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| *Title:* | **3D-HLS: On reference picture list construction for AVC based 3DV** | | |
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# Abstract

This document discusses some problems associated with the reference picture list construction (RPLC) process in the current AVC based 3DV specification. Two alternative solutions are proposed to solve the problem, one for the case wherein each texture view component can use at most one view synthetic prediction (VSP) reference component, and the other for the case wherein each texture view component can use more than VSP reference component. In both solutions, whether VSP reference is used is signalled in the slice header. It is suggested that the group make a firm decision on whether to allow for more than one VSP reference components for one texture view component, and choose one of the options accordingly.

# Introduction

## Current RPLC decoding process

The current RPLC decoding process is as follows:

**J.8.1 3DVC decoding process for reference picture lists construction**

The specifications of subclause I.8.2.1 apply with the following changes and additions:

– Modification process for reference picture lists is specified in subclause J.8.1.1 instead of subclause I.8.2.2.

– When DepthFlag is equal to 0, the variable VspRefExist is specified after applying subclause H.8.2 as follows.

– If seq\_view\_synthesis\_flag is equal to 0 (view synthesis prediction is disabled), VspRefExist is set to 0.

– Otherwise (seq\_view\_synthesis\_flag is equal to 1), if the current slice is a P or SP slice and there exists at least one synthetic reference component in RefPicList0, or if the current slice is a B slice and there exists at least one synthetic reference component in either RefPicList0 or RefPicList1, VspRefExist is set to 1;

– Otherwise, VspRefExist is set to 0.

**J.8.1.1 Modification process for reference picture lists**

Input to this process is reference picture list RefPicList0 and, when decoding a B slice, also reference picture list RefPicList1.

Outputs of this process are a possibly modified reference picture list RefPicList0 and, when decoding a B slice, also a possibly modified reference picture list RefPicList1.

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## Discussion

According to the above text, the RPL initialization (RPLI) process is the same as MVC, then the RPLM process different than the MVC RPLM process is applied.

Per the MVC RPLI process, the initial RefPicList0, and the initial RefPicList1, if any, do not include any VSP reference component. Therefore, we don't understand how the following step works:

– Otherwise (seq\_view\_synthesis\_flag is equal to 1), if the current slice is a P or SP slice and there exists at least one synthetic reference component in RefPicList0, or if the current slice is a B slice and there exists at least one synthetic reference component in either RefPicList0 or RefPicList1, VspRefExist is set to 1;

To make the step work, the RPLI process needs to be specified to include any VSP reference component into the initial RPLs when needed.

Another related problem is that the variable VspRefExist is heavily used in the slice header for conditioning of the presence of syntax elements, while the variable is only defined in the RPLC decoding process.

# Proposal

To solve the above problems, based on whether the standard should support using of more than one VSP reference component for one texture view component, we propose the following options for the RPLC process. It is suggested that the group make a firm decision on whether to allow for more than one VSP reference components for one texture view component, and choose one of the options accordingly.

## When at most one VSP reference component is used

The first option is based on that at most one VSP reference component is supported for a texture view component.

In this option, a flag vsp\_ref\_flag is signalled in the slice header when VSP reference is possible. This flag is used in the syntax table to replace the variable VspRefExist.

When this flag is equal to 1, one VSP reference component is used, and the VSP reference index (vsp\_ref\_idx) is signalled in the slice header.

In the RPLI process, the VSP reference component identified by the VSP reference index in the slice header is appended to the end of the initial RefPicList0, and, for B slices, the initial RefPicList1. Since in the current configurations the VSP reference component is always put to the end of RPLs, it makes more sense to put it to the list end than to put it the list beginning in RPLI. The lengths of the initial lists are then adjusted according to num\_ref\_idx\_lX\_active\_minus1 (X being 0 or 1), when needed.

In the RPLM syntax, when modification\_of\_pic\_nums\_idc is equal to 6, the vsp\_ref\_idx does not need to be sent, as it is known already.

The RPLM decoding process is the same as currently specified.

## When more than one VSP reference component may be used

The second option is based on that more than one VSP reference component may be used by a texture view component.

In this option, similarly as in option 1, a flag vsp\_ref\_flag is signalled in the slice header when VSP reference is possible. This flag is used in the syntax table to replace the variable VspRefExist.

When this flag is equal to 1, the maximum VSP reference index value (max\_vsp\_ref\_idx) is signalled in the slice header.

In the RPLI process, VSP reference components with VSP reference index values 0..max\_vsp\_ref\_idx are appended to the end of the initial RefPicList0, and, for B slices, the initial RefPicList1, in increasing order of VSP reference index values. The lengths of the initial lists are then adjusted according to num\_ref\_idx\_lX\_active\_minus1 (X being 0 or 1), when needed.

The RPLM syntax and the RPLM process remain the same as currently specified.

# Patent rights declaration(s)

**Qualcomm Incorporated does not have any current or pending patent rights relating to the technology described in this contribution.**