ITU-T Telecommunication Standardization Sector
Study Group 15
Experts Group for Video Coding and Systems
in ATM and Other Network Environments
(Rapporteur's Group on Part of Q.2/15)

Document AVC-612
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Source: Japan
Title: Terminal specifications for broadcasting including CATV
Purpose: Discussion

1.Introduction

This document describes the results of case study : "specification for CATV". In the case study, two classes of terminals CTV (conventional TV) and HDTV are defined and followings are assumed:

-Terminals are directly connected to B-ISDN networks.
-No video data are transmitted from terminals to center or server.

The differences from AVC-608 (Specification for Videoconferencing) are indicated with underline. The document is related to AVC-607～613.

1.1 Application

-CATV (including both real time and non-real time services)

1.2 Input Equipment

-No input equipment for video.
-Data input equipment (ex. keyboard, mouse) [optional]

1.3 Output Equipment

(1)Local format monitor [mandatory]
(2)Audio equipment [mandatory]
(3)VTR [optional]
(4)Data recorder [optional]
(5)Hardcopy equipment [optional]

1.4 The number and kinds of media for multiplexing

a)Video
-One or more programs. A program contains one or more H.262 videos (probably one or two) and associated audios
b)Audio
-One or more programs. A program contains one or more MPEG2 audios (probably two or more) and video(s).
c)Data

1.5 Control channel

(1)end-to-end control
The following sequences are necessary; terminal ID check, mode switching and encryption etc.
(2)Encryption control
The H.32X terminal should have an optional capability of data encryption and then an encryption control channel should be provided. The channel might be allocated in Transport Stream.

2.Video Coding Method

Table 1. Video Coding Method for each terminal type

	CTV			HDTV		
	specification	ENC	DEC	specification	ENC	DEC
(1)Picture Format	ITU R601(local format)	M	M	HDTV(local format)	M	M
(2)Format Conversion	conversion to local format	M	O	conversion to local format	M	O
(3)Coding Mode	SP@ML MP@ML	M O	M M	SP@HL or H14L MP@HL or H14L	M O	M M
(4)Bit Rate	CBR 4-15Mbps VBR	O O	M M	CBR 20-80Mbps VBR	O O	M M
(5)Display Aspect	4:3 and 16:9	O	M	16:9	M	M
(6)Pel Aspect	local format	M	M	local format	M	M
(7)Scalability	simulcast	O	-	simulcast	O	-

M: Mandatory, O: Optional

3.Audio Coding Method

MPEG2 Audio Layer 2, 32 ~ 384 kbps per channel

4.Network Adaptation

Several alternatives exist and they are listed in table 2.

Table 2. Applicable adaptation/multiplexing methods

AAL	Mutimedia Multiplexing	Protocol
Type1	Transport Stream. (Bit error correction is required)	H.24X
Type5	Transport Stream. (Two packets in 8cells including FEC)	H.24X
new*	Transport Stream. (One packet + 4byte FEC in 4 cells)	H.24X

* 188bytes(fixed length) CPCS-PDU payload + 4bytes FEC, no headers/trailers in SAR sublayer

5.Multipoint

No multipoint operation is required.

6.Media Synchronization

-Audio and Video Synchronization

Time Stamp Method (using STC of MPEG2 System) [Optional]

7. Error Resilience

7.1 Error Resilience

Bit error correction [Optional].

7.2 Error Concealment

(1)Video

Encoder: intra MV, intra Slice, Short Slice [Optional but recommended as a guideline]

Decoder: concealment with intra MV, intra Slice, Short Slice [Optional]

(2)Audio

(3)Video Sequence Header

More than 1 sequence headers per second for quick re-synchronization [Optional].

8. Conclusion

Terminal specifications for CATV are listed. Some discussions are needed for network adaptation.

END.