ITU-T Telecommunication Standardization Sector
Study Group 15
Experts Group for Video Coding and Systems
in ATM and Other Network Environments

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Source: RAPPORTEUR (Sakae OKUBO)
Title: REPORT OF THE FIFTEENTH EXPERTS GROUP MEETING IN PARIS (16-25 March 1994) - Part III
Purpose: Report

Part I General (see AVC-632R)
Part II Sole sessions (see AVC-632R)
Part III Joint sessions

Part III Joint sessions in Paris

Contents

A. Introduction

The joint sessions with MPEG were held at Le Conservatoire des Arts et Manufactures in Paris during 21-25 march 1994 at the kind invitation of AFNOR. At the opening session on 21 March, Mr. Daniel Lecomte (Alcatel), French HoD for SC29, made a welcoming address on behalf of the hosting organization.

The Experts Group appreciated the support and hospitality of the hosting organization.

A list of documents considered during the joint sessions is attached to this report as Annex 1.

B. REQUIREMENTS sub-group (by Sakae OKUBO)

B1. Introduction

The Requirements sub-group met four days (Monday, Tuesday Wednesday and Thursday) under chairmanship of Mr. Sakae Okubo. The summary of the work was as follows:

Monday: All available input documents were reviewed briefly and discussion items were identified. A direction to reorganize Chapter 8 and Annex E was agreed.

Tuesday: First draft of reorganized Chapter 8 and Annex was reviewed. Second draft was worked out and reviewed.

Wednesday: There was a joint meeting with Video sub-groups to exchange views on some technical issued raised through comments to CD. There was also a joint meeting with Audio to find a way out from the quality issue. Verification plan and amendment for additional profiles and levels were discussed. Third draft of reorganized Chapter 8 and Annex was reviewed.

Thursday DSM-CC documents were reviewed and suggestions were returned. Clarification of scalable layers was worked out.

B2. Documents

Input documents

WG11 N0605	Req. sub-group	Verification test items and plan
SC29 N710	Secretariat	Summary of voting on ISO/IEC CD
MPEG94/015	Okubo	Report of Ad-hoc group on procedure for introducing new Profiles and Levels
MPEG94/044	ITU-T Japan	Comments for CD13818-2|Draft Rec. H.262
MPEG94/072	Erdem, Sezan	Results of recent 10-bit experiments
MPEG94/086	Eifrig,Tabatabai	Experiments with multigeneration MPEG 10 bit coding
MPEG94/095	Puri, Haskell	A proposal for Temporal Profile in MPEG-2
MPEG94/138	DSM sub-group	DSM-CC extension requirements document

Output documents

WG11 N0702	Video Group	DIS 13818-2
WG11 N0681	Video Group	Disposition of comments

B3. Chapter 8 and Annex E of DIS 13818-2

B3.1 Reorganization of Chapter 8 and Annex E

In response to the comments from some National Bodies, we decided to reorganize Chapter 8 and Annex E so that it is easier to find profile and level dependent specifications in normative Chapter 8. Specifications are now represented in table form with relevant tables in the previous Annex E moved to the current Chapter 8. Mr. Chris Birch undertook this editing work. Agreed texts have been included in the DIS document.

The meeting also reviewed all the comments from National Bodies with getting help of VIDEO sub-group in some items and made disposition of comments relevant to Chapter 8 and Annex E.

The following is items of substance which we discussed;

- handling of MPEG-1 D pictures by MPEG-2 decoders
- scalable profile clarification
- VBV buffer size
- SP@ML capability of decoding MP@LL
- bit rates and VBV buffer size allocation between layers
- clarification of base layer bitstream decodability

B3.2 Clarification of scalable profiles

During the discussion with Video group, it was pointed out that we need clarification on permitted combinations for different layer characteristics of scalable profiles. This was in the interest of ensuring interoperability.

B4. Verification test plan

We made a framework for the verification test items and plan at the Seoul meeting. We discussed whether there remained further efforts of the Requirements sub-group, but reached a conclusion that what we need are commitments of participating members. Mr. K. McCann advised the meeting of its plan to make complete hardware consisting of MPEG-2 Video (MP@ML), MPEG-1 Audio (basic stereo) and MPEG-2 Systems TS. Mr. R. St. Girons also advised us of the US Grand Alliance plan to carry out MP@HL hardware tests before November 1994.

Provision of further testing plans and test results are awaited.

B5. Amendments for additional profiles and levels

B5.1 Amendment procedures (MPEG94/015)

As far as procedures are concerned, JTC1 Directives and Guide for ITU-T and ISO/IEC JTC1 Cooperation give us sufficient information. The time necessary from an initial proposal to AMD may differ according to the nature of new profile; whether it is simply a new entry to the existing profile and level structure, or it needs definition of new coding tools.

B5.2 Possible additional profiles

During the meeting, the following three possible additions were indicated;

1) SNR Profile @ High-1440 Level (Swedish NB comments to CD 13818-2)

This requires only definition of a new conformance point in the current profile and level structure. No new syntactic tools are necessary.

2) Temporal Scalability Profile (MPEG94/095)

This is intended as a profile of Main Profile plus temporal scalability tool which has already been defined in the current CD. Though the decoder of this profile can decode Main Profile bitstreams, the "onion ring" relationship with the existing profiles are not maintained. A new profile should be created for this purpose.

3) 10 bit amplitude resolution

This is intended for the use of editing and post production industries and thought to be advantageous in multiple generation characteristics. It needs additional coding tools besides definition of a new profile. There was a comment that in some countries there are multiple products which use 10 bits based on non-MPEG approaches, which may lead to an interoperability problem.

B5.3 Criteria for adding a new profile

We discussed what would be criteria for defining a new profile through the amendment procedures. Since they may depend on the nature of new profile, we reached a conclusion that they can be stated in a general term as "the proposal should be convincing". If we paraphrase "convincing", the proposal should at least be

- supported by more than one organization,
- market driven or based on real applications.

B5.4 Amendment work

This should be initiated when proposals are made. We should bear in mind a situation that there may be different proposals which require different time period to reach the AMD status. The target date of AMD should be set with this consideration.

B6. DSM-CC requirements

Members of the REQUIREMENTS sub-group assisted the DSM sub-group by reviewing the drafts for call for contribution and attached list of requirements and provided some comments for improvement.

B7. Recommendations of the sub-group

REQUIREMENTS sub-group recommend that;

1) WG11 approve Chapter 8 and Annex E as an integral part of DIS 13818-2 and associated disposition of National Body comments.

2) WG11 request members to thoroughly review details on permitted combinations for different layer characteristics of High Profile as contained in WG11 N0702 which we believe correct and contributive to the interoperabiliy of base layer bitstreams.

3) WG11 request members to further contribute to materializing the verification test framework as agreed in Seoul and contained in WG11 N0605.

C. VIDEO sub-group (by Kiyoshi SAKAI)

C1. Introduction

The video sub-group met for five days, but there was not a large attendance as before (20 to 30 people). The group mainly worked to deal with the comments submitted to the national body ballot regarding to the proposed video DIS. According to the comments, the group made editorial corrections, clarified the ambiguities (especially in scalable syntax) and also made fixes for a few remaining inadequacies. As the result of the meeting, the group approved the revised proposal for DIS.

The main topics discussed during the meeting were as follows.

C2. Restriction for number of bits per MB

This issue was raised by UK and US national body in order to relax the decoder implementation complexity, mainly concerned with the necessary bandwidth at the external RAM interface. The discussion point was how to accommodate an appropriate restriction in the standard to achieve good trade-off between encoder complexity and decoder complexity. This limitation would introduce some additional feedback circuit in the encoder, in exchange for reducing the decoder hardware complexity.

Several alternative solutions were discussed and as a result the group decided to include a modification on the original proposal that strictly limits the number of bits per MB. The compromised restriction was to limit the number of bits per MB to 12*(number of samples in a MB) for all MBs except any 2 MBs in each horizontal row. The number "2" was introduced to account for the feedback delay in the encoder circuit. On the other hand, restriction for the escape coding, which was defined to cope with the same problem, was deleted.

C3. IDCT mismatch control

It has been pointed out that two different compliant IDCTs can generate severe degradation in near still pictures, even though currently defined mismatch control algorithm is applied. There were some contributions and proposals to reduce the degradation by applying some tricks at the encoder side, but no essential resolution or perfect mismatch control algorithm has been found. So, the group finally decided to keep the current mismatch control algorithm as it is, but to add the following note to draw attention (see Note 2 in section 7.4.4 of DIS):

Warning. Small non-zero inputs to the IDCT may result in zero output for compliant IDCTs. If this occurs in an encoder, mismatch may occur in some pictures in a decoder that uses a different compliant IDCT. An encoder can avoid this problem by checking the output of its own IDCT.

Related to this issue, it was reconfirmed that the sample domain coefficients for a block shall all take the value zero if its **pattern_code** is zero or the block is within a skipped MB. This issue was raised by the fact that some compliant IDCTs generate non-zero data even its input data are all zero.

C4. Conformance testing

The group spent several hours to discuss conformance issues in order to develop the MPEG-2 Video Conformance Working Draft. As a result of discussion, the group decided to re-establish the ad-hoc group for conformance testing and to generate test bitstreams which will be useful for testing conformance of video decoders. Toward the next meeting, members of the ad-hoc group are requested to generate and exchange 15 test bitstreams including the worst case bitstreams (so called, evil bitstreams), such as bitstreams with maximum number and concentration of coded bits, maximum number and concentration of run-level symbols, bursts concentrated at the beginning of a picture, etc.

D. SYSTEMS sub-group (by Stuart DUNSTAN)

D1. Introduction

An interim version of the MPEG-2 Systems Committee Draft ISO/IEC JTC1/SC29/WG11 N0701 was submitted to the closing MPEG plenary in Paris. This document reflects technical agreements and editing changes agreed to at the meeting, and includes some hand written attachments.

Further work is required before the DIS can be issued. In addition no replies to national body comments on the CD have yet been written. A WG11 meeting for the Systems group will be held from 8th - 10th June, in Atlanta, USA. This will be preceded by a two day ad-hoc group meeting.

The contribution from the SG15 EG [1] was presented, however there was little time for discussion.

D2. DSM-CC extension

The following MPEG 94 documents addressed DSM-CC extension: 038, 040, 083, 087, 089, 091, 110, 113. These documents presented examples and concepts of what the future DSM-CC could look like. The following documents, relating to DSM-CC, have been issued by the WG11 Convenor:

MPEG 94/150, "Call for contributions for DSM-CC Extension"
MPEG 94/151, "DSM-CC Extension Requirements Document".

D3. Descriptors

Discussion on audio and video descriptors was initiated. The intention is that a video descriptor, for example, would indicate the video profile and level. The opinion was expressed that a video descriptor might also duplicate some parameters contained within the video elementary stream e.g. frame rate, allowing faster access to these parameters. The format of these descriptors has not been finalised.

The format of the registration descriptor, which indicates coding formats in private streams, has been revised. ASN.1 Basic Encoding Rules are used. A copyright descriptor, which provides a globally unique label for elementary streams or programs, has also been added, and is coded similarly to the registration descriptor.

D4. Transport Stream STD

The Transport Stream STD model has been changed to that of a leaky bucket. The previous latency model was found to have problems under certain conditions. For video the rate of removal of data from the TB buffer is defined as being proportional to R_{cs}(max), which is specified for each profile and level in table 8-12 of 13818-2. The rate of removal for audio data is fixed at 1 Mbit/s. The preliminary figure for systems is also 1 Mbit/s.

PES headers are placed in the buffer B_n, and some space must be allocated for them. For video the size of the buffer B_n is the size of the VBV, as defined in table 8-13 of 13818-2 for each profile and level, plus an amount to deal with remultiplex timing jitter, plus an amount to deal with PES packet headers. The latter is proportional to the profile and level. For audio the size of the buffer B_n is fixed.

In the Transport Stream STD the Network Information Tables, which are part of the PSI, do not enter B_{sys}.

D5. PCR tolerance

The PCR in the Transport Stream is the output of a 42 bit binary counter clocked by the 27 MHz system clock. The view was expressed that it is difficult in practice to place the PCR in a Transport Stream, and guarantee that all 42 bits represent the correct position of the appropriate PCR byte in the Transport Stream. The agreement was that PCRs may have a maximum jitter of $\pm 0.25\mu$sec. Additional semantics need also to be defined.

It is not clear whether the same tolerance will also apply to the SCR in the Program Stream.

6. VBR Transport Stream

A statement exists in the interim CD that, with respect to Transport Streams and variable bit rate, only a single program Transport Stream will be supported, and that a variable bit rate multiple program Transport Stream is not possible. Clarification of this statement may be required.

D7. Remultiplexing support

Additional fields to support remultiplexing have been added in an adaptation field extension. A legal time window specifies a time window in which the buffer B_n is guaranteed not to underflow or overflow. A piece wise rate field specifies the bit rate of transport packets in a particular PID.

D8. Splice point

The syntax and semantics dealing with splicing have been revised and refined. A second adaptation field extension exists which contains fields expressing the splice type and the decoding time of the next access unit.

The definition of a discontinuity has been refined to ensure that Transport Stream packets of elementary streams with PTSs and DTSs, that refer to the system clock reference following a discontinuity, do not appear in the Transport Stream before the Transport Stream packet indicating the discontinuity, in the elementary stream carrying the program PCR, has occurred.

The semantics dealing with the Transport Stream continuity counter at a discontinuity have not been decided.

D9. Other issues

The PSI tables allow a Transport Stream to carry programs or elementary streams with no associated PCR.

In line with 13818-2, the reference to skipped pictures has been replaced by the expression "VBV underflow".

The equations for PCR, SCR, ESCR, and OPCR have been revised to correctly express their intended meaning, though formal agreement, and inclusion in the interim CD, was not reached at the meeting.

At present only a few editorial comments made by national bodies have been incorporated in the interim CD.

D10. Ad hoc groups

The following ad hoc group was formed to continue work towards the next meeting:

- Ad Hoc Group to edit the Systems CD - chairman: Jan van der Meer

A meeting is planned in Atlanta, Georgia, USA, on 6 - 7th June 1994.

Reference

[1] ISO/IEC MPEG 94/134, "Report on ATM Network Adaptation in the H.32X terminal", ITU-TS SG15 Experts Group for Video Coding and Systems in ATM and Other Network Environments.

END

List of Documents for the Joint Sessions in Paris (21-25 March 1994)

MPEG 94/???	Source	Title
001	Convenor	List of documents
002	Morris	Report of Editorial group on final text of CD 13818
003	Fuchs	Report of Ad-hoc group on Formal Listening Test
004	Hidaka	Report of Ad-hoc group on MPEG-2 video verification test
005	Schreiner	Report of Ad-hoc group on MPEG-2 Audio verification test
006	Savatier	Report of Ad-hoc group on Video bitstream verification
007	Luthra	Report of Ad-hoc group on 10 bits Video
008	Fogg	Report of Ad-hoc group on Video Conformance Testing
009	Fogg	Report of Ad-hoc group on Video Technical Report
010	Stoll	Report of Ad-hoc group on ATM transmission of audio coded signal
011	Pan	Report of Ad-hoc group on Audio software simulation
012	Laczko	Report of Ad-hoc group on Audio Conformance testing
013	Nelson	Report of Ad-hoc group on conditional workplan and conditionalr equirements for MPEG-2 NBC Audio Coding
014	Lookabaugh	Report of Ad-hoc group on the additional work of DSM CC
015	Okubo	Report of Ad-hoc group on procedure for introducing new Profiles and Levels
016	McCann	Report of Ad-hoc group on requirements for syntax restrictions of MPEG-2 Systems
017	Wasilewski	Report of Ad-hoc group on Systems bitstream verification
018	van der Meer	Report of Ad-hoc group on Systems Conformance Testing
019	Dunstan	Report of Ad-hoc group on MPEG-2 Systems network applications
020	Fernando	Report of Ad-hoc group on MPEG-4 transmission media characteristics
021	O'Connell	Report of Ad-hoc group to draft an outline for the MPEG-4 Requirements document
022	Shen	Report of Ad-hoc group for MPEG-4 Syntax
023	Japanese National Body	Japanese National Body Comments on MPEG 4 Activity
024	Jap.Nat.Body	Program access scheme for broadcasting with PSI
025	N. Ito, M. Sugihara et al.	"What will happen by MPEG 4? - A report of 1st International Workshop on Mobile, Multimedia and Communication"
026	M. Kawashima et al.	Low Bit-rate Video Coding with Segment -based MC
027	NHK	Results of MP@ML subjective assessment tests at NHK
028	K. Ozawa	Results of MP@ML Verification Test in NTSC
029	NTV	Results of MPEG-2 MP@ML Verification Test at NTV
030	Y.Katayama et al.	An examination of Decoder IDCT Accuracy
031	T.Fukuhara et al.	One trial toward segment-model based coding
032	Y.Kato et al.	Results of MPEG 2 Systems bitstream decoding
033	T.Savatier	Video bitstreams for syntax verification
034	NSF	Invitation to the 27th MPEG meeting
035	D. Nasse	"Verification Tests" carried out by EBU members on MPEG-2 video MP@ML
036	D. Nasse	EBU participation to the verification tests for other profiles and levels than MP@ML
037	T. Savatier	Differences between MPEG-1 and MPEG-2 (Video part)
038	P.Schirling, M. Murphy	Proposed ASN.1 Description of DSM CC Syntax
039	P. Schirling	Evolution of H.22x-Multimedia Multiplex to include MPEG-2 Systems
040	N. Huslak	Protocol identifier for DSM CC
041	ITU-T/J	Bit-rate field in VBR operation
042	J.H. Jeon	Progressive video coding based on hierarchical edge-based motion estimation at low bit rates
043	J.H. Kim	Image Format Comparision in Modified SIM3 Algorithm
044	Japan	Comments for CD13818-2 Draft Rec. H.262
045	P. Jourdan, P. Marchisio	Considerations on the use of MHEG objects in MPEG-2 streams
046	Portuguese Nat. Body	Input of the Portuguese National Body to the 26th meeting

MPEG 94/???	Source	Title
047	M. Delahoy	Subjective Viewing Testing Conducted in Australia
048	ITU-R	Liaison statement to MPEG
049	ITU-R	Liaison Statement from Working party 11B to MPEG test sequences
050	ITU-R	Liaison Statement from Task group 11/4 to the TSB, IEC/ISO and IEC/ISO-MPEG
051	ITU	Liaison Statement from Task Group 11/4 to ISO/IEC MPEG
052	FUB	Adaptive quantization for constant bit-rate control
053	R. Schaphorst	Status Report of the ITU-TS Experts Group for Very Low Bitrate Visual Telephony
054	Japan	Cell loss correction method in AAL for the transmission of MPEG2 Transport packets
055	S. Cismas	IDCT of zero blocks/IDCT Mismatch
056	USNB	Contribution to ISO/IEC JTC1/SC29/WG11
057	T. Hidaka	Comparison of each organization's results for MP@ML Verification Test
058	Bedford	Liaison documents from ITU-R
059	SNB	Resolutions from Swedish National Body
060	Feige	Audio Statistical Evaluation Procedure
061	Yamashita	Letter to Convenor
062	Buckley	Liaison statement to MPEG
063	Fuchs	MPEG-2 Audio Validation Test Report
064	ITU-R	Subjective Assessment of Conventional television systems
065	ITU-R	Subjective Assessment of Digital Television Systems at or near the Quality of Conventional Systems
066	ITU-R	Subjective Assessment Methods for Image Quality in High-Definition Television
067	T. Alpert	New quality evaluation methods
068	F. Pereira	Contribution to Requirements and Applications for MPEG 4
069	F. Pereira	Compatibility and interoperability between mobile and fixed networks
070	F. Pereira	User Requirements and Services for Mobile Audiovisual Terminals
071	C.E.Holborow	Simulation of Phase-locked loop for processing jittered PCRs
072	T.Erdem, I. Sezan	Results of recent 10-bit experiments
073	EPFL	First draft of the requirement list for MPEG-4 (video)
074	Jin-Soo Park J.-H. Jeon	A Study on Foreground/Background Segmentation
075	FhG-IIS	Description of the Development Status of ISO/MPEG/Audio Layer-III for the Listening Tests 11/93
076	Smolinske, O'Connel	Requirements Necessary to allow commonality...
077	MPEG-4 Requirements Ad-hoc Group	Draft Outline of the MPEG-4 Requirements Document
078	P. Moroney	Splicing and the Systems CD
079	Secretariat ISO/IECJTC 1	Summary of Voting on Document JTC 1 N2682, Proposal for a new work item: Low bit-rate Audio Coding
080	CEN	Unique Acceptance Procedure - prEN 31172-1
081	M.Rubenfeld	Working Draft of the Technical Report on Multimedia and Hypermedia: Model and Framework
082	Secretariat JTC1/SC1	First WD 2382-33 "Hypermedia and Multimedia"
083	A.J. Wasilewski, G. Logston, T. Addington	Protocols For DSM CC Connection-Oriented Services
084	H. Chen et al.	Audio-Assisted Video Coding/Processing
085	UK	SC 29/WG 11 Paris Meeting (March 21-25, 1994)
086	B.Eifrig, Ali Tabatabai	Experiments with Multigeneration MPEG 10 bit coding
087	P.J. Leach	Philosophy for Command and Control Protocols
088	AFNOR	Audiovisual Works Identification within MPEG2 systems
089	Stan Searing	Information on "Open MPEG" API for personal computers
090	G.Fernando	Systems Requirements for MPEG-4
091	F. Prampolini, P. Rodi	DSM CC Functional requirements
092		
093	A. Puri	3D/stereo video applications and their initial requirements for MPEG-4

MPEG 94/???	Source	Title
094	A. Puri	MPEG-4 Applications and Requirements Representation
095	A. Puri, B. Haskell	A proposal for temporal profile in MPEG-2
096	G. Madec, C. Berthelot	Decoding in Spatial Scalable mode
097	J.P.Henot	On conformance testing
098	AFNOR	Input of the French National Body to the 26th MPEG meeting
099	Japanese NB	Requirement list for new work item proposal
100	German National Body	Position of the German National Body on the resoluitions of the 25th WG11 meeting
101	M.K.Ozkan, M. Deiss, J. Zdepski	Conflict between the VBV buffer size and T-STD buffer definition
102	M.K. Ozkan, M. Deiss	Null packet contents
103	J. Mailhot, T. Savatier, B. Hashell	Progressive extension to field-repeat reconstruction
104	W.tenKate, L.van de Kerkhof	Implemented features of the MPEG2 Layer I encoder, submitted for the subjective tests
105	Li Yan, B.G.Haskell	IDCT Mismatch Control
106	C.Reader, P.Shen	Analysis of MPEG1 Syntax in the Context of MPEG4 Object-Oriented Synatx
107	Secretariat ISO/IECJTC1	Resolutions of the ISO/IEC JTC1 Plenary Meeting, 1-4 February 1994, Washington D.C., USA
108		
109	M.S.Goldman	Gapped CBR for MPEG over ATM
110	M.S.Goldman	Client/Server API for Video/Audio Playback (DSM-CC)
111	NNI	Resolutions for MPEG
112	M. Balakrishnan, J.J.Lhuillier	Leaky Bucket - Model basis
113	I.Aguado, C.Bertin, M.Quaglia	Interfaces and protocols for Interactive Video Retrieval Services
114	Secretariat ISO/IEC JTC1 SC29	Summary of Voting on ISO/IEC JTC1/SC29 N 630: ISO/IEC CD 11172-4: Information technology - Coding of moving pictures and associated audio for digital storage media up to about 1,5 Mbit/s - Part 4: Compliance testing
115	Secretariat ISO/IEC JTC1 SC29	Summary of Voting on ISO/IEC JTC1/SC29 N 658: ISO/IEC CD 13818-1:Information technology - Generic coding of moving pictures and associated audio information - Part 1: Systems
116	Secretariat ISO/IEC JTC1 SC29	Summary of Voting on ISO/IEC JTC 1/SC 29 N 659: ISO/IEC CD 13818-2: Information technology - Generic coding of moving pictures and associated audio information - Part 2: Video
117	Secretariat ISO/IEC JTC1 SC 29	Summary of Voting on ISO/IEC JTC 1/SC 29 N 660: ISO/IEC CD 13818-3: Information technology - Generic coding of moving pictures and associated audio information - Part 3: Audio
118	H. Yasuda	Discussion Report of the JTC 1/SC 29 Chairman on Patent Issues
119	ISO/IEC JTC 1/SC29	Resolutions, the Fourth ISO/IEC JTC 1/SC 29 Plenary Meeting, 1993-11-06/08, Seoul, Korea, Rep.of
120	P. Leray, F. Guyot, P. Marchal, Y. Burnod	MPCORT: Simulation of the Visual Cortical System for 3D Image Analysis, Understanding and very low bit rate Compression for Digital TV, HDTV and Multimedia
121	AFNOR	Strong limitations of the Latency Model
122	AFNOR	A splice point definition ensuring buffer safety and allowing seamless splicing
123	AFNOR	Maximal PSI data rate
124	AFNOR	Need of additional bitstream constraints to Handle PCR discontinuities
125	AFNOR	Remuxing within MPEG-2
126	AFNOR	Need of a tolerance on PCR values in the T-STD model
127	AFNOR	Needs for standardized access to navigation services
128	van der Meer	Proposal to improve CD 13818-1
129	DAVIC	Call to participation in the DAVIC Opening Forum
130		
131		

MPEG 94/???	Source	Title
132	ITTF	Letter to Dr O J Morris
133	ITU-T EG	Effects of jitter on audiovisual system operation
134	ITU-T EG	Report on ATM network adaptation in the H.32X terminal
135	Franceschini	Extension of the adaptive clock method to variable bit rate extension
136	AFNOR	French National Body resolutions
137	Savatier	Differences between MPEG-1 and MPEG-2
138		
139	ITU-R TG 11/4	Liaison statement on possible opportunity for common ability and harmonisation of standards on television colorimetry
140	ITU-R TG 11/4	Liaison statement on Integrated Video Services (IVS)
141	ITU-T TG11/4	Liaison statement on harmonisation of standards for broadcast TC and videoconferencing and videotelephone
142	ITU-T TG11/4	Liaison statement on 16:9 format implementation
143	ITU-T TG11/4	Liaison statement on TV broadcasting technology and computers
144	ITU-T TG11/4	Meeting report of TG11/4
145	Nilsson	Clock recovery using jittered time stamps
146	AFNOR	Input to the 26th meeting
147	Open PC-MPEG	Status presentation
148	SISIR	Singapore NB comments on MPEG-2 CD
149	FERA	Letter to Convenor
150	DSM group	Call for contributions for DSM-CC extension
151	?	?
152	?	?
153	?	?
154	?	?

WG11 N????	Date	Source	Title
0665	93/11	Convenor	Twenty-sixth meeting notice
0666	93/11	Convenor	Document List
0669	94/03	Convenor	27th MPEG meeting notice
0670	94/03	Convenor	Resolutions of the Paris meeting
0671	94/03	Convenor	Report of the Paris meeting
0672	94/03	Convenor	Ad-hoc group on DSM-CC extension
0673	94/03	Hidaka	Results of MP@ML video quality verification tests
0674	94/03	Hidaka	Workplan for MPEG-2 verification tesst beyond MP@ML
0675	94/03	Hidaka	Participants form in MPEG-2 verification tests beyond MP@ML
0676	94/03	Hidaka	Ad-hoc group on MPEG-2 verification test
0677	94/03	Convenor	Liaison letter to ITU-R TG11/4
0678	94/03	Convenor	Liaison letter to ITU-R TG11/4
0679	94/03	Convenor	Liaison letter to MR. M. Yamashita, Chair ITU-T WP15/1
0680	94/03	Convenor	Letter to Mr. W. Buckley, Chair ANSI T1E1
0681	94/03	Video Group	Disposition of National Body comments on ISO/IEC CD 13818-2
0682	94/03	Audio Group	Disposition of National Body comments on ISO/IEC CD 13818-3
0683	94/03	Convenor	Call for proposals for DSM-CC extension
0684	94/03	DSM group	Requirements for DSM-CC extension
0685	94/03	Fuchs et al.	Report on formal subjective listening tests of MPEG-2 multichannel audio
0686	94/03	Convenor	Response to the National Bodies of D, F, GB, J, NL, P, S, USA
0687	94/03	Convenor	Ad-hoc group on Editing of the requirements document
0688	94/03	Convenor	Ad-hoc group on subjective testing of coders at low sampling frequencies
0689	94/03	Convenor	Ad-hoc group on MPEG-2 Audio Conformance Testing
0690	94/03	Convenor	Ad-hoc group on requirements for low bitrate audio coding
0691	94/03	Convenor	Ad-hoc group on edit and verification of Systems CD for production of DIS
0692	94/03	Convenor	MPEG-4 revised scope of work
0693	94/03	Convenor	Ad-hoc group on Establishment of standard conditions for simulations and demonstrations
0694	94/03	Convenor	Ad-hoc group on Study of Combined Audio/Visual Environments
0695	94/03	Convenor	Ad-hoc group on Study of syntax
0696	94/03	Convenor	MPEG status report
0697	94/03	Convenor	MPEG-2 detailed workplan
0698	94/03	Convenor	Five-year meeting schedule
0699	94/03	Convenor	MPEG-4 detailed workplan
0700	94/03	Convenor	Integrated MPEG workplan
0701	94/03	Systems Group	Interim Edited CD 13818-1
0702	94/03	Video Group	DIS 13818-2
0703	94/03	Audio Group	DIS 13818-3
0704	94/03	Morris	CD 11172-4 Disposition of Comments
0705	94/03	Morris	DIS 11172-4
0706	94/03	Convenor	Ad-hoc group on MPEG-4 Test Procedures
0707	94/03	Convenor	Press Release
0708	94/03	Convenor	Call for contributions for MPEG-2 Audio NBC coding algorithm
0709	94/03	Audio group	Requirements for MPEG-2 Audio NBC coding mode
0710	94/03	Fogg	ISO/IEC CD 11172-5
0711	94/03	AOE group	First draft of MPEG-4 requirements
0712	94/03	Convenor	Ad-hoc group on video bitstream exchange
0713	94/03	Convenor	Ad-hoc group on video conformance testing
0714	94/03	Convenor	Ad-hoc group on MPEG-2 Technical Report
0715	94/03	Convenor	Ad-hoc group on collection of channel characteristics
0716	94/03	Convenor	Twenty-eighth WG11 meeting notice
0717	94/03	Convenor	List of documents (501-)