



ISO/IEC 14165-321

Edition 1.0 2009-11

INTERNATIONAL STANDARD

**Information technology – Fibre channel –
Part 321: Audio video (FC-AV)**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE



ICS 35.200

ISBN 2-8318-9016-0

PATENT STATEMENT

CAUTION: The developers of this standard have requested that holder's of patents that may be required for the implementation of the standard, disclose such patents to the publisher. However, neither the developers nor the publisher have undertaken a patent search in order to identify which, if any, patents may apply to this standard.

As of the date of publication of this standard and following calls for the identification of patents that may be required for the implementation of the standard, no such claims have been made. No further patent search is conducted by the developer or the publisher in respect to any standard it processes. No representation is made or implied that licenses are not required to avoid infringement in the use of this standard.

Table of Contents

FOREWORD	12
INTRODUCTION	14
1 Scope	15
2 Normative references	15
3 Terms, definitions, abbreviations, keywords and conventions	17
3.1 Terms and definitions	17
3.2 Abbreviations and acronyms	19
3.3 Keywords	20
3.4 Conventions	20
4 Structure and concepts	22
4.1 Relationship with FC-FS	22
4.2 FC-AV Container system	22
4.3 Simple Content Movement	22
4.3.1 Overview	22
4.3.1.1 General	22
4.3.1.2 Content Movement layer	23
4.3.1.3 Content Transport layer	23
4.4 Frame Header Control Protocol	23
5 FC-AV Containers	24
5.1 Overview	24
5.2 The FC-AV Container system	25
5.2.1 Overview	25
5.2.2 The FC-AV Container	25
5.2.3 FC-AV concepts for Containers in Simple mode	25
5.3 Container Header structure	26
5.4 Description of Container Header contents	27
5.4.1 Container Information Block	27
5.4.2 Object Information Block	28
5.5 Extended Header description	28
5.6 Object classification system	29
5.6.1 Object classification overview	29
5.6.2 Object Type byte	31
5.6.2.1 General	31
5.6.2.2 Null Object	31
5.6.2.3 Video, uncompressed	31
5.6.2.4 Video, compressed	31
5.6.2.5 Reserved for future Video	31
5.6.2.6 Compressed FC-AV stream (Video Program)	31
5.6.2.7 Reserved for Video Program (multiplexed stream)	31
5.6.2.8 Graphics	31
5.6.2.9 Reserved for future Graphics	31
5.6.2.10 Audio, uncompressed	32
5.6.2.11 Audio, compressed	32
5.6.2.12 Reserved for future Audio	32
5.6.2.13 Ancillary data	32
5.6.2.14 Full Stream - structures	32
5.6.2.15 Reserved for future Full Stream - structures	32
5.6.2.16 Reserved	32
5.6.2.17 Negotiated Object Types	32
5.6.2.18 Vendor Specific Object Types	32
5.6.3 Object Index bytes	32

5.6.3.1 General	32
5.6.3.2 Vendor Specific Object Indices	33
5.6.4 Object Type Defined word	33
5.6.4.1 General	33
5.6.4.2 Object Type Defined word definition for Vendor Specific classifications	33
5.6.5 Object Data Packing	34
6 Compressed FC-AV stream transmission	35
6.1 Overview	35
6.1.1 General	35
6.1.2 Stream Header	35
6.1.3 Stream descriptor	35
6.1.3.1 Overview	35
6.1.3.2 Packet type	35
6.1.3.3 Stream type	36
6.1.4 Stream Time Stamp	36
6.1.5 CDS Packet length	36
6.1.6 CDS Packet format	37
6.1.7 CDS Packet Time Stamp	37
6.1.8 Byte count	37
6.1.9 CDS Packet payload	37
6.1.10 Forward Error Correction	37
6.2 Synchronization scheme	37
6.2.1 Overview	37
6.2.2 MPEG	38
6.2.3 Frame/Field compression	38
6.3 Error management scheme	38
6.3.1 Overview	38
6.3.2 Process policy without FEC	38
6.3.3 Process policy with FEC	38
6.3.4 Discard policy with immediate retransmission	39
6.4 Instances of compressed AV streams over Fibre Channel	39
6.4.1 DV based compression stream	39
6.4.1.1 Overview	39
6.4.1.2 Stream Header	39
6.4.1.2.1 Stream descriptor	39
6.4.1.2.1.1 Packet type	39
6.4.1.2.1.2 Stream type	39
6.4.1.2.2 CDS Packet length	40
6.4.1.3 CDS Packet format	40
6.4.1.3.1 Overview	40
6.4.1.3.2 CDS Packet payload (SMPTE)	40
6.4.1.3.3 FEC	41
6.4.2 MPEG-TS	41
6.4.2.1 Overview	41
6.4.2.2 Stream Header	41
6.4.2.2.1 Stream descriptor	41
6.4.2.2.1.1 Packet type	41
6.4.2.2.1.2 Stream type	41
6.4.2.2.2 CDS Packet length	42
6.4.2.3 CDS Packet format (MPEG-TS)	42
6.4.2.3.1 Overview	42
6.4.2.3.2 CDS Packet Time Stamp	42
6.4.2.3.3 CDS Packet payload (TS Packet)	43
6.4.2.3.4 FEC	43

7	Frame Header Control Protocol	44
7.1	Overview	44
7.2	Network profile	44
7.2.1	Topology	44
7.2.2	Classes of service	44
7.2.3	Error handling	44
7.2.4	Source and Sink rules	44
7.3	Frame header control fields	45
7.3.1	Overview	45
7.3.2	Routing Control (R_CTL)	45
7.3.3	Type	45
7.3.4	Frame Control (F_CTL)	45
7.3.5	Sequence Identifier (SEQ_ID)	45
7.3.6	Sequence Count (SEQ_CNT)	46
7.3.7	Payload	46
7.4	Example FHCP network	46
8	Simple Streaming protocol for SCMA	47
8.1	Overview	47
8.2	Stream establishment	47
8.2.1	Overview	47
8.2.2	Stream states	47
8.2.3	Establish Stream request	47
8.2.4	Establish Stream response	48
8.2.5	Content Attributes for Establish Stream operations	48
8.2.5.1	Overview	48
8.2.5.2	Content Attributes for Play mode	48
8.2.5.3	Content Attributes for Record mode	48
8.3	Stream Tear-down	49
8.3.1	Overview	49
8.3.2	Stream Tear-down request	49
8.3.3	Stream Tear-down response	49
8.4	Operations on established Streams	49
8.4.1	Overview	49
8.4.2	Play operation	49
8.4.3	Record operation	50
8.4.4	Stop operation	51
8.4.4.1	Overview	51
8.4.4.2	Stop operation in Play mode	51
8.4.4.3	Stop operation in Record mode	51
8.4.4.4	Stop operation response	51
8.4.5	Pause operation	52
8.4.5.1	Overview	52
8.4.5.2	Pause operation in Play mode	52
8.4.5.3	Pause operation request in Record mode	52
8.4.5.4	Pause operation response	52
8.4.6	Resume operation	52
8.4.6.1	Overview	52
8.4.6.2	Resume operation request for Play mode	52
8.4.6.3	Resume operation request in Record mode	53
8.4.6.4	Resume operation response	53
8.5	Operation notifications	53
8.5.1	Overview	53
8.5.2	Operation Complete notification	53
8.5.2.1	Overview	53

8.5.2.2 Streams in Play mode	53
8.5.2.3 Streams in Record mode	54
8.5.3 Operation Error notification	54
8.6 Content Movement transactions	54
8.6.1 Overview	54
8.6.2 Content Movement request	55
8.6.3 Content Movement response	55
8.7 Simple Streaming data format	56
8.7.1 Overview	56
8.7.2 SSRB format	56
8.7.2.1 Overview	56
8.7.2.2 Revision field	56
8.7.2.3 Request Identifier	56
8.7.2.4 Streaming Operation code	57
8.7.2.5 Reason Code field	57
8.7.2.6 Reason Code explanation	57
8.7.2.7 Vendor Unique field	57
8.7.2.8 Operation specific data	57
8.7.3 Simple Streaming operation requests	58
8.7.4 Simple Streaming responses	58
8.7.4.1 Overview	58
8.7.4.2 Negative operation response	58
8.7.4.3 Positive Operation response	59
8.7.5 Simple Streaming operation data	59
8.7.5.1 Overview	59
8.7.5.2 Establish Stream (ESST) operation	60
8.7.5.2.1 Overview	60
8.7.5.2.2 Stream Mode	60
8.7.5.2.3 Content name	60
8.7.5.2.4 Content Attributes	61
8.7.5.2.4.1 Content Type	61
8.7.5.2.4.2 Access Control Field	61
8.7.5.2.4.3 Frame rate	61
8.7.5.2.4.4 Total frames	61
8.7.5.2.4.5 Maximum frame size	61
8.7.5.2.4.6 Total Time	62
8.7.5.2.5 Stream Identifier	62
8.7.5.3 Tear-Down Stream (TDST) operation	62
8.7.5.4 Stop (STP) operation	62
8.7.5.5 Pause (PAS) operation	62
8.7.5.6 Resume (RSM) operation	62
8.7.5.7 Play (PLY) operation	63
8.7.5.7.1 Overview	63
8.7.5.7.2 Format field	63
8.7.5.7.3 Begin Relative Range field	63
8.7.5.7.4 End Relative Range field	63
8.7.5.7.5 Begin Relative Time field	64
8.7.5.7.6 End Relative Time field	64
8.7.5.8 Record (RCD) operation	64
8.7.6 Simple Streaming Notifications	64
9 Simple Streaming protocol - SCSI-3 FCP mapping	66
9.1 Overview	66
9.2 Client and Server requirements	66
9.2.1 Classes of service	66

9.2.2 Topology	66
9.2.3 Quality of Service for Classes 1, 2, and 3	66
9.2.4 Quality of Service for Class 4	66
9.2.5 Login	66
9.2.5.1 Fabric Login	66
9.2.5.2 Port Login	67
9.2.5.3 Process Login	67
9.3 Establish Stream operation using SCSI-3 FCP	67
9.3.1 Overview	67
9.3.2 Establish Stream request	67
9.3.3 Establish Stream response	68
9.4 Stream Tear-down operation using SCSI-3 FCP	69
9.4.1 Overview	69
9.4.2 Stream Tear-down request	69
9.4.3 Stream Tear-down response	69
9.5 Play operation using SCSI-3 FCP	70
9.5.1 Overview	70
9.5.2 Play operation request	70
9.5.3 Play operation response	71
9.6 Record operation using SCSI-3 FCP	72
9.6.1 Overview	72
9.6.2 Record operation request	72
9.6.3 Record operation response	72
9.7 Stop operation using SCSI-3 FCP	73
9.7.1 General	73
9.7.2 Stop operation Request	73
9.7.3 Stop operation response	73
9.8 Pause operation using SCSI-3 FCP	74
9.8.1 Overview	74
9.8.2 Pause operation request	74
9.8.3 Pause operation response	75
9.9 Resume operation using SCSI-3 FCP	76
9.9.1 Overview	76
9.9.2 Resume operation request	76
9.9.3 Resume operation response	76
9.10 Operation Complete notification using SCSI-3 FCP	77
9.11 Operation Error notification using SCSI-3 FCP	78
9.12 SCMA Content Movement transaction	79
9.12.1 Overview	79
9.12.2 SCMA Content Movement from the server to the client (Play operations).	79
9.12.3 SCMA Content Movement from the client to the server (Record operations).	79
Annex A (normative)	80
A.1 Overview	80
A.2 Container Header format	80
A.2.1 Overview	80
A.2.2 Container Count	80
A.2.3 Clip ID	80
A.2.4 Container Time Stamp	80
A.2.5 Transmission type	80
A.2.5.1 Video frame rate	80
A.2.5.2 Transmission rate	80
A.2.6 Container type	81
A.2.6.1 Mode	81
A.2.6.2 Number of Objects	81

A.2.6.3 Size of Extended Header	81
A.2.7 Object Information Block	81
A.2.7.1 Object n Type	81
A.2.7.2 Object n Link Pointer	81
A.2.7.3 Object n Index	81
A.2.7.4 Object n Size	81
A.2.7.5 Object n Offset	81
A.2.7.6 Object n Type defined	81
A.3 Object description	82
A.3.1 General	82
A.3.2 Object 0– Ancillary Data – Uncompressed Video	83
A.3.2.1 General	83
A.3.2.2 Object 0 Word 0	83
A.3.2.2.1 Number of Rows	83
A.3.2.2.2 Number of Columns	84
A.3.2.2.3 Frame/Field Based Video	84
A.3.2.3 Object 0 Word 1	85
A.3.2.3.1 Color Information	85
A.3.2.3.2 Pixel Aspect ratio	85
A.3.2.3.3 Pixel Array order	86
A.3.2.3.4 Packing Table number	86
A.3.2.3.5 Bits per subpixel (n)	87
A.3.2.4 Object 0, Words 2 and 3 – User Defined words	87
A.3.2.5 Object 0 Words 4-259 Ancillary Object Color palette	88
A.3.3 Object 1 - Audio data	88
A.3.4 Objects 2 and 3 - Video data	88
A.4 Profile examples (Informative)	89
A.4.1 Monochrome Video example	89
A.4.2 RGB Video example	91
Annex B (normative)	93
B.1 Type 10h characteristics	93
B.1.1 Overview	93
B.1.2 Object Type Defined Word assignment	93
B.1.3 Data packing guidelines	93
B.1.4 Sample Packing, Video types defined in SMPTE and ITU	93
B.1.4.1 Frame start for Full content - Reference SMPTE 125M-1995	93
B.1.4.1.1 Frame mode 525 line/29.97 Hz systems	93
B.1.4.1.2 Field mode 525 line/59.94 Hz systems	93
B.1.4.1.3 Frame mode 625 line/25 Hz systems	93
B.1.4.1.4 Field mode 625 line/50 Hz systems	93
B.1.4.2 Sample mapping active video only	93
B.1.4.2.1 General	93
B.1.4.2.2 Frame mode 525/29.97 systems	94
B.1.4.2.3 Field mode 525/59.94 systems	94
B.1.4.2.3.1 General	94
B.1.4.2.3.2 8-Bit Sample Case	94
B.1.4.2.3.3 10-Bit Sample Case	95
B.1.4.3 NTSC 4fsc Case	96
B.1.5 Type 10h table	97
B.2 Type 11h characteristics	98
B.3 Type 20h characteristics	98
B.3.1 Overview	98
B.3.2 Type 20h table	98
B.4 Type 30h characteristics	98

B.5 Type 40h characteristics	98
B.5.1 Overview	98
B.5.2 Type 40h table	98
B.5.3 Data packing guidelines.	98
B.6 Type 41h characteristics	100
B.7 Type 60h characteristics	100
B.7.1 Overview	100
B.7.2 Type 60h table	100
Annex C (informative)	101
C.1 Fields, frames and interlace	101
C.2 Colorimetry	101
C.3 Gamma correction	101
C.4 RGB	101
C.5 YUV.	101
C.6 Video formats	102
C.6.1 Overview	102
C.6.2 Standard-Definition Television.	102
C.6.2.1 General	102
C.6.2.2 Composite Analog Video	102
C.6.2.2.1 Overview.	102
C.6.2.2.2 NTSC	102
C.6.2.2.3 PAL.	103
C.6.2.2.4 SECAM.	103
C.6.2.3 Component Analog Video	103
C.6.2.3.1 RGB	103
C.6.2.3.2 YUV	103
C.6.2.4 Component Digital Video (4f _{sc})	103
C.6.2.5 Analog Component Digital Video.	104
C.6.2.5.1 General.	104
C.6.2.5.2 Y, C _B , C _R	104
C.6.2.5.3 Ancillary Data	104
C.6.2.6 Component Digital (480 lines progressive)	104
C.6.3 High-Definition Television	104
C.6.4 Digital Video Formats for Television	105
Annex D (informative)	106
D.1 Overview	106
D.2 File transfers	106
D.3 Streaming transfers.	106
Annex E (informative)	107
E.1 Overview	107
E.2 RFC 1323	107
E.3 Copy avoidance	107
E.4 On-board checksum generation	107
Annex F (informative)	109
Annex G (informative)	110
G.1 Overview	110
G.2 Packing table	110
BIBLIOGRAPHY	113

List of Tables

Table 1 – Container Header (Simple Mode)	26
Table 2 – Video frame rate – encoding	27
Table 3 – Object Information Block	28
Table 4 – Extended Container Header	29
Table 5 – Object Class Hierarchy	30
Table 6 – Organization Unique Identifier Object Type Defined Word format	33
Table 7 – Organization Unique Identifier Object Type Defined Word format	34
Table 8 – SSRB Format	56
Table 9 – Streaming Operation codes	57
Table 10 – Simple Streaming operation requests	58
Table 11 – Reason Code explanation	59
Table 12 – ESST Request payload	60
Table 13 – ESST Response payload	60
Table 14 – Content Name	60
Table 15 – Content Attributes	61
Table 16 – TDST Request payload	62
Table 17 – STP Request payload	62
Table 18 – PAS Request payload	62
Table 19 – RSM Request payload	62
Table 20 – PLY Request payload	63
Table 21 – Play parameters	63
Table 22 – PLY Request payload	64
Table 23 – Simple Streaming Notifications	64
Table 24 – Operation Error Reason Code	64
Table 25 – Operation Error codes	65
Table 26 – Establish Stream operation	67
Table 27 – Stream Tear-down operation	69
Table 28 – Play operation	70
Table 29 – Record operation	72
Table 30 – Stop operation	73
Table 31 – Pause operation	74
Table 32 – Resume operation	76
Table 33 – Operation Complete notification	77
Table 34 – Operation Complete notification	78
Table 35 – SCMA Content Movement operation	79
Table A.1 – Video Format codes	84
Table A.2 – Color Information codes	85
Table A.3 – Pixel Aspect ratio codes	85
Table A.4 – Pixel Array order codes	86
Table A.5 – Packing Table number	86
Table A.6 – Color Information format per subpixel mapping	87
Table A.7 – Word 4-259 Color Palette word format	88
Table B.1 – Type 10h Index values and Characteristics	97
Table B.2 – Type 20h Index values	98
Table B.3 – Type 40h Index values	98
Table B.4 – Type 60h Index values	100
Table C.1 – Digital video formats for television	105
Table G.1 – Packing table	111

List of Figures

Figure 1 – FC-AV model	22
Figure 2 – Simple Content Movement Architecture	23
Figure 3 – The FC-AV Container system	24
Figure 4 – Component AV Stream Object format	35
Figure 5 – Stream Header format	35
Figure 6 – Stream descriptor	35
Figure 7 – CDS Packet Format.	37
Figure 8 – Signal type format	39
Figure 9 – CDS Packet Format.	40
Figure 10 – CDS Packet Payload format (SMPTE)	40
Figure 11 – Signal type format	41
Figure 12 – CDS Packet format (MPEG-TS)	42
Figure 13 – CDS Packet format (TS Packet)	43
Figure 14 – FHCP Frame Header.	45
Figure 15 – Example FHCP network	46
Figure A.1 – Object 0 – Ancillary data definition	83
Figure A.2 – Bit and Byte Packing	87
Figure A.3 – Monochrome example – Container Header	89
Figure A.4 – Monochrome example - Object 0 (Ancillary data)	90
Figure A.5 – Monochrome example - Object 2 (Video data).	90
Figure A.6 – RGB example - Container Header	91
Figure A.7 – RGB example - Object 0 (Ancillary Data).	92
Figure A.8 – RGB example - Object 2 (Video Data)	92
Figure B.1 – 8-bit Sample Packing	94
Figure B.2 – YC _B C _R Active Video Packing	95
Figure B.3 – NTSC 4fsc Video Packing	96
Figure B.4 – Raw Audio Sample Packing	99
Figure B.5 – Raw 16-Bit Packing of Two Channels, A & B	99
Figure B.6 – AES/EBU Block, Frame, and Subframe format	99
Figure B.7 – Fibre Channel Transmission Word Mapping of AES/EBU Subframe pair	100
Figure F.1 – Video frame rate value	109
Figure G.1 – Bit and Byte Packing	112

INFORMATION TECHNOLOGY – FIBRE CHANNEL –

Part 321: Audio video (FC-AV)

FOREWORD

- 1) ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards. Their preparation is entrusted to technical committees; any ISO and IEC member body interested in the subject dealt with may participate in this preparatory work. International governmental and non-governmental organizations liaising with ISO and IEC also participate in this preparation.
- 2) In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.
- 3) The formal decisions or agreements of IEC and ISO on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC and ISO member bodies.
- 4) IEC, ISO and ISO/IEC publications have the form of recommendations for international use and are accepted by IEC and ISO member bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO and ISO/IEC publications is accurate, IEC or ISO cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 5) In order to promote international uniformity, IEC and ISO member bodies undertake to apply IEC, ISO and ISO/IEC publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO/IEC publication and the corresponding national or regional publication should be clearly indicated in the latter.
- 6) ISO and IEC provide no marking procedure to indicate their approval and cannot be rendered responsible for any equipment declared to be in conformity with an ISO/IEC publication.
- 7) All users should ensure that they have the latest edition of this publication.
- 8) No liability shall attach to IEC or ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC or ISO member bodies for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication of, use of, or reliance upon, this ISO/IEC publication or any other IEC, ISO or ISO/IEC publications.
- 9) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 10) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 14165-321 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

The list of all currently available parts of the ISO/IEC 14165 series, under the general title *Information technology - Fibre channel*, can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies and the voting results may be

obtained from the address given on the second title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

INTRODUCTION

This International Standard defines a protocol for transmitting AV streams using Fibre Channel Sequences and Exchanges. Fibre Channel is a high speed serial interface using either optical or electrical connections (i.e., the physical layer) at data rates currently up to 2 Gbit/s with a growth path to 10 Gbit/s. The topologies supported by Fibre Channel include point-to-point, switched fabric, and arbitrated loop. Fibre Channel connections used for transmitting AV streams utilize standard FC frame format and sequence/exchange hierarchy.

The *Fibre Channel Audio-Video* (FC-AV) standard is divided into 9 clauses and 7 annexes as follows:

Clause 1 - Scope

Clause 2 - Normative references

Clause 3 - Definitions, abbreviations, and conventions

Clause 4 - Overview of the protocol for transmitting FC-AV containers or AV frames over Fibre Channel

Clause 5 - FC-AV Container system

Clause 6 - Compressed FC-AV Stream transmission

Clause 7 - Frame Header Control Protocol

Clause 8 - Simple Streaming protocol for Simple Content Movement Architecture

Clause 9 - SCSI-3 FCP mapping of the Simple Streaming protocol

Annex A (normative) - Simple Parametric Digital Video (SPDV) profile that defines a mapping based on the FC-AV Container system.

Annex B (normative) - Object Type data.

Annex C (normative) - Television video primer.

Annex D (informative) - Audio and video information sender to receiver synchronization issues

Annex E (informative) - Three techniques that are in common use to make TCP/IP go fast on fast networks

Annex F (informative) - FC-AV container Header for allowed Video Frame Rates

Annex G (informative) - Data packing guidelines.

INFORMATION TECHNOLOGY – FIBRE CHANNEL – Part 321: Audio video (FC-AV)

1 Scope

This part of ISO/IEC 14165-321 specifies the transport of digital Audio and Video formats over Fibre Channel.

Specifications are included for:

- a coherent framework (i.e., an FC-AV Container and Objects) for mapping current and future digital Audio and Video formats to Fibre Channel;
- mapping the formats defined by the ITU-R BT-601 and SMPTE family of standards to Fibre Channel;
- mapping the formats defined by the ISO/IEC 3818 family of standards (which include MPEG and related compression systems) to Fibre Channel;
- a profile (i.e., Simple Parametric Digital Video) that parametrically defines the characteristics of Audio and Video information for specific applications; and,
- data packing guidelines recommended for AV data within the Fibre Channel transmission words.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Availability and contact information is provided as needed.

IEC 61179, *Helical-scan digital composite video cassette recording system using 19 mm magnetic tape, format D2 (NTSC, PAL, PAL-M)*

IEC 61834 (all parts), *Recording – Helical-scan digital video cassette recording system using 6.35 mm magnetic tape for consumer use (525-60, 625-50, 1125-60 and 1250-50 systems)*

ISO/IEC 14165-251, *Information technology – Fibre Channel – Part 251: Framing Signaling (FC-FS)*

ISO/IEC 14776-222, *Information technology – Small Computer System Interface (SCSI) – Part 222: Fibre Channel Protocol for SCSI, Version 2 (FCP-2)*

ISO/IEC 14165-331, *Information technology - Fibre Channel - Part 331: Virtual Interface (FC-VI)*

AES3-1992(r1997)(ANSI S4.401992), *AES Recommended Practice for Digital Audio Engineering - Serial transmission format for two-channel linearly represented digital audio data*

ANSI X3.230-1994, *Fibre Channel – Physical and Signaling Interface (FC-PH)*

ANSI/SMPTE 125M-1995, *Television – Component Video Signal 4:2:2 Bit-Parallel Interface*

ANSI/SMPTE 170M-1994, *Television – Composite Analog Video Signal – NTSC for Studio Applications*

ANSI/SMPTE 253M-1998, *Television – Three-Channel RGB Analog Video Interface*

ANSI/SMPTE 259M-1997, *Television – 10-Bit 4:2:2 Component and 4fsc Composite Digital Signals – Serial Digital Interface*

ANSI/SMPTE 274M-1995, *Television - 1920 x 1080 Scanning and Interface*

ANSI/SMPTE 291M-1996, *Television - Ancillary Data Packet and Space Formatting*

ANSI/SMPTE 292M-1996, *Television - Bit-Serial Digital Interface for High-Definition Television Systems*

ANSI/SMPTE 293M-1996, *Television - 720 x 483 Active Line at 59.94-Hz Progressive Scan Production - Digital Representation*

ANSI/SMPTE 294M-1997, *Television - 720 x 483 Active Line at 59.94-Hz Progressive Scan Production - Bit-Serial Interfaces*

ANSI/SMPTE 296M-1997, *Television - 1270 x 720 Scanning, Analog and Digital Representation and Analog Interface*

ANSI/SMTPE 298M-1997, *Universal Labels for Unique Identification of Digital Data*

ANSI/SMPTE 305M-2000, *For Television - Serial Data Transport Interface*

ANSI/SMPTE 314M-1999, *Data Structure for DV-Based Audio, Data and Compressed Video - 25 and 50 Mbits/s*

ANSI/SMPTE RP-168-1993, *Definition of Vertical Interval Switching Point for Synchronous Video Switching*

ANSI/SMPTE RP 177-1993, *Derivation of Basic Television Color Equations (R1997)*

ANSI/SMPTE RP 211-2000, *Implementation of 24P, 25P, and 30P Segmented Frames for 1920x1080 Production Format*

ATSC A/53-1995, *Digital Television Standard*

CIE 15.2-1986, *Colorimetry, 2nd Edition*

International Telecommunication Union Recommendation ITU-R BT.601-5, *Encoding Parameters of Digital Television for Studios*

International Telecommunication Union Recommendation ITU-R BT.709-3, *Parameter values for the HDTV standards for production and international programme exchange*