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SERIES J: CABLE NETWORKS AND TRANSMISSION OF TELEVISION, SOUND PROGRAMME AND OTHER MULTIMEDIA SIGNALS

IP Video Broadcast

Specifications of IP video broadcast (IPVB) for cable TV networks

Recommendation ITU-T J.1211

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Summary

In recent years, IP-based video services have developed rapidly in cable (CATV) networks, especially the highly asymmetric IP-based services with large bandwidth, such as 4K, 8K and VR, whose single program bandwidth might easily exceed 35Mbps or even up to 100Mbps. This requires a large downlink bandwidth of transmission channels and poses challenges to existing CATV technologies. For this scenario, it is necessary to propose a low cost and low complexity solution to meet the bandwidth requirements of the current asymmetric IP-based video services.

Recommendation ITU-T J.1211 specifies an IPVB technology, which simply adds a one-way IP-based video broadcast system to the existing low-cost bidirectional CATV networks. The IPVB can greatly increase the bandwidth of downlink programs, and at the same time, have the characteristics of being low cost and low complexity. The IPVB in downlink transmits IP-based video streams through broadcast channels which are identified by multicast IP addresses and UDP port numbers, and broadcasts all the IP-based video streams through the CATV networks to all subscribers. By cooperating with the uplink channel provided by the existing bidirectional access networks, it is capable of providing varieties of IP-based high bit rate video services in CATV networks.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T J.1211	2020-05-29	9	11.1002/1000/14282

* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

FOREWORD

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Specifications of IP video broadcast (IPVB) for cable TV networks

1 Scope

This Recommendation describes the technique specifications of IPVB systems, including the system architecture of IPVB, broadcast channel planning of services, coding schemes and the encapsulation formation of audio and video data, broadcast service information (BSI) tables and functional modules of IPVB systems. The Recommendation is applicable to the network construction of IPVB systems, the development of equipment, and the operation and management of IPVB systems.

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; 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. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T H.222.0] Recommendation ITU-T H.222.0 (2018) | ISO/IEC 13818-1:2019, *Information technology – Generic coding of moving pictures and associated audio information: Systems*.

[ITU-T J.83] Recommendation ITU-T J.83 (2007), *Digital multi-programme systems for television, sound and data services for cable distribution*.

[IEEE 802.3ae] IEEE 802.3ae-2002, *IEEE Standard for Information Technology- Local and Metropolitan Area Networks – Specific Requirements Part 3: Carrier Sense Multiple Access With Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications Amendment: Media Access Control (MAC) Parameters, Physical Layers, and Management Parameters for 10 Gb/S Operation*.

3 Definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 broadcast channel: The broadcast channels in this Recommendation refer to the logical channels labelled with D-class IP addresses and UDP destination port numbers. Usually one channel corresponds to a digital TV transmission stream or service stream.

3.2.2 IP broadcast: IP broadcast in this Recommendation refers to the implementation of the broadcast transmission of the baseband stream of IP on the CATV distribution network.

3.2.3 main channel: The main channel in this Recommendation refers to the broadcast channels delivering the digital TV service index data of IPVB.

3.2.4 section: A section is a syntactic structure used for mapping all service information defined in this Recommendation into ITU-T H.222.0 | ISO/IEC 13818-1 TS packets.

3.2.5 service: A service is a series of programmes which is broadcast in stages according to a time schedule under the control of the broadcaster.

3.2.6 service information: Service information in this Recommendation describes the data information such as delivery systems, contents and plans/schedules of broadcast data streams, etc., including PSI information of MPEG-2 and independently defined extensions.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ACT	Area Code Table
BSI	Broadcast Service Information
bslbf	bit string, left bit first
CPE	Customer Premises Equipment
DTV	Digital TV
EPG	Electronic Programme Guide
HTML	Hyper Text Markup Language
IPVB	IP Video Broadcast
MIT	Multicast Information Table
MPTS	Multi-Program Transport Stream
OTT	Over The Top
PID	Packet Identifier
rpchof	remainder polynomial coefficient, higher order first
SDT	Service Description Table
SI	Service Information
SNLT	Service Name List Table
SPTS	Single Program Transport Stream
STB	Set-Top Box
TS	Transport Stream
UDP	User Datagram Protocol
unisbf	undersigned integer, most significant bit first
VOD	Video On Demand
XML	Extensible Markup Language

5 Conventions

In this Recommendation:

The keywords "is required to" indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this document is to be claimed.

The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus, this requirement need not be present to claim conformance.

The keywords "is prohibited from" indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this Recommendation is to be claimed.

The keywords "can optionally" indicate an optional requirement which is permissible, without implying any sense of being recommended. This term is not intended to imply that the vendor's implementation must provide the option and the feature can be optionally enabled by the network operator/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with the Recommendation.

In the body of this Recommendation, the words shall, shall not, should and may sometimes appear, in which case they are to be interpreted, respectively, as is required to, is prohibited from, is recommended and can optionally. The appearance of such phrases or keywords in an appendix or in material explicitly marked as informative are to be interpreted as having no normative intent.

6 IPVB system

6.1 Introduction

An IPVB system mainly consists of an IPVB headend and IPVB terminal. The IPVB headend is used to broadcast the streams and data in the format of UDP multicast packets to all the subscribers through CATV networks, where multicast IP addresses and UDP destination port numbers in UDP multicast packets are used to distinguish different programs. The IPVB terminal is generally embedded in the user terminals. It receives the UDP multicast packets, and selects the required programs according to the multicast IP addresses and port numbers.

IPVB can either work as a unidirectional system independently to broadcast IP television services or realize a broadband access by working in combination with a bidirectional transmission system, to support high quality digital broadcasting service and interactive video and data services, such as VOD, OTT TV and VR.

In this Recommendation, the broadcast services are transmitted in assigned broadcast channels. Each broadcast channel is identified by the IP address and UDP destination port number of packets. All data, including audio and video data of different programmes and service information are packetized into UDP packets, and broadcast to all subscribers over CATV networks through different broadcast channels.

6.2 IPVB headend

The IPVB headend is responsible for broadcasting UDP multicast packets to all subscribers over CATV network systems. It is located at the entry edge of the CATV distribution network. It implements the functions of convergence, processing, distribution and transmission of IP-based services data. It distributes various IP service streams to the IP broadcast channels according to the service control strategies. It is the last data processing stage before the data enters the distribution network. The functional diagram of an IPVB headend is illustrated in Figure 1.

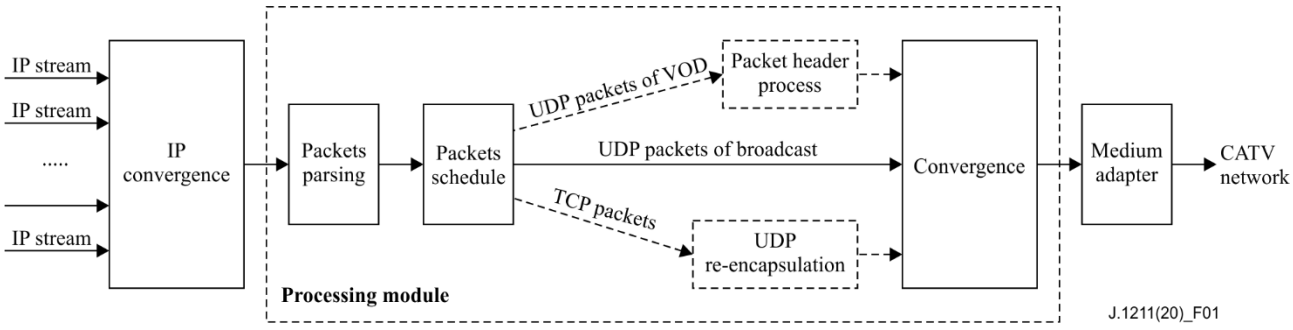

Figure 1 – The functional diagram of IPVB headend

The logical modules of an IPVB headend are defined as follows:

– The IP convergence module: this module receives the service IP streams from several GE ports, and sends them to the processing module through an internal data bus at no less than 10 Gbit/s.

– The processing module: This module implements the parsing, filtering and re-encapsulating of packets complying with different protocols, converting unicast address into multicast address if the stream has a unicast address (including VOD, OTT and other on-demand streams). And then, the processing module converges these packets and sends them to the medium adapter module.

  1) The packet header process module: If VOD adopts the VOD system based on IPQAM, but the down streams need to be transmitted in the IPVB downlink broadcast channel, the packet header process module in the IPVB headend will replace the unicast address of the received UDP packets header with the assigned multicast IP address and port number as the destination IP address and port number. Then it sends the revise packet to the convergence module: if the VOD systems are like OTT systems, the process of VOD stream packets will be processed by UDP re-encapsulation module of the IPVB headend.

  2) The UDP re-encapsulation module: This module will replace the destination IP and MAC addresses in the downstream TCP packets with the source IP and MAC addresses of the first original request packet, add the UDP header on it, and adopt the assigned multicast IP address and port number as the destination IP address and port number, then it sends the reconstructed packet to the convergence module.

– The medium adapter module: This module translates the UDP packets into the right format of packets to the network medium in use, and transmits them to the CATV network.

The parameter configuration for IPVB headend:

– On-demand services enable or disable.

– Select one physical port as "the interactive port" which is used for communication with the on-demand server and IPVB terminal.

– Configure the IP address, subnet mask and gateway of the interactive port.

– Configure the multicast IP address and port number for the main channel to broadcast the interactive port information to the IPVB terminal.

– For general on-demand services, configure the server IP address range that are used for the IPVB terminal to judge which packets and sessions are needed to be processed by the IPVB headend.

– For VOD services that are based on IPQAM, they need to configure the ACT, Frequency-To-Address conversion table and forwarding rules.

6.3 IPVB terminal

The IPVB terminal is generally embedded in the user terminal. It receives the broadcast IP-based stream from CATV networks, selects the program or service data requested by one or more user CPEs, such as IP STB, smart phone, PAD, PC and intelligent TV, by means of recognizing the IP addresses and UDP port numbers of the corresponding UDP packets. It forwards the selected data to the final user CPEs within the home network through FE/GE interface. The functional diagram of the IPVB terminal is illustrated in Figure 2.

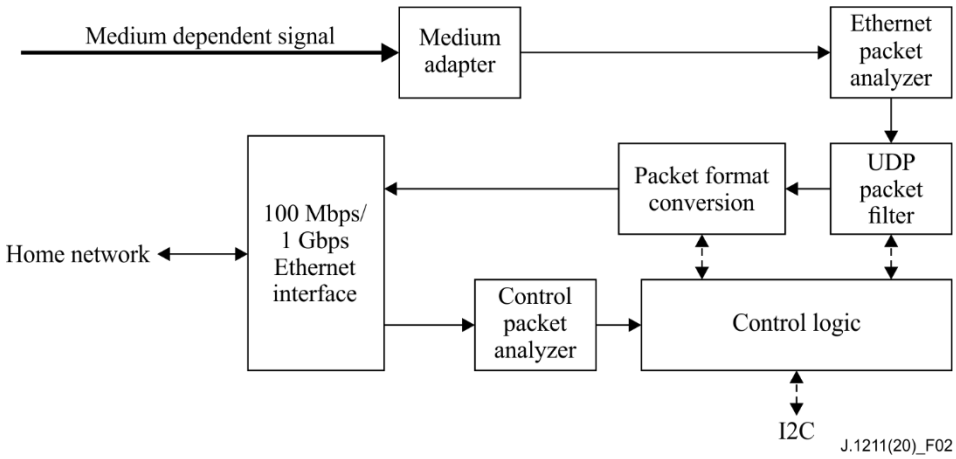

Figure 2 – The functional diagram of IPVB terminal

The major logical modules of an IPVB terminal are defined as follows:

– The UDP packet filter module: This module supports parallel-selection operation of more than 15 broadcast channels. The IPVB terminal supports as many as five user CPEs in the home network to select data from the same or different broadcast channels simultaneously, and allows each CPE to select the data from at least three broadcast channels.

– The packet format conversion module: This module supports the conversion from multicast packet to unicast packet for keeping from bandwidth waste in the home LAN. The conversion module obtains the IP addresses of the user CPE from the control logic module before implementing the conversion.

The parameter configuration for IPVB terminal:

The IPVB terminal is configured according to the configuration of the IPVB headend, which needs to receive interactive port information, server IP address range, ACT, Frequency-To-Address conversion table, etc.

6.4 Physical layer

Since the IPVB system is typically used in CATV networks, the transport medium is mainly optical fibre or coaxial cable. The physical layer coding method is not mandatory in this Recommendation. When the transport medium is optical fibre, the physical layer may comply with 10G Base-R in [IEEE802.3ae]. When the transport medium is coaxial, the physical layer may comply with [ITU-T J.83].

7 Planning of broadcast channel and format of encapsulation in IPVB system

7.1 Broadcast channel planning

Based on the carried service contents, the broadcast channels of IPVB are classified into four types: main channel, authorization channel, DTV SI Channel and program channel, as specified in Table 1.

Table 1 – Broadcast channel planning

Channel name	Description	Requirement	Service contents
Main Channel	For the essential tables	Mandatory	MIT, SNLT, and ACT
Authorization Channel	For CAT/EMM authorization information	Optional	CAT/EMM
DTV SI Channel	For DTV EPG, etc.	Optional	TS-based EPG information
Program Channel	Audio/Video programmes and data	Mandatory	Broadcasting programs, VOD, OTT TV, etc.

7.1.1 Main channel

The main channel is an IP stream channel with specific multicast IP address and UDP destination port number. The UDP packets transmitted in the main channel describes the broadcast channel information, service version number, date and other key information of digital TV programmes and other services in the IPVB system. After the user end (including IP STB, smart phone, smart TV, PAD, PC, etc) starting up, it first obtains and analyzes the data of the main channel, and then obtains the data of other service channels based on the main channel information.

The content carried in the main channel shall include the multicast information table (MIT), optionally the service name list table (SNLT), and the area code table (ACT).

7.1.2 Multicast information table (MIT)

The MIT mainly describes the multicast IP addresses, UDP port numbers and encapsulation format of all services in the IPVB system.

7.1.3 Service name list table (SNLT)

The SNLT mainly describes the program names, program providers and other program information.

7.1.4 Area code table (ACT)

The ACT describes the area codes of the access location of user terminals.

These tables are periodically broadcast to IPVB terminals through the main channel. The recommended repeating period is less than 500 ms.

As soon as user terminals are powered on, they will first receive the MIT, SNLT and ACT. Then, they will obtain the multicast addresses, UDP port numbers and encapsulation formats of the services by parsing the MIT, obtain service names from the SNLT, and they can select corresponding services according to the local area code in the ACT.

7.2 Encapsulation of DTV Audio/Video programmes

This part describes the specifications of the encapsulation of DTV audio/video programme data in IPVB systems.

7.2.1 Introduction

In IPVB systems, audio and video data of digital video broadcast shall be encapsulated into UDP packets first, and then into IPv4 or IPv6 packets, where the IP destination addresses assigned shall be assigned with multicast IP addresses. Different broadcast channels are identified with different IP destination addresses or different UDP destination port numbers. Above the UDP layer, the audio and video data could be encapsulated into MPEG transport stream (TS) packets in accordance with [ITU-T H.222.0]. Other formats are allowed too.

7.2.2 Encapsulation of TS packets into IP packets

In this Recommendation, the maximum length of Ethernet payload is 1500 bytes, and the mapping of TS packets shall start from the first byte of the field of UDP payload, so a single UDP payload accommodates at least one but at most seven complete 188-byte TS packets, and the largest payload length of a UDP packet is 188×7=1316 bytes.

The format for encapsulating TS packets into IP packets is shown in Figure 3.

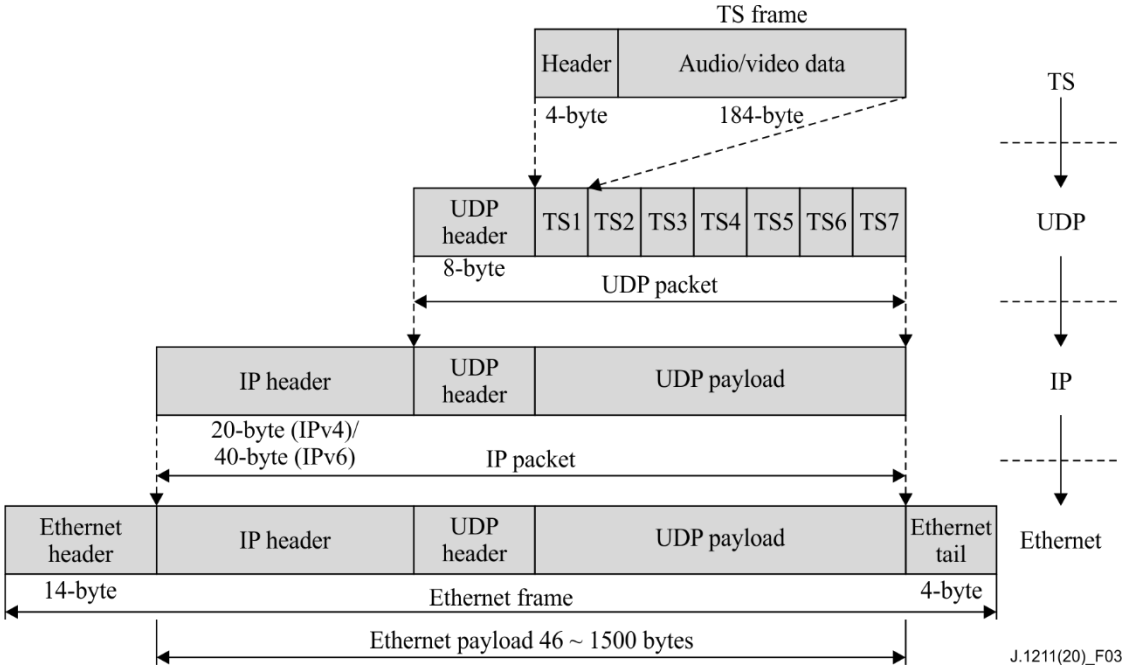

Figure 3 – The format of encapsulating TS packets into UDP/IP packets

7.2.3 Encapsulation of non-TS into IP packets

In addition to TS packets, the audio and videos data in non-TS packets (such as MP4, AVI, MOV, and other flow media containers) are also allowed to be encapsulated into the UDP/IP packets according to the encapsulation format shown in Figure 4. The maximum length of UDP payloads is 1472 bytes in the situation of IPv4, whereas it is1452 bytes in the situation of IPv6.

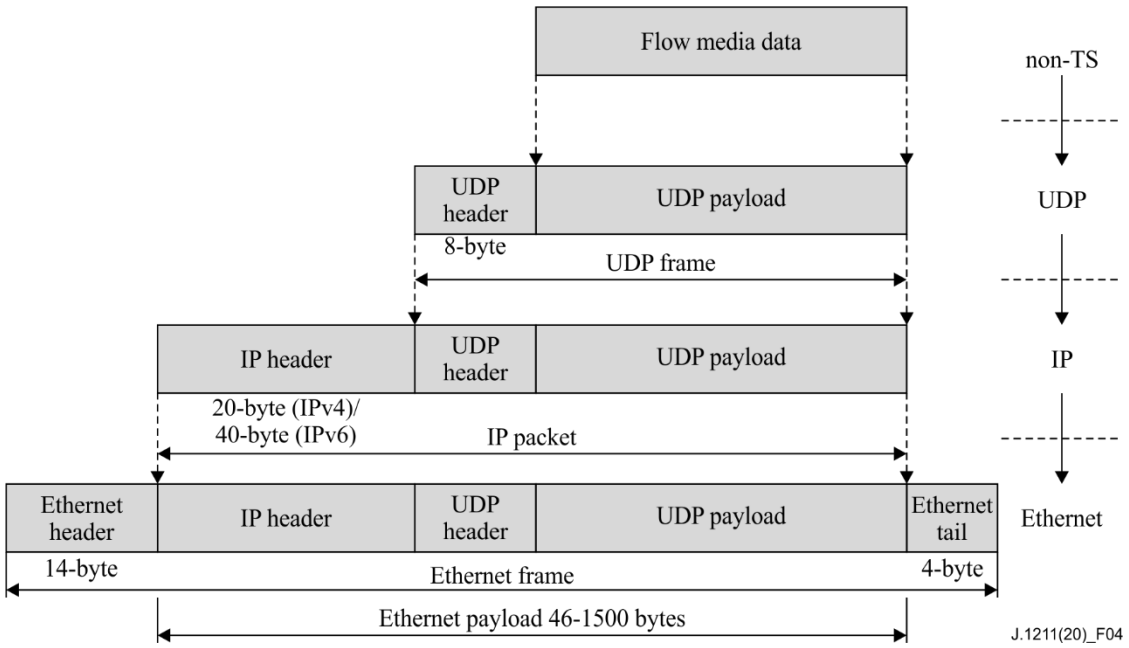

Figure 4 – The format of encapsulating non-TS packets into UDP/IP packets

8 Broadcast service information in IPVB system

8.1 Introduction

The IPVB defines three BSI tables to describe the broadcast channel information and supplement information. These three BSI tables are encapsulated into TS packets in accordance with [ITU-T H.222.0] and then broadcast in the main channel in the format of UDP.

8.2 BSI tables

BSI tables include the multicast information table (MIT), service name list table (SNLT), and the area code table (ACT). The three tables are all delivered through the main channel. The PID allocations of the BSI tables are given in Table 2.

Table 2 – PID allocation of BSI tables

Table	PID value
MIT (multicast information table)	0x000A
SNLT (service name list table)	0x000D
ACT (area code table)	0x000C

The allocations of table_id of BSI tables are presented in Table 3.

Table 3 – Allocation of table_id

Table_id	Table	Maximum section length (byte)
0xAE	MIT	1024
0xAF	SNLT	1024
0xED	ACT	1024

8.3 Multicast information table (MIT)

The MIT describes the IP destination addresses and UDP destination port numbers of each program or service in broadcast channels, which are used for the user terminals to search for programs. The MIT shall be segmented into sections in the syntax structure as given in Table 4, and encapsulated into TS packet(s). The PID value of MIT TS packets shall be 0x000A and the table_id value of MIT sections shall be 0xAE. The maximum length of MIT section is 1024 bytes.

Sub-table of MIT: A sub-table of MIT is a collection of sections with the same table_id and version_number.

The syntax of MIT section is given in Table 4.

Table 4 – MIT section

Syntax	bit (s)	Mnemonic symbol
multicast_information_section		
{		
table_id	8	uimsbf
section_syntax_indicator	1	bslbf
reserved	1	bslbf
reserved	2	bslbf
section_length	12	uimsbf
reserved	2	bslbf
version_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
reserved	4	bslbf
descriptors_length	12	uimsbf
for(int i=0;i<N;i++){		
descriptor()		
}		
CRC	32	rpchof
}		

The semantics of the fields in the MIT section are defined as follows:

table_id: This 8-bit field specifying the table identification shall be set to 0xAE.

section_syntax_indicator: The 1-bit field shall be set to "1" in this Recommendation.

section_length: This is a 12-bit unsigned integer with the first two bits of "00". It indicates the section length starting from the byte immediately after the section_length field to the end of MIT section, including the CRC field. The maximum section length is 1021 bytes, accordingly, the complete length of MIT section is less than 1024 bytes.

version_number: This is a 5-bit unsigned integer. It indicates the version number of the sub-table of MIT. The version_number shall be incremented by 1, whenever a change of the information carried in the sub-table occurs. Until the value reaches 31, it resets to 0. When the current_next_indicator is set to "1", the version_number represents the version number of the currently used sub-table. When the current_next_indicator is set to "0", the version_number represents the version number of the next used sub-table.

current_next_indicator: When current_next_indicator is set to "1", it indicates that the current sub-table is in use; when current_next_indicator is set to "0", it indicates that the sub-table is not yet currently used, but shall be the next table to be used.

section_number: This is an 8-bit field. It indicates the number of the section. The section number of the first section in the sub-table shall be set to "0x00". The value of section_number increments by "1" for each one more added section.

last_section_number: This 8-bit field indicates the section number of the last section in the belonged sub-table，which is the largest value of section_number.

descriptors_length: The descriptor length is a 12-bit field specifying the total number of bytes of the data portion of the descriptor following the byte defining the value of this field.

CRC: This 32-bit field contains the CRC value. The calculation of the CRC value shall be in accordance with [ITU-T H.222.0].

8.4 Service name list table (SNLT)

The SNLT is optional and mainly describes the names of video programes, and other supplementary information, such as names of service providers. The SNLT shall be segmented into one or more sections in the syntax structure given in Table 5. Any sections forming part of an SNLT shall be mapped in TS packets with the PID value of 0x000D. All SNLT sections shall be specified with the table_id value of 0xAF. The maximum length of an SNLT section is 1024 bytes.

Sub-table of SNLT: A sub-table of SNLT is a collection of sections with the same table_id, list_id and version_number.

The syntax of an SNLT section is given in Table 5.

Table 5 – SNLT section

Syntax	Bit(s)	Mnemonic symbol
service_name_list_section		
{		
table_id	8	uimsbf
section_syntax_indicator	1	bslbf
reserved_future_use	1	bslbf
reserved	2	bslbf
section_length	12	uimsbf
list_id	16	uimsbf
reserved	2	bslbf
version_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
reserved_future_use	8	bslbf
for(int i=0;i<N;i++){		
transport_stream_id	16	uimsbf
service_id	16	uimsbf
reserved	4	bslbf
descriptors_loop_length	12	uimsbf
for(int i=0;i<N;i++){		
descriptor()		
}		
}		
CRC	32	rpchof
}		

The semantics of the fields in the SNLT section are defined as follows:

table_id: This 8-bit field of the SNLT section shall be set to 0xAF.

section_syntax_indicator: The 1-bit field shall be set to "1" in this Recommendation.

section_length: This is a 12-bit unsigned integer with the first two bits set to "00". It indicates the section length starting from the byte immediately after the section_length field to the end of the SNLT section, including the CRC field. The maximum section length is 1021 bytes, accordingly, the complete section length of the SNLT section is less than 1024 bytes.

list_id: This is a 16-bit field for identifying a special group of channels.

version_number: This is a 5-bit unsigned integer, indicating the version number of the sub-table of the SNLT. The value of version_number increments by "1", in case of any change that occurs to the sub-table. Until the value reaches 31, it resets to 0. When the current_next_indicator is set to "1", the version_number represents the version number of the currently used sub-table. When the current_next_indicator is set to "0", the version_number represents the version number of the next used sub-table.

current_next_indicator: When current_next_indicator is set to "1", it indicates that the current sub-table is in use; when it is set to "0", it indicates that the sub-table is not yet currently used, but shall be the next table to be used.

section_number: This is an 8-bit field. It indicates the number of the section. The section number of the first section in the sub-table shall be set to "0x00". The value of section_number increments by "1" for each one more added section.

last_section_number: This 8-bit field indicates the section number of the last section in the belonged sub-table, and it is the largest section_number.

Layer 1 for-loop: This loop identifies each program globally with transport_stream_id and service_id.

Layer 2 for-loop: This loop includes the information descriptions of the corresponding program, including the program name, program provider, etc.

CRC: This 32-bit field contains the CRC value, the calculation of the CRC value shall be in accordance with [ITU-T H.222.0].

8.5 Area code table (ACT)

The ACT is optional; it mainly describes the area codes of the access location of service clients. The ACT sections shall be mapped into TS packets with a PID value of 0x000C. The table_id value of ACT sections shall be set to 0xED, and the maximum section length is 1024 bytes.

The syntax of ACT is given in Table 6.

Table 6 – ACT section

Syntax	bit (s)	Mnemonic symbol
AreaCode_section		
{		
table_id	8	uimsbf
section_syntax_indicator	1	bslbf
reserved	3	bslbf
section_length	12	uimsbf
areacode_value	32	uimsbf
}		

The semantics of the fields in the ACT section are defined as follows:

table_id: The 8-bit table_id of ACT sections shall be set to 0xED.

section_syntax_indicator: The 1-bit field shall be set to "1" in this Recommendation.

section_length: This is a 12-bit unsigned integer with the first two bits set to "00". It indicates the section length starting from the byte immediately after the section_length field to the end of ACT section, and the maximum section length is 1021 bytes. Accordingly, the complete ACT section length is less than 1024 bytes.

areacode_value: This is a 32-bit field. It is recommended that each one-byte field indicates the area code of one level, for example, each byte of its four bytes from the top to the bottom represent: Province (State), City, District and Street. The area code of a community of CH-1211 Geneva 20 – Switzerland shall be defined as 0x00-01-01-02.

8.6 Descriptors of BSI tables

The descriptors of BSI tables defined in this Recommendation are listed in Table 7, where the values of descriptor_tag are given, and the BSI tables where these descriptors are most possibly applicable are marked.

Table 7 – The descriptors of BSI tables

descriptor	descriptor_tag	MIT	SNLT
Info_service_descriptor	0x48	-	*
udp_service_list_descriptor	0xAE	*	-
udp_specific_list_descriptor	0xAF	*	-
udp_ts_list_descriptor	0xAC	*	-
NOTE – "-" means not applicable, and "*" means applicable.			

8.6.1 Info_service_descriptor

The info_service_descriptor contains basic description of services, such as service type, service name, service provider, etc. The syntax of info_service_descriptor is given in Table 8.

Table 8 – info_service_descriptor

Syntax	Bit(s)	Mnemonic symbol
Info_service_descriptor () {		
descriptor_tag	8	uimsbf
descriptor_length	8	uimsbf
service_type	8	uimsbf
service_provider_name_length	8	uimsbf
for (i=0;i<N;i++){		
char	8	uimsbf
}		
service_name_length	8	uimsbf
for(i=0;i<N;i++){		
char	8	uimsbf
}		
}		

The semantics of the main fields in the info_service_descriptor are defined as follows:

descriptor_tag: The descriptor_tag of info_service_descriptor shall be set to 0x48.

descriptor_length: This is an 8-bit field, indicating the number of bytes from the byte immediately after the descriptor_length field to the last byte of the descriptor.

service_type: This is an 8-bit field indicating the type of the service. It shall be coded according to Table 9.

Table 9 – service type coding

Service_type	Description
0x00	Not defined
0x01	Digital television service
0x02	Digital audio service
0x03 – 0xFF	Not defined

service_provider_name_length: This 8-bit field indicates the number of bytes that follow the service_provider_name_length field for describing characters of the name of the service provider.

char: This is an 8-bit field. A string of char fields indicate the name of the service provider or service.

service_name_length: This 8-bit field indicates the number of bytes that follow the service_name_length field for describing characters of the name of the service.

8.6.2 udp_service_list_descriptor

This is a UDP descriptor. It is mainly used to describe the multicast IP address and UDP port number of TS packets where the audio and video programmes are located. The syntax of udp_service_list_descriptor is given in Table 10.

Table 10 – udp_service_list_descriptor

Syntax	Bit(s)	Mnemonic symbol
udp_service_list_descriptor ()		
{		
descriptor_tag	8	uimsbf
descriptor_length	8	uimsbf
for (i=0;i<N;i++){		
transport_stream_id	16	uimsbf
service_id	16	uimsbf
udp_ipaddress	32(IPv4)	uimsbf
	128(IPv6)	uimsbf
udp_port	16	uimsbf
}		
}		

The semantics of the fields in the udp_service_list_descriptor are defined as follows:

descriptor_tag: The descriptor_tag of udp_service_list_descriptor shall be set to 0xAE.

descriptor_length: This is an 8-bit field, indicating the number of bytes from the byte immediately after the descriptor_length field to the last byte of the descriptor.

transport_stream_id: This 16-bit field uniquely identifies the TS stream where the announcement resides.

service_id: This 16-bit field uniquely identifies the service where the announcement resides.

udp_ipaddress: In IPv4, it is a 32-bit field that indicates the multicast IP destination address allocated to the current service; In IPv6, it is a 128-bit field that indicates the multicast IP destination address allocated to the current service.

udp_port: This 16-bit field indicates the UDP port number allocated to the current service.

8.6.3 udp_specific_list_descriptor

This is used for describing the IP address and UDP port number of specific TS packets, such as the main channels, the upgrading streams, global EPG, etc., as shown in Table 11.

Table 11 – udp_specific_list_descriptor

Syntax	bit(s)	Mnemonic symbol
udp_specific_list_descriptor () {		
descriptor_tag	8	uimsbf
descriptor_length	8	uimsbf
for (i=0;i<N;i++){		
info_type	8	uimsbf
data_format	8	uimsbf
udp_ipaddress	32(IPv4) 128(IPv6)	uimsbf uimsbf
udp_port	16	uimsbf
}		
}		

The semantics of the fields in the udp_specific_list_descriptor are defined as follows:

descriptor_tag: This 8-bit field of udp_specific_list_descriptor shall be set to 0xAF.

descriptor_length: This 8-bit field, indicates the length of udp_specific_list_descriptor from the byte immediately after the descriptor_length field to the end of the descriptor.

info_type: This is an 8-bit field. The values of info_type are listed in Table 12.

data_format: This 8-bit field indicates the data format of the service type currently indicated in the info_type field. The values are listed in Table 13.

udp_ipaddress: In IPv4, it is a 32-bit field that indicates the multicast IP destination address allocated to the current service; In IPv6, it is a 128-bit field that indicates the multicast IP destination address allocated to the current service.

udp_port: This 16-bit field indicates the UDP port number allocated to the current service.

Table 12 – Values of info_type of different services

Service	Value of info_type	Description
	0x00～0x0F	Reserved
EPG	0x10	Unique identification of EPG
Advertisement	0x11	Unified identification of all picture advertising, including power on, handover, main menu, etc.
Government information	0x12	Unique identification of the government information service.
Stock	0x13	Unique identification of stock service
CAT/EMM	0x14	The EMM information of CA.
Upgrading stream	0x15	Upgrading stream channel
	0x16～0xFE	Defined by users
	0xFF	Reserved

Table 13 – Values of data_format

Data format	Value	Description
	0x0	Reserved
XML	0x1	The data is in XML format
HTML	0x2	The data is in HTML format
TS	0x3	The data is in TS format

8.6.4 udp_ts_list_descriptor

The udp_ts_list_descriptor describes the multicast IP addresses and port numbers of the audio/video (such as MPTS or SPTS) broadcast channels, as shown in Table 14.

Table 14 – udp_ts_list descriptor

Syntax	Bit(s)	Mnemonic symbol

udp_ts_list_descriptor ()
{
descriptor_tag
descriptor_length
for (i=0;i<N;i++){
transport_stream_id
udp_ipaddress
 	
udp_port
}
}
	
	8
	8
	
	16
	32(IPv4)
	128(IPv6)
	16
		
		uimsbf
		uimsbf
		
		uimsbf
		uimsbf
		uimsbf
		uimsbf

The semantics of the fields in the udp_ts_list_descriptor are defined as follows:

descriptor_tag: This 8-bit descriptor-tag of udp_ts_list_descriptor shall be set to 0xAC.

descriptor_length: This 8-bit field, indicates the length of udp_ts_list_descriptor from the byte immediately after the descriptor_length field to the end of the descriptor.

transport_stream_id: This 16-bit field uniquely identifies the TS stream where the announcement resides.

udp_ipaddress: In IPv4, it is a 32-bit field that indicates the multicast IP destination address allocated to the current service; in IPv6, it is a 128-bit field that indicates the multicast IP destination address allocated to the current service.

udp_port: This 16-bit field indicates the UDP port number allocated to the current service.

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