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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

IPTV multimedia services and applications for IPTV – IPTV multimedia application frameworks

HTML for IPTV services

Recommendation ITU-T H.763.3

International Telecommunication Union

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Recommendation ITU-T H.763.3

HTML for IPTV services

Summary

Recommendation ITU-T H.763.3 describes hypertext markup language (HTML) to provide interoperability and harmonization among Internet protocol television (IPTV) multimedia application frameworks. To avoid different appearances and interactivities depending on specific implementations of HTML, a minimal set of HTML elements, to be supported by any IPTV terminal, needs to be specified for enhancing the interoperability of IPTV services among different terminals.

This Recommendation describes elements of IPTV-HTML (Basic profile), attributes of IPTV-HTML (Basic profile) and document object model (DOM) in IPTV-HTML (Basic profile).

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T H.763.3	2017-12-14	16	11.1002/1000/13438

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FOREWORD

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

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1 Scope

This Recommendation describes hypertext markup language (HTML) to provide interoperability and harmonization among Internet protocol television (IPTV) multimedia application frameworks.

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.720] Recommendation ITU-T H.720 (2008), *Overview of IPTV terminal devices and end systems*.

[ITU-T H.721] Recommendation ITU-T H.721 (2015), *IPTV terminal devices: Basic model*.

[ITU-T H.760] Recommendation ITU-T H.760 (2009), *Overview of multimedia application frameworks for IPTV services*.

[ITU-T H.761] Recommendation ITU-T H.761 (2014), *Nested context language (NCL) and Ginga-NCL*.

[ITU-T H.762] Recommendation ITU-T H.762 (2011), *Lightweight interactive multimedia environment (LIME) for IPTV services*.

[ITU-T H.763.1] Recommendation ITU-T H.763.1 (2010), *Cascading style sheets for IPTV services*.

[ITU-T H.764] Recommendation ITU-T H.764 (2012), *IPTV services enhanced script language*.

[ITU-T H.765] Recommendation ITU-T H.765 (2015), *Packaged IPTV application (widget) service*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 LIME-DOM [ITU-T H.762]: The profile of the document object model (DOM) [b-W3C DOM1] defined in [ITU-T H.762] that composes lightweight interactive multimedia environment (LIME).

3.1.2 LIME-HTML [ITU-T H.762]: The profile of extensible hypertext markup language (XHTML) defined in [ITU-T H.762] that composes lightweight interactive multimedia environment (LIME).

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 IPTV-DOM (Basic profile): IPTV-DOM is DOM for IPTV-HTML. This is defined to provide interoperability and harmonization among IPTV multimedia application frameworks. IPTV-DOM (Basic profile) is the basic profile of IPTV-DOM, abbreviated as "BI-DOM".

3.2.2 IPTV-HTML (Basic profile): IPTV-HTML is HTML [b-W3C HTML] [b-W3C HTML5] for IPTV terminal devices. This is defined to provide interoperability and harmonization among IPTV multimedia application frameworks. "IPTV-HTML (Basic profile)" is the basic profile of IPTV-HTML, abbreviated as "BI-HTML".

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms.

API	Application Programming Interface
BI-DOM	Basic profile of DOM for BI-HTML
BI-HTML	Basic profile of HTML for IPTV terminal devices
CE	Consumer Electronics
CE-HTML	The HTML profile defined in [b-CEA-2014-B]
CSS	Cascading Style Sheets
DHTML	Dynamic Hypertext Markup Language
DOM	Document Object Model
DTD	Document Type Definition
ECMA	European Computer Manufacturers Association
HDTV	High Definition Television
HTML	Hypertext Markup Language
IPTV	Internet Protocol Television
LIME	Lightweight Interactive Multimedia Environment
MAFR	Multimedia Application Framework
MIME	Multipurpose Internet Mail Extensions
SGML	Standard Generalized Markup Language
UI	User Interface
UPnP	Universal Plug and Play
XHTML	Extensible Hypertext Markup Language
XML	Extensible Markup Language

5 Conventions

The following terms and symbols are used in subsequent clauses to describe operational guidelines:

R1 Basic service required item. An IPTV terminal device designed for basic service should appropriately interpret the attribute if present in the content.

R2 Basic service required item. It is assumed the value for this attribute is not present in the content. An IPTV terminal device designed for basic service assumes the default value for this attribute.

O Item not required for basic service. It is assumed the value for this attribute is not present in the content. An IPTV terminal device designed for basic service does not need to handle the attribute even if present in the content.

R Item used as R1 or R2.

N/A Item used for not applicable.

6 Introduction

Hypertext markup language (HTML) [b-W3C HTML], [b-W3C HTML5] is the predominant markup language for web pages. It provides a means to describe the structure of text-based information in a document (by denoting certain text as links, headings, paragraphs, lists and so on) and to supplement that text with interactive forms, embedded images and other objects. HTML is written in the form of tags, surrounded by angle brackets. HTML can also describe, to some degree, the appearance and semantics of a document and can include embedded scripting language code (such as JavaScript) which can affect the behaviour of web browsers and other HTML processors.

Elements are the basic structure for HTML markup. Elements have two basic properties: attributes and content. Each attribute and each element's content has certain restrictions that must be followed for an HTML document to be considered valid. An element usually has a start tag (e.g., <element-name>) and an end tag (e.g., </element-name>). The element's attributes are contained in the start tag and content is located between the tags (e.g., <element-name attribute="value">Content </element-name>). Some elements, such as <br>, do not have any content and must not have a closing tag. Clause 7 describes several types of markup elements used in HTML.

7 Elements of IPTV-HTML (Basic profile)

HTML is a simple data format used to create hypertext documents. However, HTML has increasingly been used to create multimedia content and many declarative application platforms based on HTML have been used to provide various kinds of multimedia services in accordance with different purposes in different areas. Depending on its purpose, targeted content and services, or environments, each declarative application platform has a different implementation scope of HTML elements. This often leads to different appearances and interactivities depending on specific implementations of HTML. Therefore, a minimal set of HTML elements to be supported by any IPTV terminal needs to be specified for enhancing the interoperability of IPTV services among different terminals.

This Recommendation defines IPTV-HTML as HTML for IPTV services. In addition, it defines "IPTV-HTML (Basic profile)" as the basic profile of IPTV-HTML. IPTV-HTML (Basic profile) is required to be a subset of HTML used in multimedia application frameworks such as [ITU-T H.760], Ginga-NCL [ITU-T H.761], LIME [ITU-T H.762], [ITU-T H.763.1], [ITU-T H.764] and [ITU-T H.765]. Figure 1 shows the conceptual relationship among LIME-HTML [ITU-T H.762], HTML 4.01 [b-W3C HTML] and IPTV-HTML (Basic profile).

This clause describes the minimal set of tags of IPTV-HTML (Basic profile).

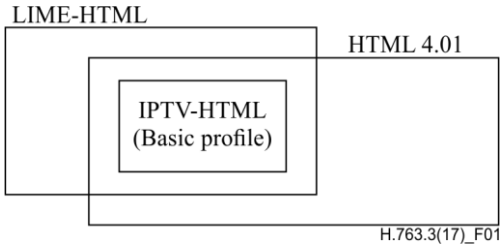

Figure 1 – Conceptual relationship between LIME-HTML and IPTV-HTML (Basic profile)

7.1 Structural elements

Structural elements are used to provide structures in every HTML document. Every HTML document includes HTML HEAD, TITLE and BODY elements.

7.1.1 Document element: HTML

The HTML document element consists of a head and a body, much like a memo or a mail message. The head contains the title and optional elements. The body is a text flow consisting of paragraphs and other elements.

7.1.1.1 Head: HEAD

The head of an HTML document is an unordered collection of information about the document.

7.1.1.2 Title: TITLE

Every HTML document is recommended to contain a TITLE element.

7.1.1.3 Body: BODY

The BODY element contains the text flow of the document, including headings, paragraphs, objects, etc.

7.2 Hypertext element

The Hypertext element creates links to other resources. It expresses links and anchors created by the LINK and the A element.

7.2.1 Anchor: A

The A element indicates a hyperlink anchor for retrieval of another web resource. This element may only appear in the BODY element.

7.2.2 Link: LINK

The LINK element represents a hyperlink and is not rendered with the document's contents, although it may be rendered by some user agents. This element may only appear in the HEAD element.

7.3 Text elements

Text elements are used to format the text in the HTML document.

7.3.1 Line break: BR

The BR element specifies a line break between words

7.3.2 Paragraph: P

The P element indicates a paragraph. The exact indentation, leading space, etc. of a paragraph is not specified and is a function of style sheets.

7.3.3 Grouping elements: the DIV and SPAN elements

The DIV and SPAN elements, in conjunction with the Id and class attributes, offer a generic mechanism for adding structure to documents. These elements define content to be inline (SPAN) or block-level (DIV) but impose no other presentational idioms on the content.

7.4 Form elements

The Form elements represent a collection of form-associated elements. It describes the controls that can be used within the context of a form. It allows users to input values that can be submitted to a server (e.g., web server) for processing.

7.4.1 Input field: INPUT

The INPUT element represents a field for user input and it is used to create interactive controls for web-based forms. This element must be placed inside of the Form tag element.

7.5 Image elements: IMG

This IMG element indicates embedding images in the HTML document.

7.6 OBJECT element

HTML's multimedia features may allow authors to include images and video. The OBJECT element allows HTML authors to specify an object. This element can be used to embed another webpage into the HTML document. This can also be used to embed plug-ins into web pages. This element must be placed inside of the BODY element.

7.7 Associated Meta-information: META

The META element is an extensible container for use in identifying specialized document meta-information and it can be used to specify page description and other metadata, such as document author, keywords and last modified. This element must be placed inside of the HEAD element.

7.8 Scripting module

This module defines elements for scripts that describe behaviours and elements for controlling scripts. The module consists of the "script" element, which can be found either within the head or body section of the HTML document. The "script" element inserts scripts into web pages.

7.9 Style sheet module

This module defines elements for describing style sheets. The module consists of the "style" element, which enables authors to put style sheet rules in the head section of the HTML document.

7.10 Style attribute module

This module defines the style attribute. The style attribute formats the contents of the element according to the listed style.

7.11 Intrinsic event module

This module defines attributes that correspond to events generated by user operation. The attributes include the "onfocus" and "onblur" attribute. An event in the "onfocus" attribute is generated when focus moves to this element and an event in "onblur" attribute is generated when focus moves from this element to others.

8 Attributes of IPTV-HTML (Basic profile)

Table 8-1 describes the attributes associated with each element in the basic profile of HTML for IPTV terminal devices (BI-HTML).

Table 8-1 – Attributes associated with each element in BI-HTML

Elements	Attributes	Operation in BI-HTML
Common attributes		
Core attributes		
	Id	R1
	class	R1
I18N attributes		
	xml:lang	R2
Events attributes		
	onclick	R1
	onkeydown	R1
	onkeyup	R1
Style attributes		
	style	R1
Core modules, Structure module		
body	%Common.attrib	N/A
	%Core.attrib	R1
	%I18n.attrib	R2
	%Style.attrib	R1
head	%I18n.attrib	R2
title	%I18n.attrib	R2
Text module		
br	%Core.attrib	R1
	%Style.attrib	R1
div	%Common.attrib	R1
p	%Common.attrib	R1
span	%Common.attrib	R1
Hypertext module		
a	%Common.attrib	R1
	accesskey	R1
	charset	R2
	href	R1
Forms module		
input	%Common.attrib	R1
	%Core.attrib	R1
	%I18n.attrib	R2
	%Events.attrib	R1

Table 8-1 – Attributes associated with each element in BI-HTML

Elements	Attributes	Operation in BI-HTML
	%Style.attrib	R1
	accesskey	R1
	disabled	R1
	readonly	R1
	maxlength	R1
	type	R1
	value	R1
	inputmode	R1
	charctertype	R1
Object module		
object	%Common.attrib	R1
	data	R1
	type	R1
Intrinsic events module		
A&	onblur	R1
	onfocus	R1
body&	onload	R1
	onunload	R1
input&	onfocus	R1
	onblur	R1
	onchange	R1
Meta element module		
Meta	%I18n.attrib	R2
	name	R1
	content	R1
Scripting module		
script	charset	R2
	type	R2
	src	R1
Style sheet module		
style	%I18n.attrib	R2
	type	R2
	media	R2
Link module		
link	charset	R2
	href	R1
	media	R2
	rel	R2
	type	R2

9 DOM in IPTV-HTML (Basic profile)

Table 9-1 gives the DOM [b-W3C DOM1] interfaces that are used in IPTV-DOM (Basic profile) and Table 9-2 shows the profile for the DOM core basic interface attributes.

Table 9-1 – DOM core fundamental interfaces

Interface	Operation in BI-DOM
Basic interface group	
DOMImplementation	R1
Document	R1
Node	R1
CharacterData	R1
Element	R1
Text	R1
Extended interface group	
CDATASection	R1

Table 9-2 – DOM core basic interface attributes of IPTV-DOM (Basic profile)

Interface	Attribute/method	Operation in BI-DOM
DOMImplementation		
	hasFeature()	R1
Document		
	Implementation	R1
	documentElement	R1
Node		
	parentNode	R1
	firstChild	R1
	lastChild	R1
	previousSibling	R1
	nextSibling	R1
CharacterData		
	Data	R1
	Length	R1
Element		
	tagName()	R1

NOTE – The child nodes of script and style are not accessed in the operation. Only the child nodes of *p*, *span* and *a* can be written in the operation.

Table 9-3 shows the profile of a DOM HTML interface group, and Table 9-4 shows the profile of attributes and methods of the DOM HTML interface group.

Table 9-3 – Profile of DOM HTML interface group

Interface	Operation in BI-DOM
HTMLDocument	R1
HTMLElement	R1
HTMLDivElement	R1
HTMLParagraphElement	R1
HTMLBRElement	R1
HTMLAnchorElement	R1
HTMLObjectElement	R1
HTMLInputElement	R1

Interface	Operation in BI-DOM
HTMLMetaElement	R1
HTMLTitleElement	R1
HTMLScriptElement	R1
HTMLStyleElement	R1
HTMLBodyElement	R1
HTMLHeadElement	R1
HTMLHtmlElement	R1

Table 9-4 – Profile of attributes and methods of DOM HTML interface group

Interface	Attribute/method	Operation in BI-DOM
HTMLDocument		
	getElementById()	R1
HTMLElement		
	id	R1
	className	R1
HTMLAnchorElement		
	accesskey	R1
	href	R1
	blur()	R1
	focus()	R1
HTMLInputElement		
	defaultValue	R1
	accesskey	R1
	disabled	R1
	maxLength	R1
	readOnly	R1
	type	R1
	value	R1
	blur()	R1
	focus()	R1
HTMLObjectElement		
	data	R1
	type	R1

Table 9-4 – Profile of attributes and methods of DOM HTML interface group

Interface	Attribute/method	Operation in BI-DOM
HTMLMetaElement		
	content	R1
	name	R1
HTMLTitleElement		
	text	R1

NOTE – If the DOM application programming interface (API) changes the data attribute of an object concerning the monomedia that is transmitted using data carousel, the data attribute value will be read again even when remaining unchanged. If the module containing a resource specified by the data attribute is locked, the locked data will be applied as it is; otherwise, the presentation must be updated after getting the data from a transmission stream again. Note that dynamically changing type attributes and dynamically changing schemas by changing data attributes for sound are not applicable to the object element.

Appendix I

Standards relevant to HTML

(This appendix does not form an integral part of this Recommendation.)

I.1 HTML and XHTML

HTML is also often used to refer to content in specific languages, such as a multipurpose Internet mail extensions (MIME) type text/html, or even more broadly as a generic term for HTML, whether in its XML-descended form, such as XHTML 1.0 and later, or its form descended directly from standard generalized markup language (SGML), such as HTML 4.01 and earlier.

One difference in the latest HTML specifications lies in the distinction between the SGML-based specification and the XML-based specification. The XML-based specification is usually called XHTML to distinguish it clearly from the more traditional definition; however, the root element name continues to be 'html' even in the XHTML-specified HTML. The W3C intended XHTML 1.0 to be identical to HTML 4.01 except where limitations of XML over the more complex SGML require workarounds. Because XHTML and HTML are closely related, they are sometimes documented in parallel. In such circumstances, some authors conflate the two names as (X)HTML or X(HTML).

Aside from the different opening declarations for a document, the differences between an HTML 4.01 and XHTML 1.0 document, in each of the corresponding document type definitions (DTDs), are largely syntactic. The underlying syntax of HTML allows many shortcuts that XHTML does not allow, such as elements with optional opening or closing tags and even EMPTY elements that must not have an end tag. By contrast, XHTML requires all elements to have an opening tag or a closing tag. XHTML, however, also introduces a new shortcut: an XHTML tag may be opened and closed within the same tag, by including a slash before the end of the tag like this: <BR/>. The introduction of this shorthand, which is not used in the SGML declaration for HTML 4.01, may confuse earlier software unfamiliar with this new convention.

I.2 DHTML

Combined with a client-side scripting language (such as ECMAScript), a presentation definition language such as cascading style sheets (CSS) and the document object model (DOM), HTML is often used to create interactive and animated web sites. Such a use is often called dynamic HTML.

Dynamic HTML allows a scripting language to change variables in a page's definition language, which in turn affects the look and function of otherwise "static" HTML page content, after the page has been fully loaded and during the viewing process.

I.3 CE-HTML

CE-HTML was created to solve the problem of displaying HTML contents on consumer electronic (CE) devices. CE-HTML uses XHTML content to define user interfaces that can be rendered on screens with different resolutions and sizes ranging from high definition television (HDTV) screens to mobile-phone displays. CE-HTML is a major component of the CEA-2014-B specification [b-CEA-2014-B].

CEA-2014-B is a web based protocol and framework for remote user interface (UI) on universal plug and play (UPnP) home networks and over Internet. CEA-2014-B defines the mechanisms allowing a user interface to be remotely displayed on and controlled by devices or control points other than the one hosting the logic. The basic device operations are based on the UPnP device architecture v1.0 for UPnP networks and UPnP devices in the home. The standard also allows the remote display of user interfaces provided by third party Internet services on UPnP devices in the home and covers UI capabilities for TVs, mobile phones and portable devices. CEA-2014-B (CE-HTML) is based on the existing web rendering technologies for CE browser with W3C tags, XHTML 1.0, ECMAScript 262, CSS TV Profile 1.0 and DOM level 2.0.

Appendix II

HTML profiles for IPTV

(This appendix does not form an integral part of this Recommendation.)

Table II.1 shows differences between BI-HTML and CE-HTML [b-CEA-2014-B].

Table II.1 – HTML elements

Module		Element	BI-HTML	CE-HTML*
Core	Structure (required)	body	R	R
		head	R	R
		html	O	R
		title	R	R
	Text (required)	abbr	O	R
		acronym	O	R
		address	O	R
		blockquote	O	R
		br	R	R
		cite	O	R
		code	O	R
		dfn	O	R
		div	R	R
		em	O	R
		h1~h6	O	R
		kbd	O	R
		p	R	R
		pre	O	R
		q	O	R
		samp	O	R
		span	R	R
		strong	O	R
		var	O	R
	Hypertext (required)	a	R	R
	List (required)	dl	O	R
		dt	O	R
		dd	O	R
		ol	O	R
		ul	O	R
		li	O	R
Applet (deprecated)		applet	O	R
		param	O	N/A

Table II.1 – HTML elements

Module		Element	BI-HTML	CE-HTML*
Text extension	Presentation	b	O	R
		big	O	R
		hr	O	R
		i	O	R
		small	O	R
		sub	O	R
		sup	O	R
		tt	O	N/A
	Edit	del	O	R
		ins	O	R
	Bi-directional	bdo	O	R
Form	Basic forms	form	O	R
		input	O	R
		label	O	R
		select	O	R
		option	O	R
		textarea	O	R
	Forms	form	O	R
		input	R	R
		select	O	R
		option	O	R
		textarea	O	R
		button	O	R
		fieldset	O	R
		label	O	R
		legend	O	R
		optgroup	O	R
Table	Basic tables	caption	O	R
		table	O	R
		td	O	R
		th	O	R
		tr	O	R
	Tables	caption	O	R
		table	O	R
		td	O	R
		th	O	R
		tr	O	R
		col	O	R

Table II.1 – HTML elements

Module		Element	BI-HTML	CE-HTML*
		colgroup	O	R
		tbody	O	R
		thead	O	R
		tfoot	O	R
Image		img	O	R
CS image map		*a&*	O	N/A
		Area	O	R
		Img&	O	N/A
		Map	O	R
		object&	O	N/A
SS image map		*Img&*	O	N/A
Object		object	R	R
		param	O	R
Frames		frameset	O	N/A
		frame	O	N/A
		noframes	O	R
Target		*a&*	O	N/A
		area&	O	N/A
		base&	O	N/A
		Link&	O	N/A
		form&	O	N/A
Iframe		iframe	O	R
Intrinsic events		*a&*	O	N/A
		area&	O	N/A
		form&	O	N/A
		body&	O	N/A
		label&	O	N/A
		input&	O	N/A
		select&	O	N/A
		textarea&	O	N/A
		button&	O	N/A
Meta-information		meta	R	R
Scripting		noscript	O	R
		script	R	R
Stylesheet		style	R	R
Style attribute			R	N/A
Link		Link	R	R
Base		Base	O	R

Table II.1 – HTML elements

Module		Element	BI-HTML	CE-HTML*
Name identification (deprecated)		*a&*	O	N/A
		applet&		
		form&		
		frame&		
		iframe&		
		Img&		
		Map&		
Legacy (deprecated)		basefont	O	R
		center	O	R
		Font	O	R
		S	O	R
		strike	O	R
		U	O	R
		body&	O	N/A
		br&	O	N/A
		caption&	O	N/A
		Div&	O	N/A
		h1-h6&	O	N/A
		ht&	O	N/A
		Img&	O	N/A
		input&	O	N/A
		legend&	O	N/A
		li&	O	N/A
		ol&	O	N/A
		p&	O	N/A
		Pre&	O	N/A
		script&	O	N/A
		table&	O	N/A
		tr&	O	N/A
		th&	O	N/A
		td&	O	N/A
		ul&	O	N/A
* NOTE – In addition to these elements, [b-CEA-2014-B] uses the elements in Table II.2.				

Table II.2 – CEA-2014-B specific elements [b-CEA-2014-B]

Element
Dir
Isindex
Menu
Opcode

Appendix III

Differences between LIME-HTML and IPTV-HTML (Basic profile)

(This appendix does not form an integral part of this Recommendation.)

LIME-HTML is extended to provide more interactive services. Table III.1 shows differences between LIME-HTML and BI-HTML (IPTV-HTML, Basic profile).

Table III.1 – Differences between LIME-HTML and BI-HTML (IPTV-HTML, Basic profile)

Elements	Attributes	Operation in BI-HTML	Operation in LIME-HTML
LIME Module			
bml	%I18n.attrib	O	R2
bevent	Id	O	R1
beitem	Id	O	R1
	Type	O	R1
	Onoccur	O	R1
	es_ref	O	R1
	message_group_id	O	R1
	message_id	O	R1
	message_version	O	R1
	module_ref	O	R1
	language_tag	O	R1
	time_mode	O	R1
	object_id	O	R1
	Subscribe	O	R1
body&	Invisible	O	R1
div&	Accesskey	O	R1
	Onfocus	O	R1
	Onblur	O	R1
p&	Accesskey	O	R1
	Onfocus	O	R1
	Onblur	O	R1
span&	Accesskey	O	R1
	Onfocus	O	R1
	Onblur	O	R1

Table III.1 – Differences between LIME-HTML and BI-HTML (IPTV-HTML, Basic profile)

Elements	Attributes	Operation in BI-HTML	Operation in LIME-HTML
object&	Streamposition	O	R1
	Streamlooping	O	R2
	Streamstatus	O	R1
	Remain	O	R1
	Accesskey	O	R1
	Onfocus	O	R1
	Onblur	O	R1

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