CLAIMS

What is claimed is:

1. A method of decoding implemented by a video decoder, comprising:

receiving, by the video decoder, a multi-layer video bitstream including multiple coded pictures within a same access unit, wherein each coded picture of the multiple coded pictures is contained in one layer access unit of multiple layer access units, wherein each layer access unit of the multiple layer access units includes a picture header (PH) network abstraction layer (NAL) unit preceding a first video coding layer (VCL) NAL unit, wherein the first VCL NAL unit includes a slice of a coded picture, wherein the PH NAL unit has a PH NAL unit type (PH_NUT), wherein the PH NAL unit is a non-VCL NAL unit, the value of TemporalId for non-VCL NAL units is constrained as follows:

if nal_unit_type is equal to DPS_NUT, VPS_NUT, or SPS_NUT, TemporalId is equal to 0 and the TemporalId of the layer access unit containing the NAL unit shall be equal to 0;

if nal_unit_type is equal to PH_NUT, TemporalId shall be equal to the TemporalId of the layer access unit containing the NAL unit; and

decoding, by the video decoder, the coded picture from the layer access unit to obtain a decoded picture.2. The method of claim 1, wherein the layer access unit includes only one picture header (PH), and wherein the coded picture is the only picture in the layer access unit.

3. The method of any of claims 1 to 2, wherein the PH NAL unit in the layer access unit precedes each VCL NAL unit in the layer access unit inclusive of a first VCL NAL unit of the layer access unit.

4. The method of claim 2, wherein the PH NAL unit includes the only one PH.

5. The method of claim 4, wherein the only one PH in the PH NAL unit includes syntax elements that apply to all slices of the coded picture.

6. The method of any of claims 1 to 5, wherein the first VCL NAL unit is an initial VCL NAL unit in the layer access unit.

7. The method of any of claims 1 to 6, further comprising displaying the decoded picture on a display of an electronic device.

8. A method of encoding implemented by a video encoder, the method comprising:

generating, by the video encoder, a layer access unit including a picture header (PH) network abstraction layer (NAL) unit preceding a first video coding layer (VCL) NAL unit, wherein the first VCL NAL unit includes a slice of a coded picture, wherein the PH NAL unit has a PH NAL unit type (PH_NUT), wherein the PH NAL unit is a non-VCL NAL unit, the value of TemporalId for non-VCL NAL units is constrained as follows:

if nal_unit_type is equal to DPS_NUT, VPS_NUT, or SPS_NUT, TemporalId is equal to 0 and the TemporalId of the layer access unit containing the NAL unit shall be equal to 0;

if nal_unit_type is equal to PH_NUT, TemporalId shall be equal to the TemporalId of the layer access unit containing the NAL unit;

encoding, by the video encoder, the layer access unit into a video bitstream, wherein the video bitstream is a multi-layer video bitstream including multiple coded pictures within a same access unit, wherein each coded picture of the multiple coded pictures is contained in one layer access unit of multiple layer access units.

9. The method of claim 8, wherein the layer access unit includes only one picture header (PH) and the coded picture, and wherein the coded picture is the only picture in the layer access unit.

10. The method of claim 9, wherein the PH NAL unit in the layer access unit precedes each VCL NAL unit in the layer access unit inclusive of the first VCL NAL unit.

11. A decoding device, comprising:

a receiver configured to receive a multi-layer video bitstream including multiple coded pictures within a same access unit, wherein each coded picture of the multiple coded pictures is contained in one layer access unit of multiple layer access units, wherein each layer access unit of the multiple layer access units includes a picture header (PH) network abstraction layer (NAL) unit preceding a first video coding layer (VCL) NAL unit, wherein the first VCL NAL unit includes a slice of a coded picture,

wherein the PH NAL unit has a PH NAL unit type (PH_NUT), wherein the PH NAL unit is a non-VCL NAL unit, the value of TemporalId for non-VCL NAL units is constrained as follows:

if nal_unit_type is equal to DPS_NUT, VPS_NUT, or SPS_NUT, TemporalId is equal to 0 and the TemporalId of the layer access unit containing the NAL unit shall be equal to 0;

if nal_unit_type is equal to PH_NUT, TemporalId shall be equal to the TemporalId of the layer access unit containing the NAL unit;

a memory coupled to the receiver, the memory storing instructions; and

a processor coupled to the memory, the processor configured to execute the instructions to cause the decoding device to:

decode the coded picture from the layer access unit to obtain a decoded picture.

12. The decoding device of claim 11, wherein the layer access unit includes only one picture header (PH), and wherein the coded picture is the only picture in the layer access unit.

13. The decoding device of claim 12, wherein the PH NAL unit in the layer access unit precedes each VCL NAL unit in the layer access unit inclusive of the first VCL NAL unit.

14. An encoding device, comprising:

a memory containing instructions;

a processor coupled to the memory, the processor configured to implement the instructions to cause the encoding device to:

generate a layer access unit including a picture header (PH) network abstraction layer (NAL) unit preceding a first video coding layer (VCL) NAL unit, wherein the first VCL NAL unit includes a slice of a coded picture, wherein the PH NAL unit has a PH NAL unit type (PH_NUT), wherein the PH NAL unit is a non-VCL NAL unit, the value of TemporalId for non-VCL NAL units is constrained as follows:

if nal_unit_type is equal to DPS_NUT, VPS_NUT, or SPS_NUT, TemporalId is equal to 0 and the TemporalId of the layer access unit containing the NAL unit shall be equal to 0;

if nal_unit_type is equal to PH_NUT, TemporalId shall be equal to the TemporalId of the layer access unit containing the NAL unit;

encode the layer access unit into a video bitstream, wherein the video bitstream is a multi-layer video bitstream including multiple coded pictures within a same access unit, wherein each coded picture of the multiple coded pictures is contained in one layer access unit of multiple layer access units.

15. The encoding device of claim 14, wherein the layer access unit includes only one picture header (PH) and a coded picture, and wherein the coded picture is the only picture in the layer access unit.

16. The encoding device of claim 15, wherein the PH NAL unit in the layer access unit precedes each VCL NAL unit in the layer access unit inclusive of the first VCL NAL unit.

17. A coding apparatus, comprising:

a receiver configured to receive a picture to encode or to receive a bitstream to decode;

a transmitter coupled to the receiver, the transmitter configured to transmit the bitstream to a decoder or to transmit a decoded image to a display;

a memory coupled to at least one of the receiver or the transmitter, the memory configured to store instructions; and

a processor coupled to the memory, the processor configured to execute the instructions stored in the memory to perform the method in any of claims 1 to 7 or any of claims 8 to 10.

18. The coding apparatus of claim 17, further comprising a display configured to display a decoded picture.

19. A system, comprising:

an encoder; and

a decoder in communication with the encoder, wherein the encoder or the decoder includes the decoding device, the encoding device, or the coding apparatus of any of claims 11to 18.

20. A means for coding, comprising:

receiving means configured to receive a picture to encode or to receive a bitstream to decode;

transmission means coupled to the receiving means, the transmission means configured to transmit the bitstream to a decoding means or to transmit a decoded image to a display means;

storage means coupled to at least one of the receiving means or the transmission means, the storage means configured to store instructions; and

processing means coupled to the storage means, the processing means configured to execute the instructions stored in the storage means to perform the method in any of claims 1 to 7 or any of claims 8 to 10.

21. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program that can be executed by a processor, and when the computer program is executed by the processor, the processor performs the method according to any one of claims 1 to 9 or any one of claims 8 to 10.

22. A storage medium, wherein the storage medium stores a bitstream obtained by using the method according to any one of claims 1 to 7 or any one of claims 8 to 10.

23. A program comprising program code for performing the method according to any one of claims 1 to 7 or any one of claims 8 to 10 when executed on a computer or a processor.

24. A coder comprising processing circuitry for carrying out the method according to any one of claims 1 to 7 or any one of claims 8 to 10.