

SMPTE STANDARD

Broadcast Exchange Format (BXF) — Schema Documentation



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Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

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Intellectual Property

At the time of publication, no notice had been received by SMPTE claiming patent rights essential to the implementation of this Standard. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document

Broadcast Exchange Format (BXF) is a protocol for exchange of data among broadcast systems such as Traffic, Program Management, Automation, and Content Distribution. It is intended to facilitate the movement of content and its associated metadata for better management, coordination and reporting between these broadcast systems. The BXF Protocol serves as a replacement for the many proprietary interfaces in place today between vendors in these areas.

Unless otherwise specified the order of precedence of the types of normative information in this document shall be as follows. Normative prose shall be the authoritative definition. Tables shall be next, followed by formal languages, then figures, and then any other language forms. In the event of a conflict between the schema and other information in this document, the schema is authoritative.

With this new release of BXF, additional schema changes including new headers have taken place. These have been accomplished with the minimum of adjustments or effect on previous versions. The changes in the BXF schema for this version are described under the appropriate schema sections in this document and represent only the changes since the previous release of BXF. Please reference prior release documentation for any BXF modifications included in prior releases.

1. Scope

This document provides documentation of the BXF schemas specified in the associated Data Supplement, including schema changes and additional elements of BXF Version 6.0.

2. Conformance Notation

Documents consist of normative text and, optionally, informative text. Normative text is that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in a Standard, Recommended Practice, Amendment, Addendum, or Corrigendum, is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

Normative references are external documents referenced in normative text that are indispensable to the user. Bibliographic references are references made in informative text or are those otherwise not indispensable to the user. Normative references shall conform to the types and procedures specified in the Engineering Administrative Practices.

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted. The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword "reserved" indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword "forbidden" indicates "reserved" and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to an Engineering Document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

3. Description of BXF Schema

This documentation does not contain the actual schema, but instead provides a reference to the individual files that can be viewed with any number of tools, including most commonly used browsers as well as other third party tools. In addition to the XML Schema Files (.XSD) the user can also browse the schema using the .html files.

Depending on the tools you use, different parts of the schema may appear in different formatting. The section below describes the meaning of various parts of the schema as you would see them in the .html version.

The schema shall be normative and this document informative should any differences exist between the two.

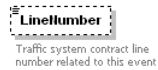
4. Schema Documentation

A number of graphics and symbols are used in the documentation to help describe the various elements of the schema and how the elements are related. These represent components and the relationships between schema components. The different components are represented by the following:

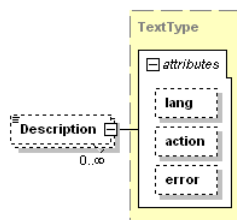
Single element – mandatory: Indicated by a rectangle with a solid border. The element name is inside the shape.



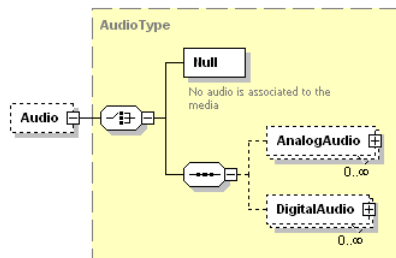
Single element – optional: Indicated by a rectangle with a dashed border. The element name is inside the shape.



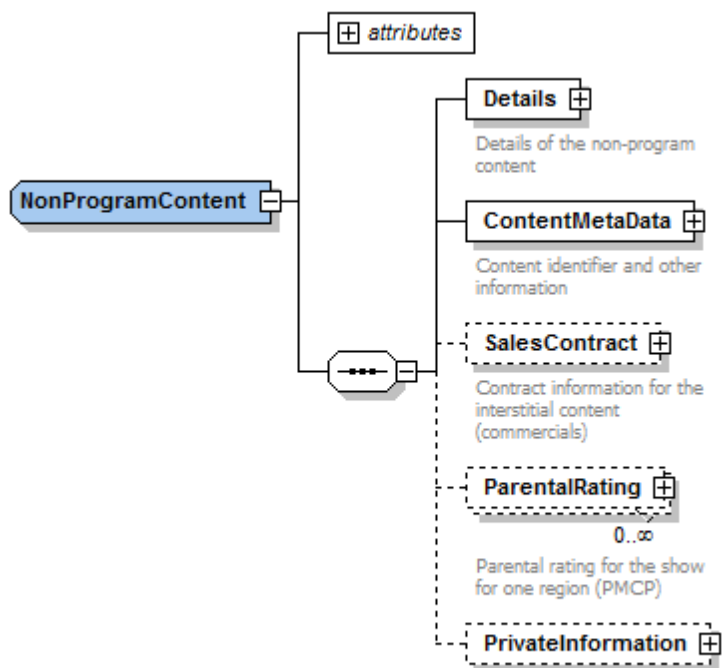
Multiple elements: Indicated by a rectangle with a solid border with a number range representing the minimum and maximum number of occurrences possible. In the example, 0 to infinity (0..∞) is shown.



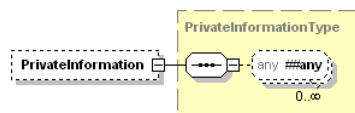
Elements containing child elements: Indicated by a [+] or [-] on the element, representing an element containing additional attributes or elements. The [+] indicates that additional elements are available for display. The [-] indicates that the child elements are displayed.



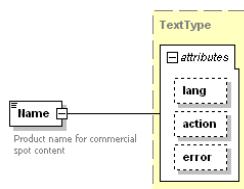
Complex type: Indicated by a partial hexagon and a child element symbol.



Wildcards: Indicated by an octagon with any at the left.

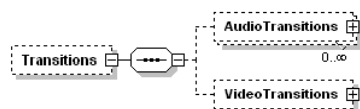


Attributes: Indicated by the word 'attributes'

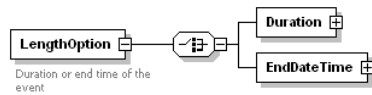


The relationships between components are represented by symbols for sequence and choice.

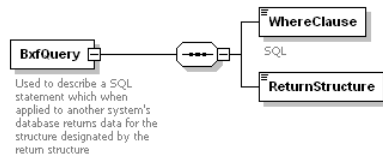
Sequence: The sequence compositor (indicated by a box with a plus sign) shows that all elements occur in sequence.



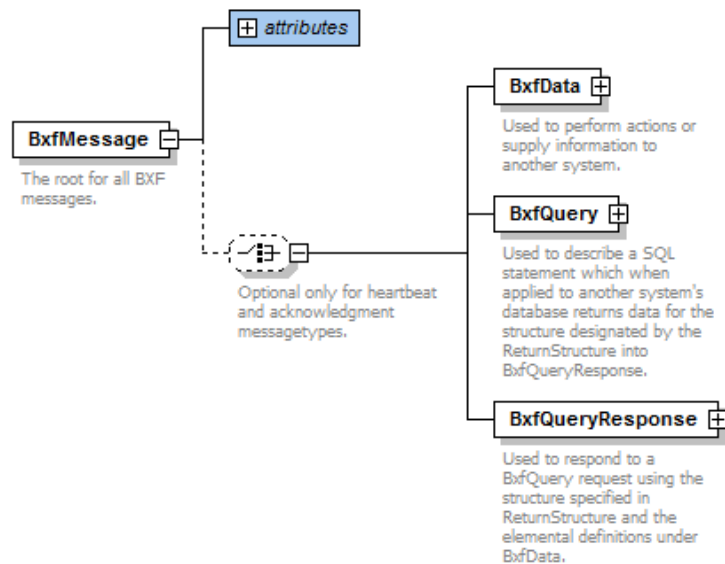
Choice: The choice compositor (indicated by a box with a plus sign) shows the 'or' relationship between associated components (only one choice may be made).



Solid lines: Solid lines connecting elements represent mandatory connections within the schema diagrams.

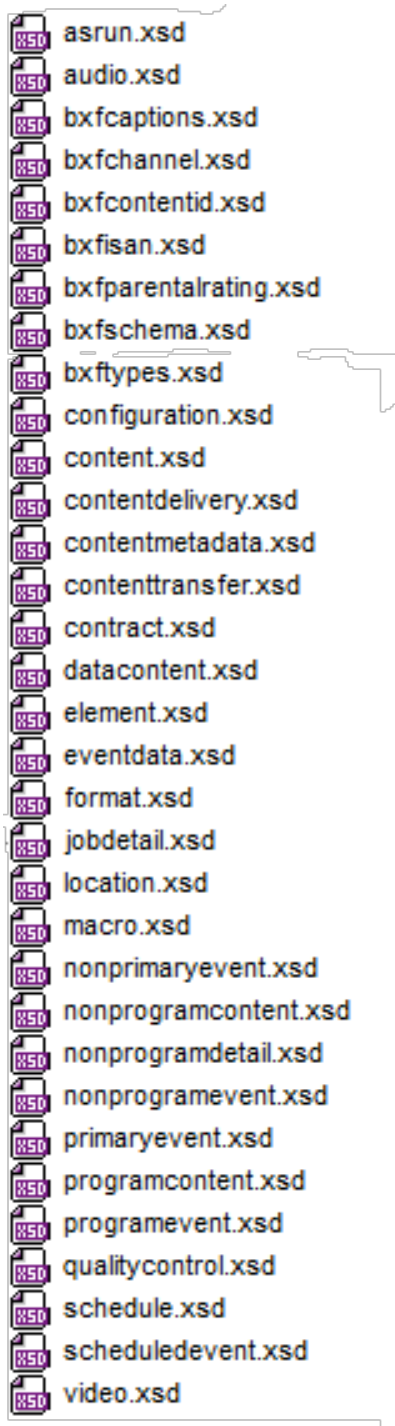


Dashed lines: Dashed lines between elements represent optional connections within the schema diagrams.



4.1 Schema File List

The Schema is actually composed of 33 files listed below. The root file (starting point) is bxfshema.xsd and all other files are referenced from this file. A brief description of each file is given below in alphabetical order. This same description may also be contained in the schema for major elements, but some elements do not contain a description and were segregated into separate files for the convenience of managing the schema. Note that no new XSD's have been added as part of version 6.0, but there are substantial new elements as part of audio.xsd, video.xsd and contentdelivery.xsd.



4.2 Header Change in BXF 6.0

All XSD file headers have the same change regarding copyright and targetNamespace:

```
<!-- Copyright 2018 Society of Motion Picture and Television Engineers. All rights reserved. -->
```

```
<xs:schema xmlns="http://smpte-ra.org/schemas/2021/2018/BXF"  
  xmlns:xs="http://www.w3.org/2001/XMLSchema"  
  xmlns:pmcp="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1" targetNamespace="http://smpte-  
ra.org/schemas/2021/2018/BXF" elementFormDefault="qualified" attributeFormDefault="unqualified"  
  version="6.000">
```

Most of the XSDs (23) had only their header changed and are listed below. There are XSD's with more substantial changes and these changes are illustrated below.

- Asrun.XSD
- BXFChannels.XSD
- BXFContentID.XSD
- BXFISAN.XSD
- BXFParentalRating.XSD
- BXFSchema.XSD
- BXFTypes.XSD
- Configuration.XSD
- Content.XSD
- ContentTransfer.XSD
- Contract.XSD
- DataContent.XSD
- EventData.XSD
- Format.XSD
- Location.XSD
- Macro.XSD
- NonProgramContent.XSD
- NonProgramEvent.XSD
- PrimaryEvent.XSD
- ProgramContent.XSD
- ProgramEvent.XSD
- Schedule.XSD
- ScheduleEvent.XSD

Schema Details and Changes for Version 6.0

4.2.1 Asrun.XSD

Contains:

| | | |
|-------------|-----------------------|------|
| include | loc:bxftypes.xsd | |
| include | loc:scheduleevent.xsd | |
| complexType | AsRunDetail | ann: |
| complexType | BasicAsRun | ann: |
| complexType | CompleteAsRun | ann: |

Used to describe the exact timing of events on a schedule after the event has been aired, including any errors or other problems that occurred during the broadcast or transmission of the content.

4.2.2 Audio.XSD

Contains:

| | | |
|-------------|--|---|
| import | http://www.atssc.org/XMLSchema/pmcp/2007/3.1/pmcp31.xsd ns: http://www.atssc.org/XMLSchema/pmcp/2007/3.1 | |
| include | loc:bxftypes.xsd | |
| complexType | AudioChannel | ann Distinct collection of sequenced audio samples that are intended for delivery to a single loudspeaker or other reproduction device. (v6.0) |
| complexType | Audios | ann Extends PMCPAudioType |
| complexType | Ac3AudioExt | ann Extends PMCPAc3Audio |
| complexType | AnalogAudio | ann Enumerates the settings of audio included in analog content |
| complexType | Audio | ann The base for all audio definitions |
| complexType | AudioTransition | ann Enumerates the settings to transition from one audio to another |
| complexType | DigitalAudio | ann Enumerates the different types of digital audio streams. (v3.0) |
| complexType | DigitalAudioAttribute | ann Enumerates the parameters of a digital audio stream |
| complexType | GroupofSoundfieldGroups | ann A group of groups allows encapsulation of SoundfieldGroups into defined streams. It is often used to classify the purpose of the audio such as Main Program, Alternate Program, etc.(v6.0) |
| complexType | Loudness | ann Indicates the loudness of the SoundfieldGroup as measured in various ways and using various standards. (v6.0) |
| complexType | MultiChannelAudioStreams | ann A collection of one or more audio streams with the same encoding method that further incorporate groups of audio channels in a specific format as defined in ST 377-4. If a data stream (MXF a |
| complexType | SoundfieldGroup | ann Used to organize a group of multiple audio channels that comprise the complete audio structure for the program. For example, Stereo, or Stereo-Spanish, or 5.1. It may be comprised of a single |
| complexType | TSAudio | ann Enumerates the parameters of digital audio in a transport stream |
| simpleType | AudioModeType | ann Defines the way audio is transitioned |
| simpleType | AudioRateType | ann Defines the speed of an audio transition |
| simpleType | AudioTransitionEnumType | ann Indicates if an audio transition is to be mixed or a cut |

The basis for all audio definitions.

4.2.2.1 BXF 6.0 Changes

Description of change:

Multiple changes were added to Audio.XSD to support new ContentDelivery options and its associated MultiChannelAudioStreams. New complex types include MultiChannelAudioStreams, GroupofSoundfieldGroups, SoundfieldGroup, and AudioChannel as well as an new Loudness complex type and a new Audio attribute voiceOver boolean flag. In addition, DigitalAudio was extended with several new elements (DED2Audio, Ac4Audio, and MPEGHAudio) as well as minor changes to PCMAudio. Two new attributes were also added: audioEncodingRefID and loudnessMeasurementType, and a new enum was added to measurementMethod to include "LUFS". Finally, a new attribute was added to the DigitalAudioAttributes: dualMono.

Text representations:

```
<xs:complexType name="AudioChannel">
```

```
<xs:annotation>
```

```
<xs:documentation>Distinct collection of sequenced audio samples that are intended for delivery to a single  
loudspeaker or other reproduction device. (v6.0)</xs:documentation>
```

```
</xs:annotation>
```

```
<xs:sequence>
```

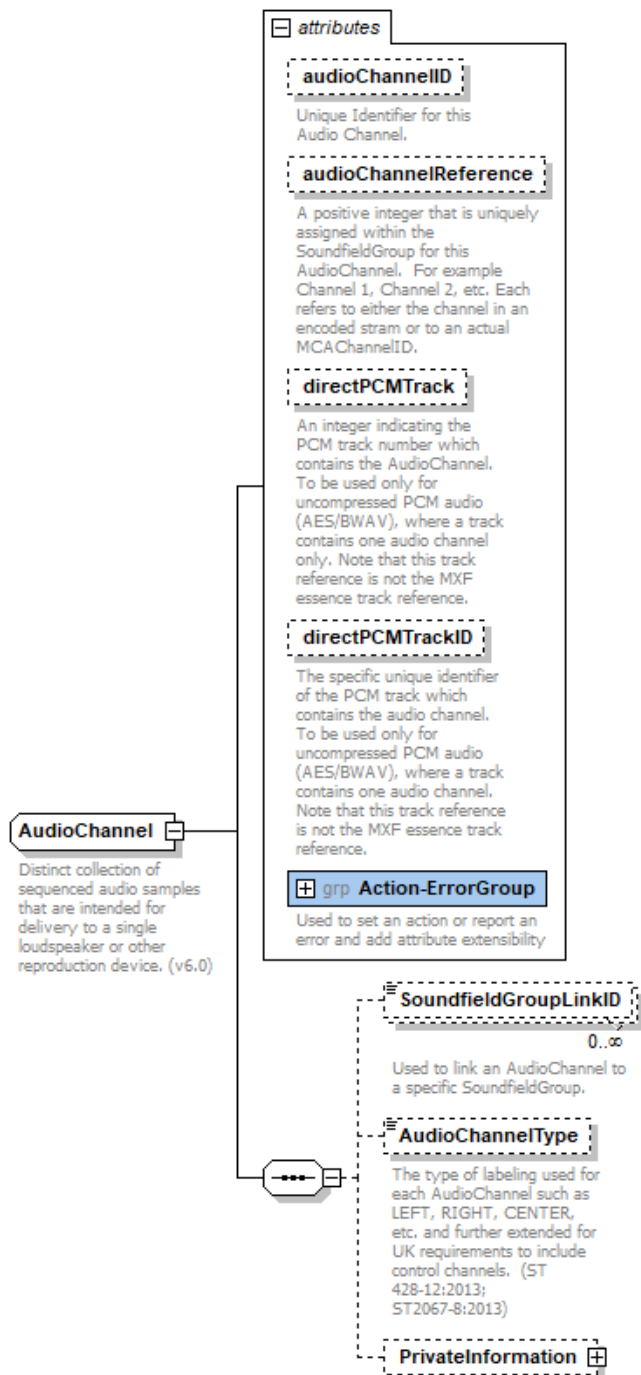
```
<xs:element name="SoundfieldGroupLinkID" type="Uuid" minOccurs="0" maxOccurs="unbounded">
```

```

<xs:annotation>
<xs:documentation>Used to link an AudioChannel to a specific SoundfieldGroup.</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="AudioChannelType" minOccurs="0">
<xs:annotation>
<xs:documentation>The type of labeling used for each AudioChannel such as LEFT, RIGHT, CENTER, etc.
and further extended for UK requirements to include control channels. (ST 428-12:2013; ST2067-
8:2013)</xs:documentation>
</xs:annotation>
<xs:simpleType>
<xs:restriction base="xs:string">
<xs:enumeration value="Left"/>
<xs:enumeration value="Center"/>
<xs:enumeration value="Right"/>
<xs:enumeration value="LFE"/>
<xs:enumeration value="Left Surround"/>
<xs:enumeration value="Right Surround"/>
<xs:enumeration value="Left Side Surround"/>
<xs:enumeration value="Right Side Surround"/>
<xs:enumeration value="Left Rear Surround"/>
<xs:enumeration value="Right Rear Surround"/>
<xs:enumeration value="Left Center"/>
<xs:enumeration value="Right Center"/>
<xs:enumeration value="Center Surround"/>
<xs:enumeration value="Mono One"/>
<xs:enumeration value="Mono Two"/>
<xs:enumeration value="Left Total"/>
<xs:enumeration value="Right Total"/>
<xs:enumeration value="Left Surround Total"/>
<xs:enumeration value="Right Surround Total"/>
<xs:enumeration value="Surround"/>
<xs:enumeration value="Control"/>
<xs:enumeration value="Other"/>
</xs:restriction>
</xs:simpleType>
</xs:element>
<xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
</xs:sequence>
<xs:attribute name="audioChannelID" type="Uuid">
<xs:annotation>
<xs:documentation>Unique Identifier for this Audio Channel.</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="audioChannelReference" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>A positive integer that is uniquely assigned within the SoundfieldGroup for this
AudioChannel. For example Channel 1, Channel 2, etc. Each refers to either the channel in an encoded stream
or to an actual MCACChannelID.</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="directPCMTrack" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>An integer indicating the PCM track number which contains the AudioChannel. To be used
only for uncompressed PCM audio (AES/BWAV), where a track contains one audio channel only. Note that this
track reference is not the MXF essence track reference. </xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="directPCMTrackID" type="Uuid">
<xs:annotation>

```

<xs:documentation>The specific unique identifier of the PCM track which contains the audio channel. To be used only for uncompressed PCM audio (AES/BWAV), where a track contains one audio channel. Note that this track reference is not the MXF essence track reference. </xs:documentation>
 </xs:annotation>
 </xs:attribute>
 <xs:attributeGroup ref="Action-ErrorGroup"/>
 </xs:complexType>

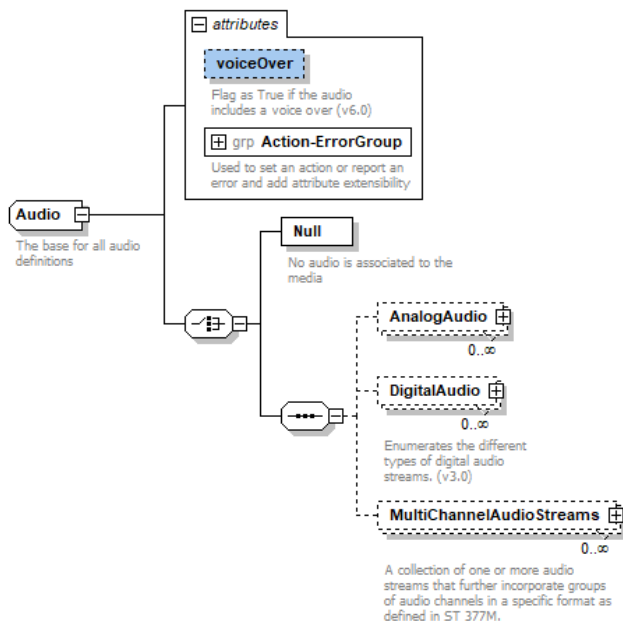


<xs:complexType name="Audio">
 <xs:annotation>
 <xs:documentation>The base for all audio definitions</xs:documentation>
 </xs:annotation>
 <xs:choice>
 <xs:element name="Null">

```

<xs:annotation>
<xs:documentation>No audio is associated to the media</xs:documentation>
</xs:annotation>
  <xs:complexType/>
</xs:element>
<xs:sequence>
  <xs:element name="AnalogAudio" type="AnalogAudio" minOccurs="0" maxOccurs="unbounded"/>
  <xs:element name="DigitalAudio" type="DigitalAudio" minOccurs="0" maxOccurs="unbounded">
    <xs:annotation>
      <xs:documentation>Enumerates the different types of digital audio streams.
(v3.0)</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="MultiChannelAudioStreams" type="MultiChannelAudioStreams"
minOccurs="0" maxOccurs="unbounded">
    <xs:annotation>
      <xs:documentation>A collection of one or more audio streams that further incorporate groups of
audio channels in a specific format as defined in ST 377M.</xs:documentation>
    </xs:annotation>
  </xs:element>
</xs:sequence>
</xs:choice>
<xs:attribute name="voiceOver" type="xs:boolean">
<xs:annotation>
<xs:documentation>Flag as True if the audio includes a voice over (v6.0)</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attributeGroup ref="Action-ErrorGroup"/>
</xs:complexType>

```



```

<xs:complexType name="DigitalAudio">
<xs:annotation>
<xs:documentation>Enumerates the different types of digital audio streams. (v3.0)</xs:documentation>
</xs:annotation>
  <xs:choice>

```

```

<xs:element name="Ac3Audio" type="Ac3AudioExt"/>
<xs:element name="DEAudio" type="DigitalAudioAttribute"/>
<xs:element name="MPEGAACAudio" type="DigitalAudioAttribute"/>
<xs:element name="MPEGLayerIIAudio" type="DigitalAudioAttribute"/>
<xs:element name="PCMAudio">
  <xs:complexType>
    <xs:attribute name="exactBitRate" type="xs:boolean" use="optional">
      <xs:annotation>
        <xs:documentation>Indicates if bitRateKbps is an exact value or an upper bound
(A/65)</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="bitRateKbps" type="pmcp:bitRateKbpsType" use="optional" default="448">
      <xs:annotation>
        <xs:documentation>Bit rate of the elementary stream in kbps (A/65B 6.9.1) (v6.0)</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attributeGroup ref="Action-ErrorGroup"/>
  </xs:complexType>
</xs:element>
<xs:element name="DED2Audio" type="DigitalAudioAttribute">
  <xs:annotation>
    <xs:documentation>(v6.0)</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="Ac4Audio" type="DigitalAudioAttribute">
  <xs:annotation>
    <xs:documentation>(v6.0)</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="MPEGHAudio" type="DigitalAudioAttribute">
  <xs:annotation>
    <xs:documentation>(v6.0)</xs:documentation>
  </xs:annotation>
</xs:element>
</xs:choice>
<xs:attribute name="audioReference" type="xs:positiveInteger">
  <xs:annotation>
    <xs:documentation>Used to reference specific channel or channels for transitions</xs:documentation>
  </xs:annotation>
</xs:attribute>
<xs:attribute name="truePeak">
  <xs:annotation>
    <xs:documentation>BS.1770 (v3.0)</xs:documentation>
  </xs:annotation>
<xs:simpleType>
  <xs:restriction base="xs:nonPositiveInteger">
    <xs:minInclusive value="-146"/>
    <xs:maxInclusive value="0"/>
  </xs:restriction>
</xs:simpleType>
</xs:attribute>
<xs:attribute name="measuredLoudness">
  <xs:annotation>
    <xs:documentation>BS.1770 (v3.0)</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:nonPositiveInteger">
      <xs:minInclusive value="-146"/>
      <xs:maxInclusive value="0"/>
    </xs:restriction>
  </xs:simpleType>

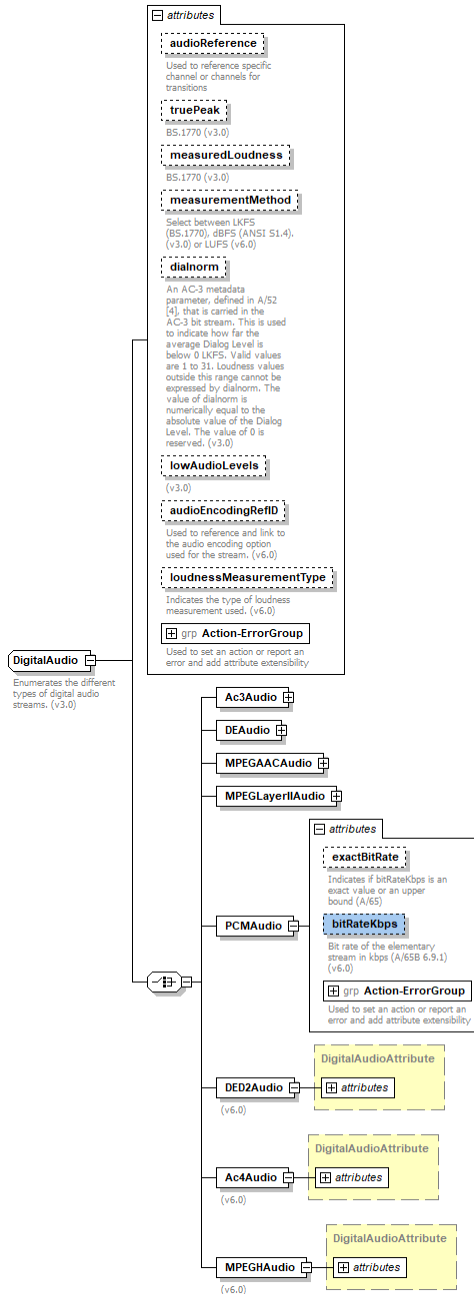
```

```

        </xs:restriction>
    </xs:simpleType>
</xs:attribute>
<xs:attribute name="measurementMethod">
<xs:annotation>
<xs:documentation>Select between LKFS (BS.1770), dBFS (ANSI S1.4). (v3.0) or LUFS
(v6.0)</xs:documentation>
</xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="dBFS"/>
            <xs:enumeration value="LKFS"/>
            <xs:enumeration value="LUFS"/>
        </xs:restriction>
    </xs:simpleType>
</xs:attribute>
<xs:attribute name="dialnorm">
<xs:annotation>
<xs:documentation>An AC-3 metadata parameter, defined in A/52 [4], that is carried in the AC-3 bit stream. This
is used to indicate how far the average Dialog Level is below 0 LKFS. Valid values are 1 to 31. Loudness values
outside this range cannot be expressed by dialnorm. The value of dialnorm is numerically equal to the absolute
value of the Dialog Level. The value of 0 is reserved. (v3.0)</xs:documentation>
</xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:positiveInteger">
            <xs:minInclusive value="1"/>
            <xs:maxInclusive value="31"/>
        </xs:restriction>
    </xs:simpleType>
</xs:attribute>
<xs:attribute name="lowAudioLevels">
<xs:annotation>
<xs:documentation>(v3.0)</xs:documentation>
</xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:nonPositiveInteger">
            <xs:minInclusive value="-146"/>
            <xs:maxInclusive value="0"/>
        </xs:restriction>
    </xs:simpleType>
</xs:attribute>
<xs:attribute name="audioEncodingRefID" type="Uuid">
<xs:annotation>
<xs:documentation>Used to reference and link to the audio encoding option used for the stream.
(v6.0)</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="loudnessMeasurementType">
<xs:annotation>
<xs:documentation>Indicates the type of loudness measurement used. (v6.0)</xs:documentation>
</xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="Program loudness"/>
            <xs:enumeration value="Max short-term loudness"/>
            <xs:enumeration value="Max momentary loudness"/>
        </xs:restriction>
    </xs:simpleType>
</xs:attribute>
<xs:attributeGroup ref="Action-ErrorGroup"/>

```

</xs:complexType>



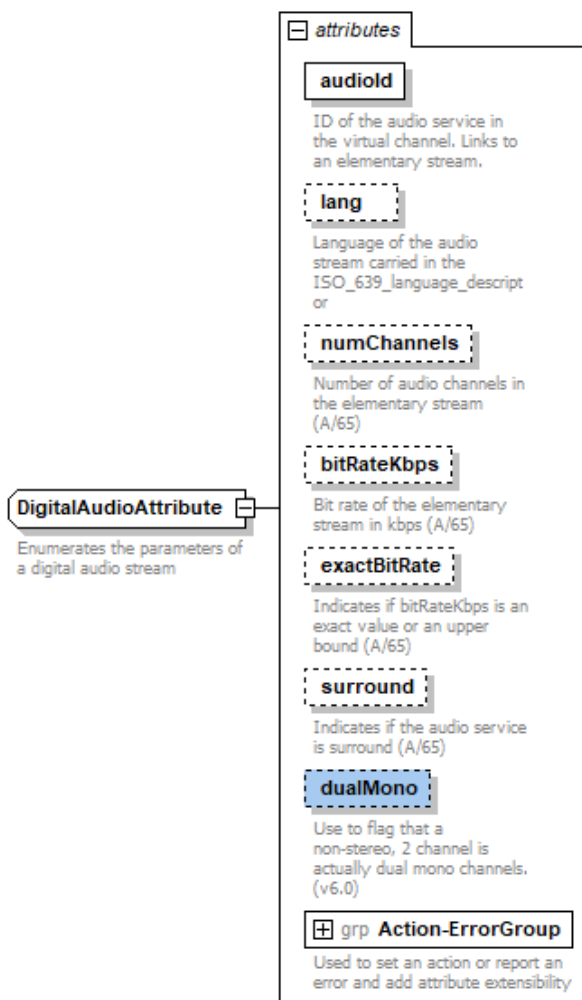
```
<xs:complexType name="DigitalAudioAttribute">
  <xs:annotation>
    <xs:documentation>Enumerates the parameters of a digital audio stream</xs:documentation>
  </xs:annotation>
  <xs:attribute name="audiold" type="pmcp:audioldType" use="required">
    <xs:annotation>
      <xs:documentation>ID of the audio service in the virtual channel. Links to an elementary
        stream.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
  <xs:attribute name="lang" type="pmcp:languageType" use="optional">
    <xs:annotation>
```



```

<xs:documentation>Language of the audio stream carried in the
ISO_639_language_descriptor</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="numChannels" type="pmcp:numChannelsType" use="optional" default="2/0">
<xs:annotation>
<xs:documentation>Number of audio channels in the elementary stream (A/65)</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="bitRateKbps" type="pmcp:bitRateKbpsType" use="optional">
<xs:annotation>
<xs:documentation>Bit rate of the elementary stream in kbps (A/65)</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="exactBitRate" type="xs:boolean" use="optional">
<xs:annotation>
<xs:documentation>Indicates if bitRateKbps is an exact value or an upper bound (A/65)</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="surround" type="xs:boolean" use="optional">
<xs:annotation>
<xs:documentation>Indicates if the audio service is surround (A/65)</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="dualMono" type="xs:boolean">
<xs:annotation>
<xs:documentation>Use to flag that a non-stereo, 2 channel is actually dual mono channels. (v6.0)
</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attributeGroup ref="Action-ErrorGroup"/>
</xs:complexType>

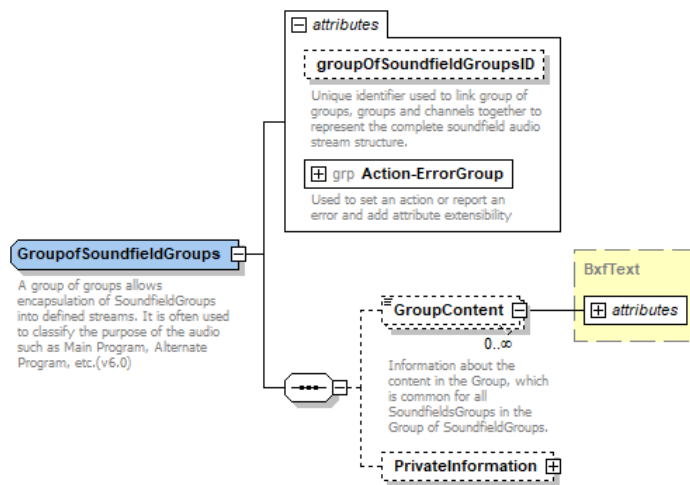
```



```

<xs:complexType name="GroupofSoundfieldGroups">
  <xs:annotation>
    <xs:documentation>A group of groups allows encapsulation of SoundfieldGroups into defined streams. It is
    often used to classify the purpose of the audio such as Main Program, Alternate Program,
    etc.(v6.0)</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="GroupContent" type="BxfText" minOccurs="0" maxOccurs="unbounded">
      <xs:annotation>
        <xs:documentation>Information about the content in the Group, which is common for all
        SoundfieldsGroups in the Group of SoundfieldGroups.</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="groupOfSoundfieldGroupsID" type="Uuid">
    <xs:annotation>
      <xs:documentation>Unique identifier used to link group of groups, groups and channels together to represent
      the complete soundfield audio stream structure.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
  <xs:attributeGroup ref="Action-ErrorGroup"/>
</xs:complexType>

```



```

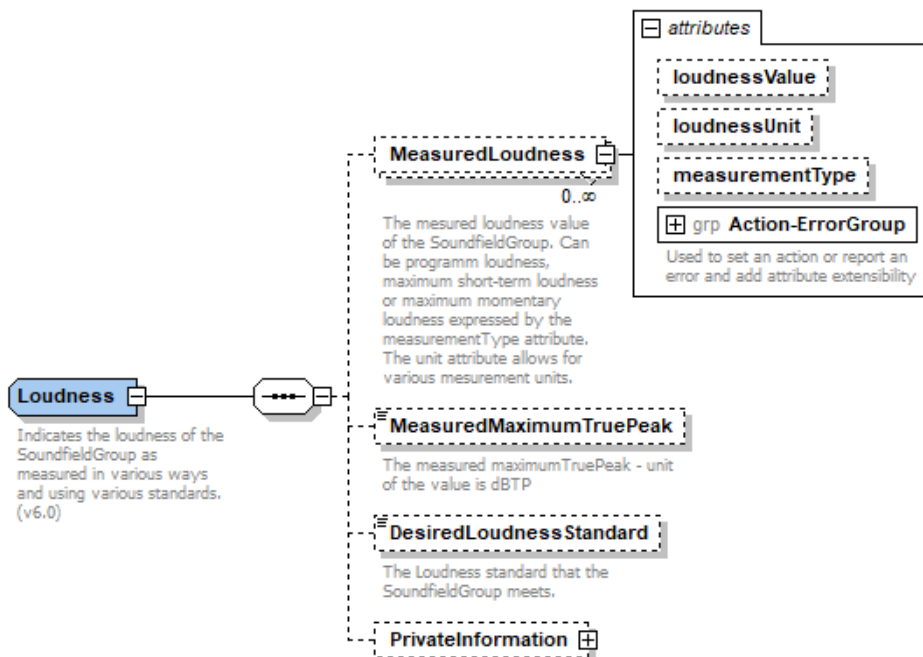
<xs:complexType name="Loudness">
  <xs:annotation>
    <xs:documentation>Indicates the loudness of the SoundfieldGroup as measured in various ways and using
    various standards. (v6.0)</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="MeasuredLoudness" minOccurs="0" maxOccurs="unbounded">
      <xs:annotation>
        <xs:documentation>The mesured loudness value of the SoundfieldGroup. Can be programm loudness,
        maximum short-term loudness or maximum momentary loudness expressed by the measurementType attribute.
        The unit attribute allows for various mesurement units. </xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:attribute name="loudnessValue">
          <xs:simpleType>
            <xs:restriction base="xs:nonPositiveInteger">
              <xs:minInclusive value="-146"/>
              <xs:maxInclusive value="0"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:attribute>
        <xs:attribute name="loudnessUnit">
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:enumeration value="dBFS"/>
              <xs:enumeration value="LKFS"/>
              <xs:enumeration value="LUFS"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:attribute>
        <xs:attribute name="measurementType">
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:enumeration value="Program loudness"/>
              <xs:enumeration value="Max short-term loudness"/>
              <xs:enumeration value="Max momentary loudness"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:attribute>
        <xs:attributeGroup ref="Action-ErrorGroup"/>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>

```

```

</xs:element>
<xs:element name="MeasuredMaximumTruePeak" minOccurs="0">
<xs:annotation>
<xs:documentation>The measured maximumTruePeak - unit of the value is dBTP </xs:documentation>
</xs:annotation>
<xs:simpleType>
<xs:restriction base="xs:nonPositiveInteger">
<xs:minInclusive value="-146"/>
<xs:maxInclusive value="0"/>
</xs:restriction>
</xs:simpleType>
</xs:element>
<xs:element name="DesiredLoudnessStandard" minOccurs="0">
<xs:annotation>
<xs:documentation>The Loudness standard that the SoundfieldGroup meets.</xs:documentation>
</xs:annotation>
<xs:simpleType>
<xs:restriction base="xs:string">
<xs:enumeration value="ATSC A/85"/>
<xs:enumeration value="EBU R128"/>
<xs:enumeration value="OP 57"/>
<xs:enumeration value="None"/>
</xs:restriction>
</xs:simpleType>
</xs:element>
<xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
</xs:sequence>
</xs:complexType>

```



```

<xs:complexType name="MultiChannelAudioStreams">

```

```

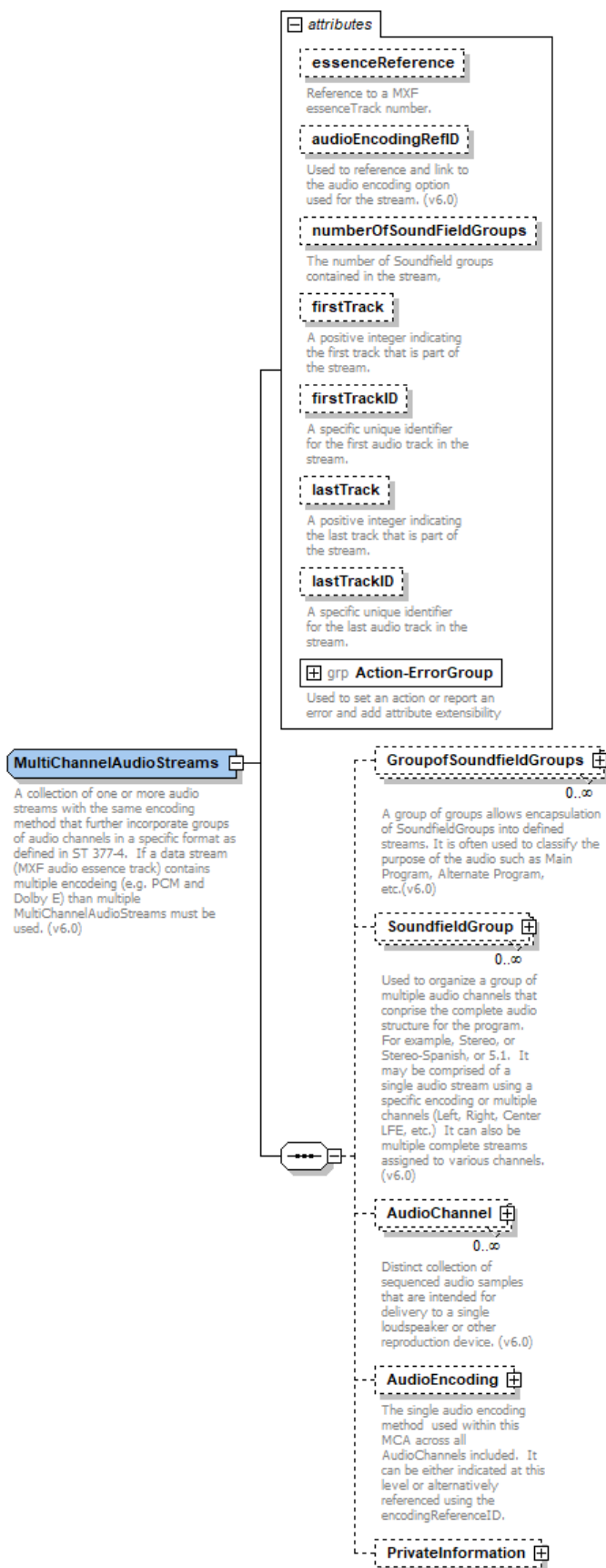
<xs:annotation>
<xs:documentation>A collection of one or more audio streams with the same encoding method that further
incorporate groups of audio channels in a specific format as defined in ST 377-4. If a data stream (MXF audio
essence track) contains multiple encoding (e.g. PCM and Dolby E) then multiple MultiChannelAudioStreams
must be used. (v6.0)</xs:documentation>
</xs:annotation>
  <xs:sequence>
    <xs:element name="GroupofSoundfieldGroups" minOccurs="0" maxOccurs="unbounded">
      <xs:annotation>
        <xs:documentation>A group of groups allows encapsulation of SoundfieldGroups into defined streams.
It is often used to classify the purpose of the audio such as Main Program, Alternate Program,
etc.(v6.0)</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:complexContent>
          <xs:extension base="GroupofSoundfieldGroups"/>
        </xs:complexContent>
      </xs:complexType>
    </xs:element>
    <xs:element name="SoundfieldGroup" minOccurs="0" maxOccurs="unbounded">
      <xs:annotation>
        <xs:documentation>Used to organize a group of multiple audio channels that comprise the complete
audio structure for the program. For example, Stereo, or Stereo-Spanish, or 5.1. It may be comprised of a
single audio stream using a specific encoding or multiple channels (Left, Right, Center LFE, etc.) It can also be
multiple complete streams assigned to various channels. (v6.0)</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:complexContent>
          <xs:extension base="SoundFieldGroup"/>
        </xs:complexContent>
      </xs:complexType>
    </xs:element>
    <xs:element name="AudioChannel" minOccurs="0" maxOccurs="unbounded">
      <xs:annotation>
        <xs:documentation>Distinct collection of sequenced audio samples that are intended for delivery to a
single loudspeaker or other reproduction device. (v6.0)</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:complexContent>
          <xs:extension base="AudioChannel"/>
        </xs:complexContent>
      </xs:complexType>
    </xs:element>
    <xs:element name="AudioEncoding" type="DigitalAudio" minOccurs="0">
      <xs:annotation>
        <xs:documentation>The single audio encoding method used within this MCA across all
AudioChannels included. It can be either indicated at this level or alternatively referenced using the
encodingReferenceID. </xs:documentation>
      </xs:annotation>
      </xs:element>
      <xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="essenceReference" type="xs:positiveInteger">
      <xs:annotation>
        <xs:documentation>Reference to a MXF essenceTrack number. </xs:documentation>
      </xs:annotation>
      </xs:attribute>
    <xs:attribute name="audioEncodingRefID" type="Uuid">
      <xs:annotation>

```

```

<xs:documentation>Used to reference and link to the audio encoding option used for the stream.
(v6.0)</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="numberOfSoundFieldGroups" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>The number of Soundfield groups contained in the stream,</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="firstTrack" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>A positive integer indicating the first track that is part of the stream.</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="firstTrackID" type="Uuid">
<xs:annotation>
<xs:documentation>A specific unique identifier for the first audio track in the stream. </xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="lastTrack" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>A positive integer indicating the last track that is part of the stream.</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="lastTrackID" type="Uuid">
<xs:annotation>
<xs:documentation>A specific unique identifier for the last audio track in the stream. </xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attributeGroup ref="Action-ErrorGroup"/>
</xs:complexType>

```



```
<xs:complexType name="SoundFieldGroup">
```

```

<xs:annotation>
<xs:documentation>Used to organize a group of multiple audio channels that comprise the complete audio
structure for the program. For example, Stereo, or Stereo-Spanish, or 5.1. It may be comprised of a single
audio stream using a specific encoding or multiple channels (Left, Right, Center LFE, etc.) It can also be
multiple complete streams assigned to various channels. (v6.0)</xs:documentation>
</xs:annotation>
  <xs:sequence>
    <xs:element name="GroupofSounfieldGroupLinkId" type="Uuid" minOccurs="0"
maxOccurs="unbounded">
      <xs:annotation>
        <xs:documentation>Used to link a SoundfieldGroup to a specific Group of
SoundfieldGroups.</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="MultichannelType" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Describes the multichannel type of SoundfieldGroup. For example MONO,
STEREO, 5.1, etc. Can be sourced from MXF MCATagname of a SoundfieldGroup (e.g.AS-11 X1 MXF) if it
contains this information.
(ST 428-12:2013 and ST2067-8:2013)</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="Mono"/>
          <xs:enumeration value="Dual Mono"/>
          <xs:enumeration value="Stereo"/>
          <xs:enumeration value="Lt-Rt"/>
          <xs:enumeration value="3.0"/>
          <xs:enumeration value="4.0"/>
          <xs:enumeration value="5.0"/>
          <xs:enumeration value="5.1"/>
          <xs:enumeration value="5.1EX"/>
          <xs:enumeration value="6.0"/>
          <xs:enumeration value="6.1"/>
          <xs:enumeration value="7.0"/>
          <xs:enumeration value="7.1DS"/>
          <xs:enumeration value="7.1SDS"/>
          <xs:enumeration value="Other"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="AudioContent" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Additional details concerning the language spoken and the purpose of the
audio.</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:sequence>
          <xs:element name="AudioContentKind" minOccurs="0">
            <xs:annotation>
              <xs:documentation>Describes the high level purpose or use of the audio content. The
assigned value can be sourced form MXF MCA Content (e.g. Video Description equals the Audio Descriprion
term widely used in the UK). If MCA content is not available, may be sourced from
MCAContentKind.</xs:documentation>
            </xs:annotation>
            <xs:simpleType>
              <xs:restriction base="xs:string">
                <xs:enumeration value="Primary"/>
                <xs:enumeration value="Secondary Audio Program"/>
                <xs:enumeration value="Hearing Impaired"/>
              </xs:restriction>
            </xs:simpleType>
          </xs:element>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:element>

```



```

        <xs:enumeration value="Descriptive Video"/>
        <xs:enumeration value="Dialog"/>
        <xs:enumeration value="Music"/>
        <xs:enumeration value="Effects"/>
        <xs:enumeration value="Music and Effects"/>
        <xs:enumeration value="Optional Music and Effects"/>
        <xs:enumeration value="Program Narration"/>
        <xs:enumeration value="Optional Narration"/>
        <xs:enumeration value="Voice Over"/>
        <xs:enumeration value="Visually Impaired"/>
        <xs:enumeration value="Visually Impaired with control channel"/>
        <xs:enumeration value="Recorded Commentary"/>
        <xs:enumeration value="Live Commentary"/>
        <xs:enumeration value="International"/>
        <xs:enumeration value="Other"/>
    </xs:restriction>
</xs:simpleType>
</xs:element>
<xs:element name="AudioContentUse" minOccurs="0">
    <xs:annotation>
        <xs:documentation>Describes the condition of the content (e.g. finished, intermediate) as
a modifier to the AudioContentKind value and indicates its intended use. Value can be sourced from MXF MCA
Use Class.</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="Finished Composite"/>
            <xs:enumeration value="Intermediary Composite"/>
            <xs:enumeration value="Simplified"/>
            <xs:enumeration value="Singular"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
<xs:element name="AudioContentSubType" minOccurs="0">
    <xs:annotation>
        <xs:documentation>Describes particular aspects of the content, such as whether a
commentary is a Director, Cast or Writer's commentary. This property is absent if it is not relevant to a particular
AudioContentKind value.</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="Director"/>
            <xs:enumeration value="Technical"/>
            <xs:enumeration value="Writer"/>
            <xs:enumeration value="Cast"/>
            <xs:enumeration value="Announcer"/>
            <xs:enumeration value="Commentator"/>
            <xs:enumeration value="Other"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
<xs:element name="PrimarySpokenLanguage" minOccurs="0">
    <xs:annotation>
        <xs:documentation>Intelligible primery spoken language that potentially distinguishes this
Soundfield Group from another Soundfield Group. Value can be sourced form MXF MCA RFC 5646 Spoken
Language.</xs:documentation>
    </xs:annotation>
    <xs:complexType>
        <xs:simpleContent>
            <xs:extension base="xs:language">

```

```

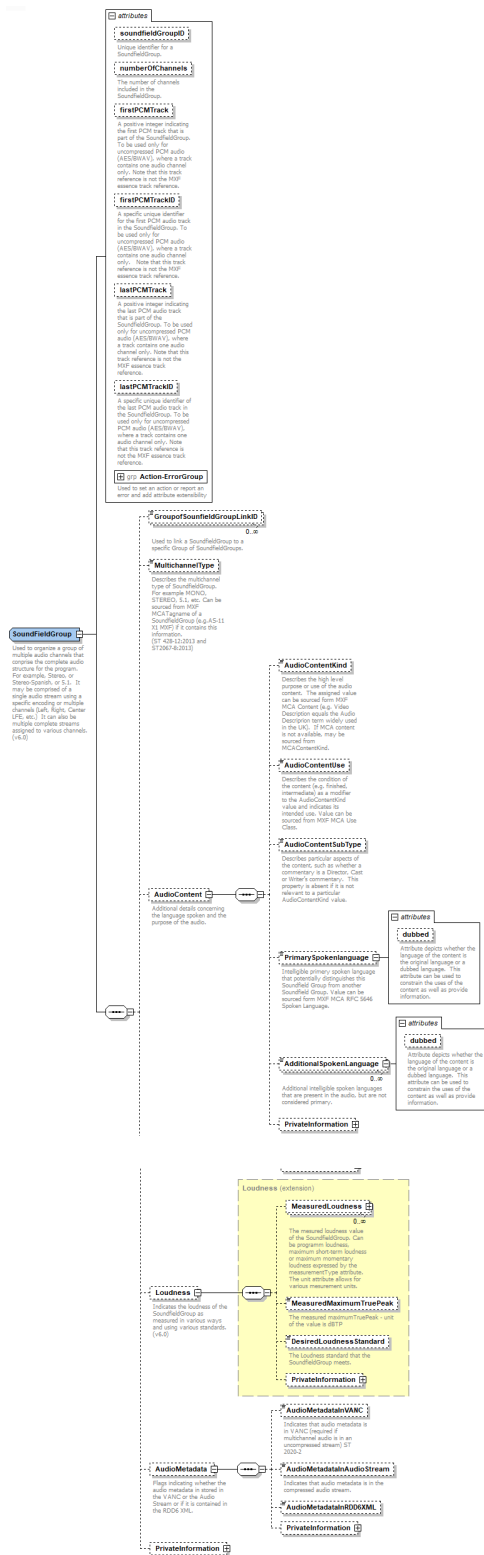
        <xs:attribute name="dubbed" type="xs:boolean">
        <xs:annotation>
        <xs:documentation>Attribute depicts whether the language of the
content is the original language or a dubbed language. This attribute can be used to constrain the uses of the
content as well as provide information. </xs:documentation>
        </xs:annotation>
        </xs:attribute>
    </xs:extension>
</xs:simpleContent>
</xs:complexType>
</xs:element>
<xs:element name="AdditionalSpokenLanguage" minOccurs="0"
maxOccurs="unbounded">
    <xs:annotation>
    <xs:documentation>Additional intelligible spoken languages that are present in the audio,
but are not considered primary. </xs:documentation>
    </xs:annotation>
    <xs:complexType>
        <xs:simpleContent>
            <xs:extension base="xs:language">
                <xs:attribute name="dubbed" type="xs:boolean">
                <xs:annotation>
                <xs:documentation>Attribute depicts whether the language of the
content is the original language or a dubbed language. This attribute can be used to constrain the uses of the
content as well as provide information. </xs:documentation>
                </xs:annotation>
                </xs:attribute>
            </xs:extension>
        </xs:simpleContent>
    </xs:complexType>
</xs:element>
<xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="Loudness" minOccurs="0">
    <xs:annotation>
    <xs:documentation>Indicates the loudness of the SoundfieldGroup as measured in various ways and
using various standards. (v6.0) </xs:documentation>
    </xs:annotation>
    <xs:complexType>
        <xs:complexContent>
            <xs:extension base="Loudness"/>
        </xs:complexContent>
    </xs:complexType>
</xs:element>
<xs:element name="AudioMetadata" minOccurs="0">
    <xs:annotation>
    <xs:documentation>Flags indicating whether the audio metadata is stored in the VANC or the Audio
Stream or if it is contained in the RDD6 XML. </xs:documentation>
    </xs:annotation>
    <xs:complexType>
        <xs:sequence>
            <xs:element name="AudioMetadataInVANC" type="xs:boolean" minOccurs="0">
            <xs:annotation>
            <xs:documentation>Indicates that audio metadata is in VANC (required if multichannel
audio is in an uncompressed stream) ST 2020-2 </xs:documentation>
            </xs:annotation>
            </xs:element>
            <xs:element name="AudioMetadataInAudioStream" type="xs:boolean" minOccurs="0">

```

```

        <xs:annotation>
        <xs:documentation>Indicates that audio metadata is in the compressed audio
stream.</xs:documentation>
        </xs:annotation>
        </xs:element>
        <xs:element name="AudioMetadataInRDD6XML" type="xs:boolean" minOccurs="0"/>
        <xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
    </xs:sequence>
</xs:complexType>
</xs:element>
    <xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
</xs:sequence>
<xs:attribute name="soundfieldGroupID" type="Uuid">
<xs:annotation>
<xs:documentation>Unique identifier for a SoundfieldGroup.</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="numberOfChannels" type="xs:integer">
<xs:annotation>
<xs:documentation>The number of channels included in the SoundfieldGroup.</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="firstPCMTrack" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>A positive integer indicating the first PCM track that is part of the SoundfieldGroup. To be
used only for uncompressed PCM audio (AES/BWAV), where a track contains one audio channel only. Note that
this track reference is not the MXF essence track reference.</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="firstPCMTrackID" type="Uuid">
<xs:annotation>
<xs:documentation>A specific unique identifier for the first PCM audio track in the SoundfieldGroup. To be used
only for uncompressed PCM audio (AES/BWAV), where a track contains one audio channel only. Note that this
track reference is not the MXF essence track reference.</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="lastPCMTrack" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>A positive integer indicating the last PCM audio track that is part of the SoundfieldGroup. To
be used only for uncompressed PCM audio (AES/BWAV), where a track contains one audio channel only. Note
that this track reference is not the MXF essence track reference.</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="lastPCMTrackID" type="Uuid">
<xs:annotation>
<xs:documentation>A specific unique identifier of the last PCM audio track in the SoundfieldGroup. To be used
only for uncompressed PCM audio (AES/BWAV), where a track contains one audio channel only. Note that this
track reference is not the MXF essence track reference. </xs:documentation>
        </xs:annotation>
    </xs:attribute>
<xs:attributeGroup ref="Action-ErrorGroup"/>
</xs:complexType>

```



4.2.3 BxfCaptions.XSD

Contains:

| | | |
|-------------|--|---|
| import | loc http://www.atsc.org/XMLSchema/pmcp/2007/3.1/pmcp31.xsd | ns http://www.atsc.org/XMLSchema/pmcp/2007/3.1 |
| include | loc bxTypes.xsd | |
| complexType | AccessServices | ann:Indicators of the type of access services provided as part of the Library Master content. (v6.0) |
| complexType | AlternativeCaptions | ann:Additional caption and subtitle options as used worldwide as well as the ability to extend to other customized types. (v6.0) |
| complexType | BFxCaptionOP42 | ann:Describes Teletext Based Closed Captions According FreeTv Australia OP 42. (v6.0) |
| complexType | BFxCaptionOP47 | ann:Describes Teletext Based Closed Captions According FreeTv Australia OP 47 note that when used, DigitalVideo and CaptionshVAHC should both be set to True in VideoType. (v6.0) |
| complexType | BxfCaptions | ann:Caption Service Descriptor (A/65B 6.9.3) |
| complexType | BxfCaption608 | ann: |
| complexType | BxfCaption708 | ann: |

Caption Service Descriptor (A/65B 6.9.3) plus Australia's OP42, OP47 and UK formats are now include (v6.0) along with the ability to extend.

4.2.3.1 BXF 6.0 Changes

Description of change:

Captions have been extended with new complex types to handle Australia's OP42 and OP47 as well as creating a more generic option, AlternateCaptions, that will be capable of handling the UK's EBU-STL, EBU-TT, and IMSC formats as well as many other customized from these platforms. The addition of PrivateInformation in this area will allow easy extensions as needed. A new complex type, AccessServices, used as part of ContentDelivery's new LibraryMaster element, also extends captioning flags to this area.

Text representations:

```
<xs:complexType name="AccessServices">
  <xs:annotation>
    <xs:documentation>Indicators of the type of access services provided as part of the Library Master content.
    (V6.0)</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="ClosedCaptioning" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Indicator of whether closed subtitles or captioning is provided and which type or
        types are included.</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:sequence>
          <xs:element name="IMSC1" type="xs:boolean">
            <xs:annotation>
              <xs:documentation>Internet Media Subtitles and Captions 1.0, as defined by the
              W3C</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="EBU-TT" type="xs:boolean">
            <xs:annotation>
              <xs:documentation>Captions may be delivered as an IMSC 1.0 constrained TTML
              document encapsulated as an MXF track. The IMSC 1.0 captions additionally constrained to meet the
              requirements of EBU-TT (EBU-Tech 3350/3390)</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="EBU-STL" type="xs:boolean">
            <xs:annotation>
              <xs:documentation>If EBU STL (EBU-Tech 3265) is to be carried in addition to the IMSC
              1.0 TTML, it will be encapsulated as an MXF Track File according to SMPTE ST 2075.</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="CEA-608" type="xs:boolean">
            <xs:annotation>
```

`<xs:documentation>`If CTA 608-708 Captioning is to be carried in addition to the IMSC 1.0 TTML, it will be encapsulated as an MXF Track File according to SMPTE ST 2052 and referenced by an Ancillary Data Essence Virtual Track according to SMPTE ST 2067-2.`</xs:documentation>`

`</xs:annotation>`

`</xs:element>`

`<xs:element name="CEA-708" type="xs:boolean">`

`<xs:annotation>`

`<xs:documentation>`If CEA 608-708 Captioning is to be carried in addition to the IMSC 1.0 TTML, it will be encapsulated as an MXF Track File according to SMPTE ST 2052 and referenced by an Ancillary Data Essence Virtual Track according to SMPTE ST 2067-2.`</xs:documentation>`

`</xs:annotation>`

`</xs:element>`

`</xs:sequence>`

`</xs:complexType>`

`</xs:element>`

`<xs:element name="AudioDescription_DVS" type="xs:boolean" minOccurs="0">`

`<xs:annotation>`

`<xs:documentation>`Indicator of whether Audio Description (AD) also known as Described Video Service (DVS) or Video Description is provided.`</xs:documentation>`

`</xs:annotation>`

`</xs:element>`

`<xs:element name="Signing" type="xs:boolean" minOccurs="0">`

`<xs:annotation>`

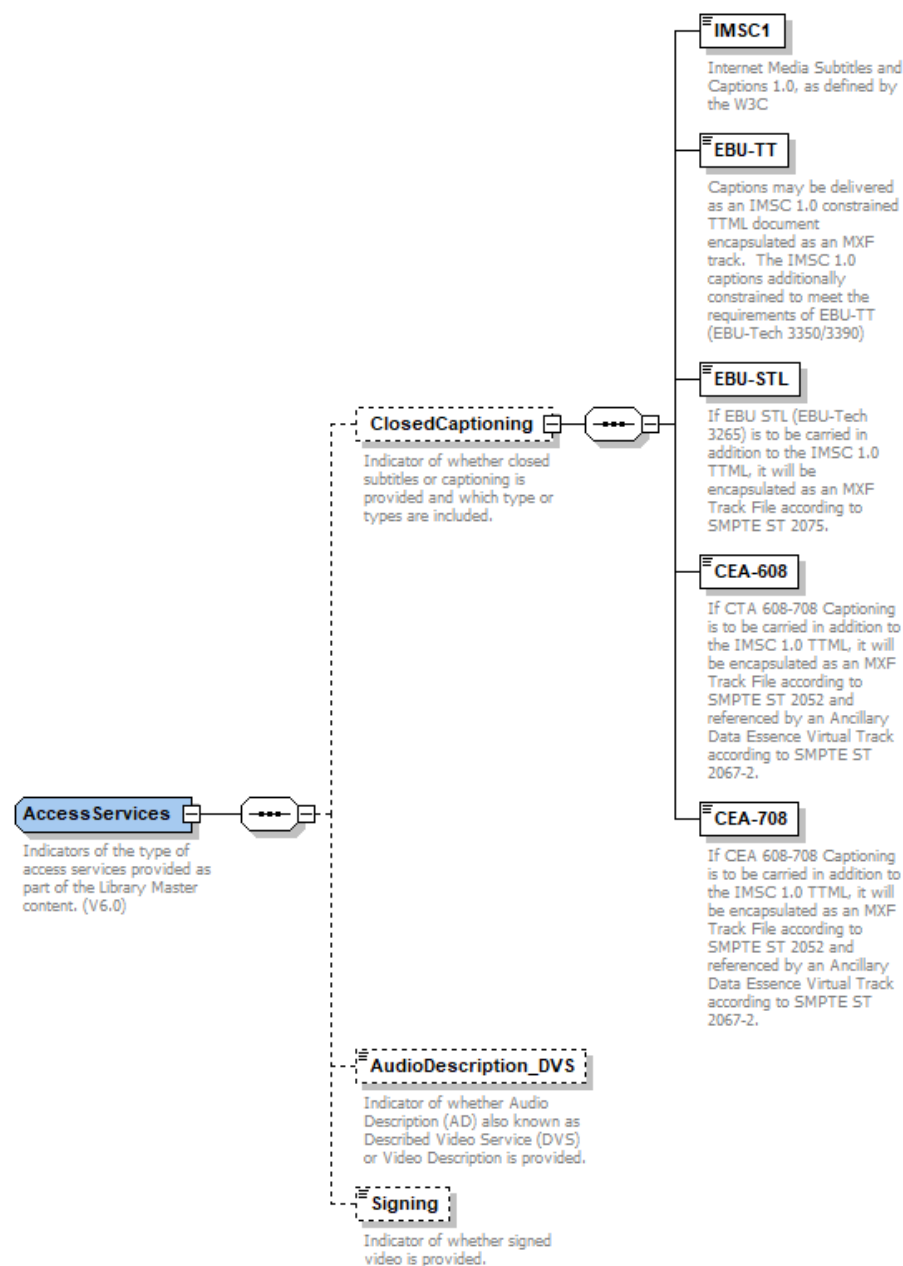
`<xs:documentation>`Indicator of whether signed video is provided.`</xs:documentation>`

`</xs:annotation>`

`</xs:element>`

`</xs:sequence>`

`</xs:complexType>`



```

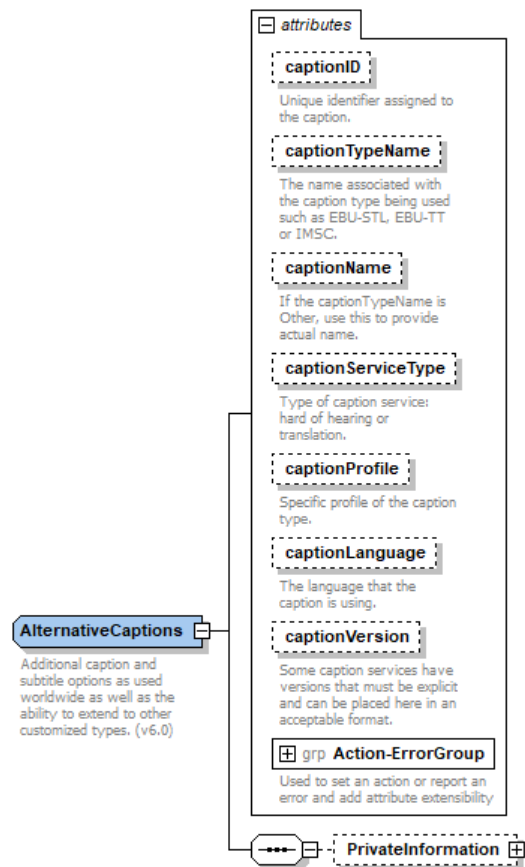
<xs:complexType name="AlternativeCaptions">
  <xs:annotation>
    <xs:documentation>Additional caption and subtitle options as used worldwide as well as the ability to extend to
    other customized types. (v6.0)</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="captionID" type="Uuid">
    <xs:annotation>
      <xs:documentation>Unique identifier assigned to the caption.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
  <xs:attribute name="captionTypeName">
    <xs:annotation>

```

```

<xs:documentation>The name associated with the caption type being used such as EBU-STL, EBU-TT or
IMSC.</xs:documentation>
</xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="EBU-STL"/>
      <xs:enumeration value="EBU-TT"/>
      <xs:enumeration value="IMSC"/>
      <xs:enumeration value="SAMI"/>
      <xs:enumeration value="SRT"/>
      <xs:enumeration value="WebVTT"/>
      <xs:enumeration value="Other"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
<xs:attribute name="captionName" type="xs:string">
  <xs:annotation>
    <xs:documentation>If the captionTypeName is Other, use this to provide actual name.</xs:documentation>
  </xs:annotation>
</xs:attribute>
<xs:attribute name="captionServiceType">
  <xs:annotation>
    <xs:documentation>Type of caption service: hard of hearing or translation.</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="Hard of Hearing"/>
      <xs:enumeration value="Translation"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
<xs:attribute name="captionProfile" type="xs:string">
  <xs:annotation>
    <xs:documentation>Specific profile of the caption type.</xs:documentation>
  </xs:annotation>
</xs:attribute>
<xs:attribute name="captionLanguage" type="xs:language">
  <xs:annotation>
    <xs:documentation>The language that the caption is using.</xs:documentation>
  </xs:annotation>
</xs:attribute>
<xs:attribute name="captionVersion" type="xs:string">
  <xs:annotation>
    <xs:documentation>Some caption services have versions that must be explicit and can be placed here in an
acceptable format.</xs:documentation>
  </xs:annotation>
</xs:attribute>
<xs:attributeGroup ref="Action-ErrorGroup"/>
</xs:complexType>

```

```

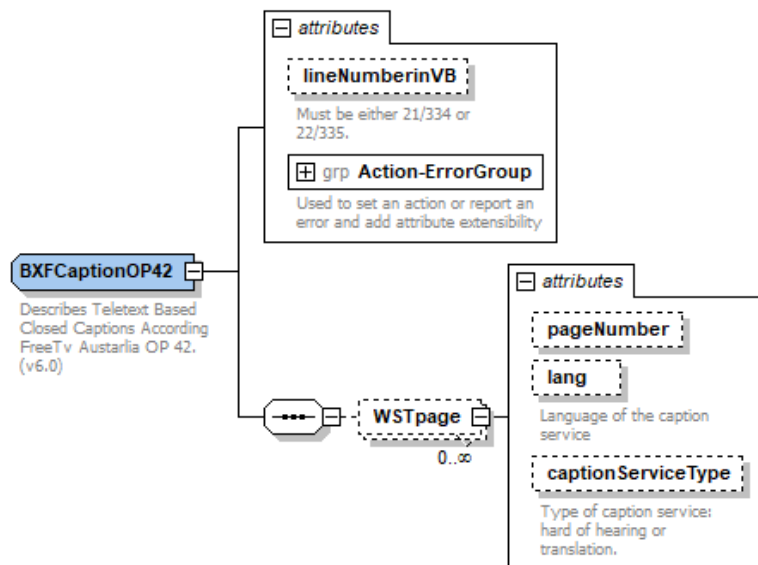
<xs:complexType name="BXCaptionOP42">
  <xs:annotation>
    <xs:documentation>Describes Teletext Based Closed Captions According FreeTv Australia OP 42. (v6.0)
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="WSTpage" minOccurs="0" maxOccurs="unbounded">
      <xs:complexType>
        <xs:attribute name="pageNumber" type="xs:positiveInteger"/>
        <xs:attribute name="lang" type="xs:language" use="optional">
          <xs:annotation>
            <xs:documentation>Language of the caption service</xs:documentation>
          </xs:annotation>
        </xs:attribute>
        <xs:attribute name="captionServiceType">
          <xs:annotation>
            <xs:documentation>Type of caption service: hard of hearing or translation.</xs:documentation>
          </xs:annotation>
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:enumeration value="Hard of Hearing"/>
              <xs:enumeration value="Translation"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:attribute>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
  <xs:attribute name="lineNumberVB">

```

```

<xs:annotation>
<xs:documentation>Must be either 21/334 or 22/335. </xs:documentation>
</xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="21/334"/>
      <xs:enumeration value="22/335"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
<xs:attributeGroup ref="Action-ErrorGroup"/>
</xs:complexType>

```



```

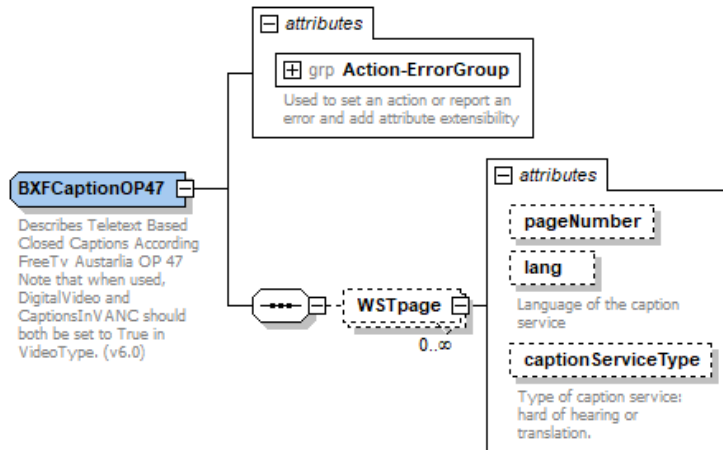
<xs:complexType name="BXCaptionOP47">
<xs:annotation>
<xs:documentation>Describes Teletext Based Closed Captions According FreeTv Australia OP 47 Note that
when used, DigitalVideo and CaptionsInVANC should both be set to True in VideoType. (v6.0)
</xs:documentation>
</xs:annotation>
  <xs:sequence>
    <xs:element name="WSTpage" minOccurs="0" maxOccurs="unbounded">
      <xs:complexType>
        <xs:attribute name="pageNumber" type="xs:positiveInteger"/>
        <xs:attribute name="lang" type="xs:language" use="optional"/>
        <xs:annotation>
          <xs:documentation>Language of the caption service</xs:documentation>
        </xs:annotation>
        </xs:attribute>
        <xs:attribute name="captionServiceType">
          <xs:annotation>
            <xs:documentation>Type of caption service: hard of hearing or translation.</xs:documentation>
          </xs:annotation>
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:enumeration value="Hard of Hearing"/>
              <xs:enumeration value="Translation"/>
            </xs:restriction>

```

```

        </xs:simpleType>
      </xs:attribute>
    </xs:complexType>
  </xs:element>
</xs:sequence>
<xs:attributeGroup ref="Action-ErrorGroup"/>
</xs:complexType>

```

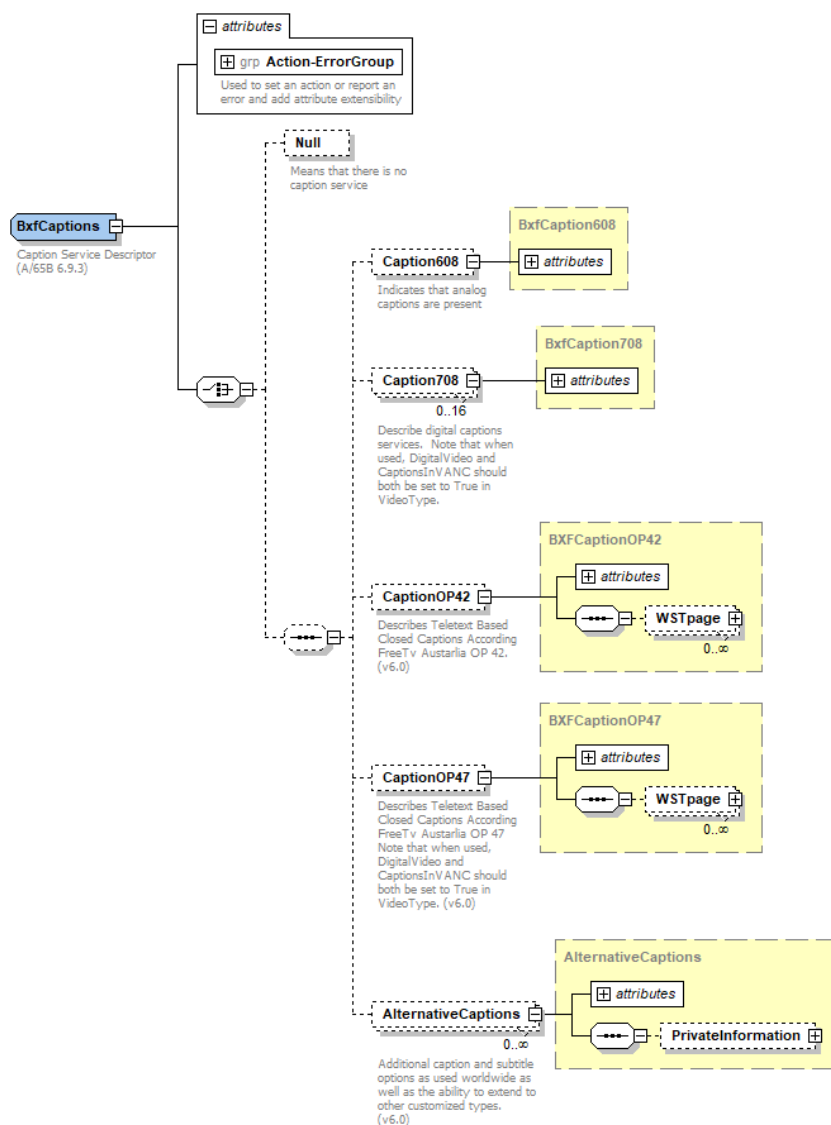


```

<xs:complexType name="BxfCaptions">
  <xs:annotation>
    <xs:documentation>Caption Service Descriptor (A/65B 6.9.3)</xs:documentation>
  </xs:annotation>
  <xs:choice>
    <xs:element name="Null" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Means that there is no caption service</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:sequence minOccurs="0">
      <xs:element name="Caption608" type="BxfCaption608" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Indicates that analog captions are present</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="Caption708" type="BxfCaption708" minOccurs="0" maxOccurs="16">
        <xs:annotation>
          <xs:documentation>Describe digital captions services. Note that when used, DigitalVideo and
CaptionServiceInVANC should both be set to True in VideoType.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="CaptionOP42" type="BxFCaptionOP42" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Describes Teletext Based Closed Captions According FreeTv Australia
OP 42. (v6.0)</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="CaptionOP47" type="BxFCaptionOP47" minOccurs="0">
        <xs:annotation>

```

`<xs:documentation>`Describes Teletext Based Closed Captions According FreeTv Australia
 OP 47 Note that when used, DigitalVideo and CaptionsInVANC should both be set to True in VideoType.
 (v6.0)`</xs:documentation>`
`</xs:annotation>`
`</xs:element>`
`<xs:element name="AlternativeCaptions" type="AlternativeCaptions" minOccurs="0"`
`maxOccurs="unbounded">`
`<xs:annotation>`
`<xs:documentation>`Additional caption and subtitle options as used in the UK as well as the
 ability to extend to other customized types. (v6.0)`</xs:documentation>`
`</xs:annotation>`
`</xs:element>`
`</xs:sequence>`
`</xs:choice>`
`<xs:attributeGroup ref="Action-ErrorGroup"/>`
`</xs:complexType>`



4.2.4 BxfChannel.XSD

Contains:

| | | |
|-------------|---|---|
| import | loc:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1/pmcp31.xsd | ns:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1 |
| include | loc:bxftypes.xsd | |
| complexType | Channel | ann: |

Extends ATSC's PMCP 3.1 definition of a channel.

4.2.5 BxfContentId.XSD

Contains:

| | | |
|-------------|---|--|
| import | loc:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1/pmcp31.xsd | ns:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1 |
| include | loc:bxfisn.xsd | |
| complexType | BxfAlternateId | ann: |
| complexType | BxfHouseNumber | ann: |
| complexType | BxfContentId | ann:Groups several content IDs that may be used simultaneously to label and reference a show |

Groups several Content IDs that may be used simultaneously to label and reference a show. In Version 2, support was added for the reuse of House Numbers by adding "duration of effectiveness" as supported under ATSC's A57/B standard.

4.2.6 BxfISAN.XSD

Contains:

| | | |
|-------------|---|---|
| import | loc:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1/pmcp31.xsd | ns:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1 |
| include | loc:bxftypes.xsd | |
| complexType | BxfIsan | ann: |

Used to define entry of an ISAN value into ContentID. Go to www.isan.org for more information on the use of ISAN with content identification.

4.2.7 BxfParentalRating.XSD

Contains:

| | | |
|-------------|---|---|
| import | loc:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1/pmcp31.xsd | ns:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1 |
| include | loc:bxftypes.xsd | |
| complexType | BxfParentalRating | ann: |

Used to define entry of parental rating values as an extension of ATSC's PMCP 3.1.

4.2.8 BxfSchema.XSD

Contains:

| | | |
|---------|------------------------------------|---|
| import | loc:http://www.w3.org/2001/xml.xsd | ns:http://www.w3.org/XML/1998/namespace |
| include | loc:bxftypes.xsd | |
| include | loc:bxfschannel.xsd | |
| include | loc:schedule.xsd | |
| include | loc:contenttransfer.xsd | |
| include | loc:configuration.xsd | |
| include | loc:jobdetail.xsd | |
| element | BxfMessage | ann:The root for all BXF messages. |

The root for all BXF messages.

4.2.9 BxfTypes.XSD

Contains:

| | | |
|----------------|-------------------------------|--|
| import | loc:pmcp31.xsd | ns:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1 |
| complexType | BxfAddress | ann: Address details |
| complexType | BxfCompany | ann: Defines all the attributes required for a company |
| complexType | BxfContact | ann: A contact is a person that is being referenced including phone, email and address details |
| complexType | BxfCoverage | ann: An area of physical locations that represent the coverage for a broadcast station or the areas of distribution for a distributor of media content. |
| complexType | BxfDateRange | ann: Allows either SMPTE or UTC based date-time notation |
| complexType | BxfDaypart | ann: A defined range of days, for one or more time period ranges and optionally dates that can be used to include or exclude for scheduling of content. Note that it is possible to create logical periods of time when potentially crossing the start of the broadcast day or crossing midnight depending on the system ingesting the definition. |
| complexType | BxfDuration | ann: Duration can be expressed using either SMPTE time code or xs:duration |
| complexType | BxfExtensions | ann: Used to describe customized metadata using data pairs and optionally a validation data type. (v3.0) |
| complexType | BxfPrivateInformation | ann: Any sequence of well-formed private XML elements |
| complexType | BxfSampleTime | ann: "H:M:S" used for time duration or offset (V5.0 added support for 60 fps) |
| complexType | BxfSimpleDateRange | ann: Used for date-time entry in the schema |
| complexType | BxfStation | ann: A transmitter or distributor of media content either over the air or by other means |
| complexType | BxfText | ann: Used for all free text entry elements in the schema |
| complexType | BxfUTCDateRange | ann: Standard UTC Date-Time |
| complexType | EventNotes | ann: Operator notes used to annotate the event with reference to the person that created the note. |
| attributeGroup | ActionErrorGroup | ann: Used to set an action or report an error and add attribute extensibility |
| attributeGroup | PmpcActionErrorExtensionGroup | ann: Used to set an action or report an error and add attribute extensibility |
| attributeGroup | QCTypeInitRep | ann: "H:M:S" Used to set the allowed Types, Units and Representations for QC test items as of December 2016. Expected to change with future technologies. |
| simpleType | AsRunStatusType | ann: |
| simpleType | BxfShortName | ann: |
| simpleType | BxfElementaryErrorExt | ann: Type for an elementary error |
| simpleType | BxfElementaryError | ann: Type for an elementary error |
| simpleType | BxfError | ann: |
| simpleType | BxfStatus | ann: Status of a reply message |
| simpleType | BxfStatusExtType | ann: |
| simpleType | BxfURI | ann: Used to denote a universal file location |
| simpleType | DayPattern | ann: A binary representation of the days of the week with Monday in the left-most position (eg. "1111100" = M-F) |
| simpleType | DestinationType | ann: Type of the destination system (see ATSC code point registry - www.atsc.org/standards/Code_Point_Registry.pdf) |
| simpleType | EICode | ann: FCC Children's and Information Codes |
| simpleType | EndModeType | ann: |
| simpleType | MessageType | ann: Allowed types of messages in this schema |
| simpleType | OperationalModeType | ann: |
| simpleType | OriginType | ann: Type of the origin system (see ATSC code point registry - www.atsc.org/standards/Code_Point_Registry.pdf) |
| simpleType | QueryStringIdentifier | ann: Restricts Query Return/Structure based on a pattern that would restrict the return structure to follow the "camel back" style used in the Schema |
| simpleType | QueryString | ann: Restricts the Query where clause based on a pattern. Note that negation requests are not supported. |
| simpleType | ScheduleEventType | ann: |
| simpleType | ScheduleType | ann: A type of schedule |
| simpleType | Simple255MTIMECode | ann: Reference SMPTE 25M, section 8 "H:M:S" Supports 60 frames per second (v5.0) |
| simpleType | StartModeType | ann: |
| simpleType | Uuid | ann: A universal unique identifier, as described by RFC 4122. |

Used as to store all the utility elements that are used by most of the other schema files.

4.2.10 Configuration.XSD

Contains:

| | | |
|-------------|------------------|------|
| include | loc:bxftypes.xsd | |
| complexType | Configuration | ann: |

Used to describe the configuration values of a system, to be shared with other BXF-compliant systems.

4.2.11 Content.XSD

Contains:

| | | |
|-------------|---------------------------|------|
| include | loc:bxftypes.xsd | |
| include | loc:programcontent.xsd | |
| include | loc:nonprogramcontent.xsd | |
| complexType | Content | ann: |

Used to describe the content at a specific location.

4.2.12 ContentDelivery.XSD

Contains:

| | | |
|-------------|------------------------|--|
| include | loc:bxftypes.xsd | |
| include | loc:bxftypes.xsd | |
| include | loc:qualitycontrol.xsd | |
| include | loc:bxfcaptions.xsd | |
| include | loc:video.xsd | |
| include | loc:audio.xsd | |
| complexType | ContentDelivery | ann:Used to specify the method by which media content should be created and formatted for downstream use by a designated media company. AirReadyMaster added (v5.0) and LibraryMaster added (v6.0) |
| complexType | DescriptiveMetadata | ann:Indicates the presence of various types of descriptive metadata in the Library Master. (v6.0) |
| complexType | IMFLibraryMasterApp2 | ann:Added content delivery options for Library Masters that conform to the IMF Framework as specified by ST 2067 (v6.0) |
| complexType | IMFLibraryMasterApp2e | ann:Added content delivery options for Library Masters that conform to the IMF Framework as specified by ST 2067 (v6.0) |
| complexType | J2KLibraryMasterApp | ann:Added content delivery options for Library Masters in various configurations (v6.0) |
| complexType | ProResLibraryMasterApp | ann:Added content delivery options for Library Masters in various configurations (v6.0) |

Used to specify the method by which media content should be created and formatted for downstream use by a designated media company. Media is often formatted in different manors depending on the planned use for that media downstream. ContentDelivery now supports both media designated to be aired as well as media content that is considered a Library Master, but may additional modification before used for air. AirReadyMaster was released in v5.0 and the corresponding document for that version should be consulted for details. LibraryMaster has been added in this release and is detailed below.

4.2.12.1 BXF 6.0 Changes

Description of change:

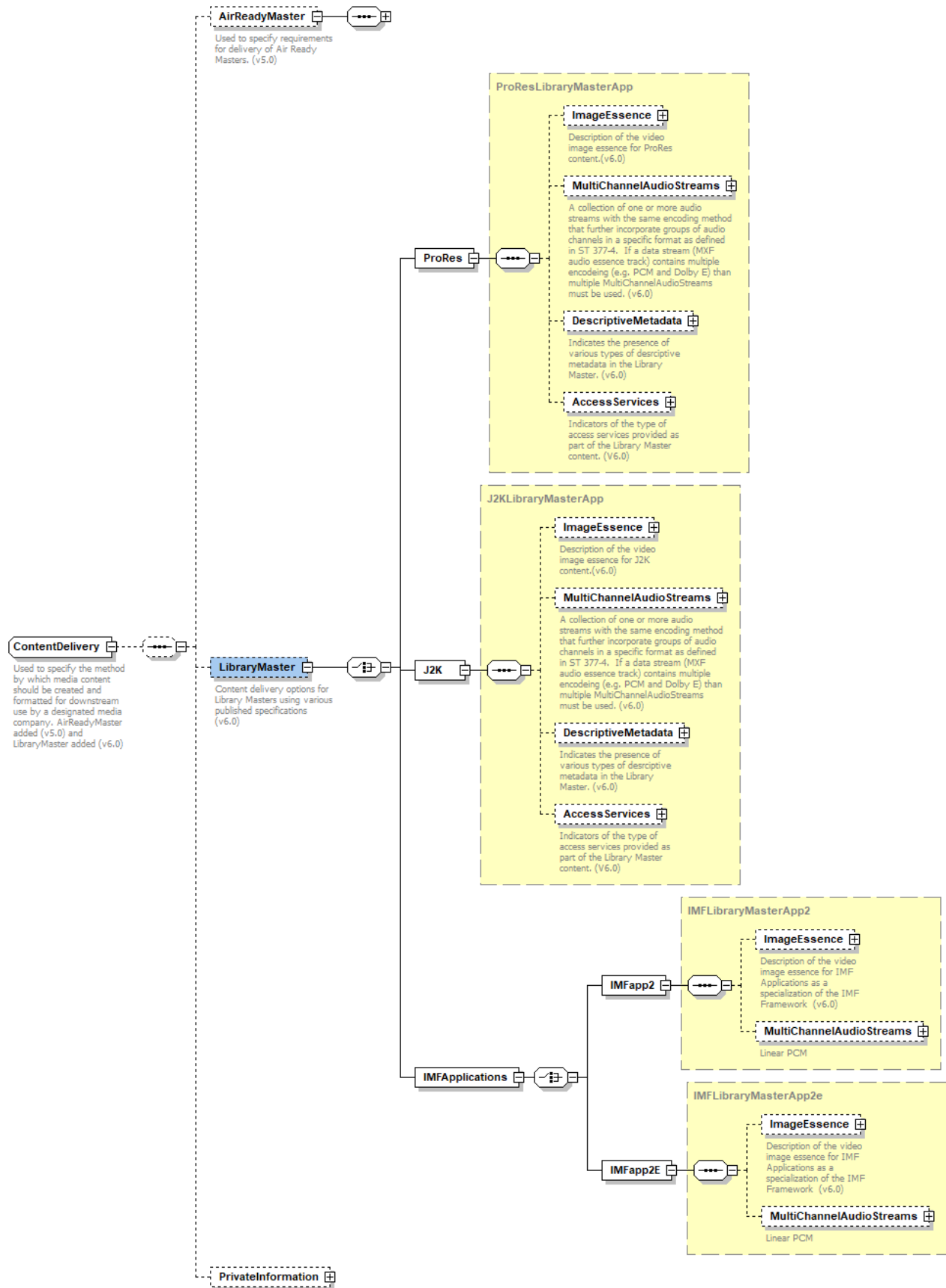
No changes were made in AirReadyMaster in v6.0. A new element, LibraryMaster, was added in v6.0 which supports additional essence types and other functions related to Library Master media creation and transfer. Additional audio, captioning and video essence elements are described in their appropriate areas. DescriptiveMetadata is a new complex type linked to two new essence types: ProRes and J2K. IMF 2 and 2e Application types are also now supported. Additional applications are planned to be added to this structure in future BXF versions. PrivateInformation was also added to allow further extension of this area.

Text representations:

```

<xs:complexType name="ContentDelivery">
  <xs:annotation>
    <xs:documentation>Used to specify the method by which media content should be created and formatted for
downstream use by a designated media company. AirReadyMaster added (v5.0) and LibraryMaster added
(v6.0)</xs:documentation>
  </xs:annotation>
  <xs:sequence minOccurs="0">
    <xs:element name="AirReadyMaster" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Used to specify requirements for delivery of Air Ready Masters.
(v5.0)</xs:documentation>
      </xs:annotation>
      ...
      (Note...AirReadyMaster did not change and was fully published as part of v5.0...)
      ...
    <xs:element name="LibraryMaster" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Content delivery options for Library Masters using various published specifications
(v6.0)</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:choice>
          <xs:element name="ProRes" type="ProResLibraryMasterApp"/>
          <xs:element name="J2K" type="J2KLibraryMasterApp"/>
          <xs:element name="IMFApplications">
            <xs:complexType>
              <xs:choice>
                <xs:element name="IMFApp2" type="IMFLibraryMasterApp2"/>
                <xs:element name="IMFApp2E" type="IMFLibraryMasterApp2e"/>
              </xs:choice>
            </xs:complexType>
          </xs:element>
        </xs:choice>
      </xs:complexType>
    </xs:element>
    <xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>

```

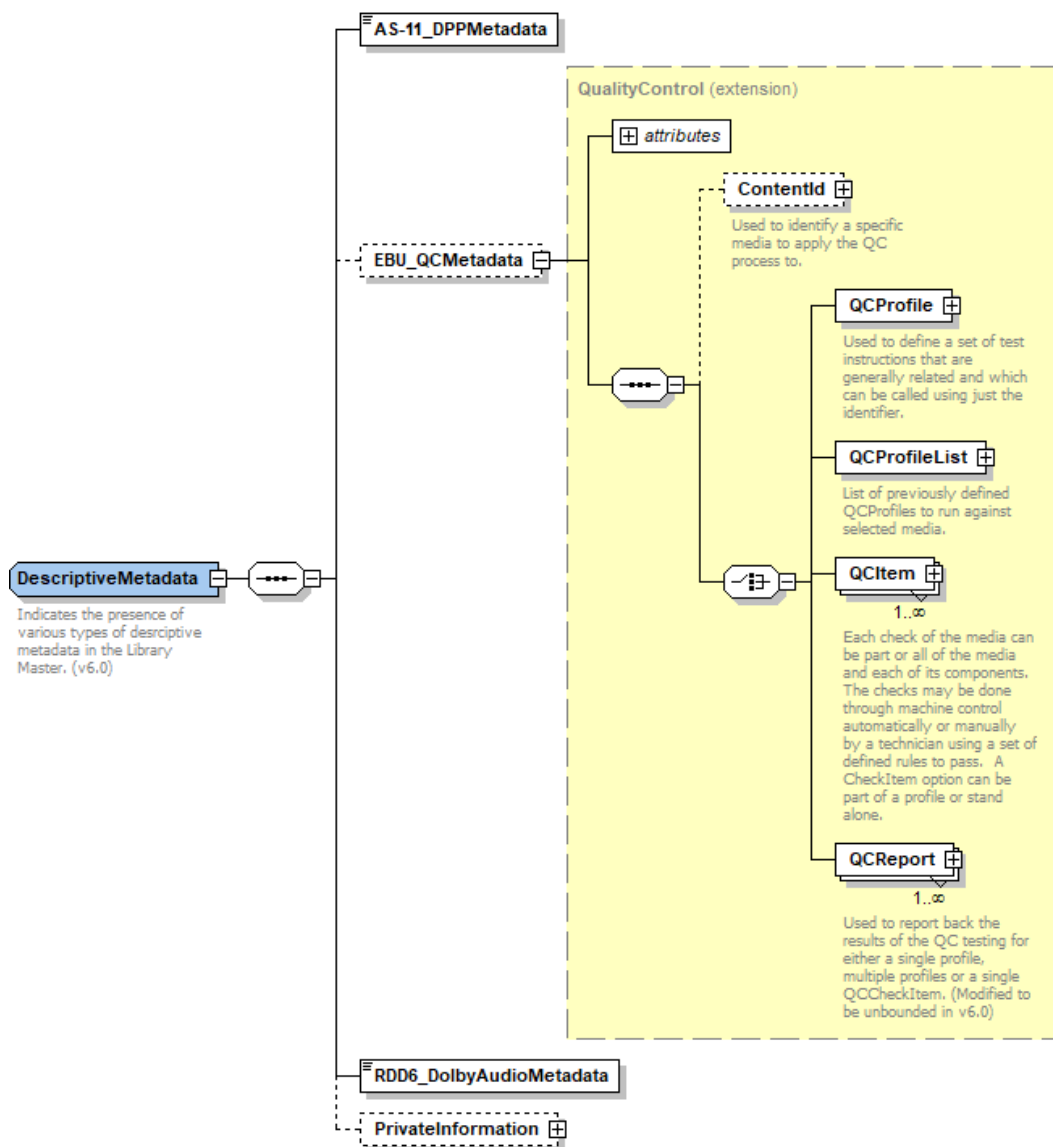



<xs:complexType name="DescriptiveMetadata">

```

<xs:annotation>
<xs:documentation>Indicates the presence of various types of descriptive metadata in the Library Master.
(v6.0)</xs:documentation>
</xs:annotation>
  <xs:sequence>
    <xs:element name="AS-11_DPPMetadata" type="xs:boolean"/>
    <xs:element name="EBU_QCMetadata" minOccurs="0">
      <xs:complexType>
        <xs:complexContent>
          <xs:extension base="QualityControl"/>
        </xs:complexContent>
      </xs:complexType>
    </xs:element>
    <xs:element name="RDD6_DolbyAudioMetadata" type="xs:boolean"/>
    <xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>

```



```

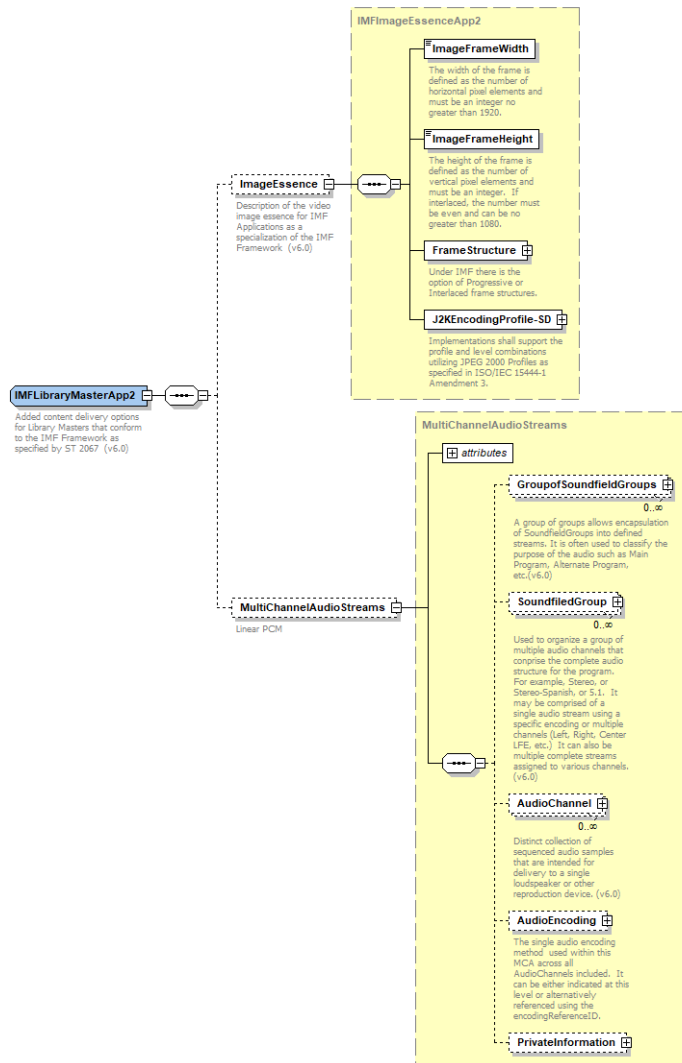
<xs:complexType name="IMFLibraryMasterApp2">
<xs:annotation>

```

```

<xs:documentation>Added content delivery options for Library Masters that conform to the IMF Framework as
specified by ST 2067 (v6.0)</xs:documentation>
</xs:annotation>
<xs:sequence>
  <xs:element name="ImageEssence" type="IMFImageEssenceApp2" minOccurs="0">
    <xs:annotation>
      <xs:documentation>Description of the video image essence for IMF Applications as a specialization of
the IMF Framework (v6.0)</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="MultiChannelAudioStreams" type="MultiChannelAudioStreams" minOccurs="0">
    <xs:annotation>
      <xs:documentation>Linear PCM</xs:documentation>
    </xs:annotation>
  </xs:element>
</xs:sequence>
</xs:complexType>

```



```

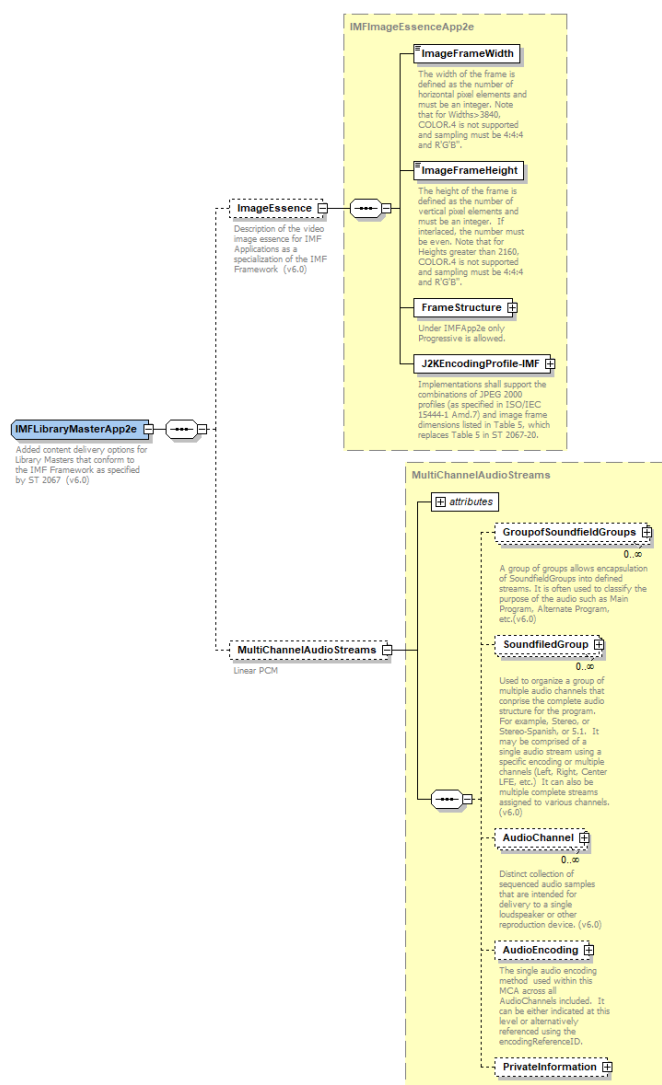
<xs:complexType name="IMFLibraryMasterApp2e">
<xs:annotation>

```

```

<xs:documentation>Added content delivery options for Library Masters that conform to the IMF Framework as
specified by ST 2067 (v6.0)</xs:documentation>
</xs:annotation>
<xs:sequence>
  <xs:element name="ImageEssence" type="IMFImageEssenceApp2e" minOccurs="0">
    <xs:annotation>
      <xs:documentation>Description of the video image essence for IMF Applications as a specialization of
the IMF Framework (v6.0)</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="MultiChannelAudioStreams" type="MultiChannelAudioStreams" minOccurs="0">
    <xs:annotation>
      <xs:documentation>Linear PCM</xs:documentation>
    </xs:annotation>
  </xs:element>
</xs:sequence>
</xs:complexType>

```



```

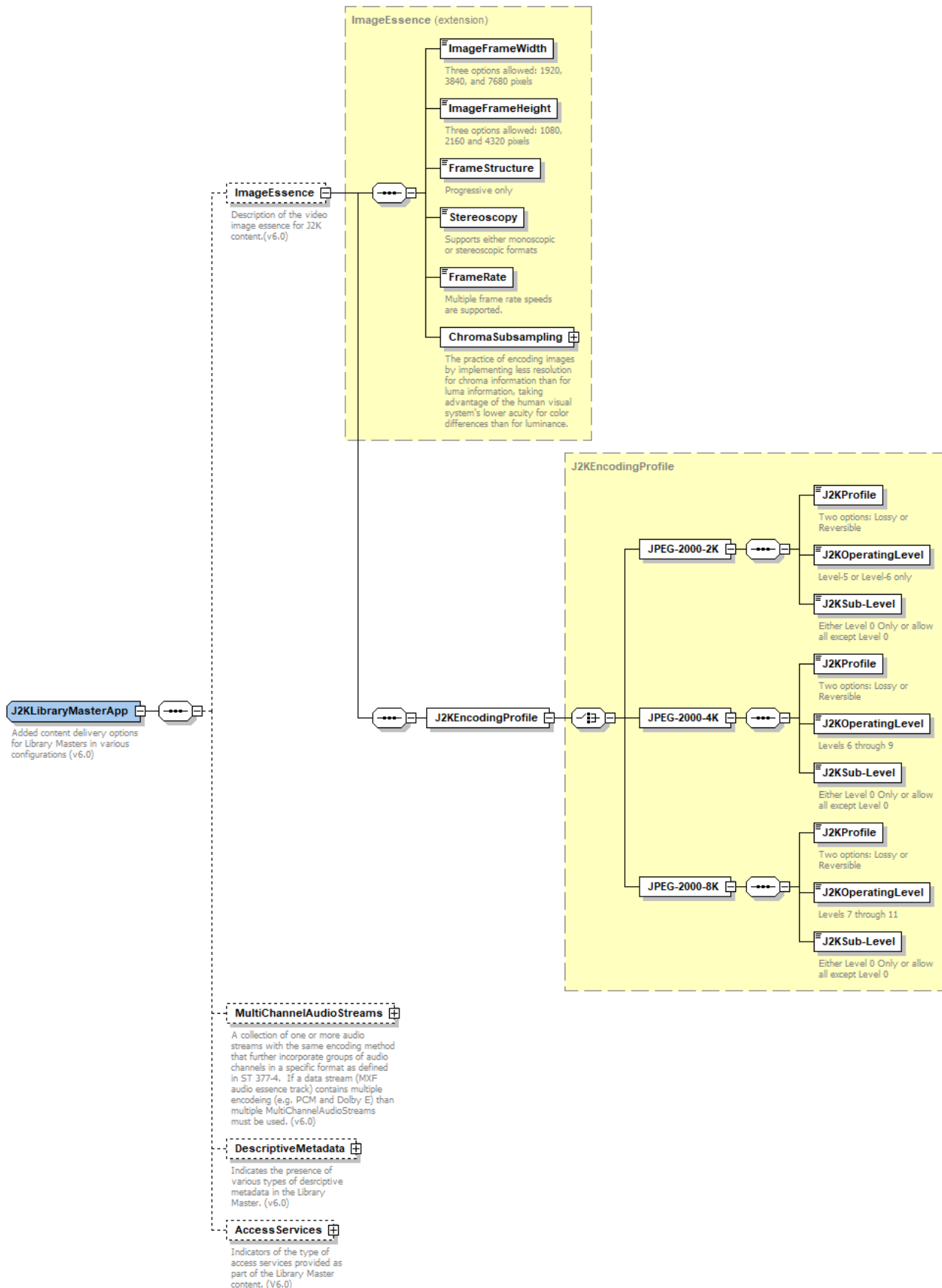
<xs:complexType name="J2KLibraryMasterApp">
  <xs:annotation>
    <xs:documentation>Added content delivery options for Library Masters in various configurations
(v6.0)</xs:documentation>

```

```

</xs:annotation>
  <xs:sequence>
    <xs:element name="ImageEssence" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Description of the video image essence for J2K content.(v6.0)
      </xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:complexContent>
        <xs:extension base="ImageEssence">
          <xs:sequence>
            <xs:element name="J2KEncodingProfile" type="J2KEncodingProfile"/>
          </xs:sequence>
        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
  </xs:element>
  <xs:element name="MultiChannelAudioStreams" type="MultiChannelAudioStreams" minOccurs="0">
    <xs:annotation>
      <xs:documentation>A collection of one or more audio streams with the same encoding method that
      further incorporate groups of audio channels in a specific format as defined in ST 377-4. If a data stream (MXF
      audio essence track) contains multiple encoding (e.g. PCM and Dolby E) than multiple
      MultiChannelAudioStreams must be used. (v6.0)</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="DescriptiveMetadata" type="DescriptiveMetadata" minOccurs="0">
    <xs:annotation>
      <xs:documentation>Indicates the presence of various types of descriptive metadata in the Library
      Master. (v6.0)</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="AccessServices" type="AccessServices" minOccurs="0">
    <xs:annotation>
      <xs:documentation>Indicators of the type of access services provided as part of the Library Master
      content. (V6.0)</xs:documentation>
    </xs:annotation>
  </xs:element>
</xs:sequence>
</xs:complexType>

```



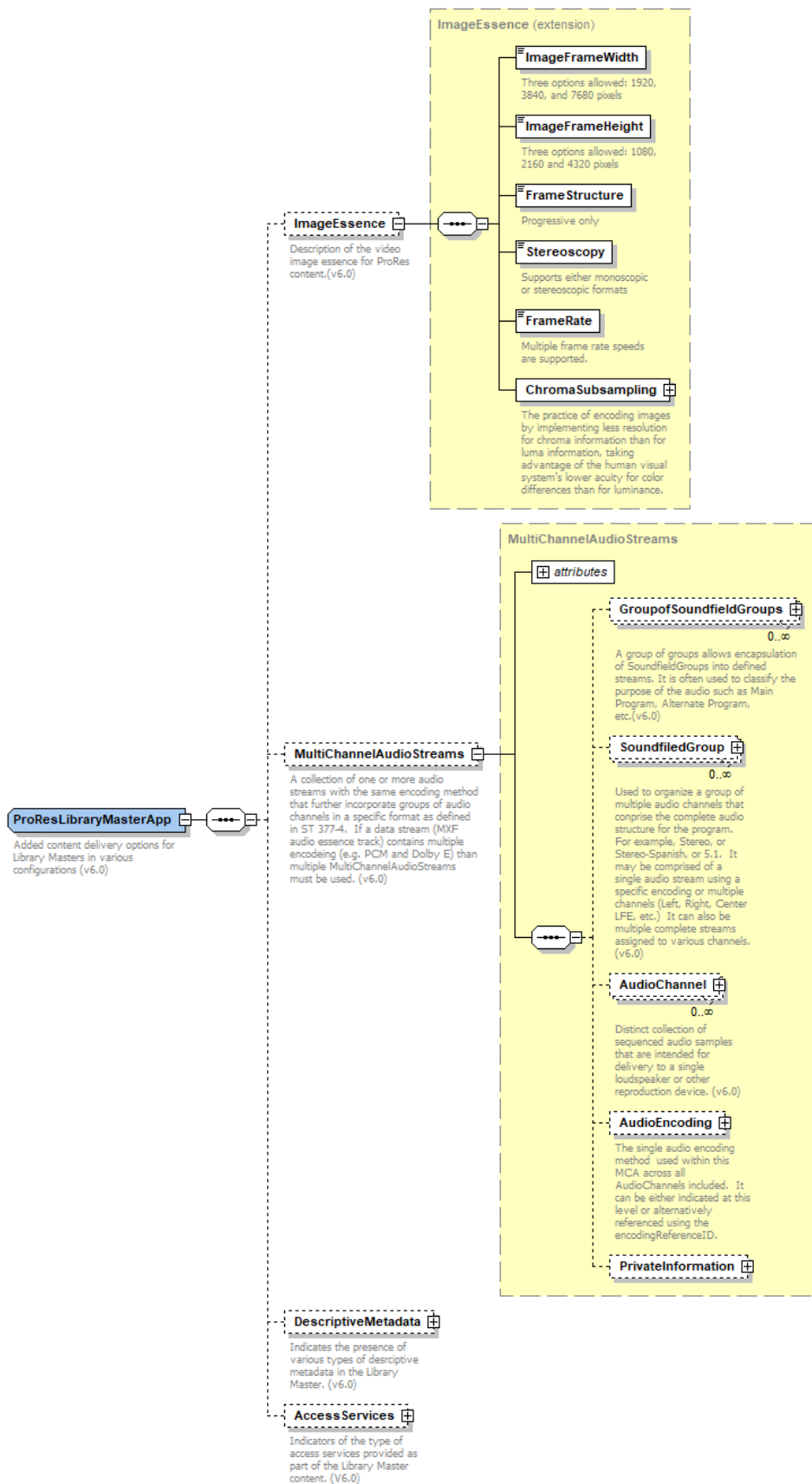
<xs:complexType name="ProResLibraryMasterApp">

<xs:annotation>

```

<xs:documentation>Added content delivery options for Library Masters in various configurations
(v6.0)</xs:documentation>
</xs:annotation>
  <xs:sequence>
    <xs:element name="ImageEssence" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Description of the video image essence for ProRes content.(v6.0)
      </xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:complexContent>
          <xs:extension base="ImageEssence"/>
        </xs:complexContent>
      </xs:complexType>
    </xs:element>
    <xs:element name="MultiChannelAudioStreams" type="MultiChannelAudioStreams" minOccurs="0">
      <xs:annotation>
        <xs:documentation>A collection of one or more audio streams with the same encoding method that
further incorporate groups of audio channels in a specific format as defined in ST 377-4. If a data stream (MXF
audio essence track) contains multiple encoding (e.g. PCM and Dolby E) than multiple
MultiChannelAudioStreams must be used. (v6.0)</xs:documentation>
      </xs:annotation>
      </xs:element>
      <xs:element name="DescriptiveMetadata" type="DescriptiveMetadata" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Indicates the presence of various types of descriptive metadata in the Library
Master. (v6.0)</xs:documentation>
        </xs:annotation>
        </xs:element>
        <xs:element name="AccessServices" type="AccessServices" minOccurs="0">
          <xs:annotation>
            <xs:documentation>Indicators of the type of access services provided as part of the Library Master
content. (V6.0)</xs:documentation>
          </xs:annotation>
          </xs:element>
        </xs:sequence>
      </xs:complexType>

```



4.2.13 ContentMetadata.XSD

Contains:

| | | |
|-------------|-------------------------|---|
| include | loc:audio.xsd | |
| include | loc:bxfcaptions.xsd | |
| include | loc:bxfcontentid.xsd | |
| include | loc:basecontent.xsd | |
| include | loc:location.xsd | |
| include | loc:video.xsd | |
| include | loc:macro.xsd | |
| include | loc:bxfatypes.xsd | |
| include | loc:qualitycontrol.xsd | |
| include | loc:contentdelivery.xsd | |
| complexType | AlternateAudioContent | ann: Used to provide alternate audio only media information |
| complexType | BaseMedia | ann: Enumerates the way content is stored or the method used to transmit |
| complexType | BillBoard | ann: Used to describe the different attributes of one or more BillBoards |
| complexType | ContentDetail | ann: Description of people, events, sports results, and word tags to search for things that represent this media (v5.0). |
| complexType | ContentMetadata | ann: Used to describe all the metadata for a single instance of content. (Note that this element name might be expected to be "ContentMetadata", but was left unchanged from previous versions in order to preserve backward compatibility. This is a documented exception as of v3.0.) |
| complexType | Media | ann: Base Media combined with Media Location |
| complexType | MediaLocation | ann: Used to designate the physical location of a media essence and its quality |
| complexType | UsagePolicy | ann: |

Content identification and other details related to media and media location.

4.2.13.1 BXF 6.0 Changes

Description of change:

Access Services have been added to BaseBand under BaseMedia. AccessMedia complex type is fully described in BXFCaptions.XSD. Note that changes in the Audio, Video and BXFCaptions types and elements below resulted in new options in this area. Also note the major change to ContentDelivery.XSD with the addition of LibraryMaster further described under the appropriate section.

Text representation:

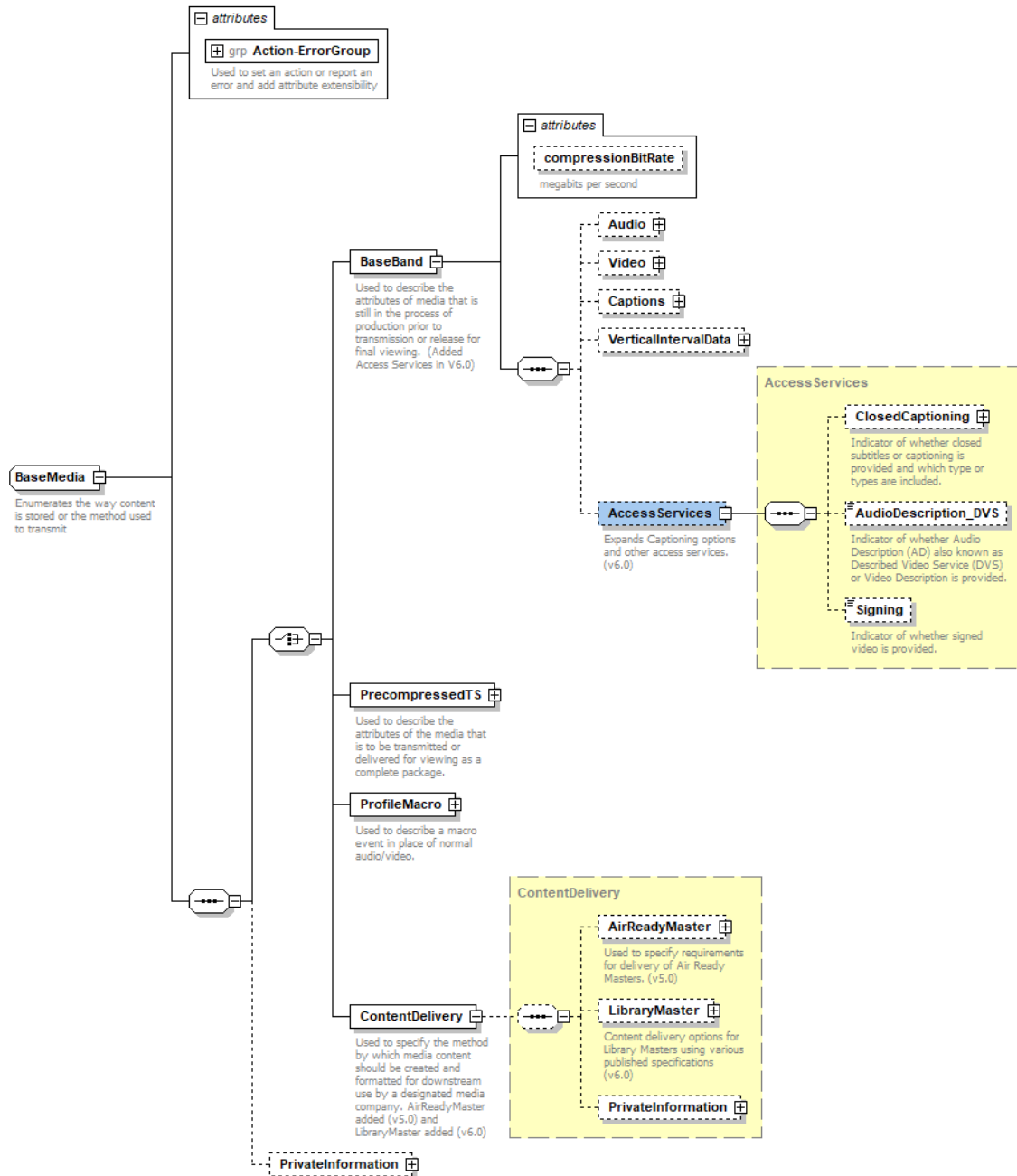
```
<xs:complexType name="BaseMedia">
  <xs:annotation>
    <xs:documentation>Enumerates the way content is stored or the method used to transmit</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:choice>
      <xs:element name="BaseBand">
        <xs:annotation>
          <xs:documentation>Used to describe the attributes of media that is still in the process of
production prior to transmission or release for final viewing. (Added Access Services in
V6.0)</xs:documentation>
        </xs:annotation>
        <xs:complexType>
          <xs:sequence>
            <xs:element name="Audio" type="Audio" minOccurs="0"/>
            <xs:element name="Video" type="Video" minOccurs="0"/>
            <xs:element name="Captions" type="BxfCaptions" minOccurs="0"/>
            <xs:element name="VerticalIntervalData" type="VerticalIntervalData"
minOccurs="0"/>
            <xs:element name="AccessServices" type="AccessServices" minOccurs="0">
              <xs:annotation>
                <xs:documentation>Expands Captioning options and other access services.
(v6.0)</xs:documentation>
              </xs:annotation>
            </xs:element>
          </xs:sequence>
          <xs:attribute name="compressionBitRate" type="xs:decimal">
            <xs:annotation>
              <xs:documentation>megabits per second</xs:documentation>
            </xs:annotation>
          </xs:attribute>
        </xs:complexType>
      </xs:element>
    </xs:choice>
  </xs:sequence>
</xs:complexType>
```

```

<xs:element name="PrecompressedTS">
  <xs:annotation>
    <xs:documentation>Used to describe the attributes of the media that is to be transmitted or
delivered for viewing as a complete package.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="TSAudio" type="TSAudio" minOccurs="0"/>
      <xs:element name="TSVideo" type="TSVideo" minOccurs="0"/>
      <xs:element name="TSCaptioning" type="xs:boolean" minOccurs="0">
        <xs:annotation>
          <xs:documentation>If true indicates that CEA-708-C captioning is
present.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="TSData" minOccurs="0">
        <xs:complexType>
          <xs:choice>
            <xs:element name="Null"/>
            <xs:element name="SeparatePID">
              <xs:complexType>
                <xs:sequence>
                  <xs:element name="DataPIDValue" type="xs:integer"/>
                  <xs:element name="DataEncapsulation">
                    <xs:simpleType>
                      <xs:restriction base="xs:string">
                        <xs:enumeration value="ETSIpamsampling"/>
                        <xs:enumeration value="ETSIteletext"/>
                        <xs:enumeration value="ETSIvps"/>
                        <xs:enumeration value="ETSIwss"/>
                        <xs:enumeration value="SCTEamol"/>
                        <xs:enumeration value="SCTEtvguide"/>
                        <xs:enumeration value="SCTEvitc"/>
                      </xs:restriction>
                    </xs:simpleType>
                  </xs:element>
                </xs:sequence>
              </xs:complexType>
            </xs:element>
            <xs:element name="DataContent" type="DataContent"/>
          </xs:choice>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
    <xs:attribute name="compressionBitRate" type="xs:decimal">
      <xs:annotation>
        <xs:documentation>megabits per second</xs:documentation>
      </xs:annotation>
    </xs:attribute>
  </xs:complexType>
</xs:element>
<xs:element name="ProfileMacro" type="Macro">
  <xs:annotation>
    <xs:documentation>Used to describe a macro event in place of normal
audio/video.</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="ContentDelivery" type="ContentDelivery">
  <xs:annotation>

```

`<xs:documentation>`Used to specify the method by which media content should be created and formatted for downstream use by a designated media company. AirReadyMaster added (v5.0) and LibraryMaster added (v6.0)`</xs:documentation>`
`</xs:annotation>`
`</xs:element>`
`</xs:choice>`
`<xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>`
`</xs:sequence>`
`<xs:attributeGroup ref="Action-ErrorGroup"/>`
`</xs:complexType>`



4.2.14 ContentTransfer.XSD

Contains:

| | | |
|-------------|---------------------------|---|
| include | loc:content.xsd | |
| include | loc:contentmetadata.xsd | |
| complexType | ContentTransfer | ann:Transfer content from a source to a destination |
| simpleType | TransferType | ann: |
| simpleType | PriorityType | ann: |
| simpleType | TransferStatusType | ann: |

Used to transfer media from one location to another location, or to transcode it.

4.2.15 Contract.XSD

Contains:

| | | |
|-------------|------------------------|------|
| include | loc:bxftypes.xsd | |
| complexType | ProgramContract | ann: |
| complexType | SalesContract | ann: |

ProgramContract - used if the program is purchased, it may be linked to a rights contract. SalesContract – used for contract information for the interstitial content (commercials).

4.2.16 DataContent.XSD

Contains:

| | | |
|-------------|-----------------------------|--|
| complexType | DataContent | ann: |
| complexType | VerticalIntervalData | ann:Used to indicate what data is embedded in the vertical interval of the video image |

Used to define data that can be added to the transport stream.

4.2.17 Element.XSD

Contains:

| | | |
|-------------|---------------------------|--|
| include | loc:scheduleevent.xsd | |
| include | loc:nonprogramcontent.xsd | |
| complexType | Element | ann: |
| complexType | ProgramElement | ann:For each element this describes the content on the element |
| simpleType | ProgramContentType | ann: |
| complexType | OverlayOpportunityType | ann:Describes locations in time and space where overlays are either permitted or restricted from use. (v3.0) |

If the program is being delivered in segmented form, this describes each segment's content, position and offset from the start of the program as well as other embedded content such as inserted barter content.

4.2.17.1 BXF 6.0 Changes

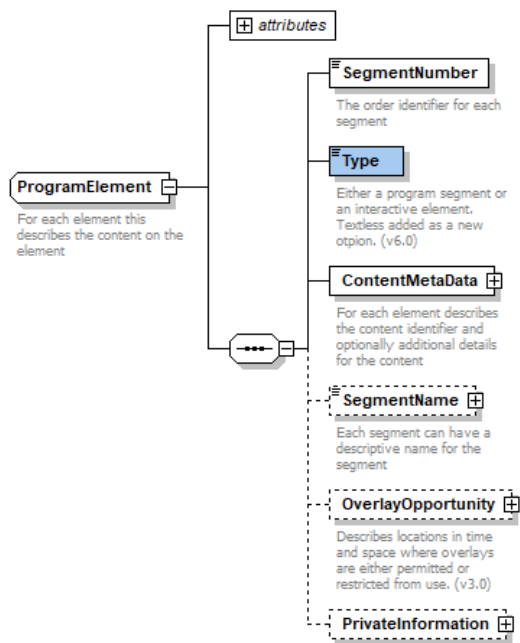
Description of change:

Added a new enumeration in the simpleType "ProgramContentType" to include the option of "Textless" in addition to existing options of Interactive and ProgramSegment. Note that ProgramSegment remains the default setting for this required field.

Text representation:

```
<xs:element name="Type" default="ProgramSegment">
  <xs:annotation>
    <xs:documentation> Either a program segment or an interactive element. Textless added as a new option.
    (v6.0)</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:simpleContent>
      <xs:extension base="ProgramContentType"/>
    </xs:simpleContent>
  </xs:complexType>
</xs:element>

<xs:simpleType name="ProgramContentType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Interactive"/>
    <xs:enumeration value="ProgramSegment"/>
    <xs:enumeration value="Textless"/>
  </xs:restriction>
</xs:simpleType>
```



4.2.18 EventData.XSD

Contains:

| | | |
|-------------|--|---|
| include | loc:bxftypes.xsd | |
| include | loc:primaryevent.xsd | |
| include | loc:nonprimaryevent.xsd | |
| include | loc:macro.xsd | |
| include | loc:audio.xsd | |
| include | loc:video.xsd | |
| complexType | SCTE-35DistributionRestrictions | ann:Accommodates the 2012 revision to SCTE-35 that adds distribution bits. (v3.0) |
| complexType | EventExtId | ann: |
| complexType | EventData | ann: |

Specifies the data specific to a particular airing of a complete show or a single event. In Version 2, support for multiple titles and descriptions in a single message has been added in order to allow multi-language support.

4.2.19 Format.XSD

Contains:

| | | |
|-------------|---------------------------|---|
| include | loc:bxftypes.xsd | |
| include | loc:macro.xsd | |
| complexType | Format | ann: |
| complexType | FormatSubElements | ann:**New** Used to subdivide a format element into smaller structures which when summed in duration would equal the total of the item. |
| complexType | FormatUsage | ann:Describes for a format which channels it can be used on |
| complexType | NonPrimaryElements | ann:**New** It is possible to add secondary events to a primary event such that one or more events occur at the same time or in overlapping sequence. |

The definition of the skeletal structure of a program as used by the traffic system to construct a schedule grid.

4.2.20 JobDetail.XSD

Contains:

| | | |
|-------------|---|---|
| Import | http://www.atlsc.org/XMLSchema/pmcp/2007/3.1/pmcp31.xsd | ns http://www.atlsc.org/XMLSchema/pmcp/2007/3.1 |
| include | loc:bxfContent0.xsd | |
| include | loc:bxfTypes.xsd | |
| include | loc:content.xsd | |
| include | loc:nonprogramdetail.xsd | |
| complexType | InstructionMap | am: Used to map stations, content and traffic instructions in a many to many relationship. (v3.0) |
| complexType | TrafficInstructions | am: Used to describe traffic instructions to a single or multiple stations for multiple content. Requires stations to be defined under a Job. (v3.0) |
| complexType | InstructionDetail | am: Rules linking where the NonProgramContent (NPC) can be used on a schedule. (v3.0) |
| complexType | JobDetail | am: Allows the message to assign job information. If more than one company or process is required for a job, enter multiple records and link using the jobId. If one job is dependent on the completion of another, link the jobs using jobId and jobDependency. (v3.0) |

Allows the message to assign job information. If more than one company or process is required for a job, enter multiple records and link using the jobId. If one job is dependent on the completion of another, link the jobs using jobId and jobDependency.

4.2.20.1 BXF 6.0 Changes

Description of change:

Under JobDetail/JobPerformers, a new attribute extends BxfStation to include a new attribute, stationCount as a positive integer to indicate the number of stations associated with the performance of the indicated job. Under JobDetail, a new attribute was added to record the performerCount, also a positive integer.

Text representation:

```
<xs:element name="JobPerformers" minOccurs="0" maxOccurs="unbounded">
```

```
<xs:annotation>
```

```
<xs:documentation>The company that actually performs the work</xs:documentation>
```

```
</xs:annotation>
```

```
<xs:complexType>
```

```
<xs:complexContent>
```

```
<xs:extension base="BxfCompany">
```

```
<xs:sequence>
```

```
<xs:element name="Station" maxOccurs="unbounded">
```

```
<xs:annotation>
```

```
<xs:documentation>The entities that will perform the job</xs:documentation>
```

```
</xs:annotation>
```

```
<xs:complexType>
```

```
<xs:complexContent>
```

```
<xs:extension base="BxfStation"/>
```

```
</xs:complexContent>
```

```
</xs:complexType>
```

```
</xs:element>
```

```
<xs:element name="JobResults" minOccurs="0">
```

```
<xs:annotation>
```

<xs:documentation>Once the Performer works on a submitted job the results of that work would be available to indicate to the JobRequester and JobManager the status of the specific job, either accepted and performed or rejected.</xs:documentation>

```
</xs:annotation>
```

```
<xs:complexType>
```

```
<xs:sequence>
```

```
<xs:element name="Accepted" type="xs:boolean">
```

```
<xs:annotation>
```

<xs:documentation>A flag to indicate that the job sent to the Performer has been accepted and either has been worked on or will be worked on. If the flag is negated it indicates the job was rejected and will not be performed.</xs:documentation>

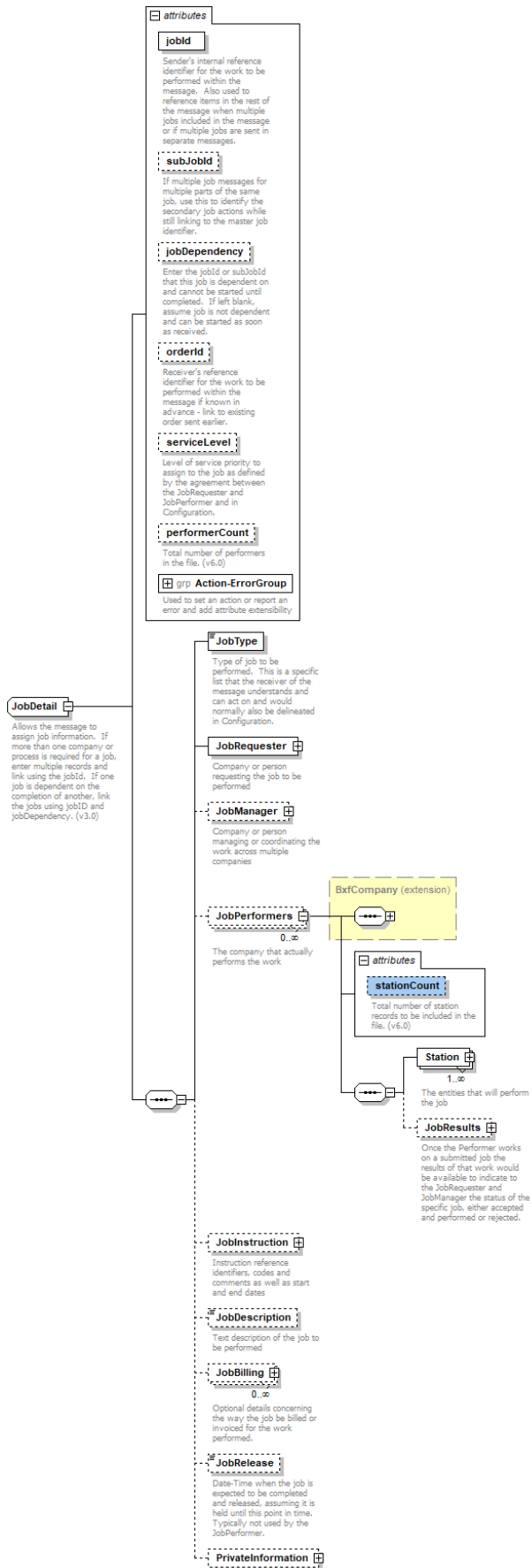
```
</xs:annotation>
```

```

        </xs:element>
        <xs:element name="UserName" type="xs:string">
        <xs:annotation>
        <xs:documentation>The user that was associated with the decision to
accept or reject a job at the Performer company. Usually linked to a specific user in the Performer's
system.</xs:documentation>
        </xs:annotation>
        </xs:element>
        <xs:element name="UserComment" type="xs:string" minOccurs="0">
        <xs:annotation>
        <xs:documentation>An optional comment to indicate what was done with a
job.</xs:documentation>
        </xs:annotation>
        </xs:element>
        <xs:element name="PrivateInformation" type="BxfPrivateInformation"
minOccurs="0"/>
    </xs:sequence>
</xs:complexType>
</xs:element>
</xs:sequence>
<xs:attribute name="stationCount" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>Total number of station records to be included in the file.
(v6.0)</xs:documentation>
</xs:annotation>
</xs:attribute>
</xs:extension>
</xs:complexContent>
</xs:complexType>
</xs:element>

<xs:complexType name="JobDetail">
<xs:annotation>
<xs:documentation>Allows the message to assign job information. If more than one company or process is
required for a job, enter multiple records and link using the jobId. If one job is dependent on the completion of
another, link the jobs using jobId and jobDependency. (v3.0)</xs:documentation>
</xs:annotation>
...
<xs:attribute name="performerCount" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>Total number of performers in the file. (v6.0)</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attributeGroup ref="Action-ErrorGroup"/>
</xs:complexType>

```

4.2.21 Location.XSD

Contains:

| | | |
|-------------|------------------|--|
| include | loc:bxftypes.xsd | |
| complexType | Location | ann:Identification of where the media is stored. Used by systems to notify locations of essence instance |

Identification of where the media is stored. Used by systems to notify locations of content.

4.2.22 Macro.XSD

Contains:

| | | |
|-------------|------------------|------|
| include | loc:bxftypes.xsd | |
| complexType | Macro | ann: |

Used to describe a MacroEvent under EventData.

4.2.23 NonPrimaryEvent.XSD

Contains:

| | | |
|-------------|-------------------------|--|
| include | loc:macro.xsd | |
| include | loc:nonprogramevent.xsd | |
| include | loc:programevent.xsd | |
| include | loc:content.xsd | |
| complexType | NonPrimaryEvent | ann: |
| complexType | GraphicData | ann:Use to add in graphics associated data to a specific secondary event. Used for delineating a graphic collection, keyer number, template name, etc. |

Used to describe those events that are not the primary content of a transport stream or playlist. Secondary events happen at the same time or in conjunction with the broadcast of the primary video and audio streams and may be started and completed using offsets from the start of the primary events.

4.2.23.1 BXF 6.0 Changes

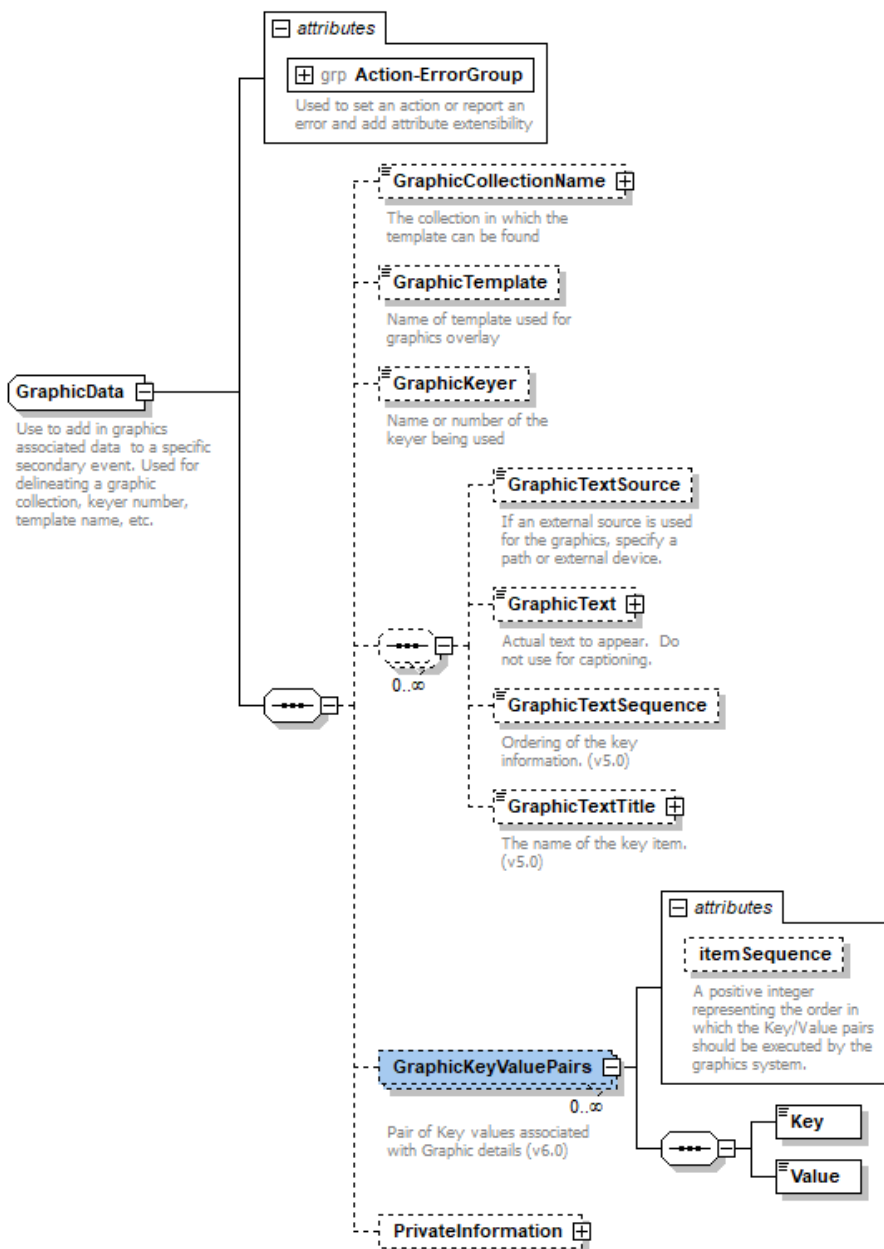
Description of change:

OffsetTime element received an expanded annotation to explain proper use of this element. The function of the element was not changed. Under GraphicData, a new element was added, GraphicKeyValuePair, which allow an unlimited number of custom key attribute pairs to be represented.

Text representation:

```
<xs:element name="OffsetTime" type="BxfSmpteTime" minOccurs="0">
  <xs:annotation>
    <xs:documentation>The time to start the event relative to the start time of the primary event, unless OffsetFrom
    = EndofEvent, OffsetType = End and direction = Negative, in which case, this is the start time of the event
    relative to the end time of the primary event. (v6.0)</xs:documentation>
  </xs:annotation>
</xs:element>
```

```
<xs:element name="GraphicKeyValuePairPairs" minOccurs="0" maxOccurs="unbounded">
  <xs:annotation>
    <xs:documentation>Pair of Key values associated with Graphic details (v6.0)</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Key" type="xs:string"/>
      <xs:element name="Value" type="xs:string"/>
    </xs:sequence>
    <xs:attribute name="itemSequence" type="xs:positiveInteger">
      <xs:annotation>
        <xs:documentation>A positive integer representing the order in which the Key/Value pairs should be
        executed by the graphics system.</xs:documentation>
      </xs:annotation>
    </xs:attribute>
  </xs:complexType>
</xs:element>
```



4.2.24 NonProgramContent.XSD

| | | |
|-------------|---------------------------|------|
| include | loc:bxfparentalrating.xsd | |
| include | loc:contentmetadata.xsd | |
| include | loc:contract.xsd | |
| include | loc:nonprogramdetail.xsd | |
| complexType | NonProgramContent | ann: |

Non-program content typically describes short form content such as commercials, psa's, id's and other events that are not considered full length program content.

4.2.25 NonProgramDetail.XSD

Contains:

| | | |
|-------------|------------------|------|
| include | loc:bxftypes.xsd | |
| complexType | Advertiser | ann: |
| complexType | Agency | ann: |
| complexType | NonProgramDetail | ann: |
| complexType | Product | ann: |

Details of the non-program content.

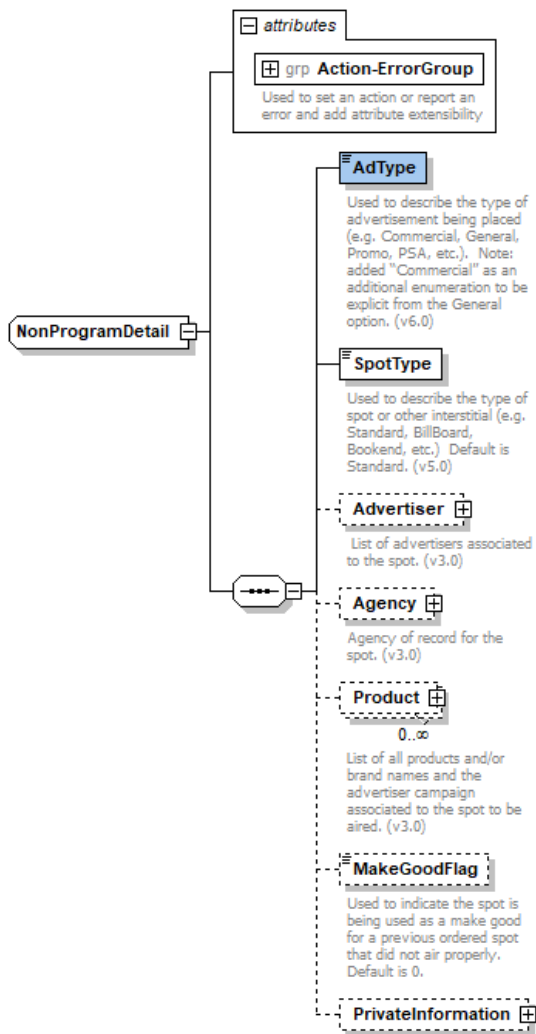
4.2.25.1 BXF 6.0 Changes

Description of change:

“Commercial” was added as a new enumeration under AdType. Previously, the value “General” had been recommended to be used for commercial content, but with v6.0, this explicit value is available. Under Product, DirectResponse was added as a new element to allow entry of DRPhoneNumber, DRCode and DR_URL as well as PrivateInformation.

Text representation:

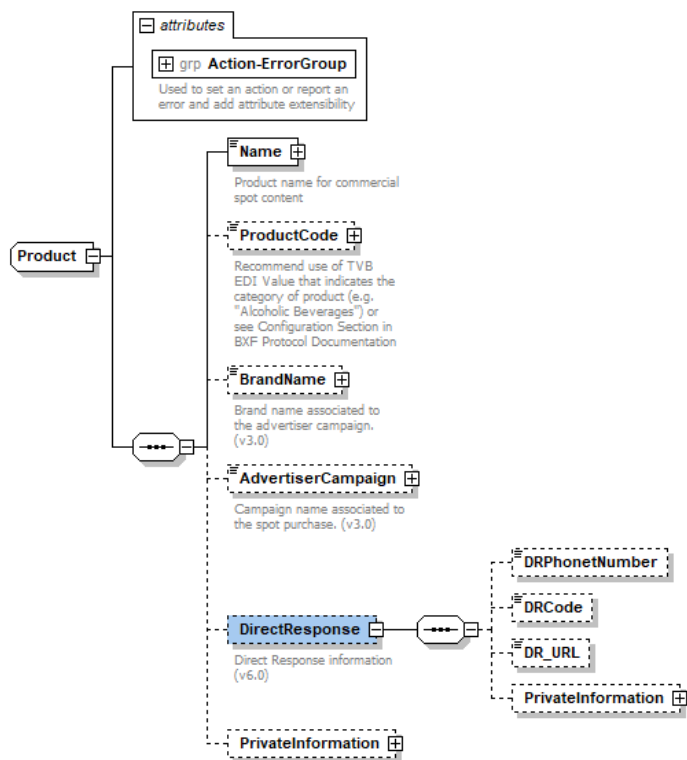
```
<xs:element name="AdType">
  <xs:annotation>
    <xs:documentation>Used to describe the type of advertisement being placed (e.g. Commercial, General, Promo,
    PSA, etc.). Note: added “Commercial” as an additional enumeration to be explicit from the General option.
    (v6.0)</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="Commercial"/>
      <xs:enumeration value="Direct Response"/>
      <xs:enumeration value="General"/>
      <xs:enumeration value="Paid Program"/>
      <xs:enumeration value="Promo"/>
      <xs:enumeration value="PSA"/>
      <xs:enumeration value="Trade/Barter"/>
      <xs:enumeration value="Other"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
```



```

<xs:element name="DirectResponse" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Direct Response information (v6.0)</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="DRPhonetNumber" type="xs:string" minOccurs="0"/>
      <xs:element name="DRCode" type="xs:string" minOccurs="0"/>
      <xs:element name="DR_URL" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```



4.2.26 NonProgramEvent.XSD

Contains:

| | | |
|-------------|--------------------------|------|
| include | loc:contract.xsd | |
| include | loc:eventdata.xsd | |
| include | loc:nonprogramdetail.xsd | |
| complexType | Constraint | ann: |
| complexType | NonProgramEvent | ann: |

Describes an event that contains NonProgramContent such as commercials and other interstitials, typically of short duration.

4.2.27 PrimaryEvent.XSD

Contains:

| | | |
|-------------|-------------------------|------|
| include | loc:bxftypes.xsd | |
| include | loc:nonprogramevent.xsd | |
| include | loc:programevent.xsd | |
| complexType | PrimaryEvent | ann: |

Describes an event that contains the primary audio and video content for the transport stream or playlist.

4.2.28 ProgramContent.XSD

Contains:

| | | |
|-------------|---------------------------|------|
| include | loc:bxfparentalrating.xsd | |
| include | loc:bxftypes.xsd | |
| include | loc:contentmetadata.xsd | |
| include | loc:contract.xsd | |
| include | loc:element.xsd | |
| include | loc:scheduledevent.xsd | |
| complexType | ProgramContent | ann: |

Used to describe the full-length content of a show.

4.2.29 ProgramEvent.XSD

Contains:

| | | |
|-------------|-------------------------|------|
| include | loc:bxftypes.xsd | |
| include | loc:contract.xsd | |
| include | loc:nonprogramevent.xsd | |
| complexType | ProgramEvent | ann: |

Describes an event that contains ProgramContent.

4.2.30 QualityControl.XSD

Contains:

| | | |
|----------------|-----------------------|---|
| include | loc:bxftypes.xsd | |
| include | loc:bxfscontentid.xsd | |
| *[complexType] | FragmentLocation | ann: The time range and a spatial location that defines a unique part of the video essence. |
| *[complexType] | QualityControl | ann: Media often must be checked for its quality each time it is copied or moved to another location. Multiple checks are typical to confirm that the audio, video and other attributes meet the standards of the intended usage. (v5.0) |
| *[complexType] | QCDetailedAnnotation | ann: Additional descriptive details concerning who or what system was deployed to perform the QC test and when it was performed. |
| *[complexType] | QCItem | ann: Each check of the media can be part or all of the media and each of its components. The checks may be done through machine control automatically or manually by a technician using a set of defined rules to pass. A CheckItem option can be part of a profile or stand alone. |
| *[complexType] | QCItemInput | ann: Whether machine controlled or manually performed, a set of rules that govern how to do the testing. |
| *[complexType] | QCItemOutput | ann: The specific result of a single QC test. |
| *[complexType] | QCItemResult | ann: The results received as a result of one or more QC test. |
| *[complexType] | QCProfile | ann: Used to define a set of test instructions that are generally related and which can be called using just the identifier. |
| *[complexType] | QCReports | ann: Used to report back the results of the QC testing for either a single profile, multiple profiles or a single QCCheckItem. |
| *[complexType] | QCToolInformation | ann: Summary of tool information when one is used for all QCCheckItems associated to the Report. |
| *[complexType] | QCScope | ann: A brief description of what the profile is defined to test and the type of media to use it against. |
| *[complexType] | QCTestPerformer | ann: Who or what system performed the QC test. |

Media often must be checked for its quality each time it is copied or moved to another location. Multiple checks are typical to confirm that the audio, video and other attributes meet the standards of the intended usage. QualityControl is accessible at the top choice level of BxfData in order to allow the creation of specific profiles without regard to specific media being tested. It is also found under Media/MediaLocation as an element that allows for the selection and reporting back on a specific media at a specific location.

4.2.30.1 BXF 6.0 Changes

Description of change:

QCReports was modified to be unbounded, allowing multiple reports to be included in one message.

Text representation:

```
<xs:element name="QCReport" type="QCReports" maxOccurs="unbounded">
  <xs:annotation>
    <xs:documentation>Used to report back the results of the QC testing for either a single profile, multiple profiles
    or a single QCCheckItem. (Modified to be unbounded in v6.0)</xs:documentation>
  </xs:annotation>
</xs:element>
```

4.2.31 Schedule.XSD

Contains:

| | | |
|----------------|-----------------------|--|
| include | loc:asrun.xsd | |
| include | loc:bxfschannel.xsd | |
| include | loc:bxftypes.xsd | |
| include | loc:scheduleevent.xsd | |
| *[complexType] | Schedule | ann: A schedule |
| *[complexType] | LayoutRestrictions | ann: Used to establish how content on a schedule can be viewed by defining what is allowed or restricted across various parameters: geography, screen types, o |

Used to describe a specific list of content in a linear playout sequence. In Version 2, support has been added to communicate schedule changes in real time by a new node, RealTimeDetail. This allows the indication of which event is the current event playing as well as the events that had played out previously and those that will playout next.

4.2.32 ScheduledEvent.XSD

Contains:

| | | |
|-------------|---------------------------|------|
| include | loc:bxfparentalrating.xsd | |
| include | loc:bxftypes.xsd | |
| include | loc:contentmetadata.xsd | |
| include | loc:eventdata.xsd | |
| include | loc:format.xsd | |
| complexType | ScheduledEvent | ann: |
| complexType | Series | ann: |

Used to describe a single event within a specific list of content arranged in a linear playout sequence.

4.2.33 Video.XSD

Contains:

| | | |
|-------------|-------------------------|--|
| include | loc:bxftypes.xsd | |
| complexType | AFDData | ann:Used to describe both Active Format Description Codes, Shorthand Text Descriptions and Bar Data options. (v3.0) |
| complexType | AFDDetails | ann: |
| complexType | ChromaSubsampling | ann:The practice of encoding images by implementing less resolution for chroma information than for luma information, taking advantage of the human visual system's lower acuity for color differences than for luminance. (v6.0) |
| complexType | ImageEssence | ann:Description of the video image essence for ProRes, J2K and others. (v6.0) |
| complexType | IMFChromaSubsample4-2-2 | ann:The two chroma components are sampled at half the sample rate of luma: the horizontal chroma resolution is halved. This reduces the bandwidth of an uncompressed video signal by one-third with little to no visual difference. (v6.0) |
| complexType | IMFImageEssenceApp2 | ann:Description of the video image essence for IMF Applications as a specialization of the IMF Framework. (v6.0) |
| complexType | IMFImageEssenceApp2e | ann:Description of the video image essence for IMF Applications as a specialization of the IMF Framework.(v6.0) |
| complexType | J2KEncodingProfile | ann:JPEG-2000 Encoding Options (v6.0) |
| complexType | J2KEncodingProfile-SD | ann:Implementations shall support the profile and level combinations utilizing JPEG 2000 Profiles as specified in ISO/IEC 15444-1 Amendment 3. (v6.0) |
| complexType | TSVideo | ann:Enumerates the various values relating to the presentation of video in a transport stream |
| complexType | Video | ann:Enumerates the various values relating to the presentation of video |
| complexType | VideoTransition | ann:Allows the user to specify specific actions to be used by the automation system to transition the video from one event to another |
| simpleType | AspectRatioType | ann:Enumerates either 4:3 or 16:9 video presentation formats |
| simpleType | TSVideoEncodingType | ann:Enumerates various methods used to compress video in a transport stream |
| simpleType | VideoEncodingType | ann:Enumerates various methods of compressing video (v6.0) |
| simpleType | VideoFormatType | ann:Enumerates the different video presentation formats (v6.0) |
| simpleType | VideoRateType | ann:Enumerates the speed of a video transition |
| simpleType | VideoTransitionEnumType | ann:Enumerates various transition options |

Enumerates the various values relating to the presentation of video.

4.2.33.1 BXF 6.0 Changes

Description of change:

As part of the changes created under ContentDelivery.XSD and the addition of the LibraryMaster element, a number of new video essence elements have been added to this XSD. These include new elements for ChromaSubsampling, ImageEssence, IMF image essence elements and J2K encoding profile elements. In addition, one significant error in prior versions was discovered and fixed as part of this release. This will affect older versions if used previously and will require a change to code. Under Video's attributes, "EncodingReference" has been changed to "encodingReference" in order to preserve proper Camel-Case etiquette for attributes. Two simpleTypes have also had new enumerations added: VideoEncodingType and VideoFormatType. Under Video, two new optional attributes have been added: a boolean flag for centerCutProtected and a string field to describe the media nativeFormatRate. In addition, a new optional boolean element for WideScreen and an element for ChromaSubsampling were also added under Video.

Text representation:

```
<xs:complexType name="ChromaSubsampling">
<xs:annotation>
```

<xs:documentation>The practice of encoding images by implementing less resolution for chroma information than for luma information, taking advantage of the human visual system's lower acuity for color differences than for luminance. (v6.0)</xs:documentation>

</xs:annotation>

<xs:choice>

<xs:element name="ChromaSubsample4-2-0">

<xs:annotation>

<xs:documentation>Cb and Cr are each subsampled at a factor of 2 both horizontally and vertically.</xs:documentation>

</xs:annotation>

<xs:complexType>

<xs:sequence>

<xs:element name="Quantization4-2-0" default="QE.1">

<xs:annotation>

<xs:documentation>Only QE.1 allowed</xs:documentation>

</xs:annotation>

<xs:simpleType>

<xs:restriction base="xs:string">

<xs:enumeration value="QE.1"/>

</xs:restriction>

</xs:simpleType>

</xs:element>

<xs:element name="ColorComponents4-2-0" default="Y'Cb'Cr">

<xs:annotation>

<xs:documentation>Y'Cb'Cr'</xs:documentation>

</xs:annotation>

<xs:simpleType>

<xs:restriction base="xs:string">

<xs:enumeration value="Y'Cb'Cr"/>

</xs:restriction>

</xs:simpleType>

</xs:element>

<xs:element name="Colorimetry4-2-0">

<xs:annotation>

<xs:documentation>Note: COLOR.3 only applies to ITU-R BT.709 delivered material and COLOR.8 corresponds to the HLG system specified in Recommendation ITU-R BT.2100</xs:documentation>

</xs:annotation>

<xs:simpleType>

<xs:restriction base="xs:string">

<xs:enumeration value="COLOR.3"/>

<xs:enumeration value="COLOR.5"/>

<xs:enumeration value="COLOR.7"/>

<xs:enumeration value="COLOR.8"/>

</xs:restriction>

</xs:simpleType>

</xs:element>

<xs:element name="PixelBitDepth4-2-0" default="10">

<xs:annotation>

<xs:documentation>Only 10 allowed</xs:documentation>

</xs:annotation>

<xs:simpleType>

<xs:restriction base="xs:integer">

<xs:enumeration value="10"/>

</xs:restriction>

</xs:simpleType>

</xs:element>

</xs:sequence>

</xs:complexType>

</xs:element>

<xs:element name="ChromaSubsample4-2-2">

```

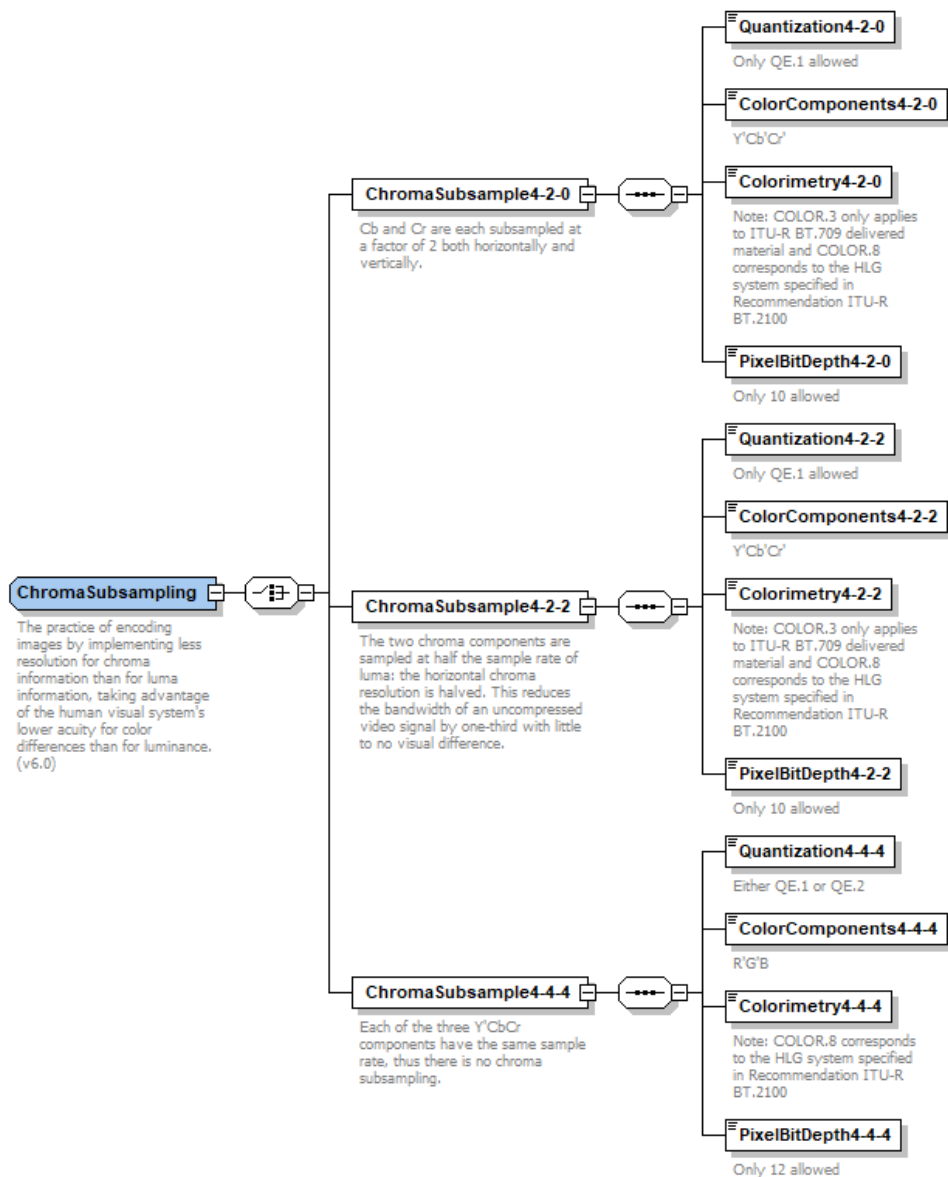
<xs:annotation>
  <xs:documentation>The two chroma components are sampled at half the sample rate of luma: the
horizontal chroma resolution is halved. This reduces the bandwidth of an uncompressed video signal by one-
third with little to no visual difference.</xs:documentation>
</xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Quantization4-2-2" default="QE.1">
        <xs:annotation>
          <xs:documentation>Only QE.1 allowed</xs:documentation>
        </xs:annotation>
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:enumeration value="QE.1"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="ColorComponents4-2-2" default="Y'Cb'Cr">
        <xs:annotation>
          <xs:documentation>Y'Cb'Cr</xs:documentation>
        </xs:annotation>
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:enumeration value="Y'Cb'Cr"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="Colorimetry4-2-2">
        <xs:annotation>
          <xs:documentation>Note: COLOR.3 only applies to ITU-R BT.709 delivered material and
COLOR.8 corresponds to the HLG system specified in Recommendation ITU-R BT.2100</xs:documentation>
        </xs:annotation>
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:enumeration value="COLOR.3"/>
            <xs:enumeration value="COLOR.5"/>
            <xs:enumeration value="COLOR.7"/>
            <xs:enumeration value="COLOR.8"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="PixelBitDepth4-2-2" default="10">
        <xs:annotation>
          <xs:documentation>Only 10 allowed</xs:documentation>
        </xs:annotation>
        <xs:simpleType>
          <xs:restriction base="xs:integer">
            <xs:enumeration value="10"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="ChromaSubsample4-4-4">
  <xs:annotation>
    <xs:documentation>Each of the three Y'CbCr components have the same sample rate, thus there is no
chroma subsampling.</xs:documentation>
  </xs:annotation>
  <xs:complexType>

```

```

<xs:sequence>
  <xs:element name="Quantization4-4-4">
    <xs:annotation>
      <xs:documentation>Either QE.1 or QE.2</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="QE.1"/>
        <xs:enumeration value="QE.2"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:element>
  <xs:element name="ColorComponents4-4-4" default="R'G'B">
    <xs:annotation>
      <xs:documentation>R'G'B</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="R'G'B"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:element>
  <xs:element name="Colorimetry4-4-4">
    <xs:annotation>
      <xs:documentation>Note: COLOR.8 corresponds to the HLG system specified in
Recommendation ITU-R BT.2100</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="COLOR.5"/>
        <xs:enumeration value="COLOR.7"/>
        <xs:enumeration value="COLOR.8"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:element>
  <xs:element name="PixelBitDepth4-4-4" default="12">
    <xs:annotation>
      <xs:documentation>Only 12 allowed</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
      <xs:restriction base="xs:integer">
        <xs:enumeration value="12"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:choice>
</xs:complexType>

```



```

<xs:complexType name="ImageEssence">
  <xs:annotation>
    <xs:documentation>Description of the video image essence for ProRes, J2K and others. (v6.0)</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="ImageFrameWidth">
      <xs:annotation>
        <xs:documentation>Three options allowed: 1920, 3840, and 7680 pixels</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:integer">
          <xs:enumeration value="1920"/>
          <xs:enumeration value="3840"/>
          <xs:enumeration value="7680"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:sequence>
  </xs:complexType>

```

```

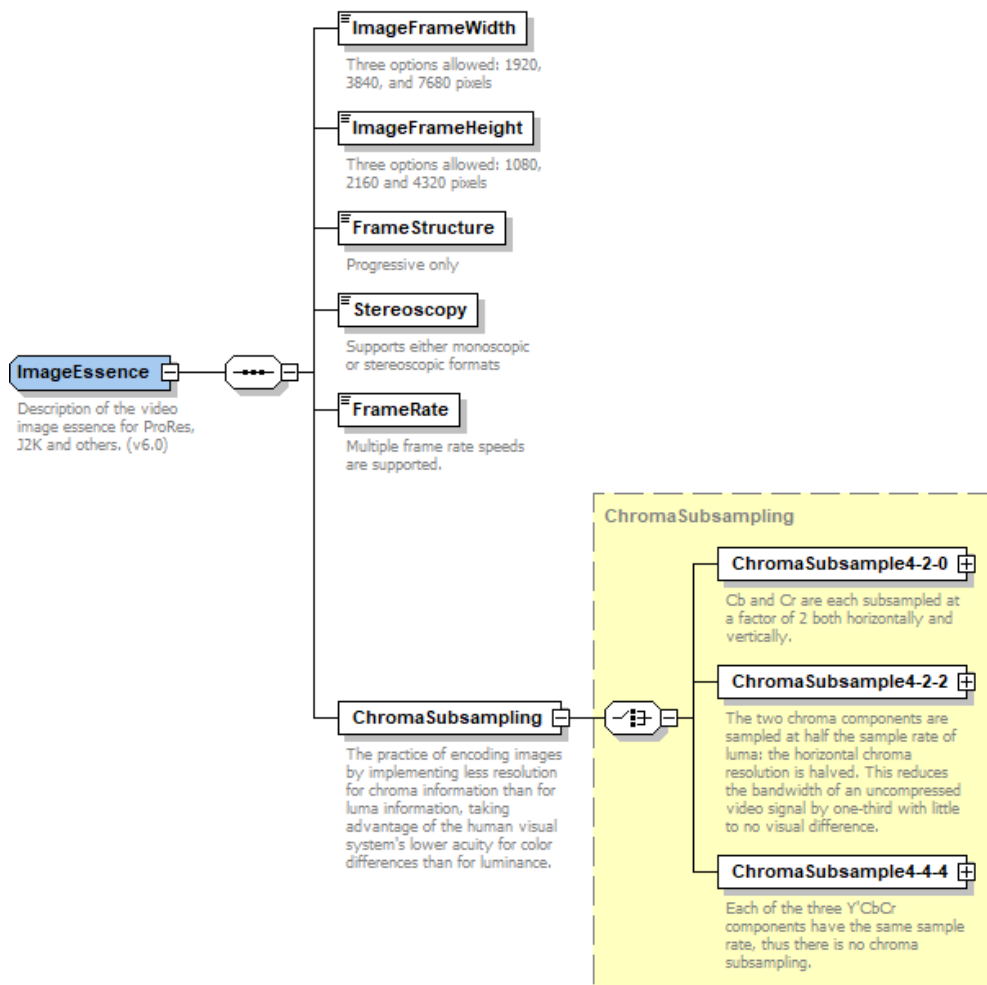
</xs:element>
<xs:element name="ImageFrameHeight">
  <xs:annotation>
    <xs:documentation>Three options allowed: 1080, 2160 and 4320 pixels</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:integer">
      <xs:enumeration value="1080"/>
      <xs:enumeration value="2160"/>
      <xs:enumeration value="4320"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
<xs:element name="FrameStructure" default="Progressive">
  <xs:annotation>
    <xs:documentation>Progressive only</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="Progressive"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
<xs:element name="Stereoscopy">
  <xs:annotation>
    <xs:documentation>Supports either monoscopic or stereoscopic formats</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="Monoscopic"/>
      <xs:enumeration value="Stereoscopic"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
<xs:element name="FrameRate">
  <xs:annotation>
    <xs:documentation>Multiple frame rate speeds are supported.</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="24"/>
      <xs:enumeration value="24000/1001"/>
      <xs:enumeration value="25"/>
      <xs:enumeration value="30"/>
      <xs:enumeration value="30000/1001"/>
      <xs:enumeration value="50"/>
      <xs:enumeration value="60"/>
      <xs:enumeration value="60000/1001"/>
      <xs:enumeration value="100"/>
      <xs:enumeration value="120"/>
      <xs:enumeration value="120000/1001"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
<xs:element name="ChromaSubsampling" type="ChromaSubsampling">
  <xs:annotation>
    <xs:documentation>The practice of encoding images by implementing less resolution for chroma
information than for luma information, taking advantage of the human visual system's lower acuity for color
differences than for luminance.</xs:documentation>
  </xs:annotation>

```

```

</xs:element>
</xs:sequence>
</xs:complexType>

```



```

<xs:complexType name="IMFChromaSubsample4-2-2">
<xs:annotation>
<xs:documentation>The two chroma components are sampled at half the sample rate of luma: the horizontal
chroma resolution is halved. This reduces the bandwidth of an uncompressed video signal by one-third with little
to no visual difference. (v6.0)</xs:documentation>
</xs:annotation>
<xs:sequence>
<xs:element name="Quantization4-2-2" default="QE.1">
<xs:annotation>
<xs:documentation>Only QE.1 allowed</xs:documentation>
</xs:annotation>
<xs:simpleType>
<xs:restriction base="xs:string">
<xs:enumeration value="QE.1"/>
</xs:restriction>
</xs:simpleType>
</xs:element>
<xs:element name="ColorComponents4-2-2" default="Y'Cb'Cr">
<xs:annotation>
<xs:documentation>Y'Cb'Cr</xs:documentation>

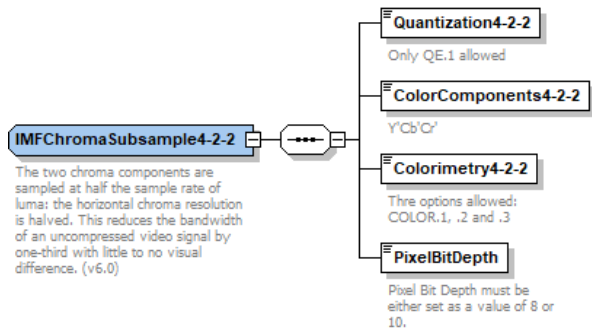
```



```

</xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="Y'Cb'Cr"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
<xs:element name="Colorimetry4-2-2">
  <xs:annotation>
    <xs:documentation>Thre options allowed: COLOR.1, .2 and .3</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="COLOR.1"/>
      <xs:enumeration value="COLOR.2"/>
      <xs:enumeration value="COLOR.3"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
<xs:element name="PixelBitDepth">
  <xs:annotation>
    <xs:documentation>Pixel Bit Depth must be either set as a value of 8 or 10.</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:integer">
      <xs:enumeration value="8"/>
      <xs:enumeration value="10"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
</xs:sequence>
</xs:complexType>

```



```

<xs:complexType name="IMFImageEssenceApp2">
  <xs:annotation>
    <xs:documentation>Description of the video image essence for IMF Applications as a specialization of the IMF Framework. (v6.0)</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="ImageFrameWidth">
      <xs:annotation>
        <xs:documentation>The width of the frame is defined as the number of horizontal pixel elements and must be an integer no greater than 1920.</xs:documentation>
      </xs:annotation>
      <xs:simpleType>

```

```

        <xs:restriction base="xs:integer">
            <xs:minInclusive value="1"/>
            <xs:maxInclusive value="1920"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
<xs:element name="ImageFrameHeight">
    <xs:annotation>
        <xs:documentation>The height of the frame is defined as the number of vertical pixel elements and
must be an integer. If interlaced, the number must be even and can be no greater than
1080.</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:integer">
            <xs:maxInclusive value="1080"/>
            <xs:minInclusive value="1"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
<xs:element name="FrameStructure">
    <xs:annotation>
        <xs:documentation>Under IMF there is the option of Progressive or Interlaced frame
structures.</xs:documentation>
    </xs:annotation>
    <xs:complexType>
        <xs:choice>
            <xs:element name="Progressive">
                <xs:annotation>
                    <xs:documentation>An image frame with progressive structure shall consist of a
complete image frame, scanned progressively left to right and from top to bottom.</xs:documentation>
                </xs:annotation>
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="Stereoscopy-P">
                            <xs:annotation>
                                <xs:documentation>Can be either stereoscopic or
monoscopic.</xs:documentation>
                            </xs:annotation>
                            <xs:simpleType>
                                <xs:restriction base="xs:string">
                                    <xs:enumeration value="Monoscopic"/>
                                    <xs:enumeration value="Stereoscopic"/>
                                </xs:restriction>
                            </xs:simpleType>
                        </xs:element>
                        <xs:element name="FrameRate-P">
                            <xs:annotation>
                                <xs:documentation>Multiple frame rate speeds are supported under
progressive structure,</xs:documentation>
                            </xs:annotation>
                            <xs:simpleType>
                                <xs:restriction base="xs:string">
                                    <xs:enumeration value="24"/>
                                    <xs:enumeration value="24000/1001"/>
                                    <xs:enumeration value="25"/>
                                    <xs:enumeration value="30"/>
                                    <xs:enumeration value="30000/1001"/>
                                    <xs:enumeration value="50"/>
                                    <xs:enumeration value="60"/>
                                    <xs:enumeration value="60000/1001"/>
                                </xs:restriction>
                            </xs:simpleType>
                        </xs:element>
                    </xs:sequence>
                </xs:complexType>
            </xs:element>
        </xs:choice>
    </xs:complexType>

```

```

        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="IMFChromaSubsampling-P">
      <xs:annotation>
        <xs:documentation>COLOR.1
Mapped as specified for 625-line systems in Section 2.6 of Recommendation ITU-R BT.601
COLOR.2
Mapped as specified for 525-line systems in Section 2.6 of Recommendation ITU-R BT.601
COLOR.3
Mapped as specified in Section 1 of Part 2 of Recommendation ITU-R BT.709</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:choice>
          <xs:element name="IMFChromaSubsample4-2-2"
type="IMFChromaSubsample4-2-2">
            <xs:annotation>
              <xs:documentation>The two chroma components are
sampled at half the sample rate of luma: the horizontal chroma resolution is halved. This reduces the bandwidth
of an uncompressed video signal by one-third with little to no visual difference.</xs:documentation>
            </xs:annotation>
            </xs:element>
            <xs:element name="IMFChromaSubsample4-4-4">
              <xs:annotation>
                <xs:documentation>Each of the three Y'CbCr components
have the same sample rate, thus there is no chroma subsampling.</xs:documentation>
              </xs:annotation>
              <xs:complexType>
                <xs:sequence>
                  <xs:element name="Quantization4-4-4">
                    <xs:annotation>
                      <xs:documentation>If set to QE.2, other
componentst are restricted.</xs:documentation>
                    </xs:annotation>
                    <xs:simpleType>
                      <xs:restriction base="xs:string">
                        <xs:enumeration value="QE.1"/>
                        <xs:enumeration value="QE.2"/>
                      </xs:restriction>
                    </xs:simpleType>
                  </xs:element>
                  <xs:element name="ColorComponents4-4-4"
default="R'G'B">
                    <xs:annotation>
                      <xs:documentation>If Quantization = QE.2 then
this must be R'G'B'.</xs:documentation>
                    </xs:annotation>
                    <xs:simpleType>
                      <xs:restriction base="xs:string">
                        <xs:enumeration value="R'G'B"/>
                        <xs:enumeration
value="Y'C'bC'r"/>
                      </xs:restriction>
                    </xs:simpleType>
                  </xs:element>
                  <xs:element name="Colorimetry4-4-4">
                    <xs:annotation>
                      <xs:documentation>If Quantization = QE.2 then
this must be COLOR.3.</xs:documentation>
                    </xs:annotation>

```

```

value="COLOR.1"/>
value="COLOR.2"/>
value="COLOR.3"/>

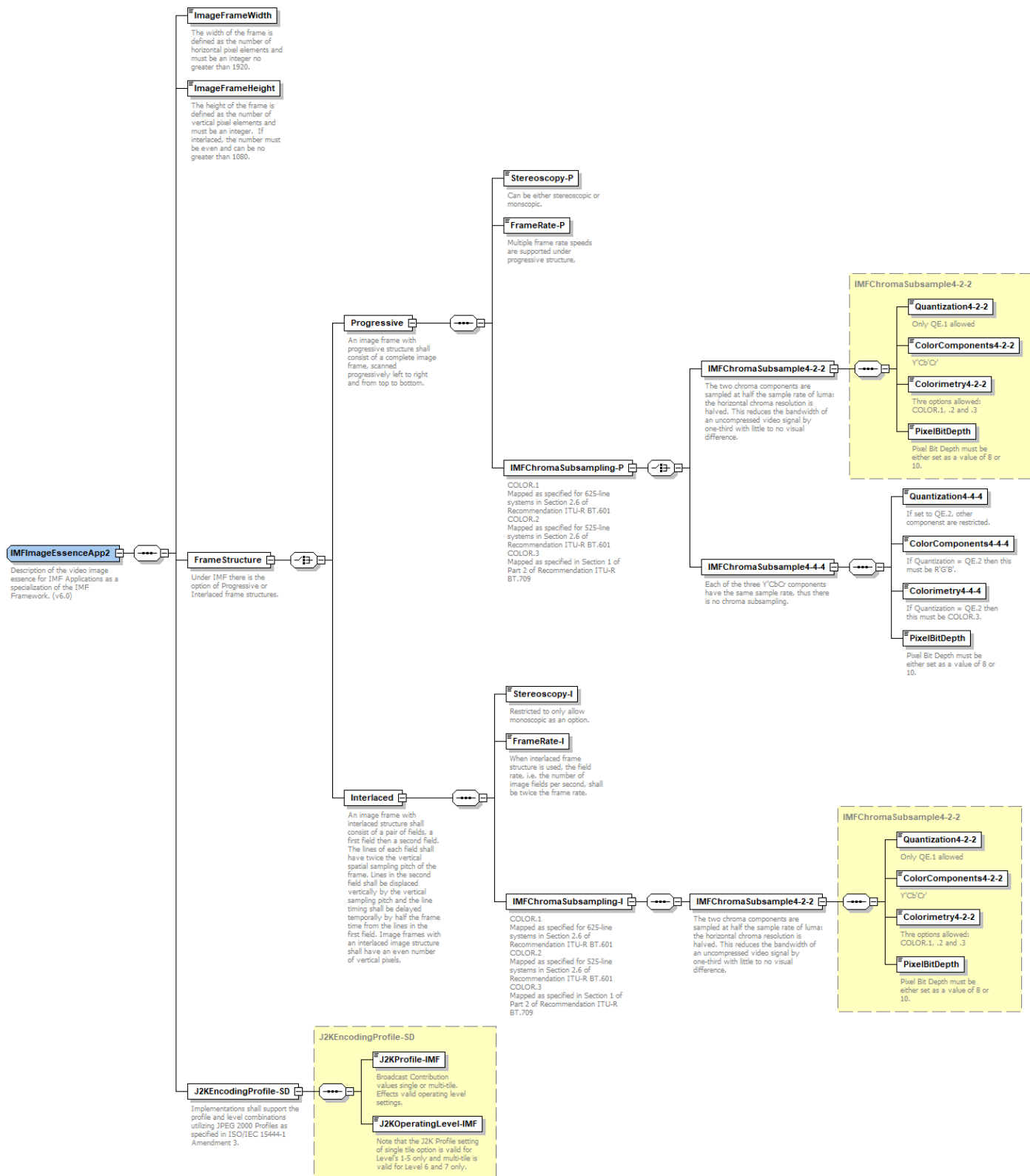
<xs:simpleType>
  <xs:restriction base="xs:string">
    <xs:enumeration
      <xs:enumeration
        <xs:enumeration
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
    <xs:element name="PixelBitDepth">
      <xs:annotation>
        <xs:documentation>Pixel Bit Depth must be
either set as a value of 8 or 10.</xs:documentation>
      </xs:annotation>
    <xs:simpleType>
      <xs:restriction base="xs:integer">
        <xs:enumeration value="8"/>
        <xs:enumeration value="10"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:choice>
</xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="Interlaced">
  <xs:annotation>
    <xs:documentation>An image frame with interlaced structure shall consist of a pair of
fields, a first field then a second field. The lines of each field shall have twice the vertical spatial sampling pitch
of the frame. Lines in the second field shall be displaced vertically by the vertical sampling pitch and the line
timing shall be delayed temporally by half the frame time from the lines in the first field. Image frames with an
interlaced image structure shall have an even number of vertical pixels.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Stereoscopy-I">
        <xs:annotation>
          <xs:documentation>Restricted to only allow monoscopic as an
option.</xs:documentation>
        </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="Monoscopic"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="FrameRate-I">
      <xs:annotation>
        <xs:documentation>When interlaced frame structure is used, the field rate,
i.e. the number of image fields per second, shall be twice the frame rate.</xs:documentation>
      </xs:annotation>
    <xs:simpleType>
      <xs:restriction base="xs:string">

```

```

        <xs:enumeration value="25"/>
        <xs:enumeration value="30"/>
        <xs:enumeration value="30000/1001"/>
    </xs:restriction>
</xs:simpleType>
</xs:element>
<xs:element name="IMFChromaSubsampling-I">
    <xs:annotation>
        <xs:documentation>COLOR.1
Mapped as specified for 625-line systems in Section 2.6 of Recommendation ITU-R BT.601
COLOR.2
Mapped as specified for 525-line systems in Section 2.6 of Recommendation ITU-R BT.601
COLOR.3
Mapped as specified in Section 1 of Part 2 of Recommendation ITU-R BT.709</xs:documentation>
    </xs:annotation>
    <xs:complexType>
        <xs:sequence>
            <xs:element name="IMFChromaSubsample4-2-2"
type="IMFChromaSubsample4-2-2">
                <xs:annotation>
                    <xs:documentation>The two chroma components are
sampled at half the sample rate of luma: the horizontal chroma resolution is halved. This reduces the bandwidth
of an uncompressed video signal by one-third with little to no visual difference.</xs:documentation>
                </xs:annotation>
            </xs:element>
        </xs:sequence>
    </xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:choice>
</xs:complexType>
</xs:element>
<xs:element name="J2KEncodingProfile-SD" type="J2KEncodingProfile-SD">
    <xs:annotation>
        <xs:documentation>Implementations shall support the profile and level combinations utilizing JPEG
2000 Profiles as specified in ISO/IEC 15444-1 Amendment 3.</xs:documentation>
    </xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>

```



```

<xs:complexType name="IMFImageEssenceApp2e">
  <xs:annotation>
    <xs:documentation>Description of the video image essence for IMF Applications as a specialization of the IMF
    Framework. (v6.0)</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="ImageFrameWidth">
      <xs:annotation>
        <xs:documentation>The width of the frame is defined as the number of horizontal pixel elements and
        must be an integer. Note that for Widths>3840, COLOR.4 is not supported and sampling must be 4:4:4 and
        R'G'B'.</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:integer">
          <xs:minInclusive value="1"/>
          <xs:maxInclusive value="4096"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="ImageFrameHeight">
      <xs:annotation>
        <xs:documentation>The height of the frame is defined as the number of vertical pixel elements and
        must be an integer. If interlaced, the number must be even. Note that for Heights greater than 2160, COLOR.4
        is not supported and sampling must be 4:4:4 and R'G'B'.</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:integer">
          <xs:maxInclusive value="3112"/>
          <xs:minInclusive value="1"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="FrameStructure">
      <xs:annotation>
        <xs:documentation>Under IMFApp2e only Progressive is allowed.</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:sequence>
          <xs:element name="Progressive">
            <xs:annotation>
              <xs:documentation>An image frame with progressive structure shall consist of a
              complete image frame, scanned progressively left to right and from top to bottom.</xs:documentation>
            </xs:annotation>
            <xs:complexType>
              <xs:sequence>
                <xs:element name="Stereoscopy-P">
                  <xs:annotation>
                    <xs:documentation>Can be either stereoscopic or
                    monoscopic.</xs:documentation>
                  </xs:annotation>
                  <xs:simpleType>
                    <xs:restriction base="xs:string">
                      <xs:enumeration value="Monoscopic"/>
                      <xs:enumeration value="Stereoscopic"/>
                    </xs:restriction>
                  </xs:simpleType>
                </xs:element>
                <xs:element name="FrameRate-P">
                  <xs:annotation>

```

```

        <xs:documentation>Note that 120 fps is only available with
FrameWidth>3840 and FrameHeight>2160.</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="24"/>
            <xs:enumeration value="24000/1001"/>
            <xs:enumeration value="25"/>
            <xs:enumeration value="30"/>
            <xs:enumeration value="30000/1001"/>
            <xs:enumeration value="50"/>
            <xs:enumeration value="60"/>
            <xs:enumeration value="60000/1001"/>
            <xs:enumeration value="120"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
<xs:element name="IMFApp2eChromaSubsampling-P">
    <xs:annotation>
        <xs:documentation>See section 5.2 under SMPTE ST 2067-21 for further
details.</xs:documentation>
    </xs:annotation>
    <xs:complexType>
        <xs:choice>
            <xs:element name="IMFApp2eChromaSubsample4-2-2">
                <xs:annotation>
                    <xs:documentation>[4:2:2]</xs:documentation>
                </xs:annotation>
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="Quantization4-2-2"
                            <xs:simpleType>
                                <xs:restriction base="xs:string">
                                    <xs:enumeration value="QE.1"/>
                                </xs:restriction>
                            </xs:simpleType>
                        </xs:element>
                        <xs:element name="ColorComponents4-2-2"
                            <xs:simpleType>
                                <xs:restriction base="xs:string">
                                    <xs:enumeration
                                        </xs:restriction>
                                    </xs:simpleType>
                                </xs:element>
                                <xs:element name="Colorimetry4-2-2">
                                    <xs:simpleType>
                                        <xs:restriction base="xs:string">
                                            <xs:enumeration
                                                <xs:enumeration
                                                <xs:enumeration
                                                <xs:enumeration
                                            </xs:restriction>
                                        </xs:simpleType>
                                    </xs:element>
                                </xs:restriction>
                            </xs:simpleType>
                        </xs:element>
                    </xs:sequence>
                </xs:complexType>
            </xs:choice>
        </xs:complexType>
    </xs:element>
</xs:element>

```



```

</xs:element>
<xs:element name="PixelBitDepth">
  <xs:annotation>
    <xs:documentation>Under IMF-App2e, Pixel Bit
Depth can be 8,10,12,16, but values are further restricted based on the Colorimetry used. COLOR.3 and
COLOR.4 allows 8 and 10, COLOR.5 allows 10 and 12 and COLOR.7 allows 10, 12, or 16.</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:integer">
      <xs:enumeration value="8"/>
      <xs:enumeration value="10"/>
      <xs:enumeration value="12"/>
      <xs:enumeration value="16"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="IMFApp2eChromaSubsample4-4-4">
  <xs:annotation>
    <xs:documentation>[4:4:4]</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Quantization4-4-4">
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:enumeration value="QE.1"/>
            <xs:enumeration value="QE.2"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="ColorComponents4-4-4"
default="R'G'B">
        <xs:annotation>
          <xs:documentation>If Quantization = QE.2 then
this must be R'G'B'.</xs:documentation>
        </xs:annotation>
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:enumeration value="R'G'B"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="Colorimetry4-4-4">
        <xs:annotation>
          <xs:documentation>If Quantization = QE.2 then
this must be COLOR.3.</xs:documentation>
        </xs:annotation>
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:enumeration
value="COLOR.3"/>
            <xs:enumeration
value="COLOR.5"/>
            <xs:enumeration
value="COLOR.6"/>
            <xs:enumeration
value="COLOR.7"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

```

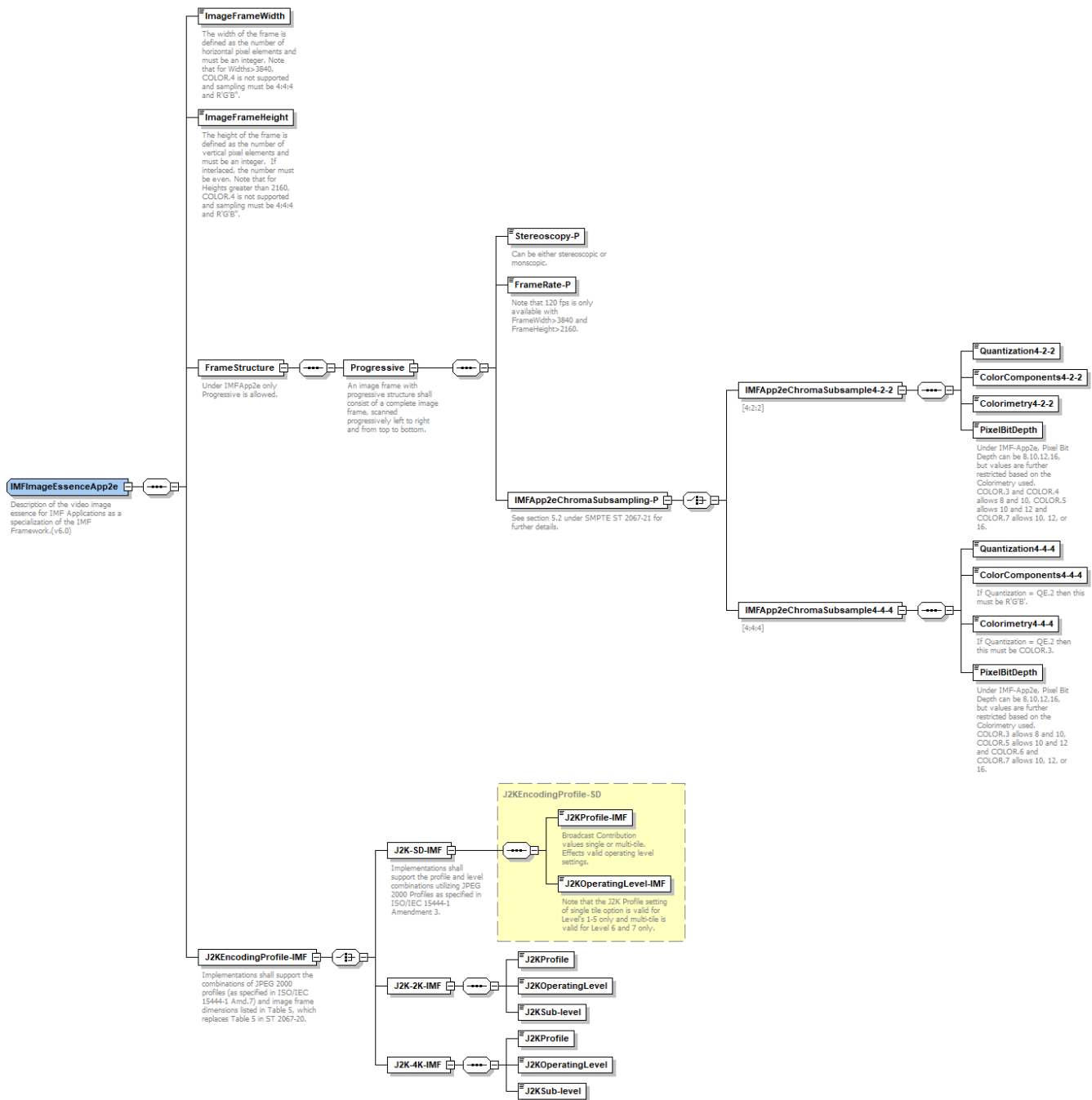
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="PixelBitDepth">
      <xs:annotation>
        <xs:documentation>Under IMF-App2e, Pixel Bit
Depth can be 8,10,12,16, but values are further restricted based on the Colorimetry used. COLOR.3 allows 8
and 10, COLOR.5 allows 10 and 12 and COLOR.6 and COLOR.7 allows 10, 12, or 16.</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:integer">
          <xs:enumeration value="8"/>
          <xs:enumeration value="10"/>
          <xs:enumeration value="12"/>
          <xs:enumeration value="16"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
</xs:element>
</xs:choice>
</xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="J2KEncodingProfile-IMF">
  <xs:annotation>
    <xs:documentation>Implementations shall support the combinations of JPEG 2000 profiles (as
specified in ISO/IEC 15444-1 Amd.7) and image frame dimensions listed in Table 5, which replaces Table 5 in
ST 2067-20.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:choice>
      <xs:element name="J2K-SD-IMF" type="J2KEncodingProfile-SD">
        <xs:annotation>
          <xs:documentation>Implementations shall support the profile and level combinations
utilizing JPEG 2000 Profiles as specified in ISO/IEC 15444-1 Amendment 3.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="J2K-2K-IMF">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="J2KProfile">
              <xs:simpleType>
                <xs:restriction base="xs:string">
                  <xs:enumeration value="Lossy"/>
                  <xs:enumeration value="Reversible"/>
                </xs:restriction>
              </xs:simpleType>
            </xs:element>
            <xs:element name="J2KOperatingLevel">
              <xs:simpleType>
                <xs:restriction base="xs:string">
                  <xs:enumeration value="Level-1"/>
                  <xs:enumeration value="Level-2"/>
                </xs:restriction>
              </xs:simpleType>
            </xs:element>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:choice>
  </xs:complexType>
</xs:element>

```

```

        <xs:enumeration value="Level-3"/>
        <xs:enumeration value="Level-4"/>
        <xs:enumeration value="Level-5"/>
        <xs:enumeration value="Level-6"/>
    </xs:restriction>
</xs:simpleType>
</xs:element>
<xs:element name="J2KSub-level">
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="Level 0 Only"/>
            <xs:enumeration value="All Except Level 0"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="J2K-4K-IMF">
    <xs:complexType>
        <xs:sequence>
            <xs:element name="J2KProfile">
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:enumeration value="Lossy"/>
                        <xs:enumeration value="Reversible"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
            <xs:element name="J2KOperatingLevel">
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:enumeration value="Level-1"/>
                        <xs:enumeration value="Level-2"/>
                        <xs:enumeration value="Level-3"/>
                        <xs:enumeration value="Level-4"/>
                        <xs:enumeration value="Level-5"/>
                        <xs:enumeration value="Level-6"/>
                        <xs:enumeration value="Level-7"/>
                        <xs:enumeration value="Level-8"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
            <xs:element name="J2KSub-level">
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:enumeration value="Sublevel 0 Only"/>
                        <xs:enumeration value="All Allowed except Sublevel 0"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
        </xs:sequence>
    </xs:complexType>
</xs:element>
</xs:choice>
</xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>

```



```

<xs:complexType name="J2KEncodingProfile">
  <xs:annotation>
    <xs:documentation>JPEG-2000 Encoding Options (v6.0)</xs:documentation>
  </xs:annotation>
  <xs:choice>
    <xs:element name="JPEG-2000-2K">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="J2KProfile">
            <xs:annotation>
              <xs:documentation>Two options: Lossy or Reversible</xs:documentation>
            </xs:annotation>
            <xs:simpleType>
              <xs:restriction base="xs:string">

```

```

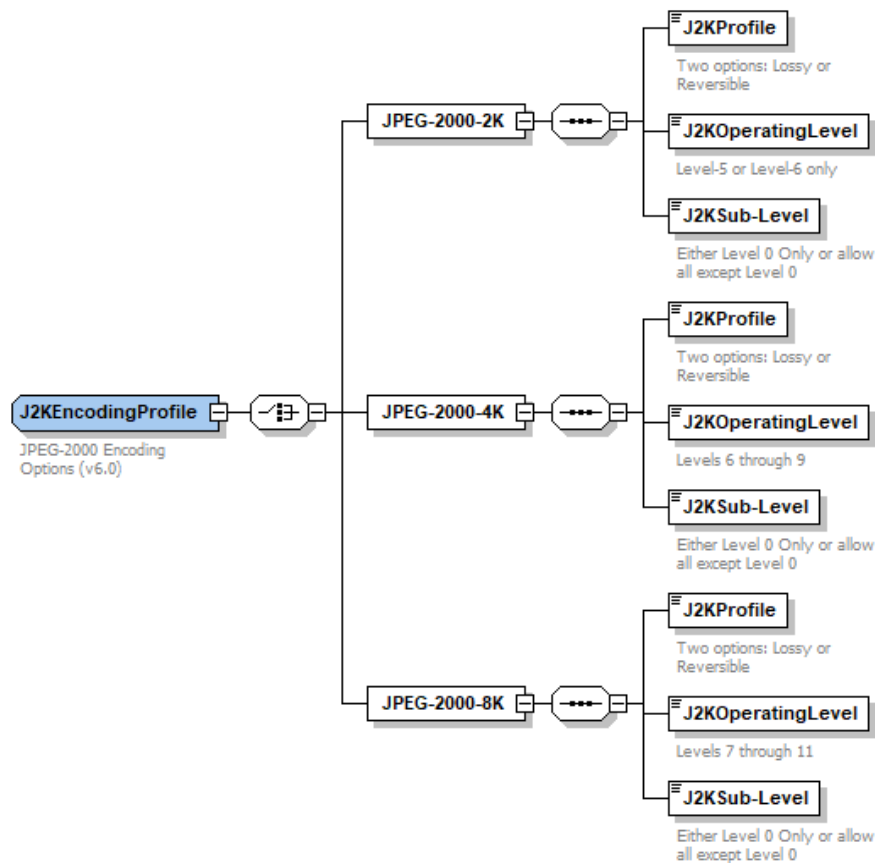
        <xs:enumeration value="Lossy"/>
        <xs:enumeration value="Reversible"/>
    </xs:restriction>
</xs:simpleType>
</xs:element>
<xs:element name="J2KOperatingLevel">
    <xs:annotation>
    <xs:documentation>Level-5 or Level-6 only</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="Level-5"/>
            <xs:enumeration value="Level-6"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
<xs:element name="J2KSub-Level">
    <xs:annotation>
    <xs:documentation>Either Level 0 Only or allow all except Level 0</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="Level 0 Only"/>
            <xs:enumeration value="All Except Level 0"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="JPEG-2000-4K">
    <xs:complexType>
        <xs:sequence>
            <xs:element name="J2KProfile">
                <xs:annotation>
                <xs:documentation>Two options: Lossy or Reversible</xs:documentation>
                </xs:annotation>
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:enumeration value="Lossy"/>
                        <xs:enumeration value="Reversible"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
            <xs:element name="J2KOperatingLevel">
                <xs:annotation>
                <xs:documentation>Levels 6 through 9</xs:documentation>
                </xs:annotation>
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:enumeration value="Level-6"/>
                        <xs:enumeration value="Level-7"/>
                        <xs:enumeration value="Level-8"/>
                        <xs:enumeration value="Level-9"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
            <xs:element name="J2KSub-Level">
                <xs:annotation>
                <xs:documentation>Either Level 0 Only or allow all except Level 0</xs:documentation>

```

```

        </xs:annotation>
        <xs:simpleType>
            <xs:restriction base="xs:string">
                <xs:enumeration value="Level 0 Only"/>
                <xs:enumeration value="All Except Level 0"/>
            </xs:restriction>
        </xs:simpleType>
    </xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="JPEG-2000-8K">
    <xs:complexType>
        <xs:sequence>
            <xs:element name="J2KProfile">
                <xs:annotation>
                    <xs:documentation>Two options: Lossy or Reversible</xs:documentation>
                </xs:annotation>
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:enumeration value="Lossy"/>
                        <xs:enumeration value="Reversible"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
            <xs:element name="J2KOperatingLevel">
                <xs:annotation>
                    <xs:documentation>Levels 7 through 11</xs:documentation>
                </xs:annotation>
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:enumeration value="Level-7"/>
                        <xs:enumeration value="Level-8"/>
                        <xs:enumeration value="Level-9"/>
                        <xs:enumeration value="Level-10"/>
                        <xs:enumeration value="Level-11"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
            <xs:element name="J2KSub-Level">
                <xs:annotation>
                    <xs:documentation>Either Level 0 Only or allow all except Level 0</xs:documentation>
                </xs:annotation>
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:enumeration value="Level 0 Only"/>
                        <xs:enumeration value="All Except Level 0"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
        </xs:sequence>
    </xs:complexType>
</xs:element>
</xs:choice>
</xs:complexType>

```



```
<xs:complexType name="J2KEncodingProfile-SD">
```

```
<xs:annotation>
```

```
<xs:documentation>Implementations shall support the profile and level combinations utilizing JPEG 2000 Profiles as specified in ISO/IEC 15444-1 Amendment 3. (v6.0)</xs:documentation>
```

```
</xs:annotation>
```

```
<xs:sequence>
```

```
— <xs:element name="J2KProfile-IMF">
```

```
<xs:annotation>
```

```
<xs:documentation>Broadcast Contribution values single or multi-tile. Effects valid operating level settings.</xs:documentation>
```

```
</xs:annotation>
```

```
<xs:simpleType>
```

```
<xs:restriction base="xs:string">
```

```
<xs:enumeration value="Single Tile"/>
```

```
<xs:enumeration value="Multi-tile Reversible"/>
```

```
</xs:restriction>
```

```
</xs:simpleType>
```

```
</xs:element>
```

```
<xs:element name="J2KOperatingLevel-IMF">
```

```
<xs:annotation>
```

```
<xs:documentation>Note that the J2K Profile setting of single tile option is valid for Level's 1-5 only and multi-tile is valid for Level 6 and 7 only.</xs:documentation>
```

```
</xs:annotation>
```

```
<xs:simpleType>
```

```
<xs:restriction base="xs:string">
```

```
<xs:enumeration value="Level-1"/>
```

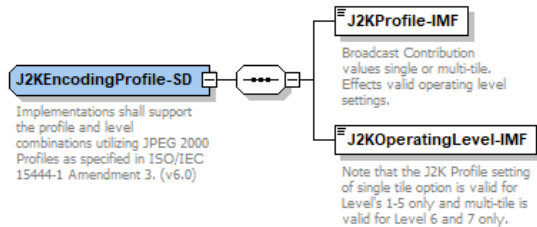
```
<xs:enumeration value="Level-2"/>
```

```
<xs:enumeration value="Level-3"/>
```

```

        <xs:enumeration value="Level-4"/>
        <xs:enumeration value="Level-5"/>
        <xs:enumeration value="Level-6"/>
        <xs:enumeration value="Level-7"/>
    </xs:restriction>
</xs:simpleType>
</xs:element>
</xs:sequence>
</xs:complexType>

```



```

<xs:complexType name="Video">
<xs:annotation>
<xs:documentation>Enumerates the various values relating to the presentation of video</xs:documentation>
</xs:annotation>
  <xs:choice>
    <xs:element name="Null">
      <xs:annotation>
        <xs:documentation>No Information provided for Video</xs:documentation>
      </xs:annotation>
      <xs:complexType/>
    </xs:element>
    <xs:sequence>
      <xs:element name="Encoding" minOccurs="0">
        <xs:annotation>
          <xs:documentation>If NTSC or PAL this should be set to uncompressed. The other options
are various compression utilities that are used to store or transmit video.</xs:documentation>
        </xs:annotation>
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="VideoEncodingType">
              <xs:attribute name="encodingReference" type="xs:string">
                <xs:annotation>
                  <xs:documentation>Allows the user to annotate the type of encoding
method used if not standard.</xs:documentation>
                </xs:annotation>
              </xs:attribute>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="DigitalVideo" type="xs:boolean" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Required to be true if video format is 2160p, 1080p, 1080i, 720p, 480p,
optional for 576i and 480i.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="Format" minOccurs="0">
        <xs:annotation>

```


`<xs:documentation>`The number of lines of video and either an "i" for interlaced or "p" for progressive. Note that NTSC = 480i; PAL = 576i; and the rest are digital ATSC/DVB options.`</xs:documentation>`
`</xs:annotation>`
`<xs:complexType>`
`<xs:simpleContent>`
`<xs:extension base="VideoFormatType"/>`
`</xs:simpleContent>`
`</xs:complexType>`
`</xs:element>`
`<xs:element name="ActiveImageAspectRatio" type="xs:float" minOccurs="0">`
`<xs:annotation>`
`<xs:documentation>`Width of the active video image divided by it's height`</xs:documentation>`
`</xs:annotation>`
`</xs:element>`
`<xs:element name="AspectRatio" type="AspectRatioType" minOccurs="0">`
`<xs:annotation>`
`<xs:documentation>`The horizontal:vertical ratio of the complete video display including AFD-
BarData (A/53)`</xs:documentation>`
`</xs:annotation>`
`</xs:element>`
`<xs:choice minOccurs="0">`
`<xs:element name="AFD-BarDataPresent" minOccurs="0">`
`<xs:annotation>`
`<xs:documentation>`Indicates that active format description and bar data is used in the
presentation of the video in order to convert the production image to the selected transmission aspect ratio. The
actual values for these items is incorporated into the video VANC.`</xs:documentation>`
`</xs:annotation>`
`<xs:complexType>`
`<xs:simpleContent>`
`<xs:extension base="xs:boolean"/>`
`</xs:simpleContent>`
`</xs:complexType>`
`</xs:element>`
`<xs:element name="PanAndScanPresent" type="xs:boolean" minOccurs="0">`
`<xs:annotation>`
`<xs:documentation>`Indicates that pan and scan techniques are being used to adjust the
production image to fit the transmission aspect ratio. Note that each frame's values may be different and the
actual data to determine the values are carried in the video VANC.`</xs:documentation>`
`</xs:annotation>`
`</xs:element>`
`</xs:choice>`
`<xs:element name="CaptionsInVANC" type="xs:boolean" minOccurs="0">`
`<xs:annotation>`
`<xs:documentation>`If set to true indicates that captioning is embedded in the video
VANC.`</xs:documentation>`
`</xs:annotation>`
`</xs:element>`
`<xs:element name="AFDDData" type="AFDDData" minOccurs="0">`
`<xs:annotation>`
`<xs:documentation>`Used to describe both Active Format Description Codes, Shorthand Text
Descriptions and Bar Data options. (v3.0)`</xs:documentation>`
`</xs:annotation>`
`</xs:element>`
`<xs:element name="WideScreen" type="xs:boolean" minOccurs="0">`
`<xs:annotation>`
`<xs:documentation>`Use to flag if original content is letterboxed, SD or HD.
(v6.0)`</xs:documentation>`
`</xs:annotation>`
`</xs:element>`

```

        <xs:element name="ChromaSubsampling" type="ChromaSubsampling" minOccurs="0">
        <xs:annotation>
        <xs:documentation>Video sampling options (v6.0)</xs:documentation>
        </xs:annotation>
        </xs:element>
        <xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
    </xs:sequence>
</xs:choice>
<xs:attribute name="centerCutProtected" type="xs:boolean">
<xs:annotation>
<xs:documentation>Set as True if video content was created with centercut protection.
(v6.0)</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="nativeFrameRate" type="xs:string">
<xs:annotation>
<xs:documentation>Original framerate that the content was shot. (v6.0)</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attributeGroup ref="Action-ErrorGroup"/>
</xs:complexType>

<xs:simpleType name="VideoEncodingType">
<xs:annotation>
<xs:documentation>Enumerates various methods of compressing video (v6.0)</xs:documentation>
</xs:annotation>
    <xs:restriction base="xs:string">
        <xs:enumeration value="Uncompressed"/>
        <xs:enumeration value="DNxHD"/>
        <xs:enumeration value="DNxHR"/>
        <xs:enumeration value="HEVC"/>
        <xs:enumeration value="MPEG-2"/>
        <xs:enumeration value="MPEG-4 AVC"/>
        <xs:enumeration value="ProRes"/>
        <xs:enumeration value="SMPTE VC-1"/>
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="VideoFormatType">
<xs:annotation>
<xs:documentation>Enumerates the different video presentation formats (v6.0)</xs:documentation>
</xs:annotation>
    <xs:restriction base="xs:string">
        <xs:enumeration value="1080p"/>
        <xs:enumeration value="1080i"/>
        <xs:enumeration value="720p"/>
        <xs:enumeration value="576i"/>
        <xs:enumeration value="480p"/>
        <xs:enumeration value="480i"/>
        <xs:enumeration value="2160p"/>
    </xs:restriction>
</xs:simpleType>

```

