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Introduction

This document contains the defects under investigation for 23090-10 V3C carriage in ISOBMFF. We are also tracking the defects in the MPEG internal GitLab [Issue#224](http://mpegx.int-evry.fr/software/MPEG/Systems/PCC-SYS/23090-10-review/-/issues/224) where the most up to date version of DuI can be found.

Object definition issues: [#192](http://mpegx.int-evry.fr/software/MPEG/Systems/PCC-SYS/23090-10-review/-/issues/192)

Two issues with the syntax definition of V3CObject are identified so far. Both issues are of the same nature and described below:

obj\_idx\_length

The syntax definition of the V3CObject includes the following two lines:

...  
unsigned int(8) obj\_idx\_length;  
unsigned int(obj\_idx\_length \* 8) soi\_object\_idx;  
...

However, if obj\_idx\_length is set to 0 it will result in 0 bits to be signalled for soi\_object\_idx, which is not quite aligned with 23090-5 (V3C) specification.

According to 23090-5:

*soi\_object\_idx[ i ] indicates the object index of the i-th object to be updated. The number of bits used to represent soi\_object\_idx[ i ] is equal to soi\_log2\_max\_object\_idx\_updated\_minus1 + 1.*

Where soi\_log2\_max\_object\_idx\_updated\_minus1 is defined as u(5). So, the index signalling is always present, and its value is signalled with a minimum of 1 bit and the maximum of 32 bits.

One possible solution would be to change the syntax to:

bit(6) reserved = 0;  
unsigned int(2) obj\_idx\_bytes\_minus1;  
unsigned int((obj\_idx\_bytes\_minus1 + 1)\*8) soi\_object\_idx;

This would disallow the number of bits used to signal soi\_object\_idx to be less than 8 or greater than 32. Here, some trade-off needs to be made when dealing with less than 8 bits. To maintain byte alignment, the example above will always use 8 bits on the systems level even if the *soi\_log2\_max\_object\_idx\_updated\_minus1<=7* on the codec level.

obj\_dep\_idx\_length

This is the same issue which occurs on a different place. The same solution as for the one identified in Section 2.1 shall be applied in this case as well.

Video decoder configuration for single track carriage: [#170](http://mpegx.int-evry.fr/software/MPEG/Systems/PCC-SYS/23090-10-review/-/issues/170)

By design of ISOBMFF the sample description table gives all the detailed information about the coding type used, and any initialization information needed for that coding. However, section 7.3 of 23090-10 specifies the single-track carriage of V3C data in so called V3C Bitstream track where the sample entry of a V3C Bitstream Track is defined as follows:

aligned(8) class V3CBitstreamSampleEntry() extends VolumetricVisualSampleEntry (type) {  
 // type is 'v3e1' or 'v3eg'  
 V3CConfigurationBox config;  
}

V3CConfigurationBox stores the V3C\_VPS alongside with all Atlas Parameter Sets such as ASPS, AFPS, AAPS or CASPS for that track. Depending on the sample entry type we either allow or disallow the atlas parameter sets to be present in the samples of that track. While samples of ‘v3eg’ track (in-band track) *can* contain parameter sets, samples of ‘v3e1’ track (out-of-band track) *cannot*.

However, we are currently not saying anything about the video components of the V3C Bitstream Track, which raises the following questions:

* Sample entry is used to provide the all the important information about decoder initialization without reading samples and parsing their contents. However, currently it is not possible to initialize the video decoders without parsing samples and looking for VPS, SPS, and PPS for example.
* Is the out-of-band track of the type ‘v3e1’ really out-of-band, even if the parameter sets of the video components change over time but the V3C\_VPS remains the same?

The definition of the V3CBitstreamSampleEntry should be extended in order to provide signalling for video decoder configuration.

V3CVector3 precision and sign: [#193](http://mpegx.int-evry.fr/software/MPEG/Systems/PCC-SYS/23090-10-review/-/issues/193)

The current definition of V3CVector3 does not allow signalling negative values and provides unnecessary means for signalling bitwise precision that cause more problems than solutions.

DynamicVolumetricMetadataSampleEntry syntax: [#226](http://mpegx.int-evry.fr/software/MPEG/Systems/PCC-SYS/23090-10-review/-/issues/226)

The syntax of DynamicVolumetricMetadataSampleEntry is missing an instance of V3CSpatialRegionCollectionBox it should be defined as:

aligned(8) class DynamicVolumetricMetadataSampleEntry extends MetaDataSampleEntry('dyvm') {  
 V3CSpatialRegionCollectionBox spatial\_regions;  
}

Where spatial\_regions should also be mentioned in semantics.

On Atlas Parameter set SampleGroup usage: [#230](http://mpegx.int-evry.fr/software/MPEG/Systems/PCC-SYS/23090-10-review/-/issues/230)

It is not clear from the specification how the parameter sets which are stored in sgpd shall be used. What should be the behavior if for example a sample N includes parameter sets and at the same time there is a vaps sample group associated with the same sample? It should be clarified which parameter sets should be used.

In addition, the following note could be improved:

*NOTE V3C atlas parameter set sample group can be used to improve random access of atlas tracks, by removing the need to replicate parameter sets and SEI messages for sync samples.*

Does the atlas parameter set sample group really improve the random access or does it only address the problem of redundant information?