

1995 ED.

AS/NZS 4064(Int):1995
Information technology—
Telecommunications and
information exchange between
systems—Private telecom-
munications networks—Digital
channel aggregation
(ISO/IEC DIS 13871)
(Expires 5 November 1997)
(In Professional Package 26A)

90pp JJ

Defines a set of procedures used
in the provision of higher
bandwidth digital bi-directional
channels by combining multiple
switched or non-switched
56 kbit/s or 64 kbit/s digital
bearer channels across public or
private networks. This Interim
Standard is identical with and
has been reproduced from
ISO/IEC DIS 13871.

(IT/16): Supersedes AS 4064—1992;
DR 94160: Publication date 1995-11-05.

Australian Standard®

Information processing—Digital channel aggregation ($N \times 64$)



STANDARDS AUSTRALIA



This Australian Standard was prepared by Committee IT/18, Digital Channel Aggregation. It was approved on behalf of the Council of Standards Australia on 9 July 1992 and published on 14 September 1992.

The following interests are represented on Committee IT/18:

AUSTEL

Australia Post

Australian and Overseas Telecommunications Corporation

Australian Electrical and Electronic Manufacturers Association

Australian Information Industry Association

Australian Telecommunications User Group

Optus Communications

Review of Australian Standards. To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

Australian Standard®

**Information processing—Digital
channel aggregation (N × 64)**

First published as AS 4064—1992.

PREFACE

This Standard was prepared by the Standards Australia Committee on Digital Channel Aggregation. It is the continuation of work started in AUSTEL Working Group 11/1, Digital Bandwidth Aggregation.

Although the content of this Standard may be compared with the provisions of CCITT Recommendation H.221: 1988, *Frame structure for a 64 to 1920 kbit/s channel in audiovisual teleservices*, this Standard has a different area of application and is capable of providing wider bandwidth over a switched network.

CCITT Recommendations are applied throughout this Standard where appropriate.

CONTENTS

	<i>Page</i>
FOREWORD	3
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	4
1.2 APPLICATION	4
1.3 REFERENCED DOCUMENTS	4
1.4 DEFINITIONS	4
SECTION 2 ISDN SERVICE DEFINITION	
2.1 INTRODUCTION	6
2.2 DESCRIPTION	6
2.3 PROCEDURES	6
2.4 TERMINATING THE AGGREGATED CALL	7
SECTION 3 ISDN CALL ESTABLISHMENT PROCEDURES	
3.1 SCOPE	8
3.2 BEARER CHANNEL ESTABLISHMENT METHOD	8
3.3 AGGREGATED CALL DISCONNECTION	11
3.4 ERROR ACTIONS	11
3.5 CHANNEL RECOVERY FOR ESTABLISHED CALLS	11
3.6 INTERWORKING WITH 56kbit/s NETWORKS	11
SECTION 4 CHANNEL AGGREGATION PROTOCOL	
4.1 BASIC METHOD	12
4.2 USAGE OF I-STREAM BITS	17

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

FOREWORD

Channel aggregation is achieved by splitting high-bandwidth user data into a number of lower-bandwidth channels, transmitting these channels across a network, and extracting and reassembling the data at the remote end of the network.

In general each individual lower-bandwidth channel may be routed through a network differently to the others that comprise the aggregation, resulting in different time delays between the channels. Accordingly, it is necessary to have some in-band method of not only distinguishing the channels belonging to the aggregation, and their order in it, but also to provide timing information to enable compensation for the differential delays.

The Standard typically applies to user equipment connected to an ISDN service which supports channels of 64 kbit/s. It covers both the protocol used to transmit the high-bandwidth user data and the call establishment procedures to be used to establish the call. The call establishment procedures also cover the interworking of 64 kbit/s networks with 56 kbit/s equipment or networks.

Examples of applications that could utilize this service include:

- (a) Audiovisual applications.
- (b) Broad-band data exchange.
- (c) Graphical information exchange.

The Standard may be employed in any situation where it is desired to use a number of lower-bandwidth channels to transport a high-bandwidth user data stream. If used in a non-ISDN application then much of the call setup procedure may not apply.

STANDARDS AUSTRALIA

Australian Standard

Information processing—Digital channel aggregation ($N \times 64$)

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard defines a means of creating a high-bandwidth digital bidirectional channel using multiple lower-bandwidth digital channels. This procedure is called channel aggregation. The lower-bandwidth channels may be switched or non-switched.

1.2 APPLICATION This Standard is divided into four Sections. It defines the aggregated bearer service from an ISDN user's perspective (Section 2), specifies the ISDN call establishment procedures (Section 3), and describes the channel aggregation protocol (Section 4). Section 4 is applicable to both ISDN and non-ISDN networks.

1.3 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS

2571 Information processing systems—Data communications—High-level data link control elements of procedures

AUSTEL

TS 013 General requirements for customer equipment connected to ISDN basic rate access

TS 014 General requirements for customer equipment connected to ISDN primary rate access

CCITT

Rec I.210 Principles of telecommunication services supported by an ISDN and the means to describe them

Rec I.231 Circuit-mode bearer service categories

Rec I.411 ISDN user-network interfaces—Reference configurations

Rec I.412 ISDN user-network interfaces—Interface structures and access capabilities

Rec G.704 Synchronous frame structures used at primary and secondary hierarchical levels

Rec Q.71 ISDN 64 kbit/s circuit mode switched bearer services

Rec V.110 Support of data terminal equipments (DTEs) with V-series type interfaces by an integrated services digital network (ISDN)

1.4 DEFINITIONS For the purpose of this Standard, the definitions below apply.

1.4.1 Aggregated call—a call that associates together a number of communications channels effectively providing a higher-bandwidth channel whose capacity approaches that of the sum of the lower-bandwidth channels used.

1.4.2 B-channel—a 64 kbit/s bidirectional communications channel used to carry user information such as voice, circuit-switched or packet-switched data (see CCITT Rec. I.412).

1.4.3 Bearer channel—an individual connection between two end points, a number of which provide the aggregated data stream.

1.4.4 Bearer channel number—the number given by the channel identifier associated with a particular bearer channel within an aggregated data stream. This is unrelated to the position of the time slots carrying these channels across a physical interface.

1.4.5 Channel aggregation—a means of using a number of digital bearer channels to transport a data stream (aggregated data stream) of bandwidth greater than the individual bearer channels.

1.4.6 Channel identifier—an integer in the range 1 to 1022 used to identify individual bearer channels within an aggregation, or the total number of bearer channels within an aggregation (see Clause 4.2.2.7).

1.4.7 Channel identifier flag (CF)—a single bit used to identify the first bearer channel within an aggregation. When this bit is set, it identifies the channel as bearer channel 1, and indicates that the associated channel identifier represents the value of the user data rate multiplier, P, rather than the bearer channel number (see Clause 4.2.2.8).

1.4.8 D-channel—a 16 kbit/s or 64 kbit/s channel carrying ISDN signalling and user-to-user information (see CCITT Rec. I.412).

1.4.9 F-bit—the framing bit used in bearer channel aggregation.