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J.94

Amendment 3

(03/2016)

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

Ancillary digital services for television transmission

Service information for digital broadcasting in cable television systems

Amendment 3: Revised Annex C – Service information for digital multi-programme System C

Recommendation ITU-T J.94 (1998) – Amendment 3

International Telecommunication Union

Recommendation ITU-T J.94

Service information for digital broadcasting in cable television systems

Amendment 3

Revised Annex C – Service information for digital multi-programme System C

Summary

Amendment 3 to Recommendation ITU-T J.94 (1998) revises Annex C. This amendment enhances the functionality of the transmission scheme of Annex C of Recommendation ITU-T J.83 to support channel bonding as well as transport of type length value (TLV) packets.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T J.94	1998-11-19	9	11.1002/1000/4346
1.1	ITU-T J.94 (1998) Amd. 1	2000-10-06	9	11.1002/1000/5167
1.2	ITU-T J.94 (1998) Amd. 2	2001-03-09	9	11.1002/1000/5377
1.3	ITU-T J.94 (1998) Amd. 3	2016-03-15	9	11.1002/1000/12763

* 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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Recommendation ITU-T J.94

Service information for digital broadcasting in cable television systems

Amendment 3

Revised Annex C – Service information for digital multi-programme System C

1) Clause 2, References

Add the following entry:

[ITU-T J.183] Recommendation ITU-T J.183 (2016), *Time-division multiplexing of multiple MPEG-2 transport streams over cable television systems*.

2) Clause 4, Abbreviations and acronyms

Add the following entry:

TLV Type Length Value

3) Annex C

Modify Annex C as shown below:

Annex C

Service information for digital multi-programme System C

C.1 SI tables

The specifications for SI tables are fully aligned with those in Annex A both in table names and in their function. See Table C.1.

Table C.1/J.94 – SI tables and their function

Table	Function
Program Association Table (PAT)	For each service in the multiplex, the PAT indicates the location (the PID values of the Transport Stream packets) of the corresponding Program Map Table (PMT). It also gives the location of the Network Information Table (NIT).
Conditional Access Table (CAT)	The CAT provides information on the Conditional Access (CA) systems used in the multiplex; the information is private (not defined within ITU-T H.222.0 | ISO/IEC 13818-1) and dependent on the CA system, but includes the location of the EMM stream, when applicable.
Program Map Table (PMT)	The PMT identifies and indicates the locations of the streams that make up each service, and the location of the Program Clock Reference fields for a service.

Table C.1/J.94 – SI tables and their function

Table	Function
Network Information Table (NIT)	The location of the NIT is defined in ITU-T H.222.0 | ISO/IEC 13818-1, but the data format is outside the scope of ITU-T H.222.0 | ISO/IEC 13818-1. It is intended to provide information about the physical network. The syntax and semantics of the NIT are defined in this Recommendation.
Bouquet Association Table (BAT)	The BAT provides information regarding bouquets. As well as giving the name of the bouquet, it provides a list of services for each bouquet.
Service Description Table (SDT)	The SDT contains data describing the services in the system, e.g., names of services, the service provider, etc.
Network Information Table for type length value (TLV-NIT)	It is intended to provide information about the physical network when the signal is transmitted by TLV packets streams. The syntax and semantics of the TLV-NIT are defined in this Recommendation.
Event Information Table (EIT)	The EIT contains data concerning events or programs such as event name, start time, duration, etc.; the use of different descriptors allows the transmission of different kinds of event information, e.g., for different service types.
Running Status Table (RST)	The RST gives the status of an event (running/not running). The RST updates this information and allows timely automatic switching to events.
Time and Date Table (TDT)	The TDT gives information relating to present time and date. This information is given in a separate table due to the frequent updating of the time information.
Stuffing Table (ST)	The ST is used to invalidate existing sections, for example at delivery system boundaries.

The PID allocation for SI and the allocation of table_id values are as shown in Tables C.2 and C.3, which are the same as those in Tables A.1 and A.2.

Table C.2/J.94 – PID allocation for SI

Table	PID value
PAT	0x0000
CAT	0x0001
NIT, ST	0x0010
SDT, BAT, ST	0x0011
EIT, ST	0x0012
RST, ST	0x0013
TDT	0x0014
NULL	0x1FFF

Table C.3/J.94 – Allocation of table_id values

Value	Table and description
0x00	PAT
0x01	CAT
0x02	PMT
0x40	NIT, network_information_section-actual_network or TLV-NIT, network_information_actual_network
0x41	NIT, network_information_section-other_network or TLV-NIT, network_information_other_network
0x42	SDT, service_description_section-actual_transport_stream
0x46	SDT, service_description_section-other_transport_stream
0x4A	BAT
0x4E	EIT, event_information_section-actual_transport_stream, present/following
0x4F	EIT, event_information_section-other_transport_stream, present/following
0x50 to 0x5F	EIT, event_information_section-actual_transport_stream, before 8th day EIT, event_information_section-actual_transport_stream, on or after 8th day
0x60 to 0x6F	EIT, event_information_section-other_transport_stream, before 8th day EIT, event_information_section-other_transport_stream, on or after 8th day
0x70	TDT, time_date_section
0x71	RST, running_status_section
0x72	ST, stuffing_section
0x82 to 0x85	Reserved for conditional access system
0x90 to 0xBF	Selectable as operator setting table_id

C.2 Descriptor

C.2.1 Location and tag value

The location and tag value of each descriptor are as shown in Table C.4. The description, data structure, and syntax of each descriptor are the same as those in Table A.12. However, the coding of the data field of each descriptor is not specified.

Table C.4/J.94 – Possible locations of descriptors

Descriptor	Tag value	NIT	BAT	SDT	EIT	PMT	CAT	TLV-NIT
CA_descriptor	0x09					*	*	
network_name_descriptor	0x40	*						
stuffing_descriptor	0x42	*	*	*	*			
cable_delivery_system_descriptor	0x44	*						
~~channel_bonding_cable_delivery_system_descriptor~~	~~T.B.D.~~	~~*~~						
bouquet_name_descriptor	0x47		*	*				
service_descriptor	0x48			*				
linkage_descriptor	0x4A	*	*	*	*			
NVOD_reference_descriptor	0x4B			*				
time_shifted_service_descriptor	0x4C			*				
short_event_descriptor	0x4D				*			
extended_event_descriptor	0x4E				*			
time_shifted_event_descriptor	0x4F				*			
component_descriptor	0x50				*			
mosaic_descriptor	0x51			*		*		
stream_identifier_descriptor	0x52					*		
content_descriptor	0x54				*			
parental_rating_descriptor	0x55				*			
User-defined	0x80 to 0xBF							
channel_bonding_cable_delivery_system_descriptor	0xF3	*						*
Forbidden	0xFF							

Table C.4/J.94 – Possible locations of descriptors *(concluded)*

Descriptor	Tag value	NIT	BAT	SDT	EIT	PMT	CAT
area_specified_service_descriptor	0x96		*	*			
data_coding_method_descriptor	0xFD					*	
* Possible location							

Descriptors which are used in Japan but not specified in Annex A are detailed in the following clauses.

C.2.2 CA descriptor

The CA descriptor which is described in CAT and PMT identifies the type of conditional access and also identifies the PID in TS packet that carries the information related to conditional access. Conditional access is only available when this descriptor is used. See Table C.5.

Table C.5/J.94 – CA descriptor

Syntax	Bits	Identifier	Note
CA_descriptor(){			
descriptor_tag	8	uimsbf	
descriptor_length	8	uimsbf	
CA_system_id	16	uimsbf	
reserved	3	bslbf	"111"
CA_PID	13	uimsbf	
for (i = 0; i < N; i++) {			
private_data }	8xN	bslbf	
}			

C.2.3 Area specified service descriptor

This descriptor is used to render the services to the specified part within a given service area by transmitting either the area list of the service reception area or the one beyond the service reception area (see Table C.6). Area specified service is only available when this descriptor is used.

Table C.6/J.94 – Area specified service descriptor

Syntax	Bits	Identifier	Note
area_specified_service _descriptor(){			
descriptor_tag	8	uimsbf	
descriptor_length	8	uimsbf	
descriptor_flag	1	bslbf	(1: available, 0: not available)
reserved	7	bslbf	
for (i = 0; i < N; i++) { area_code	24	bslbf	alphanumeric 3 characters
}			
}			

C.2.4 Data coding method descriptor

The data coding method descriptor which is described in PMT identifies the data coding method for data broadcasting services. See Table C.7.

Table C.7/J.94 – Data coding method descriptor

Syntax	Bits	Identifier	Note
data_coding_method_descriptor(){			
descriptor_tag	8	uimsbf	
descriptor_length	8	uimsbf	
data_component_id	16	uimsbf	
for (i = 0; i < N; i++) {			
additional_identification_information	8xN	bslbf	
}			
}			

C.2.5 Cable delivery system descriptor

This descriptor which is described in NIT identifies the physical conditions of the cable channel. See Table C.8.

Table C.8/J.94 – Cable delivery system descriptor

Syntax	No. of bits	Identifier
cable_delivery_system_descriptor(){		
descriptor_tag	8	uimsbf
descriptor_length	8	uimsbf
Frequency	32	bslbf
reserved_future_use	8	bslbf
frame_type	**4**	**bslbf**
FEC_outer	4	bslbf
Modulation	8	bslbf
symbol_rate	28	bslbf
FEC_inner	4	bslbf
}		

Semantics for cable delivery system descriptor

frequency: The frequency is a 32-bit field giving the 4-bit BCD values specifying 8 characters of the frequency value. For the cable_delivery_system_descriptor, the frequency is coded in MHz, where the decimal occurs after the fourth character (e.g., 0312.0000 MHz).

frame_type: The frame_type is a 4-bit field specifying the frame type according to Table C.9. The frame type indicates the number of slots in the TSMF, N, and the maximum number of TSs or data streams with specific PID transmitted simultaneously, M if the TSMF is used. The values of N and M should be identical to those in ~~the~~ [ITU-T J.183].

Table C.9/J.94 – Frame type

frame_type bit 3210	Description
0000	Reserved for future use
0001	(N, M) = (53, 15)[a)] TSMF is for both single channel and/~~or~~ channel bonding functionality.
0010	(N, M) = (53, 15)[a)] Used for channel bonding functionality
0011 to 1110	Reserved for future use
1111	None – indicates that the waveform does not use TSMF
[a)] The frame type (N, M) is (53,15) for Annex C. It might be determined for other transmission systems.	

FEC_outer: The FEC_outer is a 4-bit field specifying the outer Forward Error Correction (FEC) scheme used according to Table C.10.

Table C.10/J.94 – Outer FEC scheme

FEC_outer bit 3210	Description
0000	Not defined
0001	No outer FEC coding
0010	RS(204/188)
0011 to 1111	Reserved for future use

modulation: This is an 8-bit field. It specifies the modulation scheme used on a cable delivery system according to Table C.11.

Table C.11/J.94 – Modulation scheme for cable

Modulation (hex)	Description
0x00	Not defined
0x01	16-QAM
0x02	32-QAM
0x03	64-QAM
0x04	128-QAM
0x05	256-QAM
0x06 to 0xFF	Reserved for future use

symbol_rate: The symbol_rate is a 28-bit field giving the 4-bit BCD values specifying 7 characters of the symbol_rate in Msymbol/s where the decimal point occurs after the third character (e.g., 027.4500).

FEC_inner: The FEC_inner is a 4-bit field specifying the inner FEC scheme used according to Table C.12.

Table C.12/J.94 – Inner FEC scheme

FEC_inner bit 3210	Description
0000	Not defined
0001	1/2 conv. code rate
0010	2/3 conv. code rate
0011	3/4 conv. code rate
0100	5/6 conv. code rate
0101	7/8 conv. code rate
1111	No conv. Coding
0110 to 1110	Reserved for future use

C.2.~~5~~6 Channel bonding cable delivery system descriptor

This descriptor, which is described in NIT or TLV-NIT, is defined to identify the physical layer specification of multiple channels for demodulation and combining to restore the original stream. See Table C.13 of [ITU-T J.94].

Table C.13/J.94 – Channel bonding cable delivery system descriptor

Syntax	No. of bits	Identifier
channel_bonding_cable_delivery_system_descriptor(){		
descriptor_tag	8	uimsbf
descriptor_length	8	uimsbf
for(i=0;i<N;i++){		
Frequency	32	bslbf
reserved_for_future_use	8	
frame_type	4	uimsbf
FEC_outer	4	bslbf
Modulation	8	bslbf
symbol_rate	28	bslbf
FEC_inner	4	bslbf
group_id	8	bslbf
}		
}		

The value of descriptor tag,'0xF3', is used as described in Table C.4.

N: number of carriers

group_id: this is an 8-bit field. It specifies a unique identifier of a group corresponding to bonding channels.

Other semantics are the same as 'Cable delivery system descriptor' in clause C.2.5.

C.3 Character code tables

The tables corresponding to Annex A are under study now.

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