



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.1112

(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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.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

	<i>Page</i>
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

Recommendation Q.1112

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 apply 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	–	

Connector
reference

1

1

3

1

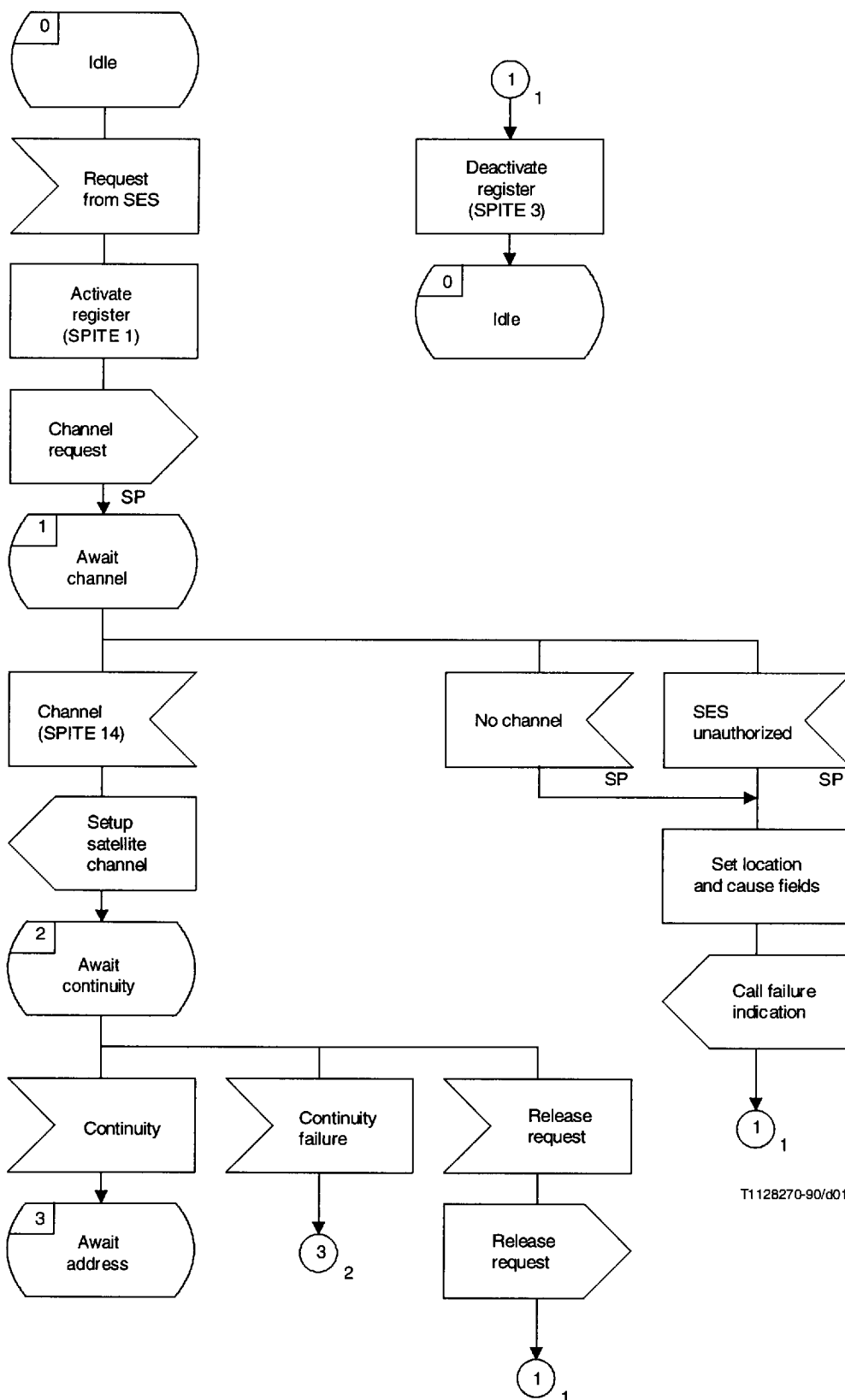
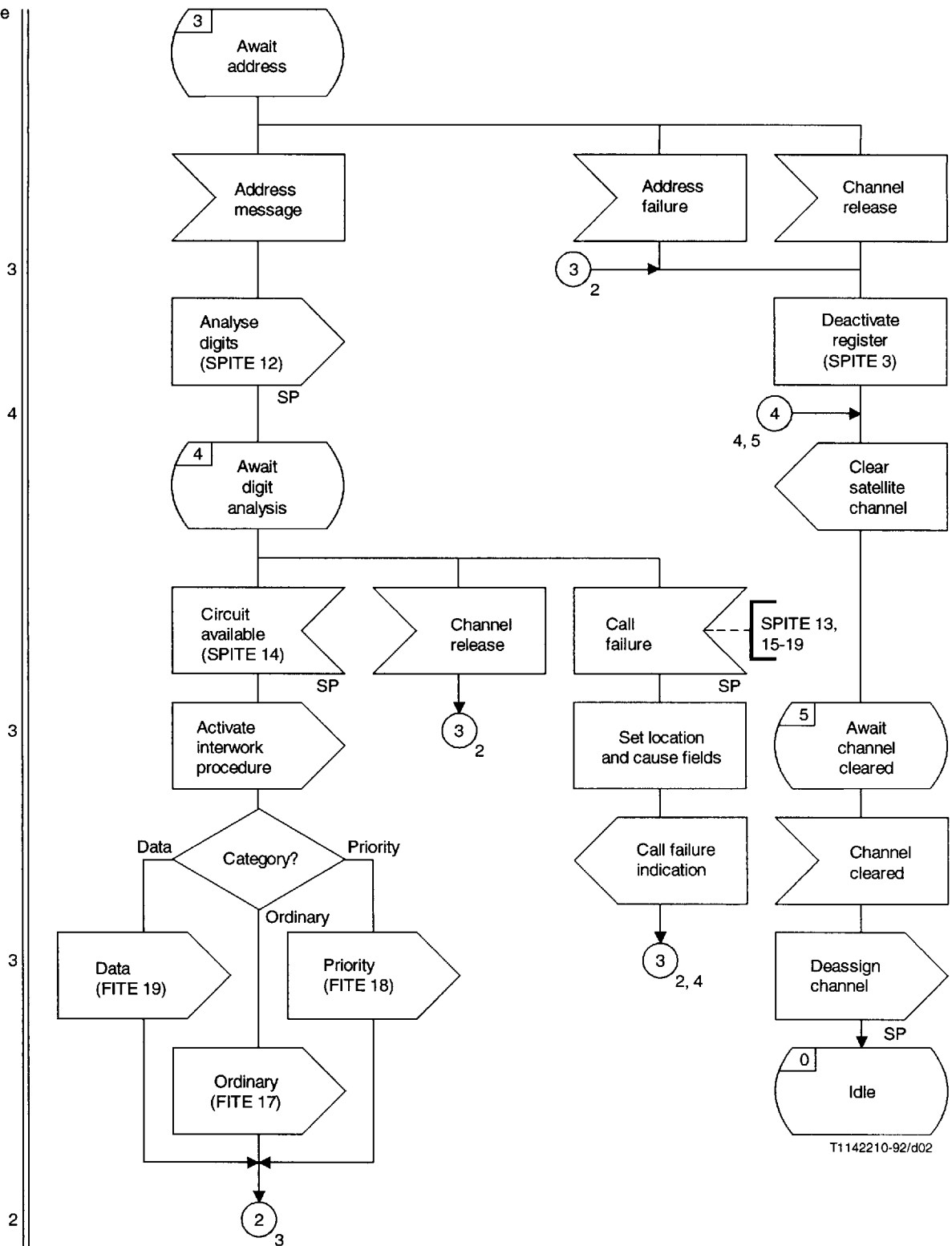


FIGURE 1/Q.1112 (sheet 1 of 5)

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



T1142210-92/d02