ISO/IEC JTC 1/SC 29/WG 03 N0978

**ISO/IEC JTC 1/SC 29/WG 03  
MPEG Systems   
Convenorship: KATS (Korea, Republic of)**

**Document type:** Output Document

**Title:** Technologies under Consideration for ISO/IEC 14496-15

**Status:** Approved

**Date of document:** 2023-07-21

**Source:** ISO/IEC JTC 1/SC 29/WG 03

**No. of pages:** 1 (with cover page)

**Email of Convenor:** young.L @ samsung . com

**Committee URL:** <https://isotc.iso.org/livelink/livelink/open/jtc1sc29wg3>

**INTERNATIONAL ORGANIZATION FOR STANDARDIZATION**

**ORGANISATION INTERNATIONALE DE NORMALISATION**

**ISO/IEC JTC 1/SC 29/WG 03 MPEG SYSTEMS**

**ISO/IEC JTC 1/SC 29/WG 03 N0978**

**July 2023, Geneva**

|  |  |
| --- | --- |
| **Title** | **Technologies under Consideration for ISO/IEC 14496-15** |
| **Source** | **WG 03, MPEG Systems** |
| **Status** | **Approved** |
| **Serial Number** | **22972** |

**Abstract**

This document proposes three approaches for carriage of a Base bitstream (e.g. AVC, HEVC, EVC, VVC) and an LCEVC Enhancement bitstream in a “Single-Track”, that is without the need to use two separate PIDs or Tracks, but rather carrying the base NALUs and the LCEVC NALUs as if they were a single bitstream.

Three possible solutions to carry a complete set composed by Base and LCEVC Enhancement bitstreams are:

(1) Interleaved NALUs approach: insert LCEVC NALUs as interleaved NALUs within the Base NALUs.

(2) SEI approach: insert LCEVC NALUs as SEI messages in the Base NALUs.

(3) Aggregators to aggregate the Base bitstream with the LCEVC bitstream.

The following sections describe the three possible Single-Track solutions making explicit reference to four existing MPEG Video Coding specification:

• ISO/IEC 14496-10 Advanced Video Coding (AVC/H264)

• ISO/IEC 23008-2 High Efficiency Video Coding (HEVC/H265)

• ISO/IEC 23090-3 Versatile Video Coding (VVC/H266)

• ISO/IEC 23094-1 Essential Video Coding (EVC)

Contents

[**1.** **NALU aproach** 4](#_Toc140671824)

[**1.1** **AVC/H264 NALU header format** 4](#_Toc140671825)

[**1.2** **HEVC/H265 NALU header format** 5](#_Toc140671826)

[**1.3** **VVC/H266 NALU header format** 5](#_Toc140671827)

[**1.4** **LCEVC NALU header format** 6](#_Toc140671828)

[**1.5** **Compatibility of interleaving LCEVC NAL units with AVC/HEVC/VVC NAL units** 6](#_Toc140671829)

[**2.** **SEI aproach** 8](#_Toc140671830)

[**2.1** **Carriage of LCEVC NALUs in SEI messages** 8](#_Toc140671831)

[**2.2** **Suggested solution for SEI carriage** 8](#_Toc140671832)

[**3.** **Dual DecoderConfigurationBoxes in Single Track** 10](#_Toc140671833)

[**3.1** **Option 1 – Use of SampleDescriptionBox** 10](#_Toc140671834)

[**3.2** **Option 2 – Use of MPEG4ExtensionDescriptorsBox** 11](#_Toc140671835)

[**4.** **Dual Configuration Boxes in Single Track: specification amendments** 13](#_Toc140671836)

[**4.1** **Option 1 – Use of SampleDescriptionBox** 13](#_Toc140671837)

[**4.2** **Option 2 – Use of MPEG4ExtensionDescriptorsBox** 13](#_Toc140671838)

[**5.** **Aggregators approach** 14](#_Toc140671839)

[**5.1** **AVC/H264 NALU header format** 14](#_Toc140671840)

[**13** **LCEVC elementary streams and sample definitions** 14](#_Toc140671841)

[**13.1** **Overview** 14](#_Toc140671842)

[**13.4** **Derivation from ISO base media file format** 14](#_Toc140671843)

[13.4.1 LCEVC video stream definition: sample entry name and format 14](#_Toc140671844)

[13.4.2 LCEVC mixed sample entry 15](#_Toc140671845)

[13.4.3 LCEVC track structure 16](#_Toc140671846)

[13.4.4 Parameter sets 16](#_Toc140671847)

[13.4.5 'sync' sample 16](#_Toc140671848)

1. **NALU aproach**

LCEVC encoded data units are Network Abstraction Layer units (NALU) as defined in ISO/IEC 23094-2, Sec. 7.3.2.

Each of the Base video coding standards under considerations here (AVC, HEVC, VVC) defines its own NALU syntax.

The format of the LCEVC NALU, in fact, allows for their unambiguous detection even when parsed according to the NALU syntax of the AVC, HEVC or VVC Base bitstream. This property allows for an “interleaved” single stream base plus enhancement, which means a single stream where LCEVC NALUs are inserted among base NALUs, within the same NALU sequence.

In the resulting interleaved single stream, each Access Unit, defined as the set of NALUS that result in each decoded picture, will contain both the LCEVC NALUs (an LCEVC Access Unit contains only one LCEVC NAL unit) and the Base NALUs relevant for the specific Access Unit.



***Figure 1 – Diagram of Interleaved NALU “single track” for LCEVC.***

* 1. **AVC/H264 NALU header format**

The AVC NALU header is defined in ISO/IEC 14496-10, Sec. 7.3.1, with the following syntax:

| ***Syntax*** | **Descriptor** |
| --- | --- |
| nal\_unit\_header( ) { |  |
| forbidden\_zero\_bit | u(1) |
| nal\_ref\_idc | u(2) |
| nal\_unit\_type | u(5) |
| } |  |

Table 6 – AVC NALU header syntax

The NALU type values and semantics for AVC are specified in Table 7-1 of the specification (IS 14496-10). Table 7 summarizes the usage of the AVC NALU types. Since the AVC NALU type is a field of 5 bits, the possible values are from 0 to 31.

|  |  |  |  |
| --- | --- | --- | --- |
| nal\_unit\_type | Name of nal\_unit\_type | Content of NAL unit and RBSP syntax structure | NAL unit type class |
| 0 - 5 | (…) | (…) | VCL |
| 6 - 20 | (…) | (…) | Non VCL |
| 21 - 23 | RSV | Reserved | Non VCL |
| 24 - 31 | UNSPEC | Unspecified | Non VCL |

Table 7 – AVC NALU types

* 1. **HEVC/H265 NALU header format**

The HEVC NALU header is defined in ISO/IEC 23008-2, Sec. 7.3.1.2, with the following syntax:

| ***Syntax*** | **Descriptor** |
| --- | --- |
| nal\_unit\_header( ) { |  |
| forbidden\_zero\_bit | f(1) |
| nal\_unit\_type | u(6) |
| nuh\_layer\_id | u(6) |
| nuh\_temporal\_id\_plus1 | u(3) |
| } |  |

Table 8 – HEVC NALU header syntax

The NALU type values and semantics for HEVC are specified in Table 7-1 of the specification (IS 23008-2). Table 9 summarizes the usage of the HEVC NALU types. Since the HEVC NALU type is a field of 6 bits, the possible values are from 0 to 63.

|  |  |  |  |
| --- | --- | --- | --- |
| nal\_unit\_type | Name of nal\_unit\_type | Content of NAL unit and RBSP syntax structure | NAL unit type class |
| 0 - 21 | (…) | (…) | VCL |
| 22 - 31 | RSV | Reserved | VCL |
| 32 - 40 | (…) | (…) | Non VCL |
| 41 - 47 | RSV | Reserved | Non VCL |
| 48 - 63 | UNSPEC | Unspecified | Non VCL |

Table 9 – HEVC NALU types

* 1. **VVC/H266 NALU header format**

The VVC NALU header is defined in ISO/IEC 23090-3, Sec. 7.3.1.2, with the following syntax:

| ***Syntax*** | **Descriptor** |
| --- | --- |
| nal\_unit\_header( ) { |  |
| forbidden\_zero\_bit | f(1) |
| nuh\_reserved\_zero\_bit | u(1) |
| nuh\_layer\_id | u(6) |
| nal\_unit\_type | u(5) |
| nuh\_temporal\_id\_plus1 | u(3) |
| } |  |

Table 10 – VVC NAL unit header syntax

The NALU type values and semantics for VVC are specified in Table 5 of the specification (IS 23090-3). Table 11 summarizes the usage of the VVC NALU types. Since the VVC NALU type is a field of 5 bits, the possible values are from 0 to 31.

|  |  |  |  |
| --- | --- | --- | --- |
| nal\_unit\_type | Name of nal\_unit\_type | Content of NAL unit and RBSP syntax structure | NAL unit type class |
| 0 - 11 | (…) | (…) | VCL |
| 12 - 25 | (…) | (…) | Non VCL |
| 26 - 27 | RSV | Reserved | Non VCL |
| 28 - 31 | UNSPEC | Unspecified | Non VCL |

Table 11 – VVC NALU types

* 1. **LCEVC NALU header format**

The LCEVC NALU header is defined in ISO/IEC 23094-2, Sec. 7.3.2, with the following syntax:

| ***Syntax*** | **Descriptor** |
| --- | --- |
| nal\_unit\_header( ) { |  |
| forbidden\_zero\_bit | u(1) |
| forbidden\_one\_bit | u(1) |
| nal\_unit\_type | u(5) |
| reserved\_flag | u(9) |
| } |  |

Table 12 - LCEVC NAL unit header

The NALU type values and semantics for LCEVC are specified in Table 17 of the specification (IS 23094-2). Table 13 summarizes the usage of the LCEVC NALU types. Since the LCEVC NALU type is a field of 5 bits, the possible values are from 0 to 31.

|  |  |  |  |
| --- | --- | --- | --- |
| nal\_unit\_type | Name of nal\_unit\_type | Content of NAL unit and RBSP syntax structure | NAL unit type class |
| 0 - 27 | UNSPEC | Unspecified | Non VCL |
| 28 - 29 | (…) | (…) | VCL |
| 30 | RSV | Reserved | Non VCL |
| 31 | UNSPEC | Unspecified | Non VCL |

Table 13 – LCEVC NALU types

The two NALU type values used to identify VCL NALUs are:

28 = 0x1C = 0b1.1100 (LCEVC NALU type 28Non IDR)

29 = 0x1D = 0b1.1101 (LCEVC NALU type 29IDR)

The two NALU header bytes for the two VCL NALU types of LCEVC are as follows:

0111.1001:1111.1111 (LCEVC NALU type 28 Non-IDR)

0111.1011:1111.1111 (LCEVC NALU type 29 IDR)

* 1. **Compatibility of interleaving LCEVC NAL units with AVC/HEVC/VVC NAL units**

The following table summarizes the position and semantic of the main fields of the NALU headers of the four MPEG specifications: AVC, HEVC, VVC, LCEVC:

* in yellow the NALU Type field
* in blue the Layer ID field
* in green the Temporal ID field

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | | 14 | 15 |
| AVC | 0 |  |  | NALU Type | | | | |  |  |  |  |  |  | |  |  |
| HEVC | 0 | NALU Type | | | | | | Layer ID (6) | | | | | | | Temp ID (3) | | | |
| VVC | 0 | 0 | Layer ID (6) | | | | | | NALU type | | | | | | Temp ID (3) | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | | 14 | 15 |
| LCEVC | 0 | 1 | 1 | 1 | 1 | 0/1 | 0/1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 |
| LCEVC 28 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 |
| LCEVC 29 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 |

The following table reports how the base parsers for AVC, HEVC, VVC would interpret the two bytes of NALU headers for the significant LCEVC NALUs.

|  |  |  |  |
| --- | --- | --- | --- |
|  | LCEVC 28|29 | Layer ID | Temp ID |
| AVC parser | AVC 25|27 |  |  |
| HEVC parser | HEVC 60|61 | 63 | 7 |
| VVC parser | VVC 31|31 | 57|59 | 7 |

For the AVC parser, the LCEVC NALU types (interpreted as 25 or 27) fall in the Unspecified range from 24 to 31.

For the HEVC parser, the LCEVC NALU types (interpreted as 60 or 61) fall in the Unspecified range from 48 to 63.

For the VVC parser, the LCEVC NALU types (interpreted as 31) fall in the Unspecified range from 28 to 31.

1. **SEI aproach**

LCEVC encoded data units are Network Abstraction Layer (NAL) units as defined in ISO/IEC 23094-2, Sec. 7.3.2.

All the MPEG base video coding standards considered (e.g., AVC, HEVC, VVC) provide metadata messages that can be used for the carriage of LCEVC. AVC, HEVC and VVC, employ NAL units as basic data units, and additionally the type of NAL unit identified as Supplemental Enhancement Information (SEI) that can be used to embed the LCEVC NAL unit stream.



***Figure 2 – Diagram of Embedded SEI “single track” for LCEVC.***

**2.1 Carriage of LCEVC NALUs in SEI messages**

When the base encoding for LCEVC is an MPEG standard, the elementary stream is a NALU stream. In this case, the encapsulation of LCEVC Access Units as metadata is implemented using the SEI messages specific for each Base codec. AVC, HEVC and VVC have each a different NALU format (i.e., with different NALU headers) breakdown of NALU types and payloads. However, all of them comprise SEI messages, identified with a nal\_unit\_type field as in the following table, where RBSP stands for raw byte sequence payload (see Table 1 below).

|  |  |  |
| --- | --- | --- |
| MPEG Standard | SEI nal\_unit\_type | Corresponding NAL unit payload |
| AVC | 6 | sei\_rbsp() |
| HEVC | 39\* | sei\_rbsp() |
| VVC | 23\* | sei\_rbsp() |
| \* prefix SEI | | |

Table 1 - SEI NALU type

**2.2 Suggested solution for SEI carriage**

The proposed solution for using SEI encapsulation of an LCEVC bitstream consists in defining a new SEI message for LCEVC and referencing it as a new Payload Type in each of the base layer video coding specifications.

In AVC (IS 14496-10), the SEI message payloadType is a field of 8 bits (with an escape mechanism). The Payload Types are specified in Section D.1.1, with values ranging from 0 to 56, and from 137 to 201, with the other values up to 255 allocated as reserved\_sei\_message.

In HEVC (IS 23008-2), as well, the SEI message payloadType is a field of 8 bits (with an escape mechanism). The Payload Types are specified in Section D.2.1, with values ranging from 0 to 56, and from 128 to 201, with other values up to 255 allocated as reserved\_sei\_message.

In VVC (IS 23090-3), as well, the SEI message payloadType is a field of 8 bits (with an escape mechanism). The Payload Types are specified in Section D.2.1, with values ranging from 0 to 45, and from 129 to 204, with other values up to 255 allocated as reserved\_sei\_message.

The suggested value of payloadType to be allocated to LCEVC in the three specifications (AVC, HEVC, VVC) is payloadType value 57, that falls in the “reserved range” of all the three spec.

1. **Dual Configuration Boxes in Single Track**

One open issue in the “NALU approach” proposal, where Base codec NALUs and LCEVC Enhancement codec NALUs are interleaved, is how to carry two different DecoderConfigurationBoxes in a Single Track, preserving backward compatibility with existing MP4 players.

To solve the above issue, two options are proposed for a backward compatible solution to carry an LCEVC bitstream and a base bitstream in a single-track carriage.

* 1. **Option 1 – Use of SampleDescriptionBox**

In this option, we would insert the LCEVC Decoder Configuration associated to the Base Decoder configuration using the same SampleDescriptionBox containing the Base Decoder configuration.

The SampleDescriptionBox is described in ISO/IEC 14496-12 (ISO BMFF) in Section 8.5.2.2 and reported below for convenience:

***SampleDescriptionBox***

aligned(8) class SampleDescriptionBox () extends FullBox ('stsd', version, 0) {

int i;

unsigned int(32) entry\_count;

for (i = 1 ; i <= entry\_count ; i++) {

SampleEntry(); // an instance of a class derived from SampleEntry

}

}

The SampleDescriptionBox allows the allocation of one or more SampleEntry, depending on the field entry\_count. Thus, the LCEVC Sample Entry can be inserted after the Base Sample Entry in the same SampleDescriptionBox.

NOTE:

Since there cannot be two samples (Base and LCEVC) with the same time stamp in a single track, the LCEVC Sample should be packed in the corresponding Base Sample, or the LCEVC Sample should be carried in Sample Auxiliary Information, as specified in clauses 8.7.8 and 8.7.9 of 14496-12.

The approach using Sample Auxiliary Information might have limitations with respect to ISOBMFF tools, such as differential encryption of Base Samples and LCEVC SAI Samples.

NOTE:

We should have specific signaling in the Sample Entry to signal that the stream contains unspecified NALUs (with respect to the Base Sample Entry) that then are interpreted no longer as unspecified, but as LCEVC NALUs according to the MPEG4ExtensionDescriptorsBox.

* 1. **Option 2 – Use of MPEG4ExtensionDescriptorsBox**

With this option, we would insert the LCEVC Decoder Configuration using the MPEG4ExtensionDescriptorsBox present in the sample entry of the Base Decoder (in the example below, we show the one for AVC, others are reported in the Annex):

class AVCSampleEntry() extends VisualSampleEntry ('avc1' or 'avc3') {

AVCConfigurationBox config;

MPEG4ExtensionDescriptorsBox (); // optional

}

class MPEG4ExtensionDescriptorsBox extends Box('m4ds') {

Descriptor Descr[0 .. 255];

}

The MPEG4ExtensionDescriptorsBox is described in ISO/IEC 14496-15 (NALU FF) in Section 5.4.2.1.2 and reported below for convenience:

***MPEG4ExtensionDescriptorsBox***

*Descr is a descriptor that should be placed in the ElementaryStreamDescriptor when this stream is used in an MPEG-4 systems context. This does not include SLConfigDescriptor or DecoderConfigDescriptor, but includes the other descriptors in order to be placed after the SLConfigDescriptor.*

Note that DecoderConfigDescriptor (Decoder Configuration Descriptor) is defined in 14496-1, clause 7.2.6.6 and SLConfigDescriptor (Sync Layer Configuration Descriptor) is defined in 14496-1, clause 7.3.2.3.

Since the specific ConfigurationBox for any Base codec of interest (AVCConfigurationBox, HEVCConfigurationBox, EVCConfigurationBox, VVCConfigurationBox) is not derived from the DecoderConfigDescriptor, it seems consistent with the existing 14496-15 specification, clause 5.4.2.1.3, to include in the MPEG4ExtensionDescriptorsBox an LCEVCConfigurationBox.

NOTE:

Since there cannot be two samples (Base and LCEVC) with the same time stamp in a single track, the LCEVC Sample should be packed in the corresponding Base Sample, or the LCEVC Sample should be carried in Sample Auxiliary Information, as specified in clauses 8.7.8 and 8.7.9 of 14496-12.

The approach using Sample Auxiliary Information might have limitations with respect to ISOBMFF tools, such as differential encryption of Base Samples and LCEVC SAI Samples.

NOTE:

We should have specific signaling in the Sample Entry to signal that the stream contains unspecified NALUs (with respect to the Base Sample Entry) that then are interpreted no longer as unspecified, but as LCEVC NALUs according to the MPEG4ExtensionDescriptorsBox.

1. **Dual Configuration Boxes in Single Track: specification amendments**

This section reports the required amendments to the MPEG4 File Format specification, 14496-12, to support the presence of two DecoderConfigDescriptors in a single track, one for the Base codec, one for the LCEVC Enhancement codec.

* 1. **Option 1 – Use of SampleDescriptionBox**

In principle, in 14496-12, clause 8.5.2.2, no amendment would be strictly needed, since the current specification allows the insertion of a first Sample Entry for the Base and a second Sample Entry for the LCEVC Enhancement.

For clarity and completeness, the specific case of a second Sample Entry for LCEVC can be described in the text or a note to the specification.

This solution also gives the advantage of possibly associating more than one LCEVC bitstream to the same Base bitstream, without the need for duplication.

* 1. **Option 2 – Use of MPEG4ExtensionDescriptorsBox**

In 14496-15, clause 5.4.2.1.3, at the end of the Descr semantics, add the highlighted text:

*Descr is a descriptor that should be placed in the ElementaryStreamDescriptor when this stream is used in an MPEG-4 systems context. This does not include SLConfigDescriptor or DecoderConfigDescriptor, but includes the other descriptors in order to be placed after the SLConfigDescriptor. In particular, the descriptor for an LCEVC decoder can be present in the Descr field: in this case, one or more LCEVCConfigurationBox shall be considered as the descriptor(s) for one or more LCEVC decoder(s) associated as enhancement to the Base decoder identified by the ConfigurationBox preceding the MPEG4ExtensionDescriptorsBox.*

This solution also gives the advantage of possibly associating more than one LCEVC bitstream to the same Base bitstream, without the need for duplication.

1. **Aggregators approach**

In this proposal we provide a ISOBMFF based codec-agnostic solution for the carriage of LCEVC bitstream in a single-track.

* 1. **AVC/H264 NALU header format**

The proposed changes, with respect to the current “Dual Track” carriage of LCEVC, are highlighted with track changes or yellow text.

The clause numbering refers to the numbering currently used in IS 14496-15, Clause 13.

**13 LCEVC elementary streams and sample definitions**

**13.1 Overview**

…

LCEVC elementary streams carry enhancement to a "base" codec such as the ones listed above. A LCEVC elementary stream and a “base” codec elementary stream may be present in the same track. When, a LCEVC elementary stream is in its own track, it makes a reference to a "base" codec elementary stream in a separate track, so that the LCEVC stream can be decoded in conjunction with the "base" stream, while the "base" stream can be decoded independently of the LCEVC stream.

An aggregator structure is specified to allow LCEVC elementary stream and a “base” codec elementary stream to be present in the same track. The aggregator structure enables grouping of NAL units from the base codec elementary stream into aggregated data units.

This clause defines the carriage of LCEVC elementary streams in the ISO base media file format as defined in this specification.

…

**13.4 Derivation from ISO base media file format**

### 13.4.1 LCEVC video stream definition: sample entry name and format

#### 13.4.1.1 Definition

…

#### 13.4.1.2 Syntax

…

#### 13.4.1.3 Semantics

…

### 13.4.2 LCEVC mixed sample entry

#### 13.4.2.1 Definition

Sample Entry and Box Types: 'lvms'

Container: Sample Description Box ('stsd')

Mandatory: The 'lvms' sample entry is mandatory

Quantity: One or more sample entries may be present

An LCEVC mixed sample entry shall contain a LCEVCConfigurationBox and a BaseConfigurationBox, as defined below. The BaseConfigurationBox contains the sample entry type and the decoder configuration box of the base stream (e.g. AVCConfigurationBox, HEVCConfigurationBox).

An optional BitRateBox may be present in the LCEVC mixed sample entry to signal the bit rate information of the LCEVC and the the base stream. Extension descriptors that should be inserted into the Elementary Stream Descriptor, when used in MPEG-4, may also be present.

The sample entry name 'lvms' specifies that the track to which this sample entry applies contains both a LCEVC stream and the base stream.

Base aggregators, as specified in subclause A.10, shall be used for aggregating the base stream in 'lvms' tracks. The order of all coded data included in a base aggregator is exactly the decoding order as if the coded data were present in a sample not containing aggregators or LCEVC NAL units.

If the sample of an 'lvms' track contains unspecified NAL unit types as defined in ISO/IEC 23094-2, the NAL units or NAL-unit-like structures having unspecified NAL unit types shall be discarded from the sample before providing the sample to the LCEVC decoder.

#### 13.4.2.2 Syntax

class LCEVCMixedSampleEntry() extends VisualSampleEntry('lvms'){

LCEVCConfigurationBox config1;

BaseConfigurationBox config2;

MPEG4ExtensionDescriptorsBox(); // optional

}

class BaseConfigurationBox() extends Box('blcf'){

unsigned int(32) base\_4cc;

Box config; // E.g., AVCConfigurationBox

Box other\_boxes[]; // optional boxes that are allowed for base\_4cc

}

#### 13.4.2.3 Semantics

Compressorname in the base class VisualSampleEntry indicates the name of the compressor used with the value "\014LCEVC Coding" being recommended (\014 is 10, the length of the string in bytes).

BaseConfigurationBox contains the decoder configuration box of the base stream (e.g. AVCConfigurationBox, HEVCConfigurationBox).

base\_4cc is the sample entry type that the base stream conforms to.

config is the decoder configuration box of the base stream (e.g. AVCConfigurationBox, HEVCConfigurationBox).

### 13.4.3 LCEVC track structure

…

When the base track is coded using EVC, the base track shall be constructed according to clause 12.

A LCEVC mixed track is a track containing both the external base layer stream and the LCEVC enhancement stream, forming a representation of a complete set of encoded information.

The picture dimensions of the base stream and the LCEVC stream, width and height in Luminance samples, are specified by the corresponding relevant DecoderConfigurationRecord(s).

### 13.4.4 Parameter sets

…

### 13.4.5 'sync' sample

…