CLAIMS

~~What is claimed is:~~

1. A method implemented in a decoder, the method comprising:

receiving~~, by a receiver of the decoder,~~ a bitstream comprising a plurality of adaptation parameter sets (APSs) including a plurality of APS types associated with a coded slice, wherein each APS includes an APS identifier (ID), and wherein each of the APS types uses a separate value space for the APS ID; and

decoding~~, by the processor,~~ the coded slice using parameters from the plurality of APSs obtained based on the APS IDs;

wherein the plurality of APS types include an adaptive loop filter (ALF) type containing ALF parameters, and a luma mapping with chroma scaling (LMCS) type containing LMCS parameters;

wherein the APS is a syntax structure containing syntax elements that apply to slices, the LMCS parameters are used for a LMCS which is a process that scale chroma values based on luma mappings, and wherein the ALF parameters are used for an ALF which is a filter that is controlled by parameters included in the ALF APS; and

wherein each of the separate value spaces extend over a predefined range. and wherein the predefined ranges are determined based on the APS types.

2. The method of claim 1, wherein the separate value spaces are overlapping.

3. The method of ~~any of claims 1-2~~claim 1 or 2, wherein the plurality of APS types include ~~an adaptive loop filter (ALF) type containing ALF parameters,~~ a scaling list type containing scaling list parameters, wherein the scaling list parameters are included in a scaling list for a transform process~~, and a luma mapping with chroma scaling (LMCS) type containing LMCS parameters~~.

4. The method of any of claims 1~~-~~ to 3, wherein each APS includes an APS parameter type (aps_params_type) code set to a predefined value indicating a type of parameters included in the each APS.

5. The method of any of claims 1~~-~~ to 4, wherein a current APS includes a current APS ID selected from a predefined range across a current value space, wherein the current APS ID is related to a previous APS ID associated with a previous APS of a same type as the current APS, and wherein the current APS ID is not related to another previous APS ID associated with another previous APS of a different type than the current APS.

~~6. The method of any of claims 1-5, wherein each of the separate value spaces extend over a predefined range, and wherein the predefined ranges are determined based on the APS types.~~

~~7~~6. The method of any of claims 1~~-~~ to ~~6~~5, wherein each APS is identified by a combination of a current APS type and a current APS ID.

~~8~~7. A method implemented in an encoder, the method comprising:

determining~~, by the processor,~~ a plurality of types of parameters employed for encoding ~~the coded~~a slice;

encoding~~, by a processor of the encoder,~~ a slice into a bitstream as a coded slice;

encoding~~, by the processor,~~ the plurality of types of parameters into a plurality of adaptation parameter sets (APSs) of the bitstream;

assigning~~, by the processor,~~ an APS identifier (ID) to each of the APSs, wherein each of the APS types uses a separate value space for the APS ID;

encoding~~, by the processor,~~ each APS ID into the plurality of APSs;

wherein the plurality of APS types include an adaptive loop filter (ALF) type containing ALF parameters and a luma mapping with chroma scaling (LMCS) type containing LMCS parameters;

wherein the APS is a syntax structure containing syntax elements that apply to slices, the LMCS parameters are used for a LMCS which is a process that scale chroma values based on luma mappings, and wherein the ALF parameters are used for an ALF which is a filter that is controlled by parameters included in the ALF APS; and

wherein each of the separate value spaces extend over a predefined range, and wherein the predefined ranges are determined based on the APS types.

~~9~~8. The method of claim ~~8~~7, wherein the separate value spaces are overlapping.

~~10~~9. The method of ~~any of claims 8-9~~claim 7 or 8, wherein the plurality of APS types include ~~an adaptive loop filter (ALF) type containing ALF parameters,~~ a scaling list type containing scaling list parameters~~, and a luma mapping with chroma scaling (LMCS) type containing LMCS parameters~~.

~~11~~10. The method of any of claims ~~8~~7- to ~~10~~9, wherein each APS includes an APS parameter type (aps_params_type) code set to a predefined value indicating a type of parameters included in the each APS.

~~12~~11. The method of any of claims ~~8~~7- to ~~11~~10, wherein a current APS includes a current APS ID selected from a predefined range across a current value space, wherein the current APS ID is related to a previous APS ID associated with a previous APS of a same type as the current APS, and wherein the current APS ID is not related to another previous APS ID associated with another previous APS of a different type than the current APS.

~~13. The method of any of claims 8-12, wherein each of the separate value spaces extend over a predefined range, and wherein the predefined ranges are determined based on the APS types.~~

~~14~~12. The method of any of claims ~~8~~7- to ~~13~~11, wherein each APS is identified by a combination of a current APS type and a current APS ID.

~~15~~13. A video coding device comprising:

a processor, a receiver coupled to the processor, a memory coupled to the processor, and a transmitter coupled to the processor, wherein the processor, receiver, memory, and transmitter are configured to perform the method of any of claims 1- to ~~14~~12.

~~16~~14. A non-transitory computer readable medium comprising a computer program product for use by a video coding device, the computer program product comprising computer executable instructions stored on the non-transitory computer readable medium such that when executed by a processor cause the video coding device to perform the method of any of claims 1- to ~~14~~12.

~~17~~15. A decoder comprising:

a receiving unit, configured to receive a bitstream comprising a plurality of adaptation parameter sets (APSs) including a plurality of APS types associated with a coded slice, wherein each APS includes an APS identifier (ID), and wherein each of the APS types uses a separate value space for the APS ID; and

a decoding unit, configured to -decode the coded slice using parameters from the plurality of APSs obtained based on the APS IDs;

wherein the plurality of APS types include an adaptive loop filter (ALF) type containing ALF parameters, and a luma mapping with chroma scaling (LMCS) type containing LMCS parameters;

wherein the APS is a syntax structure containing syntax elements that apply to slices, the LMCS parameters are used for a LMCS which is a process that scale chroma values based on luma mappings, and wherein the ALF parameters are used for an ALF which is a filter that is controlled by parameters included in the ALF APS; and

wherein each of the separate value spaces extend over a predefined range, and wherein the predefined ranges are determined based on the APS types.

~~18~~16. The decoder of claim ~~17~~15, wherein the decoder is further configured to perform the method of any of claims 1- to ~~7~~6.

~~19~~17. An encoder comprising:

a determining unit, configured to determine a plurality of types of parameters employed for encoding a slice;

an encoding unit, configured to:

encode the slice into a bitstream as a coded slice;

encode the plurality of types of parameters into a plurality of adaptation parameter sets (APSs) of the bitstream; and

encode each APS identifier(ID) into the plurality of APSs; and

an assigning unit, configured to -assign an APS ID to each of the APSs, -wherein each of the APS types uses a separate value space for the APS ID;

wherein the plurality of APS types include an adaptive loop filter (ALF) type containing ALF parameters, and a luma mapping with chroma scaling (LMCS) type containing LMCS parameters;

wherein the APS is a syntax structure containing syntax elements that apply to slices, the LMCS parameters are used for a LMCS which is a process that scale chroma values based on luma mappings, and wherein the ALF parameters are used for an ALF which is a filter that is controlled by parameters included in the ALF APS; and

wherein each of the separate value spaces extend over a predefined range, and wherein the predefined ranges are determined based on the APS types.

~~20~~18. The encoder of claim ~~19~~17, wherein the encoder is further configured to perform the method of any of claims ~~8~~7- to ~~14~~12.

~~21~~19. A non-transitory storage medium which includes an encoded bitstream, the bitstream being generated by a method according to any of claims 7 to 12 ~~comprising a plurality of adaptation parameter sets (APSs) including a plurality of APS types associated with a coded slice, wherein each APS includes an APS identifier (ID), and wherein each of the APS types uses a separate value space for the APS ID~~.

~~22~~20. A~~n~~ decoder comprising processing circuitry for carrying out the method according to any one of claims 1 to ~~7~~6.

~~23~~21. An encoder comprising processing circuitry for carrying out the method according to any of claims ~~8~~ 7 to ~~14~~12.

~~24~~22. A computer program product comprising program code for performing the method according to any of claims 1 to ~~14~~ 12 when executed on a computer or a processor.

~~25~~23. A non-transitory computer-readable medium carrying a program code which, when executed by a computer device, causes the computer device to perform the method of any one of claims 1 to ~~14~~12.