 1 of 2)

Interworking of Signalling System R2 to INMARSAT Standard B System

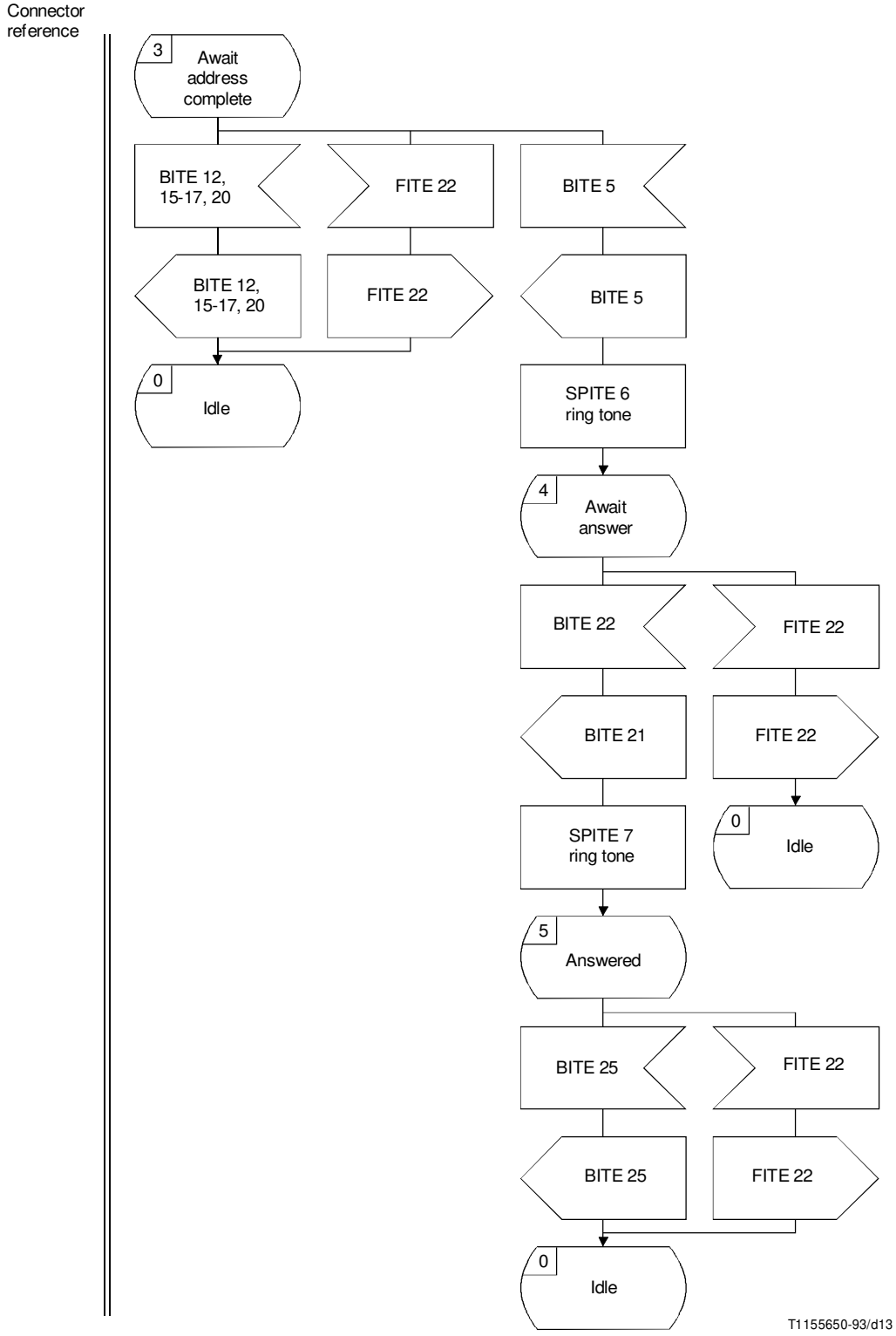


FIGURE 4/Q.1112 (sheet 2 of 2)

Interworking of Signalling System R2 to INMARSAT Standard B System

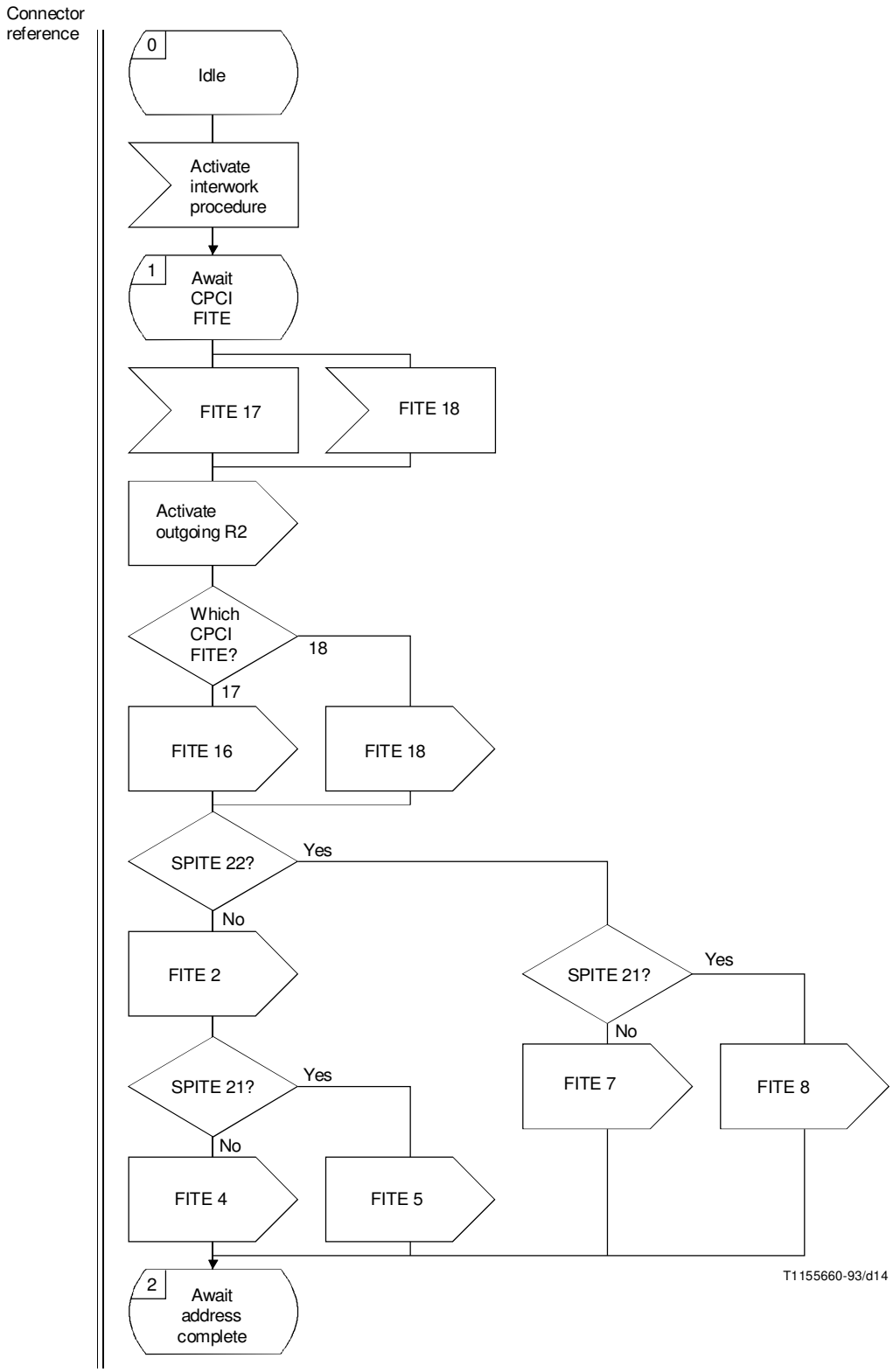


FIGURE 5/Q.1112 (sheet 1 of 3)

Interworking of INMARSAT Standard B System to Signalling System R2

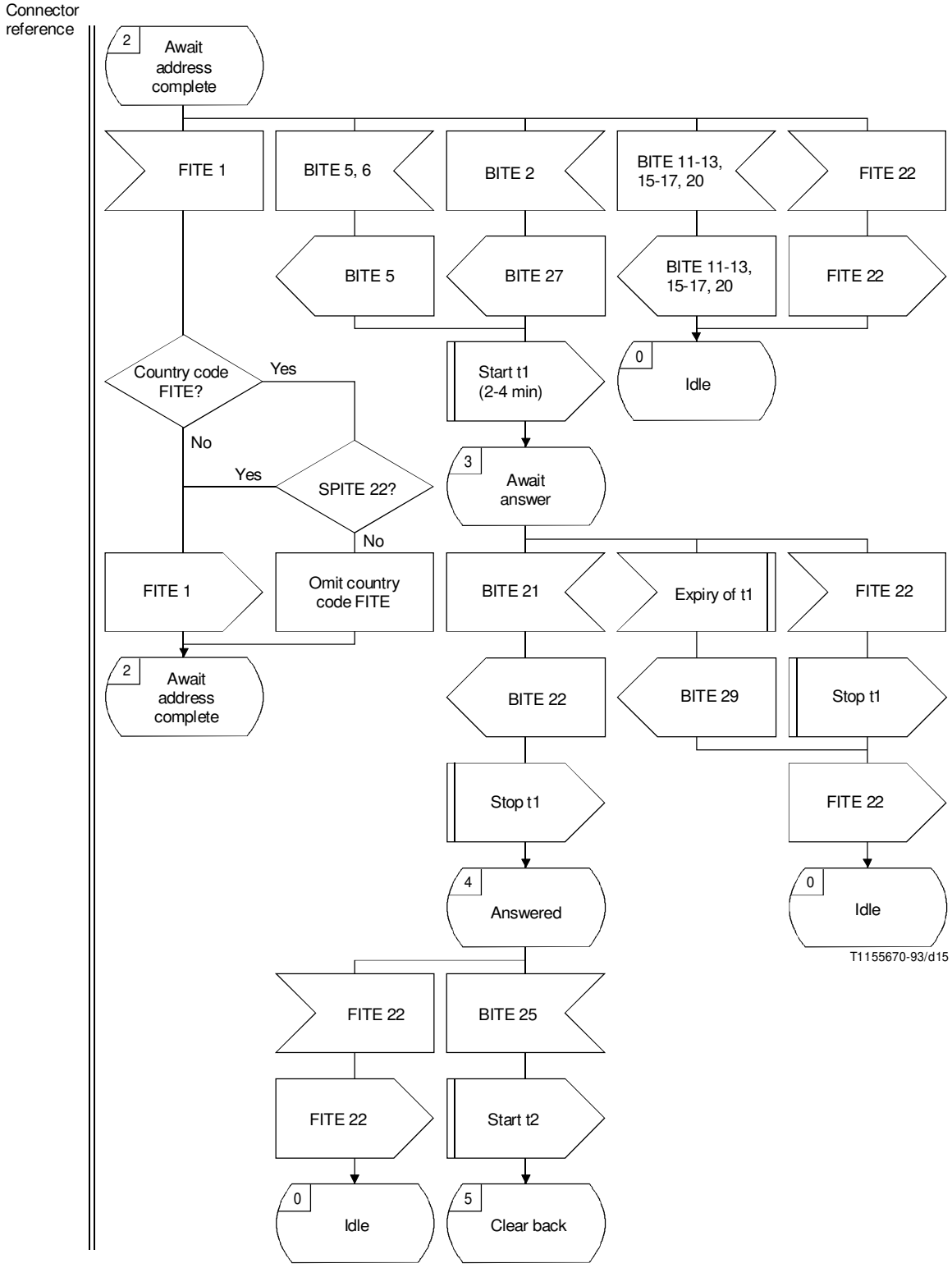


FIGURE 5/Q.1112 (sheet 2 of 3)

Interworking of INMARSAT Standard B System to Signalling System R2

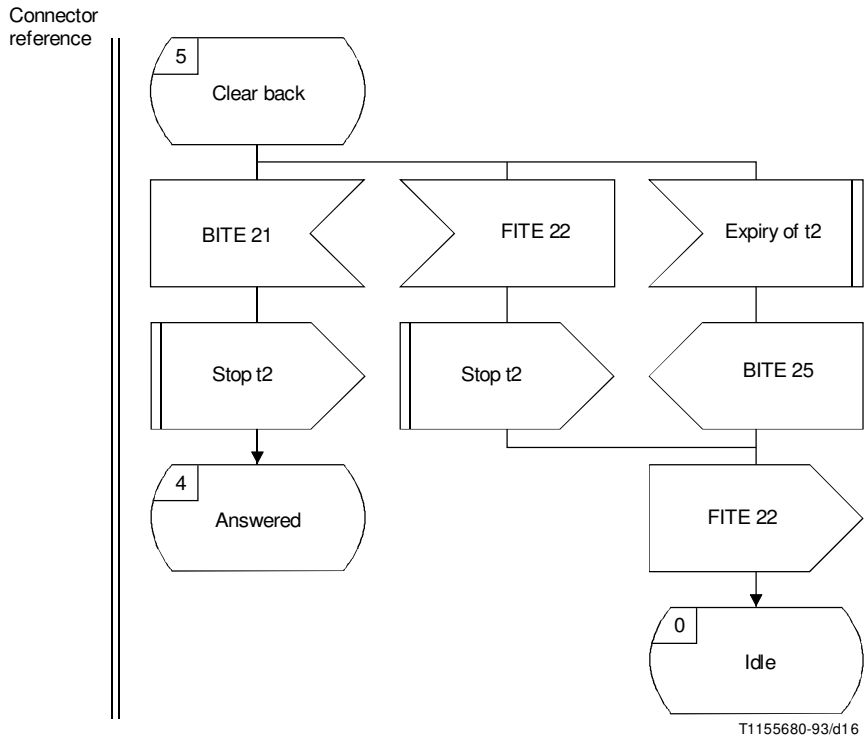


FIGURE 5/Q.1112 (sheet 3 of 3)

Interworking of INMARSAT Standard B System to Signalling System R2

When timer t1 expires, a forced release message is returned to the incoming INMARSAT procedure (BITE 29). When timer t2 expires, a clear-back message is sent to the incoming INMARSAT procedure (BITE 25).

8 Interworking of Signalling System No. 7 TUP to outgoing INMARSAT

8.1 Figure 6 contains the procedures for interworking of Signalling System No. 7 TUP to INMARSAT Standard-B signalling system.

8.2 Activation of the outgoing INMARSAT procedure takes place when a continuity indicator (FITE 24 or FITE 25) is received from Signalling System No. 7. Any digits received during this time are stored by the interworking procedure and then provided to the outgoing INMARSAT procedure when continuity has been indicated.

8.3 The ringing tone towards the calling subscriber of the fixed network is initiated by the interworking procedure. The tone should have characteristics in accordance with Recommendation Q.35.

9 Interworking of incoming INMARSAT to Signalling System No. 7 TUP

9.1 Figure 7 contains the procedures for interworking of incoming INMARSAT Standard-B signalling system to Signalling System No. 7 TUP.

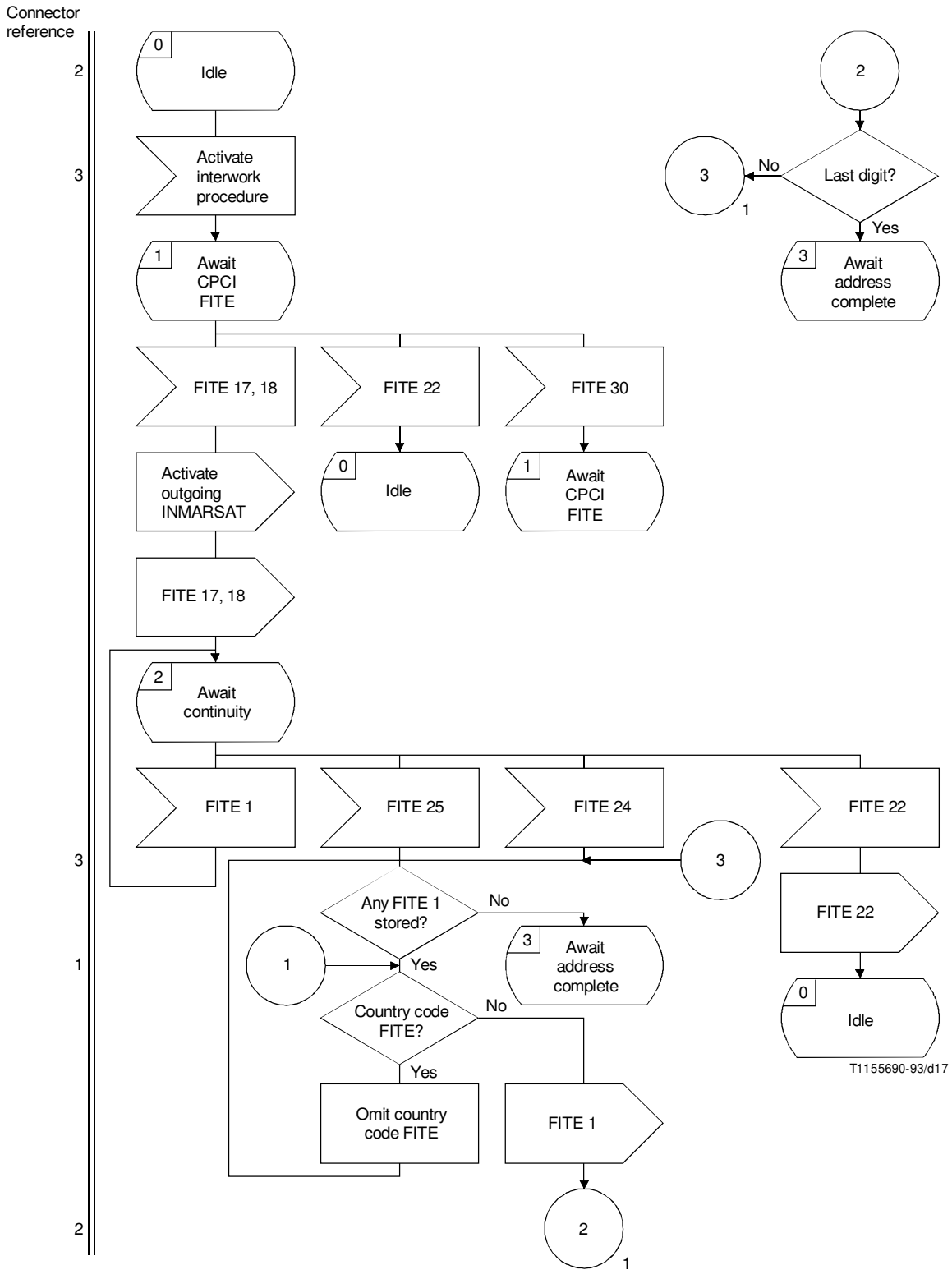


FIGURE 6/Q.1112 (sheet 1 of 2)

Interworking of Signalling System No. 7 TUP of INMARSAT Standard B System

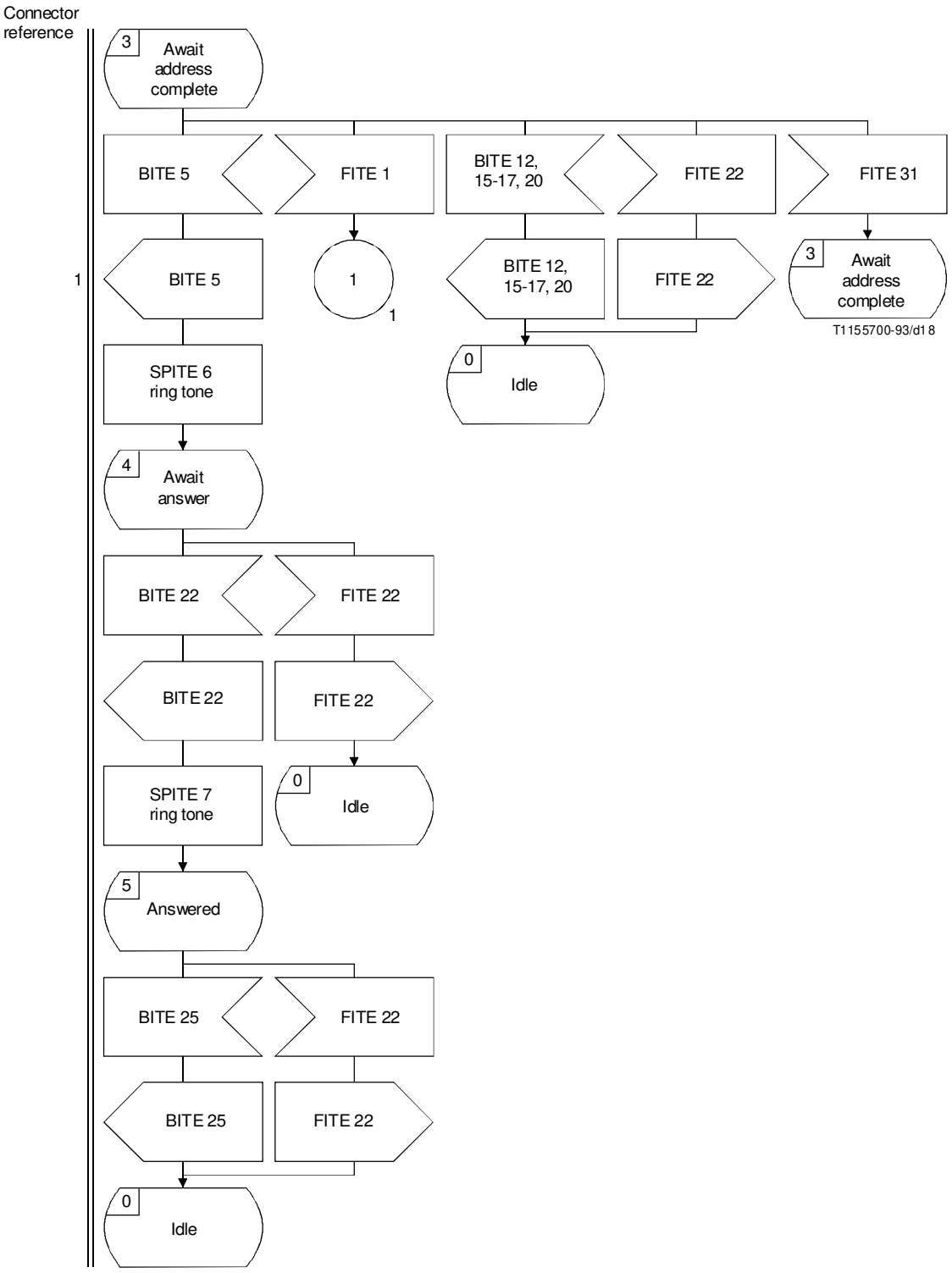


FIGURE 6/Q.1112 (sheet 2 of 2)

Interworking of Signalling System No. 7 TUP of INMARSAT Standard B System

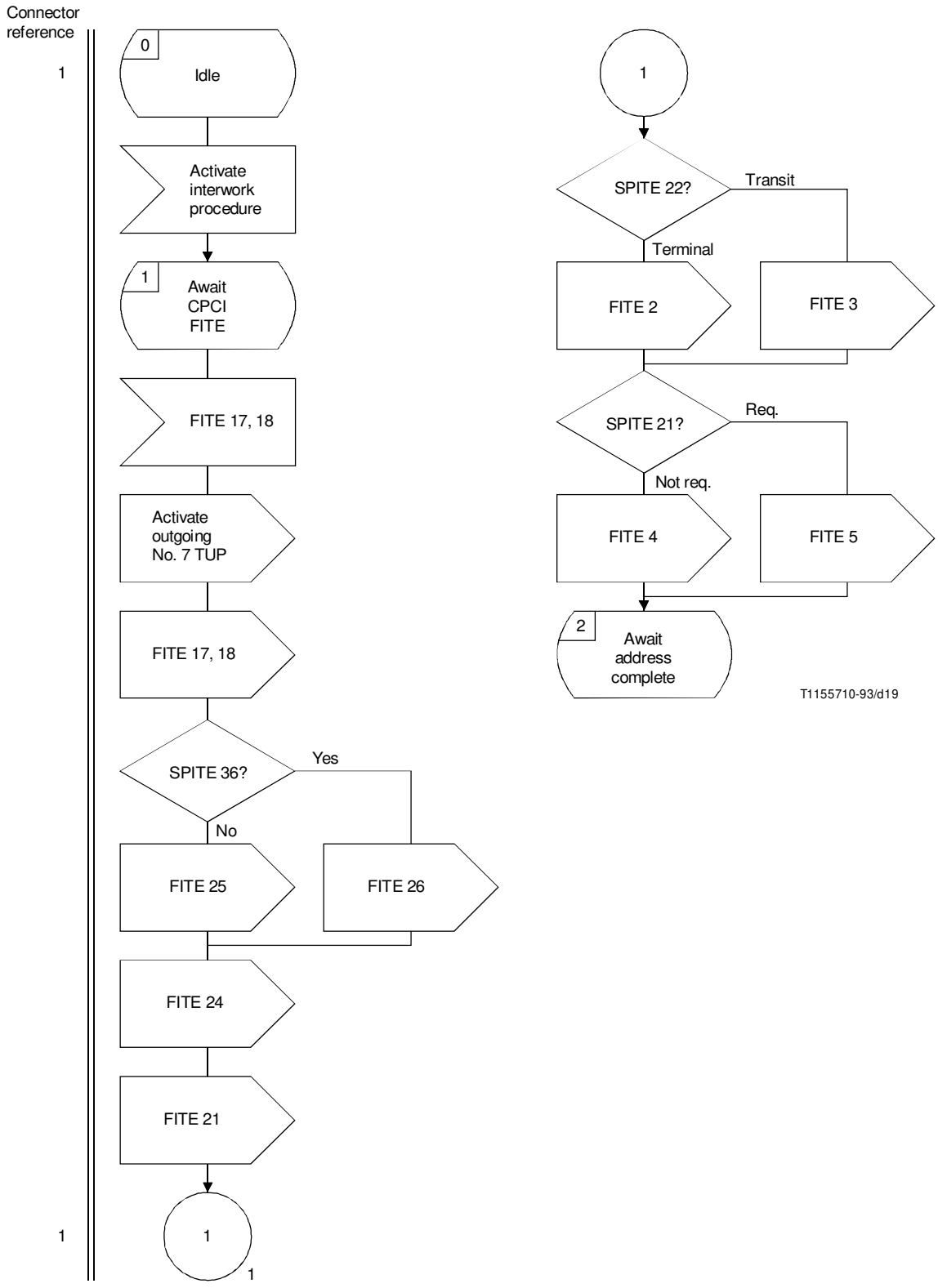


FIGURE 7/Q.1112 (sheet 1 of 3)

Interworking of INMARSAT Standard B System to Signalling System No. 7 TUP

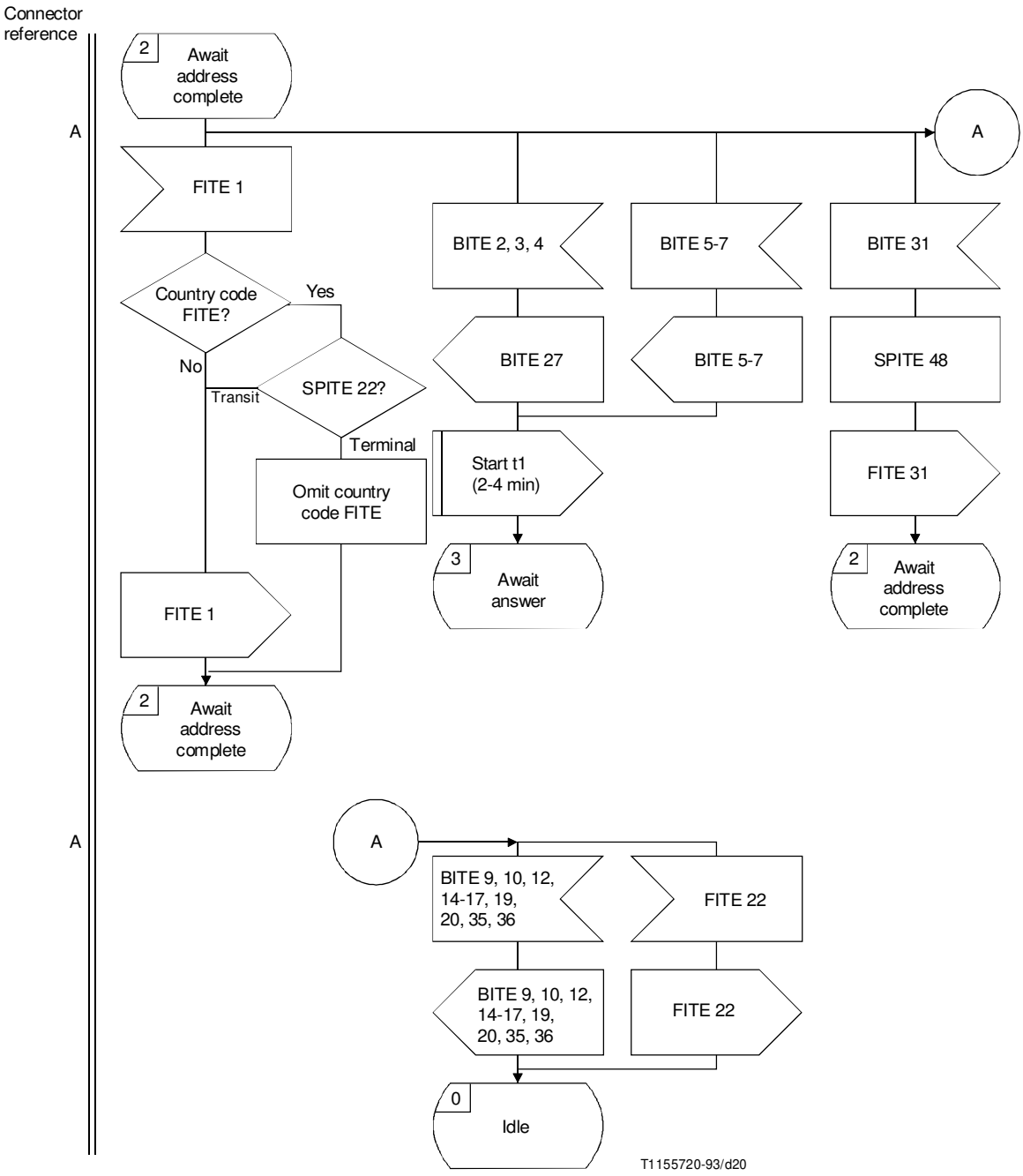


FIGURE 7/Q.1112 (sheet 2 of 3)

Interworking of INMARSAT Standard B System to Signalling System No. 7 TUP

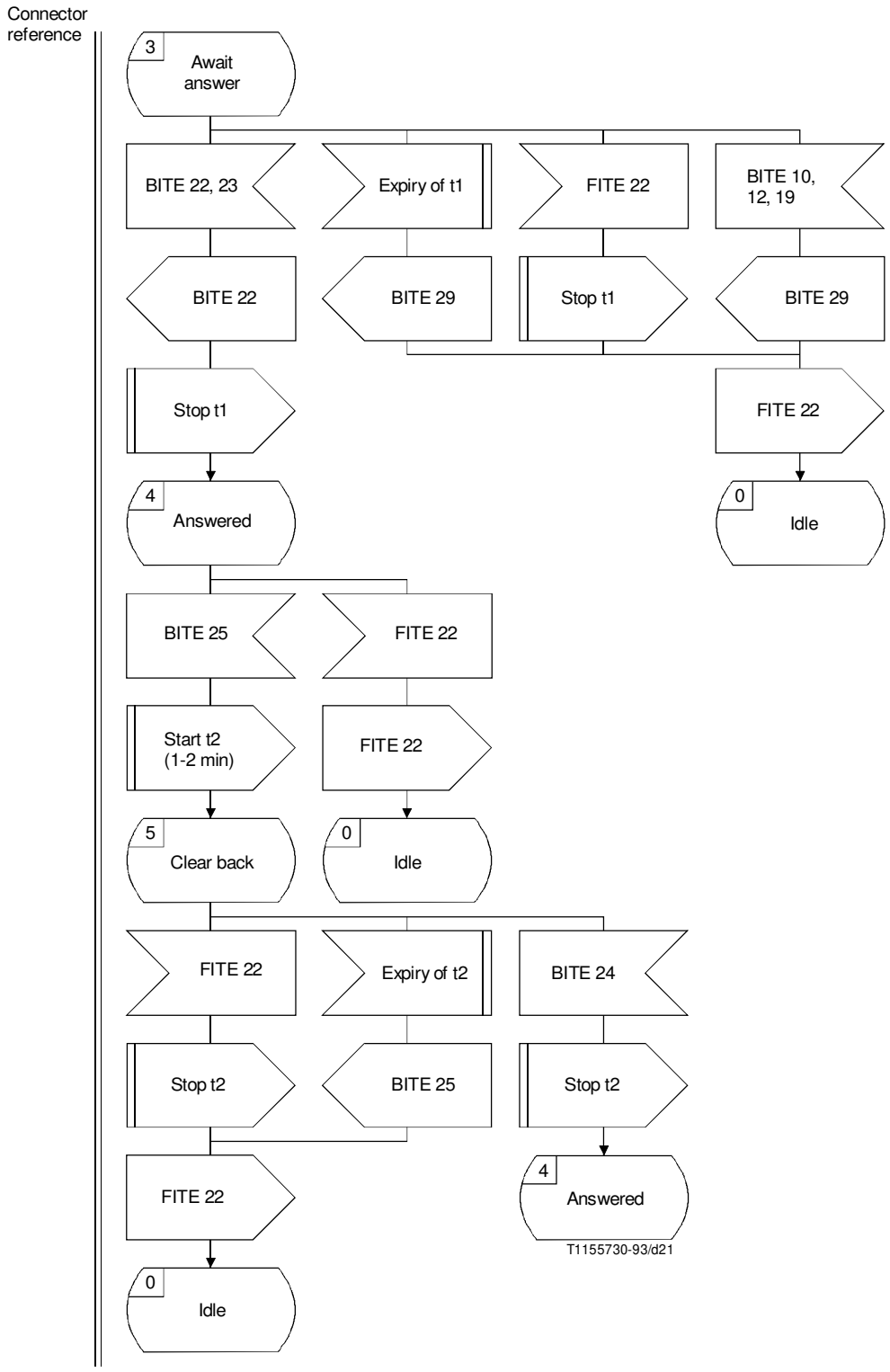


FIGURE 7/Q.1112 (sheet 3 of 3)

Interworking of INMARSAT Standard B System to Signalling System No. 7 TUP

9.2 The interworking procedure provides the following information to the outgoing Signalling System No. 7 procedure in order to initialize the information elements of the initial address message.

– continuity check required or not required (FITE 25 or FITE 26);

– one satellite link included (FITE 21);

– country code indicator: FITE 2 if the call is destined for a country whose ISC has direct connections to the MSSC and FITE 3 in all other cases;

– echo control indicator: FITE 4 when an echo control device is not required and FITE 5 when such a device is required at the incoming end.

9.3 The interworking procedure supervises the answer time and the clear-back time (timers t1 and t2, respectively).

Timers t1 and t2 take values as follows:

t1 = two to four minutes, 4.3.1/Q.118;

t2 = one to two minutes, 4.3.2/Q.118.

When timer t1 expires, a forced release message is returned to the incoming INMARSAT procedure (BITE 29). When timer t2 expires, a clear-back message is sent to the incoming INMARSAT procedure (BITE 25).

10 Interworking of Signalling System No. 5 to outgoing INMARSAT

Figure 8 contains the procedures for the interworking of Signalling System No. 5 to the INMARSAT Standard-B signalling system.

11 Interworking of incoming INMARSAT to Signalling System No. 5

Figure 9 contains the procedures for the interworking of INMARSAT Standard-B signalling system to Signalling System No. 5.

12 Interworking of Signalling System No. 7 ISUP to outgoing INMARSAT-B

Figures 10 and 11 contain the procedures for the interworking of Signalling System No. 7 ISUP to the INMARSAT Standard-B signalling system.

13 Interworking of incoming INMARSAT to Signalling System No. 7 ISUP

Figure 12 and 13 contain the procedures for the interworking of INMARSAT Standard-B signalling system to Signalling System No. 7 ISUP.

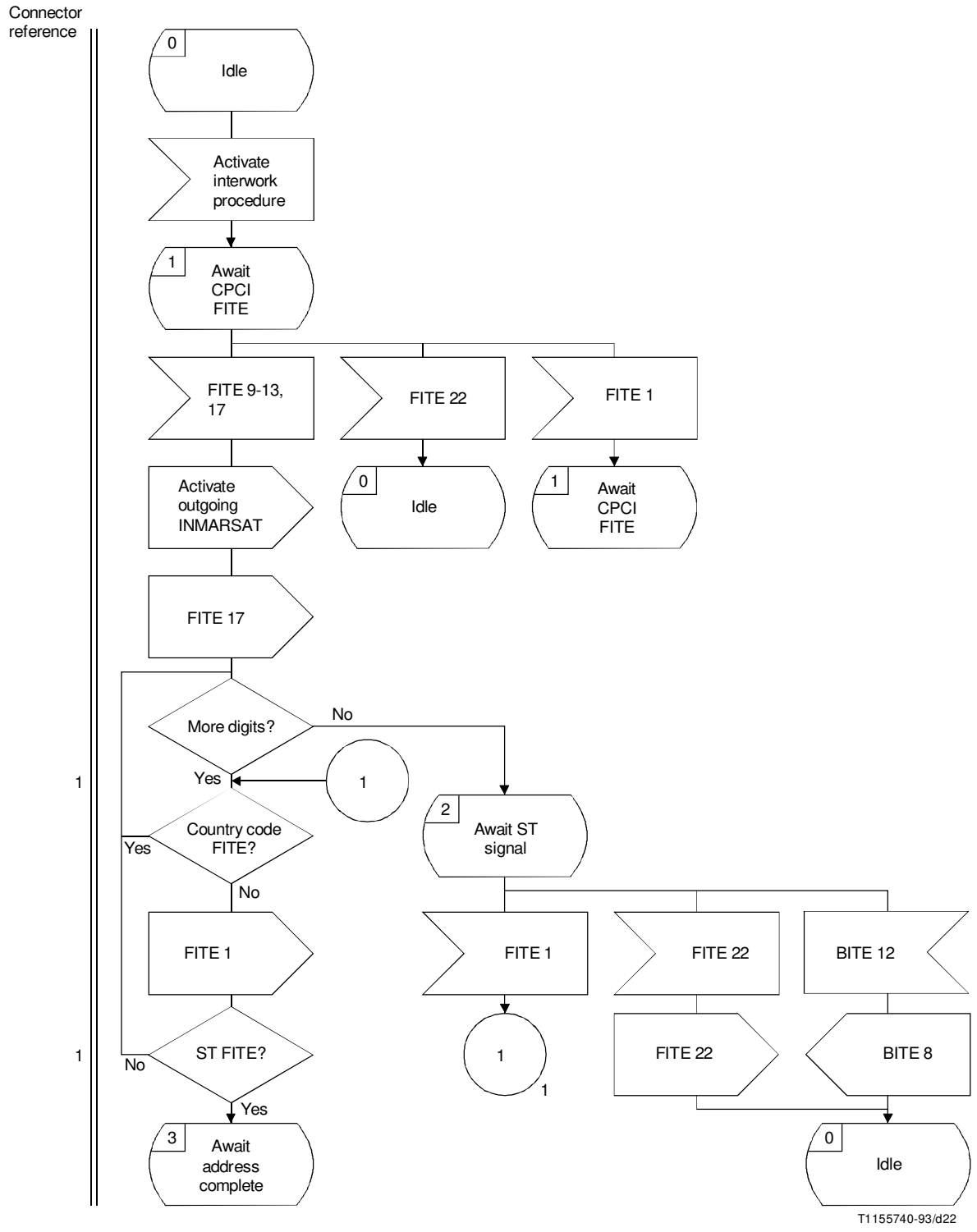


FIGURE 8/Q.1112 (sheet 1 of 2)

Interworking of Signalling System No. 5 to INMARSAT Standard B System

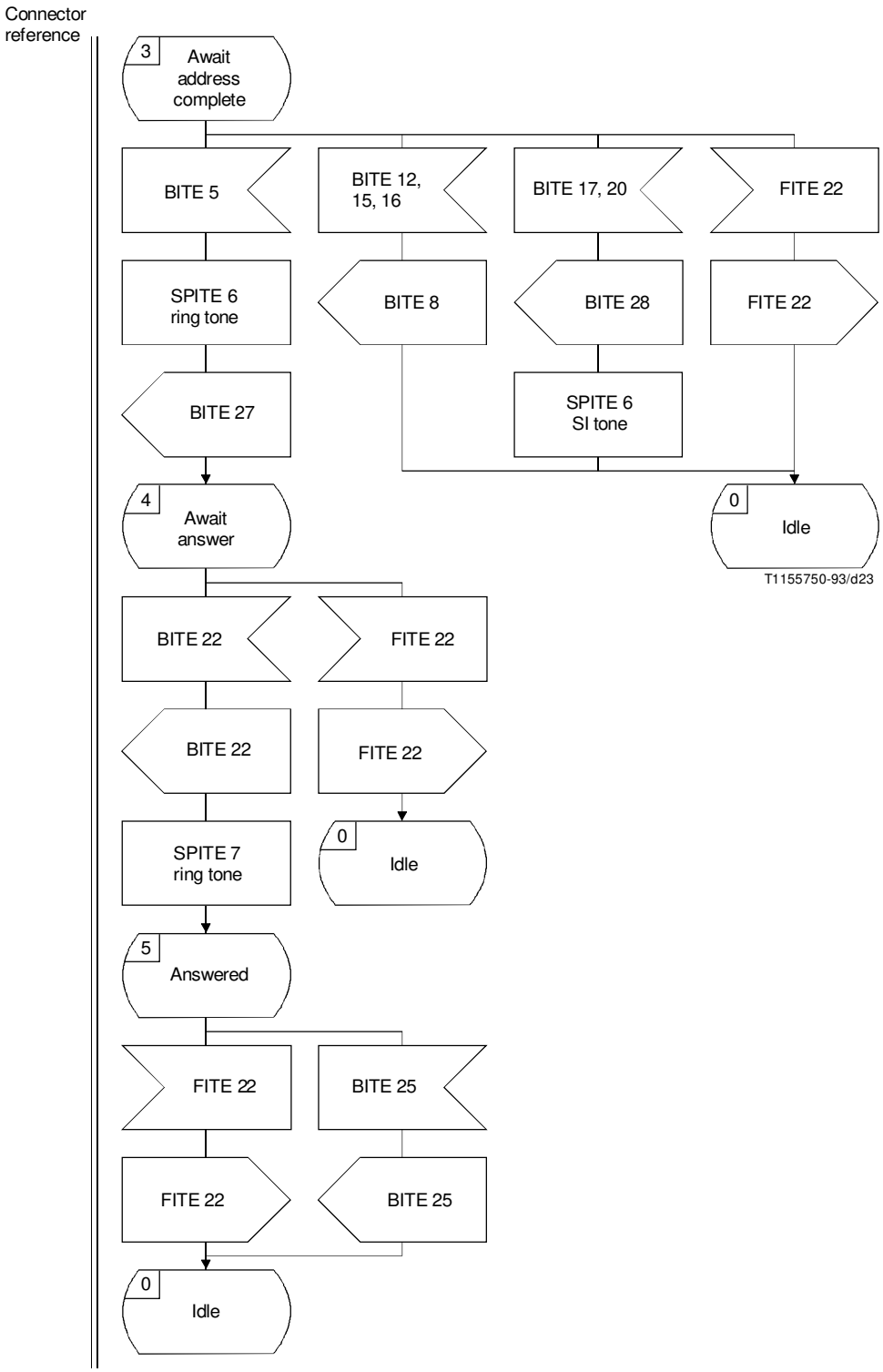


FIGURE 8/Q.1112 (sheet 2 of 2)

Interworking of Signalling System No. 5 to INMARSAT Standard B System

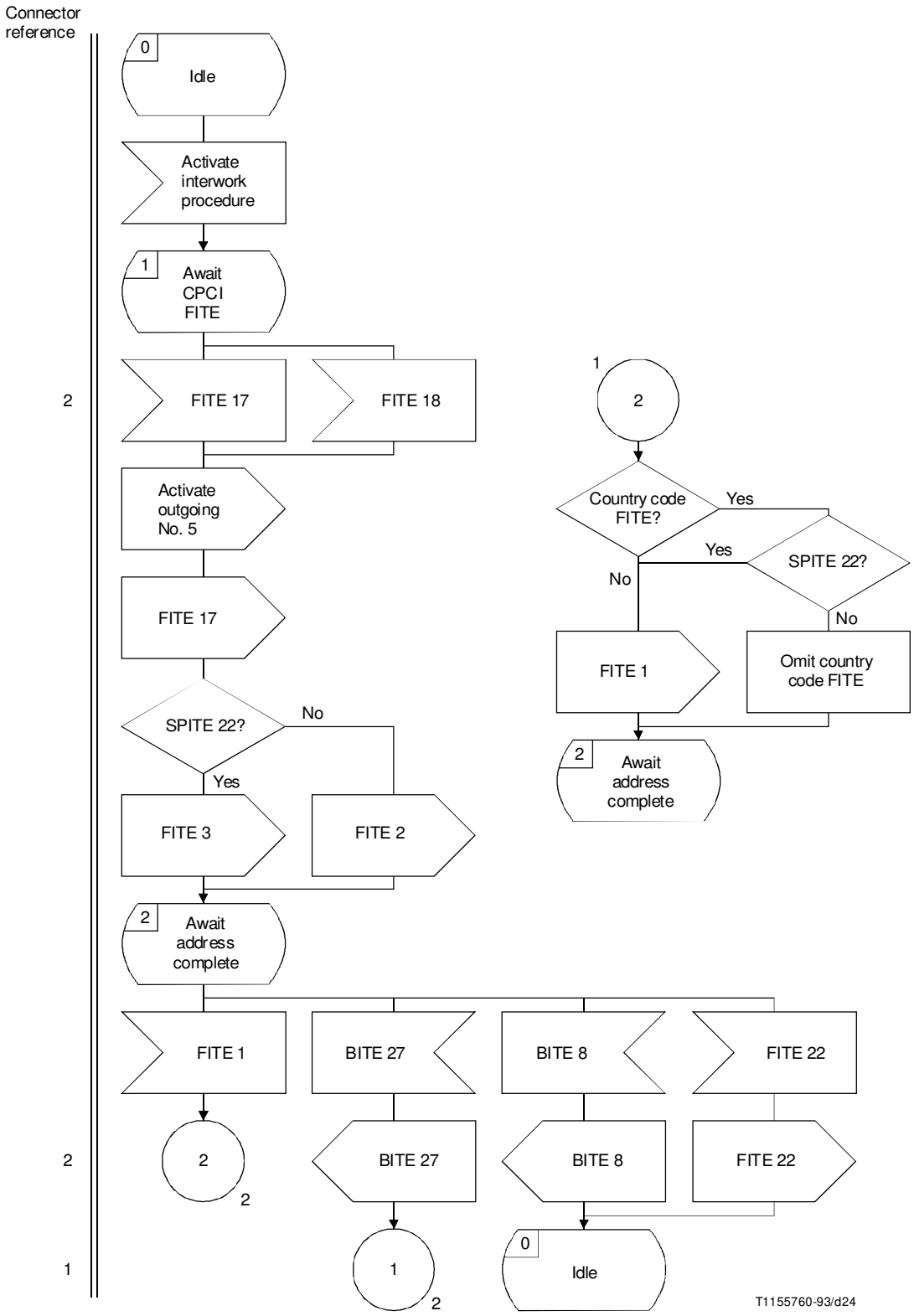


FIGURE 9/Q.1112 (sheet 1 of 3)

Interworking of INMARSAT Standard B System to Signalling System No. 5

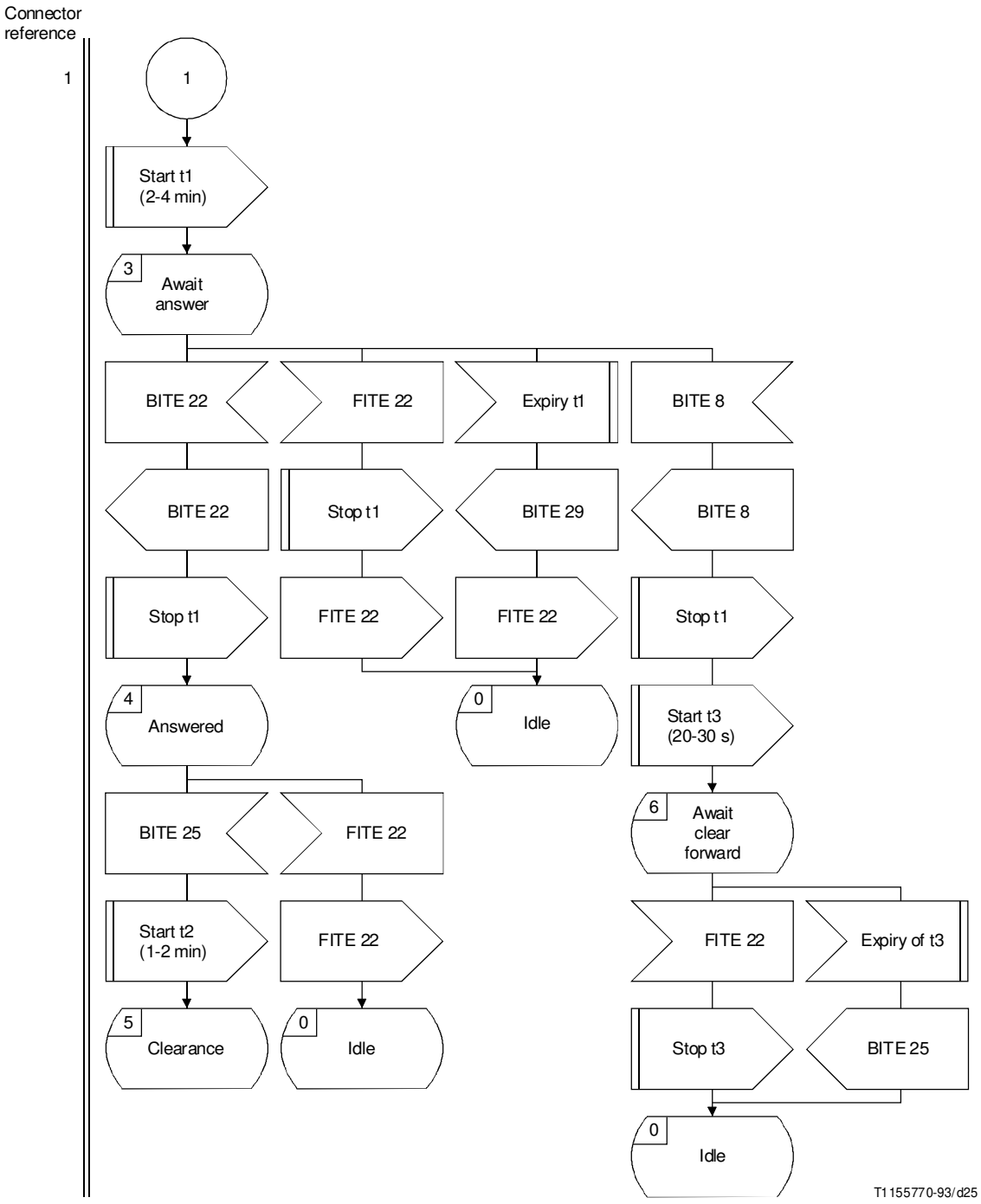


FIGURE 9/Q.1112 (sheet 2 of 3)

Interworking of INMARSAT Standard B System to Signalling System No. 5

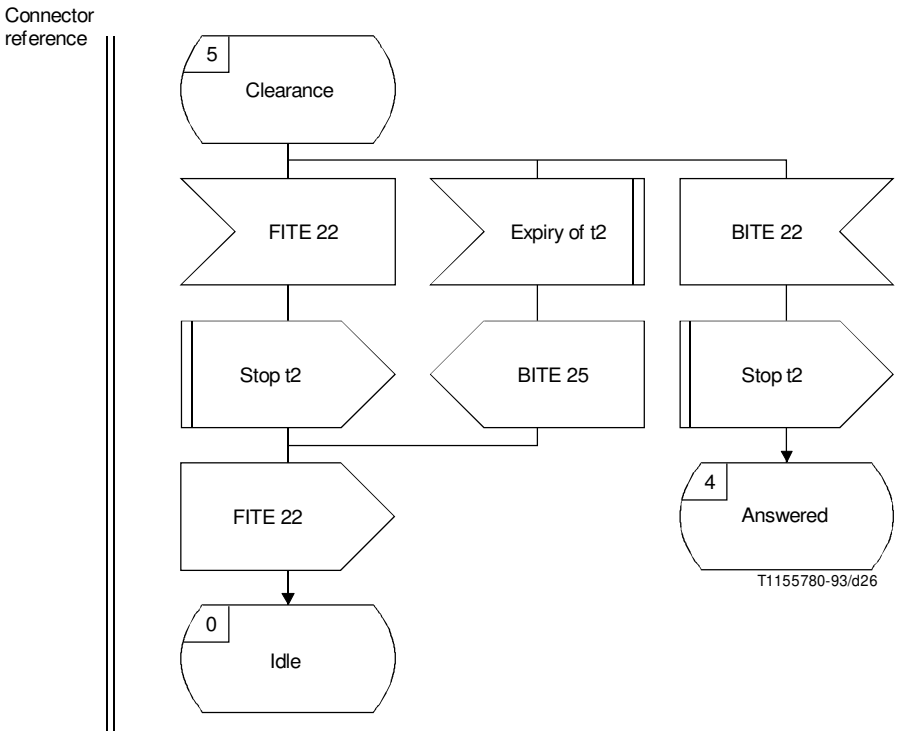
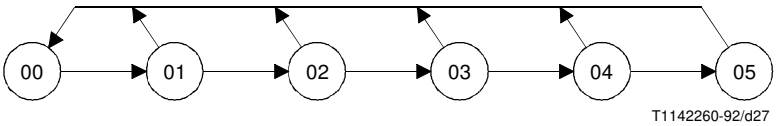


FIGURE 9/Q.1112 (sheet 3 of 3)

Interworking of INMARSAT Standard B System to Signalling System No. 5



State number	State description	Sheet reference
00	Idle	1
01	Wait for call set-up information	1
02	Await continuity	2
03	Wait for address complete	3
04	Wait for answer	4
05	Answered	4

FIGURE 10/Q.1112

State overview diagram for interworking of Signalling System No. 7 ISUP to INMARSAT-B

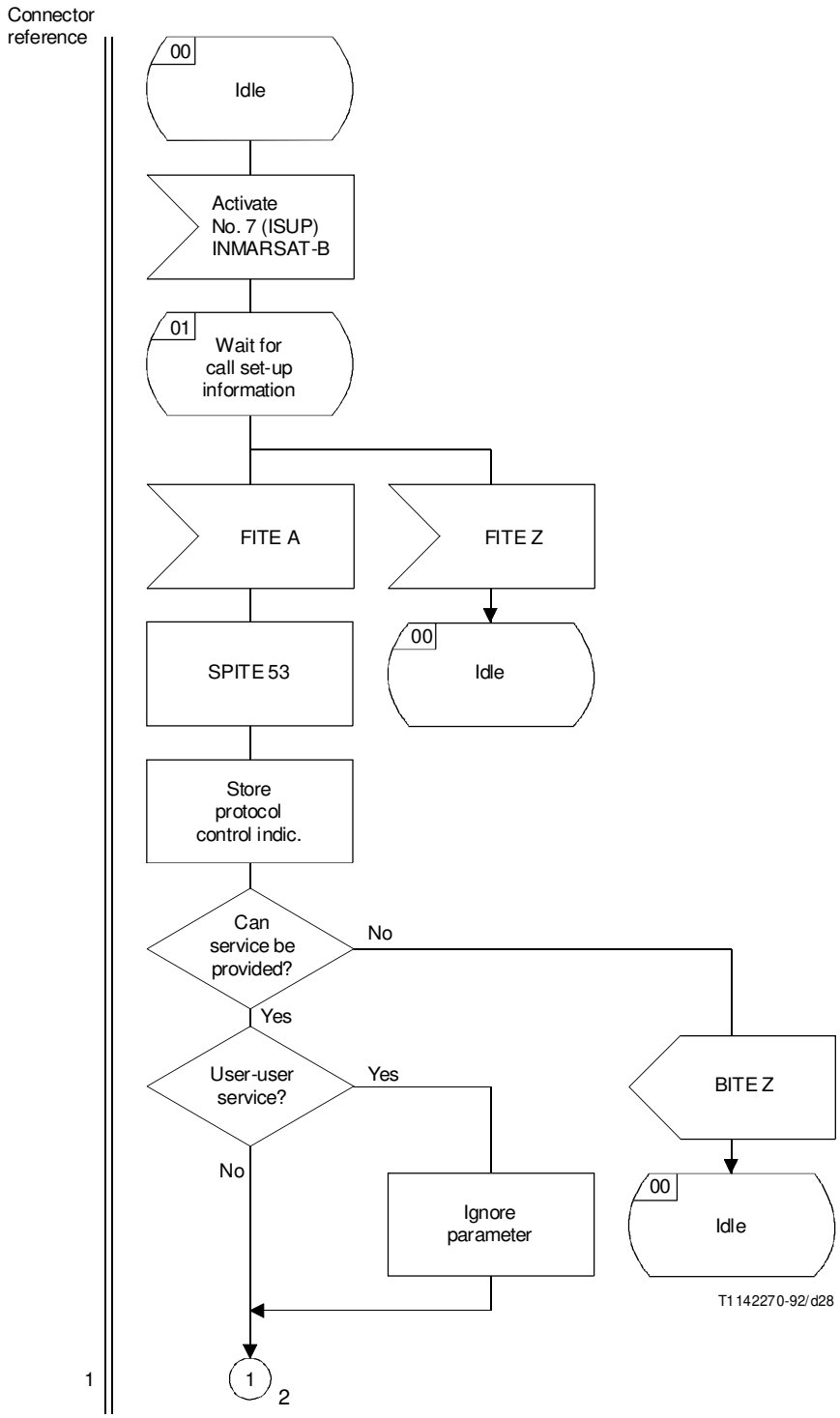


FIGURE 11/Q.1112 (sheet 1 of 4)

Interworking of Signalling System No. 7 (ISUP) to INMARSAT-B

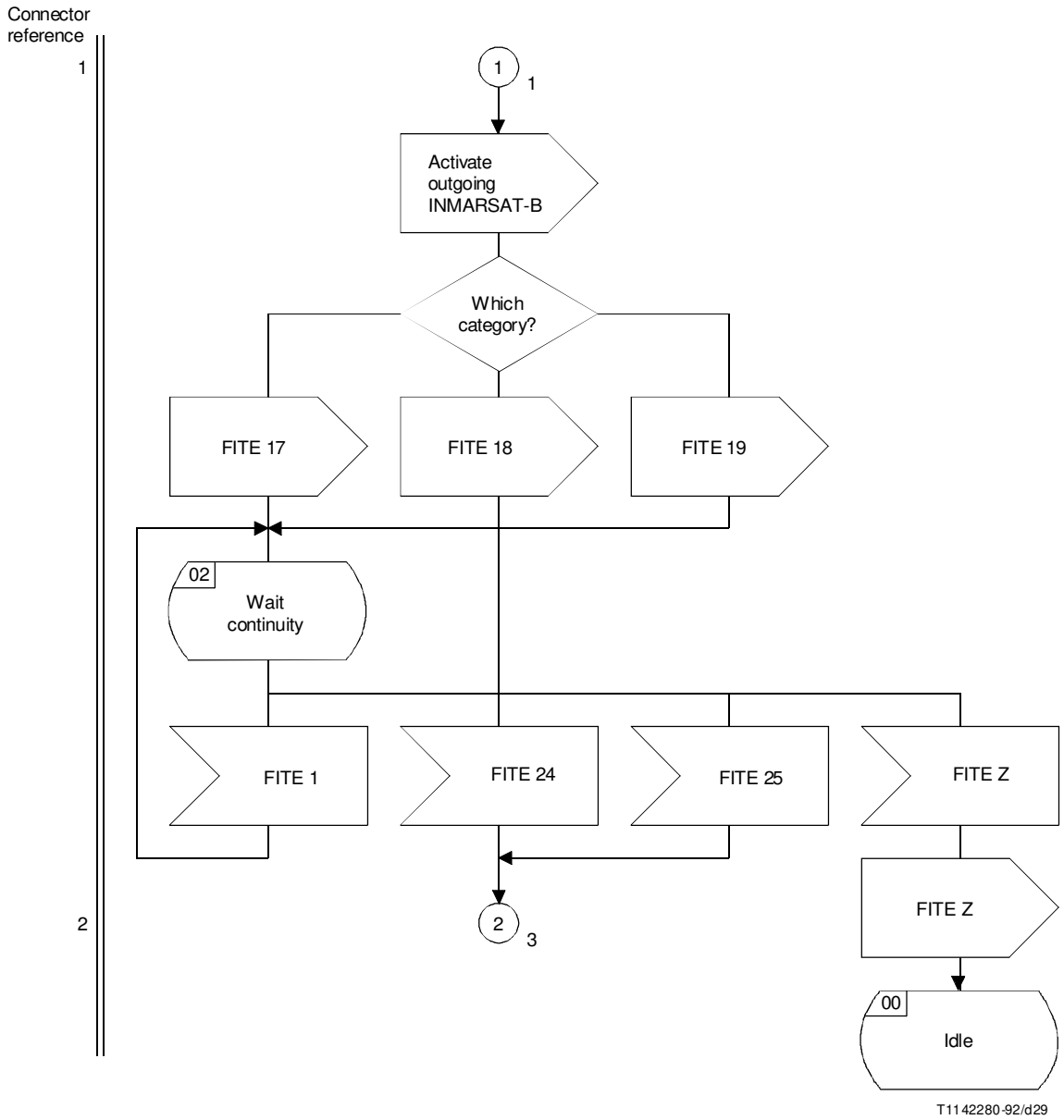


FIGURE 11/Q.1112 (sheet 2 of 4)

Interworking of Signalling System No. 7 (ISUP) to INMARSAT-B

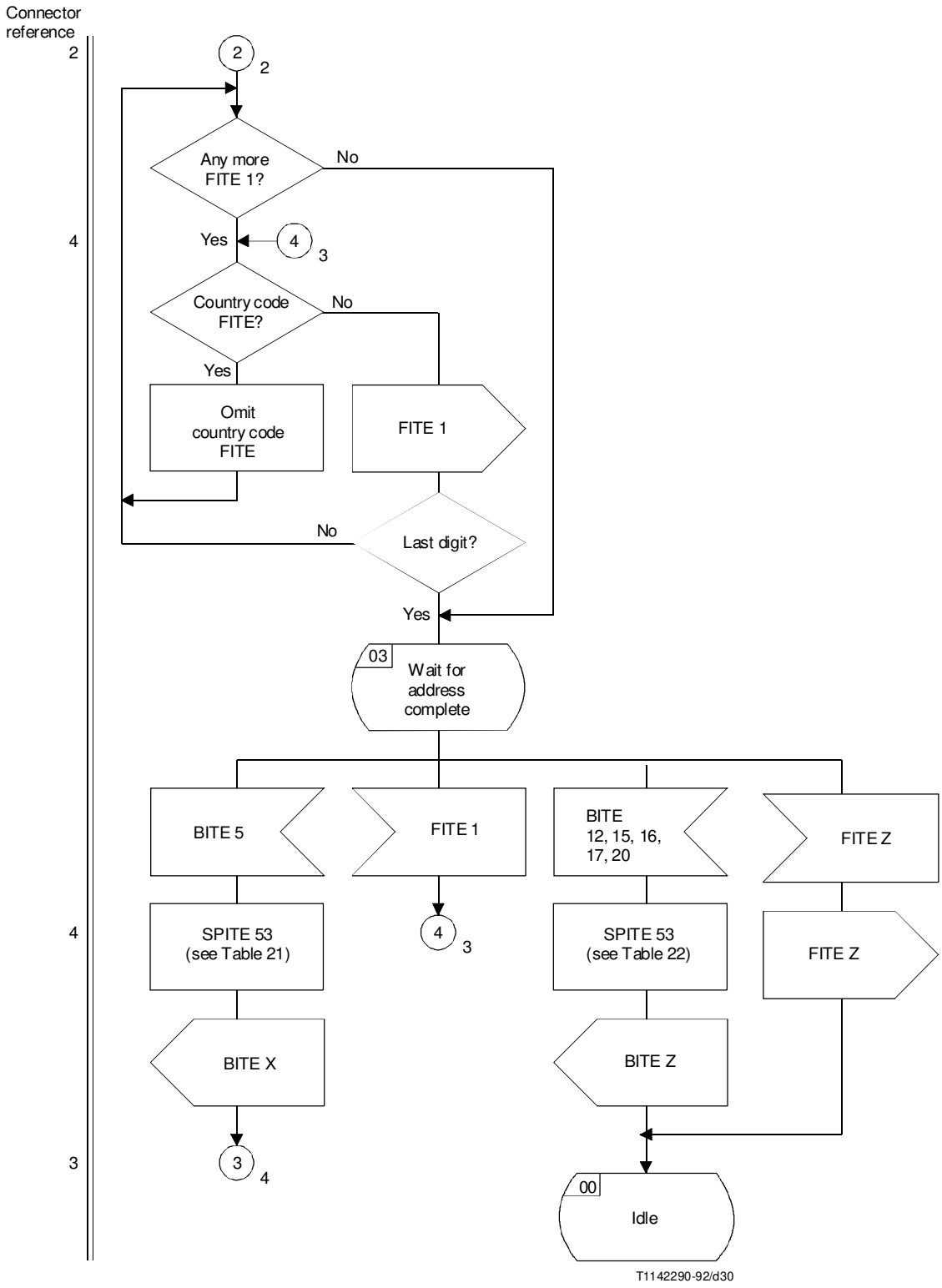


FIGURE 11/Q.1112 (sheet 3 of 4)

Interworking of Signalling System No. 7 (ISUP) to INMARSAT-B

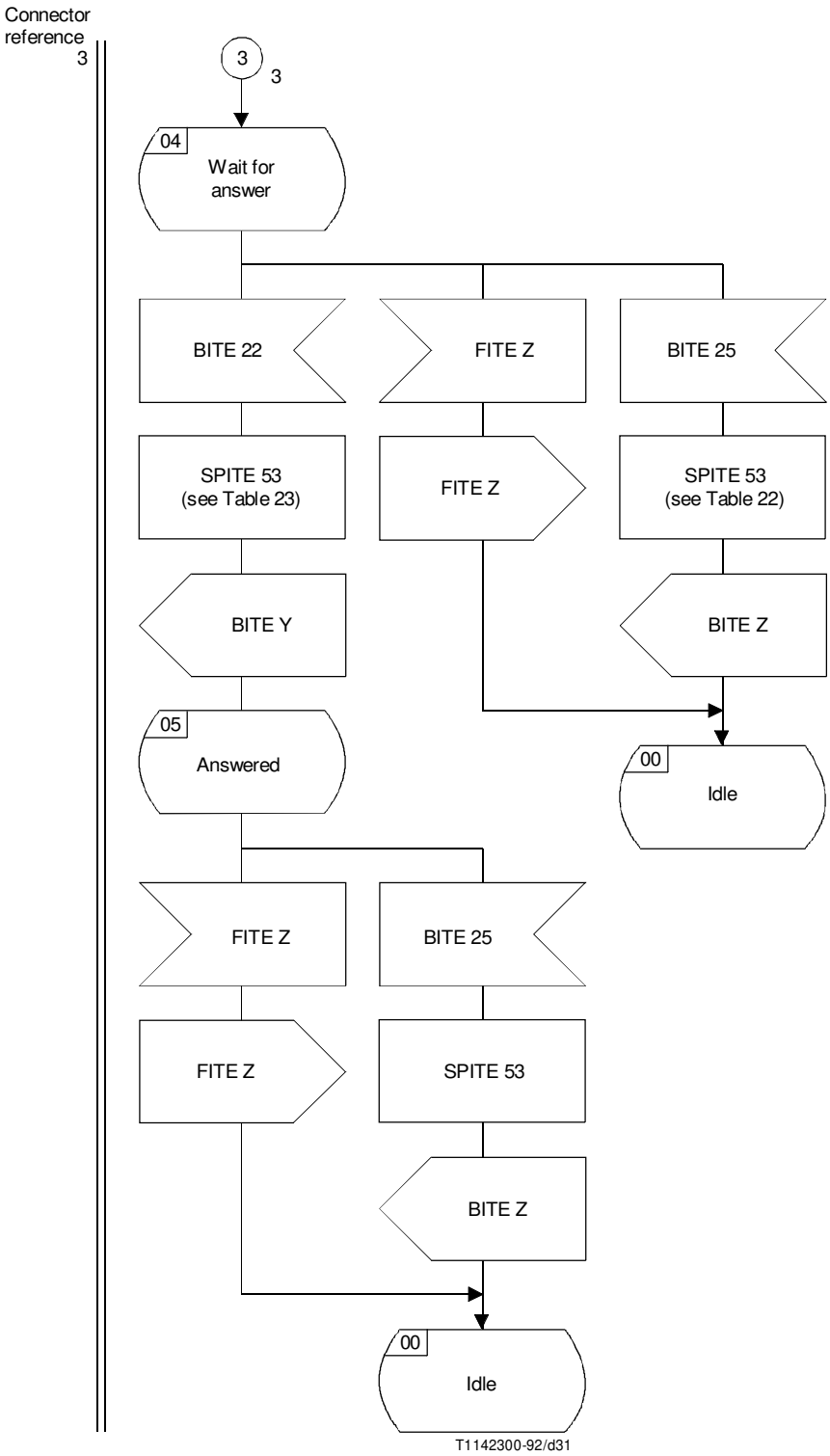
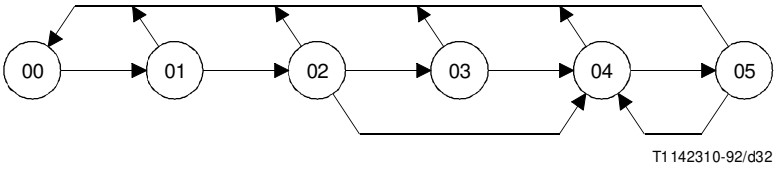


FIGURE 11/Q.1112 (sheet 4 of 4)

Interworking of Signalling System No. 7 (ISUP) to INMARSAT-B



State number	State description	Sheet reference
00	Idle	1
01	Wait for CPCI FITE	1
02	Wait for address complete	2
03	Wait for answer	3
04	Answered	3
05	Clear back	4

FIGURE 12/Q.1112

State overview diagram for interworking of INMARSAT-B to Signalling System No. 7 ISUP

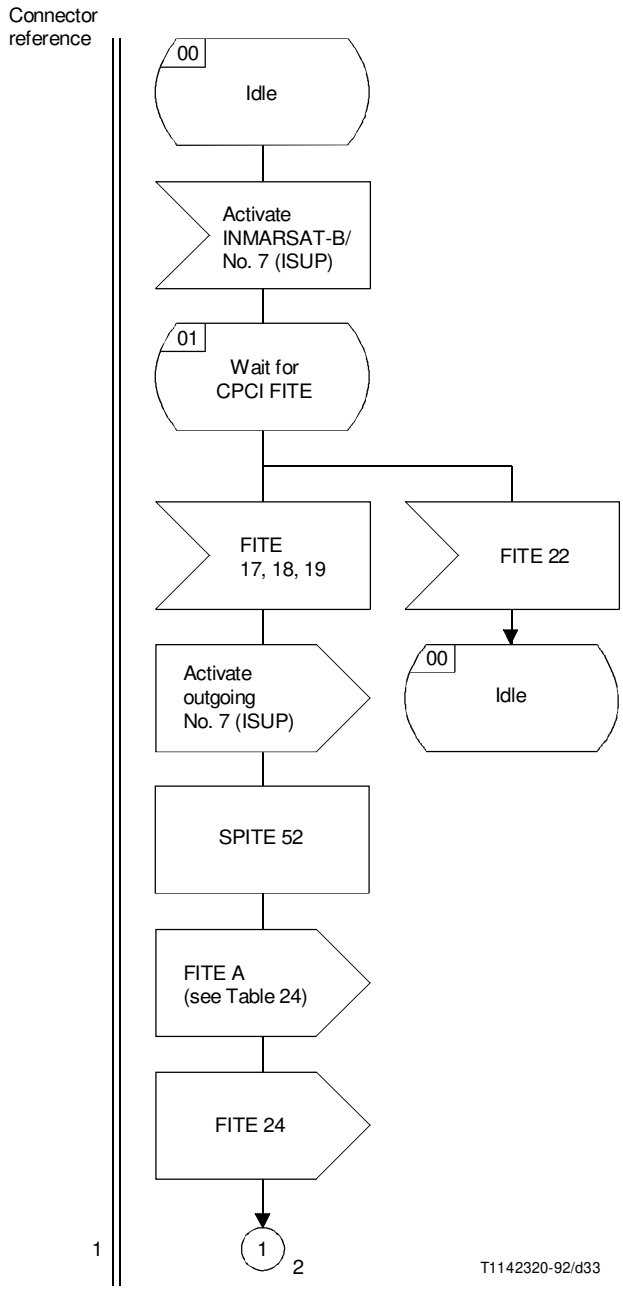
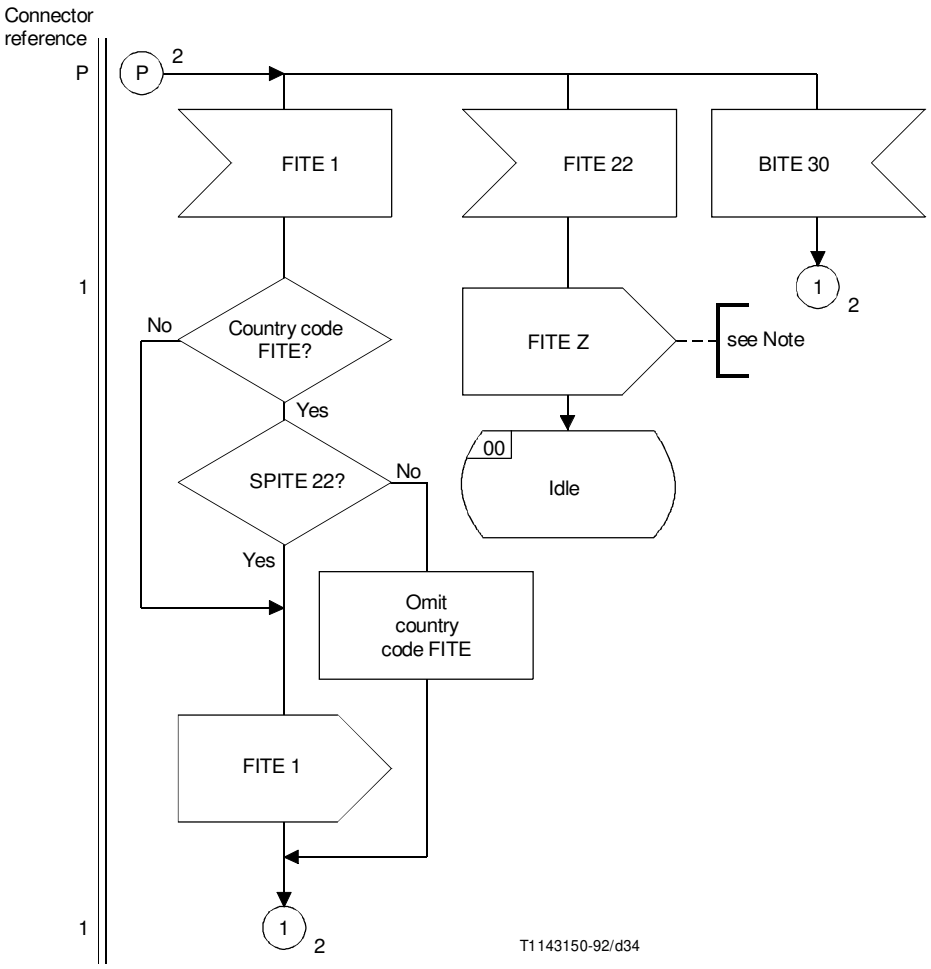


FIGURE 13/Q.1112 (sheet 1 of 5)

Interworking of INMARSAT-B to Signalling System No. 7 (ISUP)



NOTE – In principle, FITE 22 should result in cause 16. However in the case where FITE 22 results from a time out expiry cause 127 should be sent.

FIGURE 13/Q.1112 (sheet 2 of 5)

Interworking of INMARSAT-B to Signalling System No. 7 (ISUP)

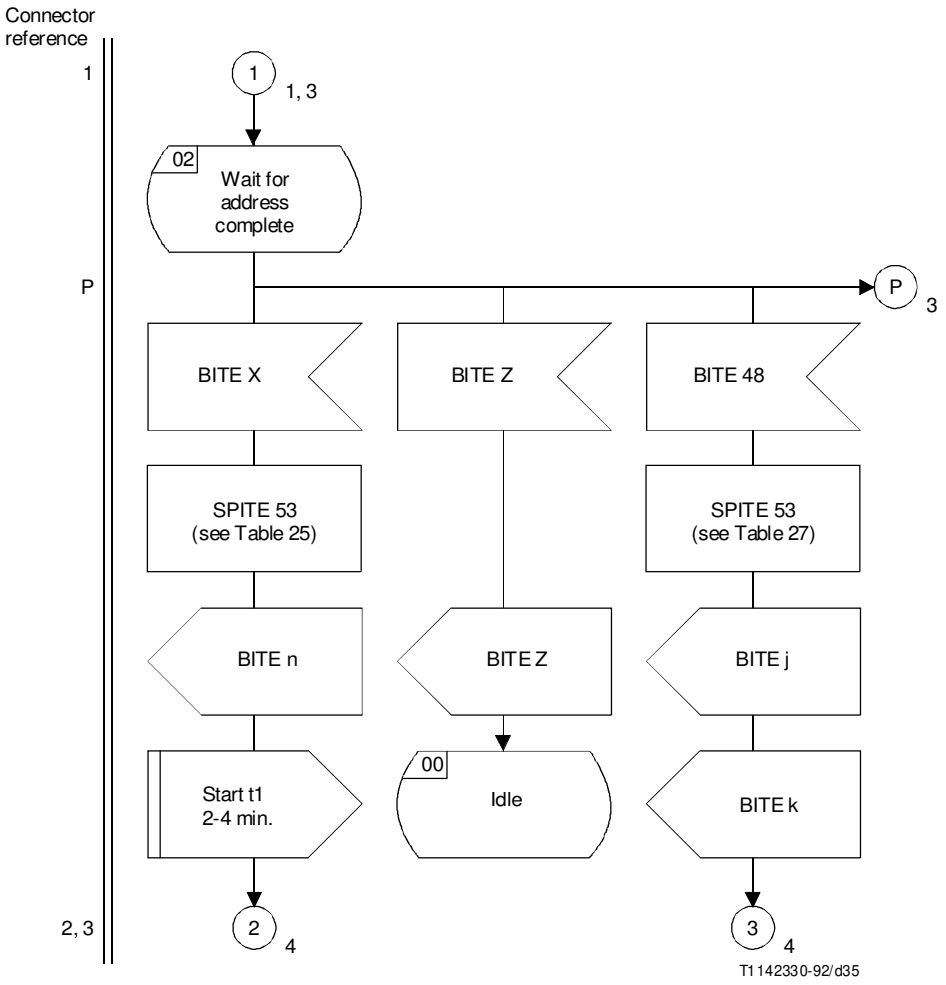
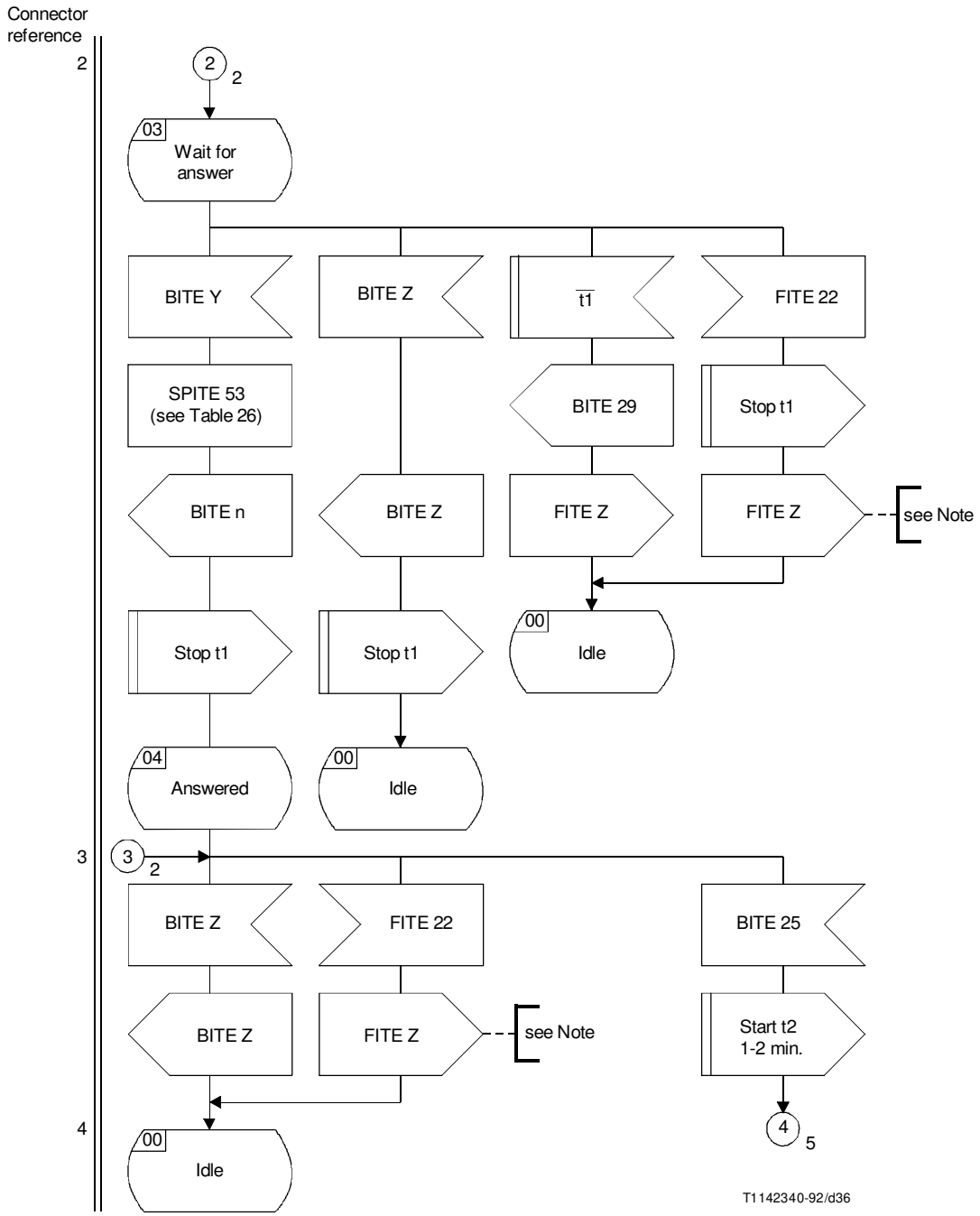


FIGURE 13/Q.1112 (sheet 3 of 5)

Interworking of INMARSAT-B to Signalling System No. 7 (ISUP)



NOTE – In principle, FITE 22 should result in cause 16. However in the case where FITE 22 results from a time out expiry cause 127 should be sent.

FIGURE 13/Q.1112 (sheet 4 of 5)

Interworking of INMARSAT-B to Signalling System No. 7 (ISUP)

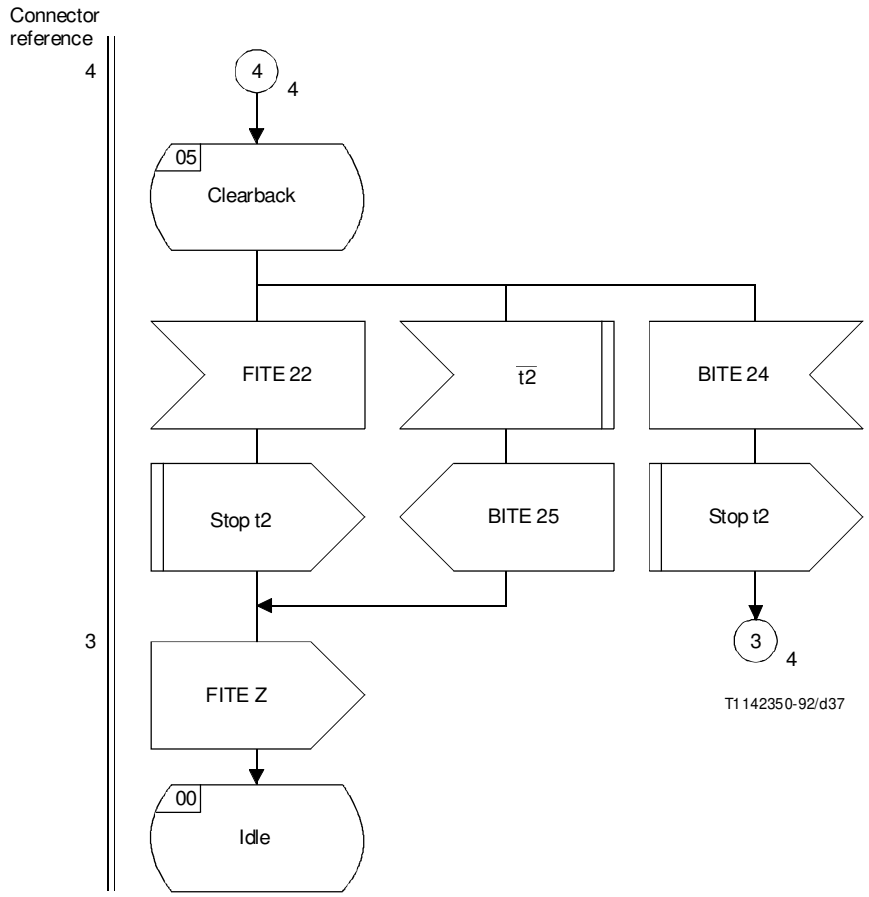


FIGURE 13/Q.1112 (sheet 5 of 5)

Interworking of INMARSAT-B to Signalling System No. 7 (ISUP)

TABLE 21/Q.1112

	Received BITES
Backward call indicators in ACM	5
Charging indicator Called party's status Called party's category Interworking indicator	10 01 00 1

TABLE 22/Q.1112

Received BITES (Release)	Cause sent	Location
12	34	1010
15	1	1010
16	17	1010
17	27	1010
20	4	1010
25	16	1010

TABLE 23/Q.1112

Backward call indicators in ANM
ANM without backward call indicators is to be sent

TABLE 24/Q.1112

FITE A construction – Interworking of INMARSAT-B to ISUP

Calling party's category (CPC)

Received FITE	CPC
17	1010
18	1011
19	1100

Continuity check indicator (CCH)

SPITE 36	CCH
Yes	01
No	00

Nature of address indicator (NAI)

SPITE 22	NAI
Yes	100
No	011

Satellite indicator (SI): SI = 1

Echo control indicator (ECI)

SPITE 21	ECI
Yes	1
No	0

Transmission medium requirements (TMR)

Received FITE	MTR
17	11
18	11
19	For futher study

Closed user group interlock code

SPITE 51	
Yes	–
No	Set CUG interlock code

TABLE 25/Q.1112

BITE X analysis – Interworking of INMARSAT-B to ISUP

Received BITE X			BITE n to be sent
CH	ST	CAT	
00	00	00	BITE 27
00	00	01	BITE 27
00	00	10	BITE 27
00	01	00	BITE 5
00	01	01	BITE 5
00	01	10	BITE 7
01	00	00	BITE 27
01	00	01	BITE 27
01	00	10	BITE 27
01	01	00	BITE 6
01	01	01	BITE 6
01	01	10	BITE 7
10	00	00	BITE 27
10	00	01	BITE 27
10	00	10	BITE 27
10	01	00	BITE 5
10	01	01	BITE 5
10	01	10	BITE 7

CH Charge indicator
ST Called party's status indicator
CAT Called party's category indicator

TABLE 26/Q.1112

BITE Y analysis – Interworking of INMARSAT-B to ISUP

Received BITE Y CH	BITE to be sent
–	BITE 22
00	BITE 22
01	BITE 23
10	BITE 22

CH Charge indicator

TABLEAU 27/Q.1112

Analyse CONNEXION – Interfonctionnement entre le système INMARSAT, de norme B, et le sous-système utilisateur du RNIS (ISUP)

Champs CONNEXION reçus			BITE j	BITE k
CH	ST	CAT		
00	00	00	BITE 27	BITE 22
00	00	01	BITE 27	BITE 22
00	00	10	BITE 27	BITE 22
00	01	00	BITE 5	BITE 22
00	01	01	BITE 5	BITE 22
00	01	10	BITE 7	BITE 22
01	00	00	BITE 27	BITE 23
01	00	01	BITE 27	BITE 23
01	00	10	BITE 27	BITE 23
01	01	00	BITE 6	BITE 23
01	01	01	BITE 6	BITE 23
01	01	10	BITE 7	BITE 23
10	00	00	BITE 27	BITE 22
10	00	01	BITE 27	BITE 22
10	00	10	BITE 27	BITE 22
10	01	00	BITE 5	BITE 22
10	01	01	BITE 5	BITE 22
10	01	10	BITE 7	BITE 22