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Radiocommunication Sector of ITU

Recommendation ITU-R BT.2055-0

(02/2014)

Content elements in multimedia broadcasting systems for mobile reception

BT Series

Broadcasting service (television)

Foreword

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SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
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Note: *This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.*

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RECOMMENDATION ITU-R BT.2055-0

Content elements in multimedia broadcasting systems for mobile reception

(Question ITU-R 45-4/6)

(2014)

Scope

This Recommendation deals with content elements appropriate in multimedia broadcasting systems for mobile reception. Specifications are given for media type constituting multimedia content, for the coding schemes of each media type, and for methods for content navigation and interactivity.

The ITU Radiocommunication Assembly,

considering

a) that digital television and sound broadcasting systems have been implemented in many countries;

b) that multimedia broadcasting services for mobile reception have been or are planned to be introduced using the inherent capability of digital broadcasting systems;

c) that the characteristics of mobile reception are quite different from those of fixed reception;

d) that digital broadcasting services are expected to be offered in a variety of reception environments including indoor, portable, handheld and vehicular receivers;

e) that the display sizes and receiver capabilities of handheld, portable and vehicular receivers are different from those of fixed receivers;

f) that a special case of mobile reception by handheld receivers requires specific technical characteristics;

g) the need for flexible configuration of a wide variety of services;

h) the need for interoperability between mobile telecommunication services and interactive digital broadcasting services;

j) that there should be appropriate content elements for multimedia content in broadcasting systems for mobile reception,

recommends

1 that for content elements in multimedia broadcasting systems for mobile reception, the media type, media coding schemes, and methods for content navigation and interactivity described in Annex 1 should be used;

2 that compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words “shall” or some other obligatory language such as “must” and the negative equivalents are used to express requirements. The use of such words shall in no way be construed to imply partial or total compliance with this Recommendation.

Annex 1

Content elements in multimedia broadcasting systems for mobile reception

1 Introduction

Many digital television and sound broadcasting systems providing high-quality programmes to many viewers have already been deployed. Programme reuse would be facilitated if fixed and mobile receivers use the same programme format.

The display sizes of mobile receivers are different from those of fixed receivers, however, and the use cases of mobile reception are quite different from those of fixed reception. Non-real-time services may be provided for mobile reception because mobile receivers cannot always receive signals from broadcast stations. The characteristics peculiar to mobile reception determine which content elements are appropriate for mobile reception.

This Recommendation describes content elements appropriate in multimedia broadcasting systems for mobile reception. In this context, "content" means programme material and related information of any kind.

2 References

Recommendation ITU-T H.222.0 | ISO/IEC 13818-1: Information Technology – Generic coding of moving pictures and associated audio information – Part 1: Systems.

Recommendation ITU-T H.264 | ISO/IEC 14496-10: Information technology – Coding of audio-visual objects – Part 10: Advanced Video Coding.

Recommendation ITU-T H.750: High-level specification of metadata for IPTV services.

ETSI TS 102 428: Digital Audio Broadcasting (DAB); DMB video service; User application specification.

ETSI TS 102 471: Digital Video Broadcasting (DVB); IP Datacast over DVB-H: Electronic Service Guide (ESG).

ETSI TS 102 005: Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in DVB services delivered directly over IP protocols.

ISO/IEC 10918-1: Information technology – Digital compression and coding of continuous-tone still images: Requirements and guidelines.

ISO/IEC 11172-3: Information technology – Coding of moving pictures and associated audio for digital storage media at up to about 1.5 Mbit/s – Part 3: Audio.

ISO/IEC 13818-3: Information technology – Generic coding of moving pictures and associated audio information – Part 3: Audio.

ISO/IEC 13818-7: Information technology – Generic coding of moving pictures and associated audio information – Part 7: Advanced Audio Coding (AAC).

ISO/IEC 14496-1: Information technology – Coding of audio-visual objects – Part 1: Systems.

ISO/IEC 14496-2: Information technology – Coding of audio-visual objects – Part 2: Visual.

ISO/IEC 14496-3: Information technology – Coding of audio-visual objects – Part 3: Audio.

ISO/IEC 14496-14: Information technology – Coding of audio-visual objects – Part 14: MP4 file format.

ISO/IEC 23003-1: Information technology – MPEG audio technologies – Part 1: MPEG Surround.

3GPP TS 26.245: Transparent end-to-end Packet switched Streaming Service (PSS); Timed text.

ARIB STD-B24 Volume 1: Data Coding and Transmission Specification for Digital Broadcasting.

Doc. CEA-708-C: Digital Television (DTV) Closed Captioning.

Open Mobile Alliance, OMA-TS-BCAST_Service_Guide-V1_0: Service Guide for Mobile Broadcast Services.

SMPTE 421M: VC-1 Compressed Video Bitstream Format and Decoding Process.

3 Abbreviations

3GPP	3rd Generation Partnership Project No. 1
AAC	Advanced audio coding
AIFF	Audio interchange file format
AMR-WB	Adaptive multi rate wide band
ASCII	American Standard Code for Information Interchange
AVC	Advanced video coding
BIFS	Binary format for scene description
BML	Broadcast mark-up language
BMP	Bit map
CEA	Consumer Electronics Association
ER-BSAC	Error resilience – Bit sliced arithmetic coding
ESG	Electronic service guide
GIF	Graphics interchange format
HE-AAC	High efficiency advanced audio coding
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
JPEG	Joint Photographic Experts Group
MIME	Multipurpose internet mail extension
MNG	Multiple-image network graphics
MPEG	Motion Picture Experts Group
OMA	Open Mobile Alliance
PNG	Portable networks graphics
PSI/SI	Programme specific information/service information
SMPTE	Society of Motion Picture and Television Engineers
SVC	Scalable video coding
RME	Rich media environment
VC-1	SMPTE 421M-2006 video codec standard
XML	extensible markup language

4 Media type

Multimedia content elements are classified into audio, video and data. For file delivery, audio, video and other elements can be packed into file data. Media types appropriate for content elements in multimedia broadcasting systems for mobile reception are listed in Table 1.

TABLE 1

Media types of content elements

<table>
<tr><th>Media type</th><th colspan="4">Description</th></tr>
<tr><td rowspan="2">Audio</td><td colspan="2">Format</td><td colspan="2">Coding scheme</td></tr>
<tr><td colspan="2">Mono
Stereo
Surround</td><td colspan="2">MPEG-1/MPEG-2 Audio Layer II[1]
MPEG-2 AAC (ISO/IEC 13818-7)[1]
MPEG-4 HE-AAC (ISO/IEC 14496-3)
MPEG-4 HE-AAC v2 (ISO/IEC 14496-3)[1]
MPEG-4 ER BSAC (ISO/IEC 14496-3)
MPEG Surround (ISO/IEC 23003-1)[1]
AMR-WB+
AIFF-C
HiQ Audio 2</td></tr>
<tr><td rowspan="2">Video</td><td colspan="2">Resolution</td><td>Frame rate</td><td>Coding scheme</td></tr>
<tr><td colspan="2">320 × 180, 320 × 240,
384 × 224,
400 × 240, 416 × 240,
720 × 480, 832 × 480</td><td>Up to 60</td><td>ITU-T H.264/MPEG-4 AVC (ISO/IEC 14496-10)[2]
ITU-T H.264/MPEG-4 SVC (ISO/IEC 14496-10 Annex G)
VC-1 (SMPTE 421M)</td></tr>
<tr><td rowspan="6">Data</td><td>Category</td><td colspan="3">Coding scheme</td></tr>
<tr><td>Text</td><td colspan="3">ASCII text</td></tr>
<tr><td>Still image</td><td colspan="3">BMP
GIF
MNG
JPEG
PNG</td></tr>
<tr><td>Closed caption</td><td colspan="3">CEA 708 closed captioning
3GPP timed text</td></tr>
<tr><td>Container</td><td colspan="3">Self-declared MIME format
MP4
3GP</td></tr>
<tr><td>Binary data</td><td colspan="3">N/A</td></tr>
</table>

[1] This coding scheme is described in Recommendation ITU-R BS.1196.

[2] This coding scheme is described in Recommendation ITU-R BT.1870.

5 Content navigation methods

Content navigation enables end users to find and select services quickly. In mobile environments, the ability to navigate through broadcast services easily is especially important. An example of content navigation is provided by the Electronic Service Guide (ESG), which contains information about the available services and how they can be accessed.

Table 2 lists content navigation methods appropriate in multimedia broadcasting systems for mobile reception.

TABLE 2

Content navigation methods

OMA Service Guide
MPEG-2 PSI/SI
MPEG-2 PSI/SI and XML scheme (ITU-T H.750)

6 Interactivity methods

An interactive environment for users of mobile services has become a basic requirement. Wide-scale interactive capabilities can be provided by telecommunication networks, and local interactive services can be provided without telecommunication networks. Interactive applications can also be provided by data elements listed in Table 1.

Table 3 lists interactivity methods appropriate in multimedia broadcasting systems for mobile reception.

TABLE 3

Interactivity methods

BML
Hypertext linkage
MPEG-4 BIFS
OMA-RME (Rich Media Environment)