~~WHAT IS CLAIMED IS~~CLAIMS:

1. A method for video decoding ~~in a decoder~~, comprising:

decoding coded information of a chroma coding block (CB) from a coded video bitstream, the coded information indicating that a cross-component filter is applied to the chroma CB, the coded information further indicating a chroma subsampling format ~~and a chroma sample type that indicates a relative position of a chroma sample with respect to at least one luma sample in a corresponding luma CB~~;

determining a filter shape of the cross-component filter ~~based on at least one of the chroma subsampling format and the chroma sample type~~ applied to the chroma CB, wherein a range of filter coefficients of the cross-component filter is less than or equal to K bits and K is a positive integer, and the filter coefficients of the cross-component filter are coded and signaled using fixed-length coding;

generating a first intermediate CB by applying a loop filter to the chroma CB;

generating a second intermediate CB by applying, to a corresponding luma CB, the cross-component filter applied to the chroma CB and having the determined filter shape ~~to the corresponding luma CB~~; and

determining a filtered chroma CB based on the first intermediate CB and the second intermediate CB by combining the loop filtered chroma CB with the cross-component filtered luma CB.

2. The method of claim 1, wherein ~~the~~a chroma sample type is signaled in the coded video bitstream.

3. The method of claim 1, wherein

a number of filter coefficients of the cross-component filter is signaled in the coded video bitstream; and

the determining the filter shape includes determining the filter shape of the cross-component filter based on the number of filter coefficients and ~~the at least one of~~ the chroma subsampling format ~~and the chroma sample type~~.

4. The method of claim ~~1~~2, wherein

the chroma subsampling format is 4:2:0;

the at least one luma sample includes four luma samples that are a top-left sample, a top-right sample, a bottom-left sample, and a bottom-right sample;

the chroma sample type is one of six chroma sample types 0-5 indicating six relative positions 0-5, respectively, and the six relative positions 0-5 of the chroma sample correspond to a left-center position between the top-left and the bottom-left samples, a center position of the four luma samples, a top left position co-located with the top-left sample, a top-center position between the top-left and the top-right samples, a bottom left position co-located with the bottom-left sample, and a bottom–center position between the bottom-left and the bottom-right samples, respectively; and

the determining the filter shape includes determining the filter shape of the cross-component filter based on the chroma sample type.

5. The method of claim 4, wherein the coded video bitstream includes a cross-component linear model (CCLM) flag indicating that the chroma sample type is 0 or 2.

6. The method of claim 1, wherein the cross-component filter is a cross-component adaptive loop filter (CC-ALF) and the loop filter is an adaptive loop filter (ALF).

7. The method of claim 1, wherein ~~a range of filter coefficients of the cross-component filter is less than or equal to K bits and K is a positive integer~~ the filter shape of the cross-component filter is independent of the chroma subsampling format and a chroma sample type of the chroma CB, the chroma sample type indicating a relative position of a chroma sample with respect to at least one luma sample in the corresponding luma CB.

~~8. The method of claim 7, wherein the filter coefficients of the cross-component filter are coded using fixed-length coding.~~

~~9~~8. The method of claim 7, further comprising:

shifting luma sample values of the corresponding luma CB to have a dynamic range of 8 bits based on the dynamic range of the luma sample values being larger than 8 bits, K being 8 bits, wherein

the generating the second intermediate CB includes applying the cross-component filter having the determined filter shape to the shifted luma sample values.

~~10. A method for video decoding in a decoder, comprising:~~

~~decoding coded information of a chroma coding block (CB) from a coded video bitstream, the coded information indicating that a cross-component filter is applied to the chroma CB based on a corresponding luma CB;~~

~~generating a down-sampled luma CB by applying a down-sampling filter to the corresponding luma CB, a chroma horizontal subsampling factor, and a chroma vertical subsampling factor between the chroma CB and the down-sampled luma CB being one;~~

~~generating a first intermediate CB by applying a loop filter to the chroma CB;~~

~~generating a second intermediate CB by applying the cross-component filter to the down-sampled luma CB, a filter shape of the cross-component filter being independent of a chroma subsampling format and a chroma sample type of the chroma CB, the chroma sample type indicating a relative position of a chroma sample with respect to at least one luma sample in the corresponding luma CB; and~~

~~determining a filtered chroma CB based on the first intermediate CB and the second intermediate CB.~~

~~11. The method of claim 10, wherein the down-sampling filter corresponds to a filter applied to co-located luma samples in a CCLM mode.~~

~~12. The method of claim 10, wherein the down-sampling filter is a {1,2,1;1,2,1}/8 filter and the chroma subsampling format is 4:2:0.~~

~~13. The method of claim 10, wherein the filter shape of the cross-component filter is one of a 7×7 diamond shape, a 7×7 square shape, a 5×5 diamond shape, a 5×5 square shape, a 3×3 diamond shape, and a 3×3 square shape.~~

~~14~~9. An apparatus for video decoding, comprising processing circuitry configured to:

decode coded information of a chroma coding block (CB) from a coded video bitstream, the coded information indicating that a cross-component filter is applied to the chroma CB, the coded information further indicating a chroma subsampling format ~~and a chroma sample type that indicates a relative position of a chroma sample with respect to at least one luma sample in a corresponding luma CB~~;

determine a filter shape of the cross-component filter ~~based on at least one of the chroma subsampling format and the chroma sample type~~ applied to the chroma CB, wherein a range of filter coefficients of the cross-component filter is less than or equal to K bits and K is a positive integer, and the filter coefficients of the cross-component filter are coded and signaled using fixed-length coding;

generate a first intermediate CB by applying a loop filter to the chroma CB;

generate a second intermediate CB by applying, to a corresponding luma CB, the cross-component filter applied to the chroma CB and having the determined filter shape; ~~to the corresponding luma CB~~ and

determine a filtered chroma CB based on the first intermediate CB and the second intermediate CB by combining the loop filtered chroma CB with the cross-component filtered luma CB.

~~15~~10. The apparatus of claim ~~14~~9, wherein ~~the~~a chroma sample type is signaled in the coded video bitstream.

~~16~~11. The apparatus of claim ~~14~~9, wherein

a number of filter coefficients of the cross-component filter is signaled in the coded video bitstream; and

the processing circuitry is configured to determine the filter shape of the cross-component filter based on the number of filter coefficients and the ~~at least one of the~~ chroma subsampling format ~~and the chroma sample type~~.

~~17~~12. The apparatus of claim ~~14~~10, wherein

the chroma subsampling format is 4:2:0;

the at least one luma sample includes four luma samples that are a top-left sample, a top-right sample, a bottom-left sample, and a bottom-right sample;

the chroma sample type is one of six chroma sample types 0-5 indicating six relative positions 0-5, respectively, and the six relative positions 0-5 of the chroma sample correspond to a left-center position between the top-left and the bottom-left samples, a center position of the four luma samples, a top left position co-located with the top-left sample, a top-center position between the top-left and the top-right samples, a bottom left position co-located with the bottom-

left sample, and a bottom–center position between the bottom-left and the bottom-right samples, respectively; and

the processing circuitry is configured to determine the filter shape of the cross-component filter based on the chroma sample type.

~~18~~13. The apparatus of claim ~~17~~12, wherein the coded video bitstream includes a cross-component linear model (CCLM) flag indicating that the chroma sample type is 0 or 2.

~~19~~14. The apparatus of claim ~~14~~9, wherein the cross-component filter is a cross-component adaptive loop filter (CC-ALF) and the loop filter is an adaptive loop filter (ALF).

~~20. The apparatus of claim 14, wherein a range of filter coefficients of the cross-component filter is less than or equal to K bits and K is a positive integer.~~