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OF ITU

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SERIES Q: SWITCHING AND SIGNALLING

International automatic and semi-automatic working – Signalling for circuit multiplication equipment

Signalling between International Switching Centres (ISC) and Digital Circuit Multiplication Equipment (DCME) including the control of compression/decompression

ITU-T Recommendation Q.50.1

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ITU-T Recommendation Q.50.1

Signalling between International Switching Centres (ISC) and Digital Circuit Multiplication Equipment (DCME) including the control of compression/decompression

Summary

This Recommendation describes a signalling interface between an International Switching Centre (ISC) and a Digital Circuit Multiplication Equipment (DCME) that has the additional (compared to ITU-T Q.50) capability to control the compression/decompression function of the DCME. This signalling interface provides for the call by call control of a DCME in real time.

Source

ITU-T Recommendation Q.50.1 was prepared by ITU-T Study Group 11 (2001-2004) and approved under the WTSA Resolution 1 procedure on 13 July 2001.

Keywords

DCME.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. 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 Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

CONTENTS

ITU-T Recommendation Q.50.1

Signalling between International Switching Centres (ISC) and Digital Circuit Multiplication Equipment (DCME) including the control of compression/decompression

1 Scope

This Recommendation describes a signalling interface between an International Switching Centre (ISC) and a Digital Circuit Multiplication Equipment (DCME) with a built in device controller that allows a per call control of various functions in the DCME in real time. It is based on the interface described in ITU-T Q.50 [1]. In addition to the functions described in [1] that can be controlled by the switch, the compression/decompression function in the DCME can also be controlled.

The DCME is of type 2 (see ITU-T Q.50 [1]).

This interface is supported in E1-networks.

The signalling interface defined in this Recommendation assumes a fixed relationship between the circuits of the ISC and the DCME.

While this Recommendation is intended for use on international networks, the information defined here may be used within national networks.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

[1] ITU-T Q.50 (2001), *Signalling between Circuit Multiplication Equipment (CME) and International Switching Centers (ISC)*.

[1'] ITU-T Q.50 (1998), *Implementor's Guide*.

[2] ITU-T G.763 (1998), *Digital circuit multiplication equipment using G.726 ADPCM and digital speech interpolation*.

[3] ITU-T G.767 (1998), *Digital circuit multiplication equipment using 16 kbit/s LD-CELP, digital speech interpolation and facsimile demodulation/remodulation*.

[4] ITU-T G.768 (2001), *Digital circuit multiplication equipment using 8 kbit/s CS-ACELP*.

[5] ITU-T G.704 (1998), *Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels*.

3 Definitions

This Recommendation uses the following terms:

3.1 Channel Associated Signalling (CAS): CAS refers to the channel associated signalling referred to in G.704 [5].

3.2 E1 Facility: A transmission link operating at 2048 kbit/s, supporting 30 or 31 64 kbit/s channels.

3.3 **external**: A device is called external, when it is located outside of the switch.

4 Abbreviations

This Recommendation uses the following abbreviations:

CAS Channel Associated Signalling

CCF Call Control Function

DCME Digital Circuit Multiplication Equipment

DCMECF DCME Control Function

DCMESF DCME Switching Function

ISC International Switching Centre

5 Requirements

The protocol used between the ISC and the DCME must include the control signals/messages for the control of the compression/decompression function in the DCME.

6 Conceptual Model

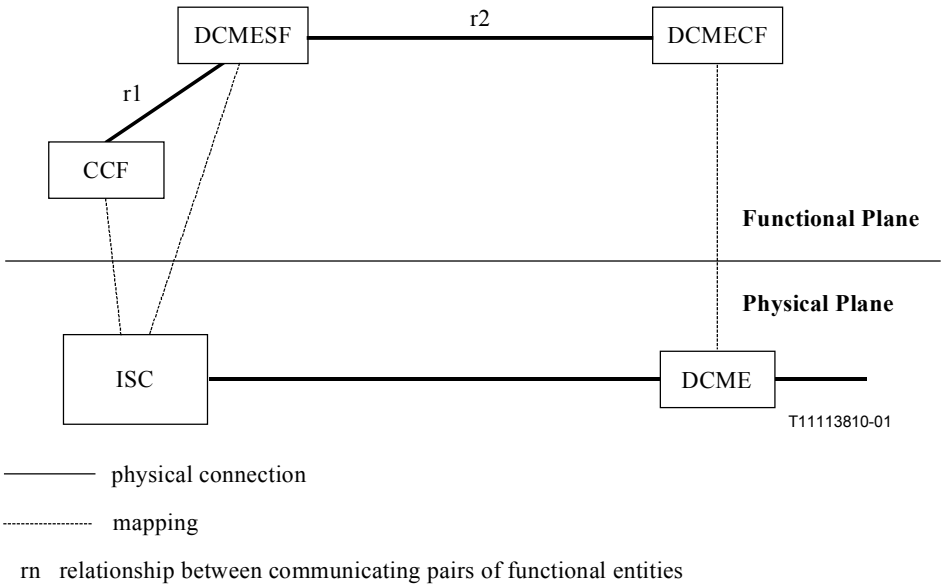


Figure 1/Q.50.1 – Conceptual methodology model

A master slave relation exists between the DCME switching function (located in the switch) and the DCME control function (located in the DCME).

7 Network Architecture

7.1 E1-Network

The DCME has a physical interface according to ITU-T G.704 [5] which allows the DCME to be inserted in an E1 transmission facility. The control channel is embedded in time slot 16 (CAS mode: a, b and d bit) of the E1 transmission facility. The use of time slot 16 in 2048 Kbit/s networks for channel associated signalling is defined in ITU-T G.704 [5].

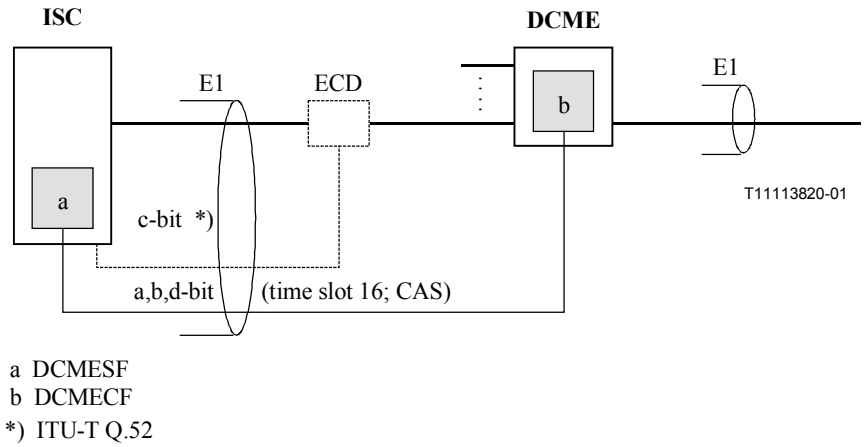
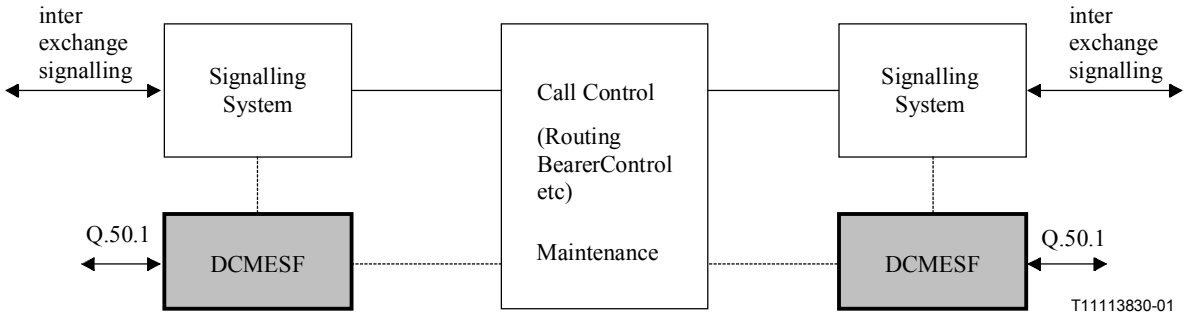


Figure 2/Q.50.1 – ISC-DCME Interface in an E1-Network

7.2 International Switching Centre

The ISC provides an E1 circuit interface and a control channel interface. The ISC also provides the logic to decide on a per call basis the control info to be sent to the DCME. The control info is conveyed to the DCME via a control channel, see clause 10.



NOTE – Communication between DCMESF and Call Control can either be direct or via the Signalling System Process

Figure 3/Q.50.1 – Process Diagram

7.3 Digital Circuit Multiplication Equipment

The DCME provides an E1 circuit interface and a control channel interface. The compression/decompression function can be enabled/disabled for each circuit individually.

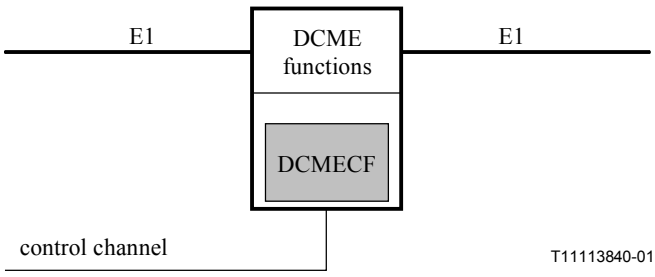


Figure 4/Q.50.1 – Digital Circuit Multiplication Equipment

8 Protocol

8.1 Information elements

The information elements supported by this Recommendation are the same as in ITU-T Q.50 [1] added by those contained in Table 1.

Table 1/Q.50.1 – Information elements for the control of compression/decompression

Type of information element		Notes	Direction of the information element
1.1	compression/decompression not allowed	Sent to inform the "outgoing" DCME do not compress/decompress the bit stream, when a 3.1 kHz/speech select/seizure was sent to the DCME	ISC → DCME
1.2	decompression/compression not allowed	Sent to inform the "incoming" DCME do not decompress/compress the bit stream	ISC → DCME

8.2 SDL

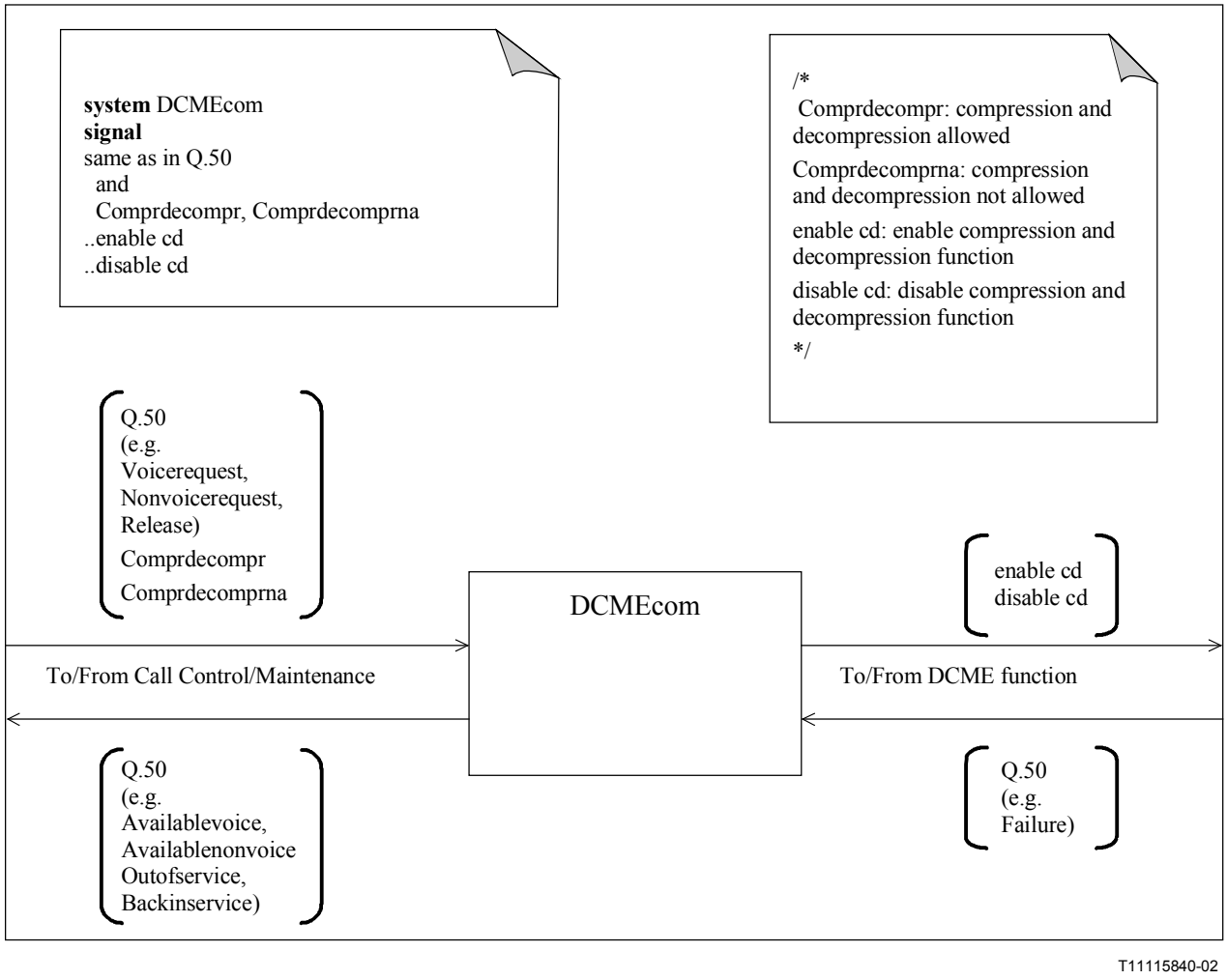


Figure 5/Q.50.1 – System "DCME communication"

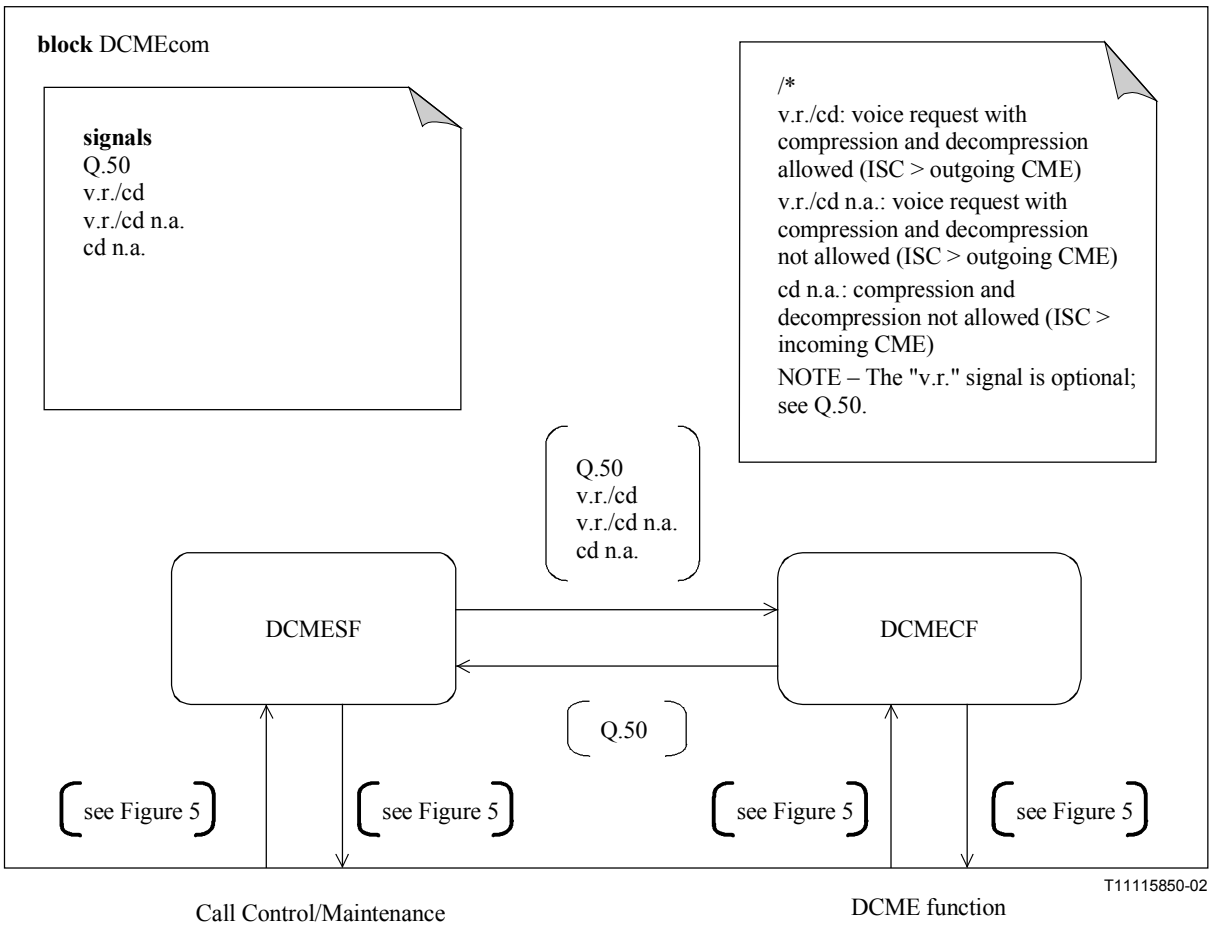


Figure 6/Q.50.1 – Block "DCME communication"

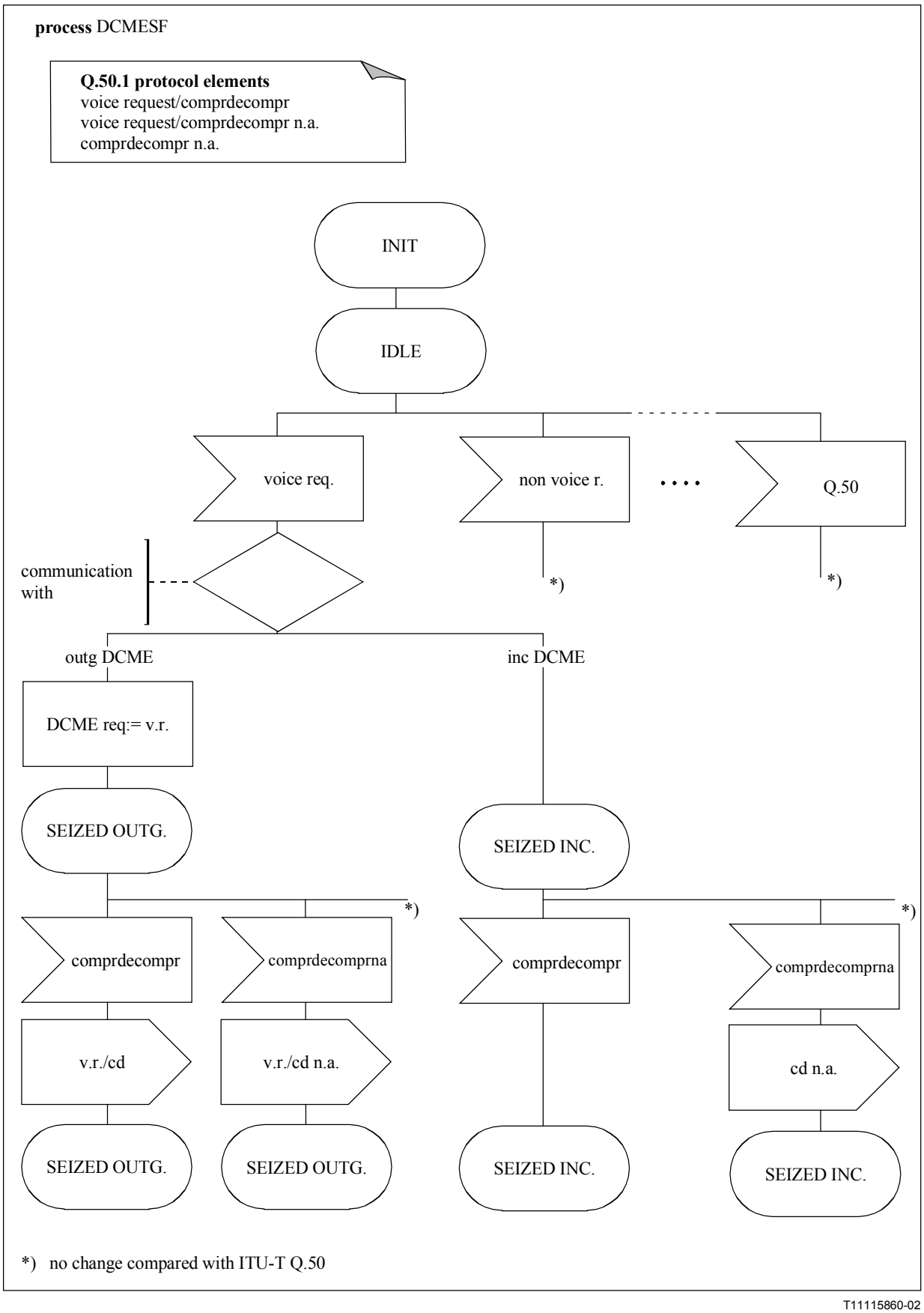


Figure 7/Q.50.1 – "Process DCMESF"

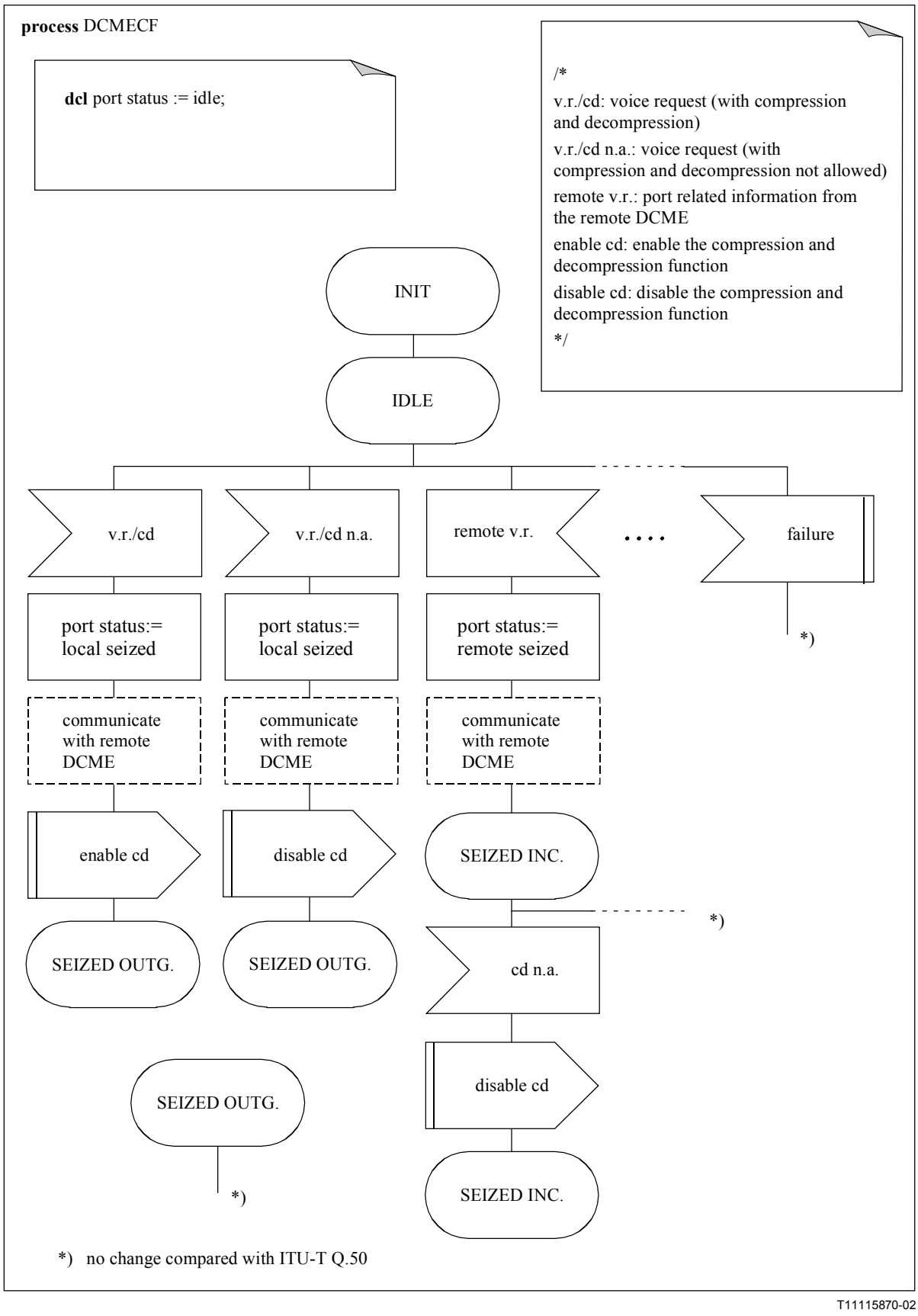


Figure 8/Q.50.1 – "Process DCMECF"

Annex A

Interface based on time lot 16 (frame 0-15)

NOTE – This annex is for further study.

Annex B

Interface based on time slot 16 (frame 1-15)

B.1 Protocol

B.1.1 Coding

Table B.1/Q.50.1 – Signals

Signal No.	Type of signal	Direction ISC-DCME	Bits a, b and d of TS16		Group of information element
			Forward a_f b_f d_f	Backward a_b b_b d_b	
1	Circuit available for 64 kbit/s	←	1 0 1	1 0 1	
2	Circuit available for 3.1 kHz data, speech	←	1 0 1	0 1 1	Load control
3	Circuit not available	←	1 0 1	0 0 1	
4	64 kbit/s seizure	→	1 1 1	1 0 1	
5	3.1 kHz/speech seizure	→	0 1 1	0 1 1	
		→	(0 1 1	1 0 1) (Note)	
6	64 kbit/s positive acknowledgment	←	1 1 1	0 1 1	
7	3.1 kHz/speech positive acknowledgement	←	0 1 1	1 0 1	Seizure Release
		←	(0 1 1	0 1 1) (Note)	
8	Release 64 kbit/s	→	1 0 1	0 1 1	
9	Release 3.1 kHz/speech	→	1 0 1	1 0 1	
		→	(1 0 1	0 1 1) (Note)	
10	Maintenance release signal (after 3.1 kHz, speech seizure)	←	0 1 1	0 0 1	
11	Maintenance release signal (after 64 kbit/s seizure)	←	1 1 1	0 0 1	
12	Maintenance release acknowledgement	→	0 0 1	0 0 1	

Table B.1/Q.50.1 – Signals

Signal No.	Type of signal		Direction ISC-DCME	Bits a, b and d of TS16		Group of information element
				Forward a_f b_f d_f	Backward a_b b_b d_b	
13	CME clear of traffic		→	1 0 1	0 0 1	Maintenance
14	Out-of-service	a	←	0 0 1	1 1 1	
		b	←	0 1 1	1 1 1	
		c	←	1 0 1	1 1 1	
		d	←	1 1 1	1 1 1	
15	Out-of-service acknowledgement		→	0 0 1	1 1 1	
16	Back-in-service		←	0 0 1	0 1 1	
17	3.1 kHz/speech seizure and compression/decompression not allowed		→	0 1 0	0 1 1	Compression and Decompression
			→	(0 1 0	1 0 1) (Note)	Control
18	decompression/compression not allowed		→	1 0 0	1 0 1 (Note)	
			→	1 0 0	0 1 1	

NOTE – This bit combination is required only if 3.1 kHz/speech seizure is to be permitted for circuits marked available for 64 kbit/s.

Signals 1 to 16 are the same as in Annex B/Q.50 [1]; with the d-bit = 1.

B.1.2 Procedures

If on both the incoming circuit and the outgoing circuit DCMEs are present and using the same coding for compression the DCMEs on the incoming and on the outgoing circuit will be informed that compression and decompression are not allowed. Signal 17 is sent to the outgoing DCME and signal 18 is sent to the incoming DCME.

The DCME when receiving signal 17 or 18 will not apply the compression/decompression function for that circuit.

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