



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

J.90

(04/97)

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

Specific Recommendations for television transmission

**Electronic programme guides for delivery by
digital cable television and similar methods**

ITU-T Recommendation J.90

(Previously CCITT Recommendation)

ITU-T J-SERIES RECOMMENDATIONS

TRANSMISSION OF TELEVISION, SOUND PROGRAMME AND OTHER MULTIMEDIA SIGNALS

General Recommendations	J.1–J.9
General Recommendations concerning sound-programme transmissions	J.10–J.19
Performance characteristics of sound-programme circuits	J.20–J.29
Characteristics of equipment and lines used for setting up sound-programme circuits	J.30–J.39
Characteristics of equipment for coding analogue sound-programme signals	J.40–J.49
Digital transmission of sound-programme signals	J.50–J.59
Characteristics of circuits for television transmissions	J.60–J.69
Systems for television transmission over metallic lines and interconnection with radio-relay links	J.70–J.79
Digital transmission of television signals	J.80–J.89
Specific Recommendations for television transmission	J.90–J.99
Transmission of signals with multiplexing of video, sound and data, and signals of new systems	J.100–J.109
Interactive services	J.110–J.119

For further details, please refer to ITU-T List of Recommendations.

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Geneva, October 1996).

ITU-T Recommendation J.90 was prepared by ITU-T Study Group 9 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 22nd of April 1997.

NOTE

In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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CONTENTS

	<i>Page</i>
1 Scope	1
2 Terms, definitions and acronyms	1
3 Discussion on Electronic Programme Guides for delivery by digital cable television	2
3.1 Information to be provided by EPGs	2
3.2 Labelling of EPG information	3
3.3 Conditional access	3
3.4 Delivery of EPG information to the home	4
3.5 Refresh rates	4
3.6 Presenting EPG information on consumer receivers	4
3.7 Considerations on interoperability	5
4 Summary of guidelines and specifications	5
Appendix I – Example of an operating scenario for the generation, assembly and delivery of EPG information	13
I.1 Introduction	13
I.2 Sourcing EPG information	13
I.3 Assembling EPG information	13
I.4 Delivering EPG information	14
I.5 Presenting EPG information	14
Appendix II – Bibliography	14

SUMMARY

The present Recommendation specifies some requirements to be met when Electronic Programme Guide (EPG) information is delivered to the home by digital cable television and other similar distribution methods.

Delivery of EPG information may be implemented through various operating scenarios; a typical one is described in Appendix I by way of an example.

The importance of properly structured EPGs in which home viewers can readily navigate is becoming increasingly important with the expected large increase in the number of programmes offered to the home, that is made possible by digital television delivery systems that employ bit rate reduction. This Recommendation is meant to catalyse the development of an efficient structure for EPG information, conducive to user-friendly interactive navigation tools that will help viewers to find their way among EPG information.

ELECTRONIC PROGRAMME GUIDES FOR DELIVERY BY DIGITAL CABLE TELEVISION AND SIMILAR METHODS

(Geneva, 1997)

1 Scope

The present Recommendation specifies some requirements to be met when Electronic Programme Guides (EPGs) are delivered to the home by digital cable television and other similar distribution methods.

The specified approach is based on the identification of the various items of information that should be delivered to the home; those items of information may be divided into categories having different degrees of importance or delivery priorities, and identification codes must be assigned to them, to allow unequivocal retrieval upon reception. Although the scope of this Recommendation is focused on EPG delivery over digital channels, its main operational concepts, and the structure for EPGs based on them are generally also applicable to EPGs delivered by teletext over analogue television channels.

A typical operating scenario is described in Appendix I as an example of the way the generation, assembly and delivery of EPG information may be organized. This scenario is taken as a reference in the presentation of the Recommendation.

The present Recommendation does not cover the mechanism to obtain downloading of EPG information on user request (i.e. interactive applications), nor the labelling of the various components in the MPEG-2 ([1] of Appendix II) bit stream used to deliver digital television to the home: it just specifies the individual labelling of the various items of EPG information carried in the bit stream.

2 Terms, definitions and acronyms

Some specific terms, definitions and acronyms used in this Recommendation are listed below.

2.1 application-free EPG: An EPG in which the provider can freely select the content and the layout of the presentation, in a way that is implemented by the consumer television/multimedia display.

2.2 capacity provider: The entity that provides the technical facilities needed to deliver a programme schedule (e.g. the common carrier).

2.3 consumer premises equipment provider: The entity that supplies the television/multimedia equipment at the consumer premises (e.g. the equipment manufacturer).

2.4 content provider: The entity that provides the creative content of a programme (e.g. the programme producer or the owner of its rights).

2.5 electronic programme guide: A structured multimedia database, intended to provide information on programmes to be broadcast or cablecast.

2.6 EPG: Electronic Programme Guide.

2.7 EPG provider: The entity that collects, collates and assembles the elements of information that constitute the EPG database.

2.8 presentation-free EPG: An EPG for which the information content is specified, but the operation of the consumer television/multimedia display is not.

2.9 schedule provider: The entity that decides the schedule in which programmes are sequenced on a delivery channel (e.g. the broadcaster).

2.10 area availability code: A code used to denote that part of the area covered by a programme distribution service, to which a specific programme should be distributed.

3 Discussion on Electronic Programme Guides for delivery by digital cable television

3.1 Information to be provided by EPGs¹⁾

EPGs should preferably provide the following “basic” items of information, concerning the content of each delivered programme:

- programme title and subtitle or episode title;
- programme category (drama, sports, news, etc.);
- parental rating (children, adult, etc.);
- area availability code (blackout identification information);
- programme duration;
- talent (director, cast, photographer, music, author, etc.);
- producer;
- date of production;
- short text summary of the programme;
- technical format (wide screen, stereo sound, etc.).

EPGs may also optionally provide the following supplementary items of information on each delivered programme:

- long text summary of the programme;
- press reviews;
- press/critics’ rating, if available;
- photos of the leading performers;
- photos of posters, if available;
- stage photos;
- video clips or “teasers”;
- music excerpts or “teasers”;
- production company;
- production facility;
- production staff;
- intellectual property rights;
- copyright aspects;
- others.

¹⁾ The content-related information and the delivery-related information listed in this subclause are not necessarily arranged in order of importance, nor in the order in which they should be displayed.

EPGs should preferably provide the following “basic” items of information, concerning the delivery of each offered programme:

- designation of the broadcast or cable channel;
- day and time of broadcast;
- first screening on TV, repeat screening, etc.;
- ancillary services: subtitling, audio for the hearing-impaired, etc.;
- information on access entitlement, if any;
- codes to programme automatic video recording, etc.

It is clear from the lists above that EPG information will take the form of a multimedia database.

This Recommendation provides detailed lists for some of the information items in the database.

It is recognized that there may be instances when some of the information items listed above will not be provided, e.g. for competition or copyright reasons.

3.2 Labelling of EPG information

Every item of EPG information delivered to the home must be labelled in a unique way, in order that it may be unequivocally retrieved and processed in the home. The objective is to allow consumers at home to freely navigate through the EPG information if their receiver has adequate intelligence and memory.

This Recommendation does not specify the label or the data length for every item of EPG information listed in it. Such labelling is currently under study for worldwide standardization; lists of regionally-applicable labels exist in some regional standards.

Table 1 gives a provisional listing of the “content descriptors”; Table 2 gives a provisional listing of programme categories with their labels.

It will be noted that Table 2 only provides for a maximum of 16 categories, and for a maximum of 16 subcategories in each category. This is likely to be insufficient to identify each programme category with adequate accuracy to meet the users’ needs. A third tier of classification for categories is currently under study; it is likely that if this tier were to provide, for example, 16 sub-subcategories for each listed subcategory, the resulting accuracy would be adequate for all practical purposes.

3.3 Conditional access

Delivery of EPGs will likely be subjected to some degree of conditional access. A consumer that wishes to receive basic information on all programmes as a separate service will likely be charged for it. The mechanism for conditional access in this case may be similar to the one used for conditional access in television subscription services.

Delivery of EPG information to professional parties will likely also be subjected to conditional access. In this respect it is likely that different professional parties will be granted different degrees of conditional access. For instance, “write” access will generally only be granted to some selected parts of the EPG multimedia database, while “read-only” access will likely be more generally granted.

Specifically, schedule providers will likely be granted write access only to information that concerns programmes on their channels. Other professional parties such as publishers of printed programme guides may well be willing to pay a “professional” subscription fee to be entitled to receive the complete content of the EPG multimedia database and to print selected parts of it.

It is obvious that space must be allocated in the EPG multimedia database, to carry conditional access information for each part of it. Standardization of this aspect is currently under study.

3.4 Delivery of EPG information to the home

Digital delivery of EPGs to the home amounts to downloading a digital multimedia application to the user. Since digital delivery of television to the home is based on the delivery of MPEG-2 transport streams, the logical choice for delivering EPGs to the home is to use that part of the capacity in the MPEG-2 transport stream that is set aside for data delivery.

EPG delivery in the MPEG-2 multiplex must obviously comply with the protocols specified for assembling a MPEG-2 transport stream. This Recommendation does not cover those protocols.

If it is not possible to set aside a sufficiently large capacity for EPG delivery in the capacity for data of the MPEG-2 transport stream, then only selected parts of the EPG database will be delivered in it. Delivery of the remaining parts of the database to the home will then require the use of some shared data capacity available in the delivery channel, outside the MPEG-2 transport stream. Standardization of protocols for the management of the data capacity of a delivery channel is under study; some specifications already exist in regional standards.

Another approach may be to apply compression to the EPG database in order to achieve more efficient transmission and storage. Several algorithms exist for this purpose. If such an approach is used for the EPG database, then a compatible algorithm to expand the database needs to be provided in the consumer receiver. This aspect is under study.

Modulation of EPG data in view of its delivery to the home in the MPEG-2 transport stream must obviously comply with the modulation methods specified for the delivery of the MPEG-2 transport stream over broadcast and cablecast channels, e.g. in Recommendations J.83 and J.84 ([2] and [3] of Appendix II).

3.5 Refresh rates

Another important aspect of EPG information delivery concerns its refresh rate, as there may be a need for several refresh rates or priorities, e.g.:

- a refresh rate of very few seconds (perhaps one or two) is needed for the barely essential information that should be displayed to the “zapping” audience immediately after each channel change; such information is the title of the current programme, and the channel identification;
- a refresh rate of several seconds (perhaps ten) may be suitable for a somewhat larger but still basic information such as the schedule for the day on the selected channel;
- a much longer refresh rate (perhaps an hour or more) may be acceptable for a comprehensive information on all the programmes scheduled on several channels over several days.

The requirement for different refresh rates has repercussions on the occupation of the available capacity for data in the MPEG-2 transport stream, and it may require that the concerned information items in the EPG be properly labelled in respect of their priority also.

The need for a consumer receiver to be able to display EPG information on short notice, even when the information is refreshed at a low rate, requires that an adequate volume of (preferably non-volatile) data memory be built in the receiver.

3.6 Presenting EPG information on consumer receivers

The present Recommendation does not specify the way in which EPG information is processed and presented to the viewer when it is delivered to the home.

Such presentation (the EPG “look” and “feel”) may be controlled by means of software resident in the receiver or by means of an application downloaded to the receiver through the EPG provider. The latter approach offers attractive features for future television receivers, since it allows:

- the updating of the software environment of the receiver;
- a control of the user navigation interface by the EPG provider;
- the capability for each user to run “customized bouquet” EPGs.

When, on the contrary, the EPG look and feel is not controlled by an application downloaded to the receiver through the EPG provider, it would then be determined by software that is resident in the receiver itself, that software being chosen by the consumer equipment manufacturer; thus, the equipment manufacturer would be free to compete in the market on this ground, while complying with the appropriate technical specifications.

It is recommended that consumer receivers should not alter the look and feel of the information they present, when this is determined by instructions downloaded to the receiver by the EPG provider.

3.7 Considerations on interoperability

It is stressed that the benefits of an orderly development in the use of EPGs in the home requires that a single set of technical specifications be applied by all parties concerned. The following paragraphs highlight some of the fundamental requirements related to various levels of interoperability.

- 1) It is essential that all content providers should use the sets of programme content categories specified in the present Recommendation, even if they use different labels for them; indeed different labels with the same meaning can be readily harmonized by means of look-up tables, while a divergence in the way content categories are specified by different content providers may well make it necessary to manually re-code each programme.
- 2) It is also desirable, albeit not essential, that all content providers and all schedule providers use the same sets of labels for programme content categories, otherwise EPG providers would be obliged to re-label programmes, in order to harmonize their labels; when necessary, it would be possible to automatically perform such re-labelling by means of look-up tables, but only on condition that all programme content categories be uniformly specified.
- 3) It is extremely desirable that all broadcasters and cable television operators that deliver EPGs to the home use the same programme delivery labels and the same syntax; otherwise, immediate compatibility among EPG databases delivered to consumer receivers through different delivery channels will be lost. This requirement amounts to the delivery of presentation-free EPGs, i.e. EPGs for which the information content is specified, but the operation of the consumer television/multimedia display is not.
- 4) It is also extremely desirable to ensure interoperability among various programme delivery media having different delivery capacity, such as terrestrial broadcasting, satellite broadcasting, cable television, SMATV, etc. In order to achieve this goal, the data rate needed to deliver the “basic” items of information listed in 4.1 must be designed to match the capacity available for the delivery of data in the delivery medium that has the lowest data capacity, e.g. analogue television teletext. The additional capacity provided by other media having a higher data capacity can be used to deliver the “supplementary” information.

It is also essential that interoperability be ensured among all the various services that may use the capacity for data delivery in digital distribution channels. In the context of EPGs, this requirement amounts to the delivery of application-free EPGs, i.e. EPGs in which the provider can freely select the content and the layout of the presentation, in a way that is implemented by the consumer television/multimedia display. To achieve this goal, it is necessary to tag various application systems in the transport stream by means of appropriate descriptors. Such descriptors are currently under study. The “registration descriptor” of the “MPEG-2 TS description section” can be used for this purpose.

4 Summary of guidelines and specifications

The approach and criteria given below should be used in the design of properly structured EPGs for delivery to the home by digital cable television and similar delivery methods.

- The sets of information items specified in Table 1 should be used by all parties that concur in the preparation of EPGs.
- A single set of labels (currently under study and partly specified in Table 2) should also be used.

- EPGs should include provisions (currently under study) for a range of conditional access entitlements to different parts of the EPG multimedia database.
- EPGs must also include provisions (currently under study) for appropriate descriptors if the data channel must carry various applications.
- For cable television distribution to the home, at least part of the EPG should be delivered in part of the capacity available for data delivery in the MPEG-2 transport stream.
- Modulation methods for cable television delivery of MPEG-2 transport streams to the home are specified in Recommendations J.83 and J.84.
- Future consumer television/multimedia displays should be designed to faithfully present the “look and feel” of EPG information on specific programmes or channels, when the “look and feel” are specified by the EPG; otherwise, consumer equipment manufacturers are free in their choice of an attractive and user-friendly presentation of EPGs.
- Future consumer television/multimedia displays should incorporate sufficient data memory to allow a slower refresh rate for the EPG.
- Future consumer television/multimedia displays should incorporate sufficient intelligence to allow the use of attractive EPG presentation and navigation applications resident in the receiver or downloaded to it.

Table 1/J.90 – EPG information items on programme content

a) Basic information on programme content
Programme title ^{a)}
Subtitle or episode title ^{a)}
Category of programme
Parental rating (children, parental guidance, adult, etc.)
Area availability code (blackout identification information)
Programme duration
Director ^{a)}
Cast ^{a)}
Photographer ^{a)}
Music composer ^{a)}
Producer ^{a)}
Date of production
Short text summary of the programme ^{a)}
Technical information on programme format (wide screen, stereo sound, etc.)
Reserved for future use
b) Supplementary information on programme content
Long text summary of the programme ^{a)}
Press reviews ^{a)}
Critics' ratings ^{a)}
Stills of leading performer
Stills of posters
Stage photos
Video clips or “teasers”

Table 1/J.90 – EPG information items on programme content (concluded)

b) Supplementary information on programme content (cont.)
Music excerpts or “teasers”
Intellectual property rights
Production company ^{a)}
Production facility ^{a)}
Production staff ^{a)}
Copyright aspects
Reserved for future use
c) Basic information on programme delivery
Broadcast or cable channel
Day and time of broadcast
First screening on TV, repeat screening, etc.
Information on ancillary services (subtitling, audio for the hard of hearing, etc.)
Information on access entitlement
Codes to programme automatic video recording
Reserved for future use
^{a)} This may be labelled in an itemized list of free text fields. Some constraint on the text length of each item, or of the sum of all items, may be applied to avoid an unnecessary burden in data capacity.

Table 2/J.90 – Programme content categories

(Each category and subcategory has its own label; slightly different categories may need to be used in different cultural areas; this is flagged by appropriate descriptors, shown in the rightmost column of the table)

Content Description	Category label (hexadec.)	Subcateg. label (hexadec.)	Cultural area description	
			System 1	System 2
Movie/Drama:	1		x	x
movie/drama (general)		0	x	x
detective/thriller		1	x	
mystery/suspense/thriller		1		x
adventure/western/war		2	x	
adventure/war/action/western		2		x
science fiction/fantasy/horror		3	x	
science fiction/horror		3		x
comedy		4	x	x
soap/melodrama/folkloric		5	x	
soap/melodrama		5		x
romance		6	x	x
serious/classical/religious/historical movie/drama		7	x	x

Table 2/J.90 – Programme content categories (continued)

Content Description	Category label (hexadec.)	Subcateg. label (hexadec.)	Cultural area description	
			System 1	System 2
Movie/Drama (cont.):				
adult movie/drama		8	x	
fantasy/folkloric		8		x
reserved for future use		9 to E	x	
reserved for future use		9 to C		x
others		D, E		x
user defined		F	x	x
News/Current affairs:	2		x	x
news/current affairs (general)		0	x	x
news/weather report		1	x	
weather		1		x
news magazine		2	x	
highlight		2		x
documentary		3	x	
international		3		x
discussion/interview/debate		4	x	
political		4		x
social		5		x
economics		6		x
advisory		7		x
reserved for future use		5 to E	x	
reserved for future use		8 to C		x
others		D, E		x
user defined		F	x	x
Show/Game show:	3		x	x
show/game show (general)		0	x	x
game show/quiz/contest		1	x	x
variety show		2	x	x
talk show		3	x	x
vaudeville		4		x
reserved for future use		4 to E	x	
reserved for future use		5 to C		x
others		D, E		x
user defined		F	x	x

Table 2/J.90 – Programme content categories (continued)

Content Description	Category label (hexadec.)	Subcateg. label (hexadec.)	Cultural area description	
			System 1	System 2
Sports:	4		x	x
sports (general)		0	x	x
special events (Olympic Games, World Cup, etc.)		1	x	
baseball		1		x
sports magazines		2	x	
soccer/football		2		x
football/soccer		3	x	
other team sports		3		x
tennis/squash		4	x	
tennis		4		x
team sports (excluding football)		5	x	
golf		5		x
athletics		6	x	
boxing/wrestling		6		x
motor sport		7	x	x
water sport		8	x	x
winter sports		9	x	x
equestrian		A	x	
athletics		A		x
marital sports		B	x	x
reserved for future use		C to E	x	
reserved for future use		C		x
others		D, E		x
user defined		F	x	x
Children's/Youth programmes:	5		x	x
children's/youth programmes (general)		0	x	x
pre-school children's programmes		1	x	x
entertainment programmes, 6 to 14		2	x	
elementary		2		x
entertainment programmes, 10 to 16		3	x	
junior		3		x
informational/educational/school programmes		4	x	x
cartoons/puppets		5	x	x
reserved for future use		6 to E	x	
reserved for future use		6 to C		x
others		D, E		x
user defined		F	x	x

Table 2/J.90 – Programme content categories (continued)

Content Description	Category label (hexadec.)	Subcateg. label (hexadec.)	Cultural area description	
			System 1	System 2
Music/Ballet/Dance:	6		x	x
music/ballet/dance (general)		0	x	
music (general)		0		x
rock/pop		1	x	x
serious music/classical music		2	x	x
folk/traditional music		3	x	x
jazz		4	x	x
musical/opera		5	x	x
ballet		6	x	
ballet/dance		6		x
others 1		7		x
concert		8		x
reserved for future use		7 to E	x	
reserved for future use		9 to C		x
others 2		D, E		x
user defined		F	x	x
Arts/Culture (without music):	7		x	x
arts/culture without music (general)		0	x	x
performing arts		1	x	x
fine arts		2	x	x
religion		3	x	x
popular culture/traditional arts		4	x	x
literature		5	x	x
film/cinema		6	x	x
experimental film/video		7	x	
visual arts		7		x
broadcasting/press		8	x	x
new media		9	x	x
arts/culture magazines		A	x	
fashion		A		x
fashion		B	x	
reserved for future use		C to E	x	
reserved for future use		B, C		x
others		D, E		x
user defined		F	x	x

Table 2/J.90 – Programme content categories (continued)

Content Description	Category label (hexadec.)	Subcateg. label (hexadec.)	Cultural area description	
			System 1	System 2
Social/Political issues/Economics:	8		x	
social/political issues/economics (general)		0	x	
magazines/reports/documentary		1	x	
economics/social advisory		2	x	
remarkable people		3	x	
reserved for future use		4 to E	x	
user defined		F	x	
Education/Science/Factual topics:	9		x	
Education/Science/Factual topics:	8			x
education/science/factual topics (general)		0	x	x
nature/animals/environment		1	x	x
technology/natural sciences		2	x	x
medicine/physiology/psychology		3	x	x
foreign countries/expeditions		4	x	x
social/spiritual sciences		5	x	x
further education		6	x	x
languages		7	x	x
reserved for future use		8 to E	x	
reserved for future use		8 to C		x
others		D, E		x
user defined		F	x	x
Leisure hobbies:	A		x	
Leisure hobbies:	9			x
leisure hobbies (general)		0	x	x
tourism/travel		1	x	
sightseeing/touring		1		x
handicraft		2	x	x
motoring		3	x	x
fitness & health		4	x	x
cooking		5	x	x
advertisement/shopping		6	x	
outdoor/fishing		6		x
gardening		7	x	
house and gardening		7		x
table/board games		8		x
literary		9		x

Table 2/J.90 – Programme content categories (continued)

Content Description	Category label (hexadec.)	Subcateg. label (hexadec.)	Cultural area description	
			System 1	System 2
Leisure hobbies (cont.):				
pet		A		x
reserved for future use		8 to E	x	
reserved for future use		B, C		x
others		D, E		x
user defined		F	x	x
Event characteristics:	D			x
how to/lesson		0		x
advertisement/shopping		1		x
documentary		2		x
discussion/interview/debate		3		x
reports		4		x
series		5		x
special events		6		x
international events		7		x
historical fine works		8		x
magazine		9		x
for adults only		A		x
reserved for future use		B, C		x
others		D, E		x
user defined		F		x
Special characteristics:	B		x	
Production characteristics:	E			x
original language		0	x	x
black & white		1	x	x
unpublished		2	x	x
live broadcast		3	x	x
movie works		4		x
TV works		5		x
sending		6		x
live recording		7		x
animation works		8		x
reserved for future use		4 to E	x	
reserved for future use		9 to C		x
others		D, E		x
user defined		F	x	x

Table 2/J.90 – Programme content categories (concluded)

Content Description	Category label (hexadec.)	Subcateg. Label (hexadec.)	Cultural area description	
			System 1	System 2
Production characteristics (cont.):				
reserved for future use	C to E	0 to F	x	
reserved for future use	A to C	0 to F		x
user defined	F	0 to F	x	x
NOTE 1 – Although this Recommendation does not cover protocols specified for assembling an MPEG-2 transport stream, the labels FF may be used for control codes for the link and/or download of categories sets other than the above.				
NOTE 2 – In order to identify the systems, an appropriate descriptor is required. While such descriptors are currently under study, the “registration descriptor” of the MPEG-2 “TS description section” and “private descriptors” of MPEG-2 can be applied.				
NOTE 3 – The contents descriptions and labels for system 2 are currently under study.				

Appendix I

Example of an operating scenario for the generation, assembly and delivery of EPG information

I.1 Introduction

This non-normative appendix describes, as an example, an operating scenario in which EPG information is generated, assembled, delivered and displayed to viewers.

Other operating scenarios can of course be developed and implemented, while meeting the requirements of this Recommendation. The scenario described in this Recommendation is the one used as a reference in the tutorial part of the Recommendation.

I.2 Sourcing EPG information

When the information provided by current programme guides, such as printed ones, is examined, it is seen that there are several categories of information, coming from two main sources.

- Information on programme content generally comes from the content provider, e.g. the producer of the programme or the holder of its rights.
- Information on programme delivery generally comes from the schedule provider, e.g. the broadcaster or cable television operator.

The main body of this Recommendation provides lists applicable to EPG programme content information.

I.3 Assembling EPG information

The information supplied by the various content providers will not generally conform to a single format, unless this has been carefully prearranged. Similarly, the information supplied by the various schedule providers will not generally conform to a single format.

There is thus a need for an entity that collates all the information supplied by all the content providers and all the schedule providers, and assembles a single, properly structured and formatted database in which all information on all programmes scheduled on all channels at all times during a predetermined period of time (e.g. a week) can be found.

The collated information constitutes a multimedia database in which each individual item of information must be separately labelled in order to be individually addressable, links and hyperlinks being built among related items of information, in order to set the stage for an easy navigation through the multimedia database.

I.4 Delivering EPG information

The multimedia database of EPG information so assembled must be broadcast or distributed by cable television to viewers at home. Different solutions may well apply in this respect to broadcasting and cable television distribution, due to the differences between the two media.

For instance, in the case of analogue television broadcasting, EPG information could be distributed by teletext, possibly by means of magazines personalised by the schedule provider for each individual programme channel. The limitation of analogue television broadcasting in this respect is in the modest data capacity of teletext, which limits the information to just the essential items for each programme (title, duration, day and time of broadcast, etc.). It would be impossible to supplement such very basic information with, for example photos or video clips of programmes, by just using teletext. Indeed, analogue television broadcasters may well have to select, in the multimedia EPG database, only those basic items of information that are of main interest to their own programming policy.

In the case of digital broadcasting, the quite large capacity provided for data delivery in the MPEG-2 transport stream shows promise to allow broadcasters to deliver a richer EPG database to the home.

In the case of cable television distribution, where it is expected that there would be some abundance of delivery channels, it may be possible for cable television operators to set aside, for example, a dedicated channel to provide a rich EPG, covering all the programmes to be delivered on all their channels, and to additionally use the data capacity in each channel in order to provide information on the current and the next programmes on that channel. Cable television operators would thus be free to select a larger range of items of information from the multimedia EPG database, again discarding those parts that do not fit their programming policy.

I.5 Presenting EPG information

The role of the receiver manufacturers in this perspective is to put receivers on the market that are capable to detect, decode, process and display EPG information received in the home, irrespective of the delivery channel and of the service provider.

It is essential for this purpose that a single approach be adopted to structure and format the delivered EPG information, either worldwide or at least regionally.

As to the approach used by the receiver to process and display the received EPG information, this is a matter that should be left to receiver manufacturers, who may wish to offer various degrees of completeness and sophistication in the displayed information, notably in relation to the class of their various receivers and their purchase price.

It should be noted nevertheless that there will likely be some aspects of the EPG, such as its “look” and “feel” when information on some programmes or on some channels is displayed, for which content providers or, respectively, schedule providers, will wish to retain control, rather than leaving these aspects to the discretion of receiver manufacturers.

Appendix II

Bibliography

- [1] ITU-T Recommendation H.222.0 (1996) | ISO/IEC 13818-1:1996, *Information technology – Generic coding of moving pictures and associated audio information: Systems*.
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