Amended Set of Claims

1. A method for coding video data, the method comprising;

coding a supplemental enhancement information (SEI) message in an access unit, wherein the access unit includes the video data for reconstructing at least one picture, and the SEI message defines a characteristic of the video data;

determining whether there is a restriction on contents of multiple instances of the SEI message in the access unit based on a type of the SEI message; and

coding a copy of the SEI message in the access unit based on the determination that there is not a restriction on the contents of the multiple instances of the SEI message.

2. The method of claim 1, further comprising:

including the SEI message before a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in the access unit; and

including the copy of the SEI message after the first VCL NAL unit in decoding order and before a last VCL NAL unit in decoding order in the access unit,

wherein coding the SEI message comprises encoding the SEI message that is included before the first VCL NAL unit, and

wherein coding the copy of the SEI message comprises encoding the copy of the SEI message that included after the first VCL NAL unit and before the last VCL NAL unit.

3. The method of claim 1, further comprising:

decoding a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in the access unit; and

decoding a last VCL NAL unit in decoding order in the access unit,

wherein coding the SEI message comprises decoding the SEI message prior to decoding the first VCL NAL unit, and

wherein coding the copy of the SEI message comprises decoding the copy of the SEI message after decoding the first VCL NAL unit and prior to decoding the last VCL NAL unit.

4. The method of claim 1, further comprising:

determining the type of the SEI message;

determining a temporal identification value of the access unit; and

determining whether a presence of the SEI message is allowed based on the temporal identification value of the access unit and the type of SEI message,

wherein coding the SEI message comprises coding the SEI message based on the determination that the presence of the SEI message is allowed.

5. The method of claim 1, wherein the SEI message comprises one of:

a buffering period SEI message;

a picture timing SEI message;

a pan-scan rectangle SEI message;

a filler payload SEI message;

a user data registered SEI message;

a user data unregistered SEI message;

a recovery point SEI message;

a scene information SEI message;

a full-frame snapshot SEI message;

a progressive refinement segment start SEI message;

a progressive refinement segment end SEI message;

a film grain characteristics SEI message;

a deblocking filter display preference SEI message;

a post-filter hint SEI message;

a tone mapping information SEI message;

a frame packing arrangement SEI message;

a display orientation SEI message;

a structure of pictures description SEI message;

a field indication SEI message;

a decoded picture hash SEI message;

an active parameter sets SEI message; or

a sub-picture timing SEI message.

6. The method of claim 1, wherein coding the SEI message comprises coding the SEI message in the access unit for a multi-session transmission, and wherein coding the copy of the SEI message comprises coding the copy of the SEI message in the access unit for the multi-session transmission.

7. A device for coding video data, the device comprising a video coder configured to:

code a supplemental enhancement information (SEI) message in an access unit, wherein the access unit includes the video data for reconstructing at least one picture, and the SEI message defines a characteristic of the video data;

determine whether there is a restriction on contents of multiple instances of the SEI message in the access unit based on a type of the SEI message; and

code a copy of the SEI message in the access unit based on the determination that there is not a restriction on the contents of the multiple instances of the SEI message.

8. The device of claim 7, wherein the video coder comprises a video encoder, and wherein the video encoder is configured to:

include the SEI message before a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in the access unit;

include the copy of the SEI message after the first VCL NAL unit in decoding order and before a last VCL NAL unit in decoding order in the access unit;

encode the SEI message that is included before the first VCL NAL unit; and

encode the copy of the SEI message that included after the first VCL NAL unit and before the last VCL NAL unit.

9. The device of claim 7, wherein the video coder comprises a video decoder, and wherein the video decoder is configured to:

decode a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in the access unit;

decode a last VCL NAL unit in decoding order in the access unit;

decode the SEI message prior to decoding the first VCL NAL unit; and

decode the copy of the SEI message after decoding the first VCL NAL unit and prior to decoding the last VCL NAL unit.

10. The device of claim 7, wherein the video coder is configured to:

determine the type of the SEI message;

determine a temporal identification value of the access unit; and

determine whether a presence of the SEI message is allowed based on the temporal identification value of the access unit and the type of SEI message, and

wherein the video coder is configured to code the SEI message based on the determination that the presence of the SEI message is allowed.

11. The device of claim 7, wherein the SEI message comprises one of:

a buffering period SEI message;

a picture timing SEI message;

a pan-scan rectangle SEI message;

a filler payload SEI message;

a user data registered SEI message;

a user data unregistered SEI message;

a recovery point SEI message;

a scene information SEI message;

a full-frame snapshot SEI message;

a progressive refinement segment start SEI message;

a progressive refinement segment end SEI message;

a film grain characteristics SEI message;

a deblocking filter display preference SEI message;

a post-filter hint SEI message;

a tone mapping information SEI message;

a frame packing arrangement SEI message;

a display orientation SEI message;

a structure of pictures description SEI message;

a field indication SEI message;

a decoded picture hash SEI message;

an active parameter sets SEI message; or

a sub-picture timing SEI message.

12. The device of claim 7, wherein the video coder is configured to code the SEI message in the access unit for a multi-session transmission, and wherein the video coder is configured to code the copy of the SEI message in the access unit for the multi-session transmission.

13. The device of claim 7, wherein the device comprises one of:

microprocessor;

an integrated circuit; and

a wireless communication device that includes the video coder.

14. A computer-readable storage medium having instructions stored thereon that when executed by one or more processors of a device for coding video data cause the one or more processors to:

code a supplemental enhancement information (SEI) message in an access unit, wherein the access unit includes the video data for reconstructing at least one picture, and the SEI message defines a characteristic of the video data;

determine whether there is a restriction on contents of multiple instances of the SEI message in the access unit based on a type of the SEI message; and

code a copy of the SEI message in the access unit based on the determination that there is not a restriction on the contents of the multiple instances of the SEI message.

15. The computer-readable storage medium of claim 14, further comprising instructions that cause the one or more processors to:

determine the type of the SEI message;

determine a temporal identification value of the access unit; and

determine whether a presence of the SEI message is allowed based on the temporal identification value of the access unit and the type of SEI message, and

wherein the instructions that cause the one or more processors to code the SEI message comprise instructions that cause the one or more processors to code the SEI message based on the determination that the presence of the SEI message is allowed.

16. The computer-readable storage medium of claim 14, wherein the SEI message comprises one of:

a buffering period SEI message;
a picture timing SEI message;
a pan-scan rectangle SEI message;
a filler payload SEI message;
a user data registered SEI message;
a user data unregistered SEI message;
a recovery point SEI message;
a scene information SEI message;
a full-frame snapshot SEI message;
a progressive refinement segment start SEI message;
a progressive refinement segment end SEI message;
a film grain characteristics SEI message;
a deblocking filter display preference SEI message;
a post-filter hint SEI message;
a tone mapping information SEI message;
a frame packing arrangement SEI message;
a display orientation SEI message;
a structure of pictures description SEI message;
a field indication SEI message;
a decoded picture hash SEI message;
an active parameter sets SEI message; or
a sub-picture timing SEI message.

17. The computer-readable storage medium of claim 14, wherein the instructions that cause the one or more processors to code the SEI message comprise instructions that cause the one or more processors to code the SEI message in the access unit for a multi-session transmission, and wherein the instructions that cause the one or more processors to code the copy of the SEI message comprise instructions that cause the one or more processors to code the copy of the SEI message in the access unit for the multi-session transmission.

18. A device for coding video data, the device comprising:

means for coding a supplemental enhancement information (SEI) message in an access unit, wherein the access unit includes the video data for reconstructing at least one picture, and the SEI message defines a characteristic of the video data;

means for determining whether there is a restriction on contents of multiple instances of the SEI message in the access unit based on a type of the SEI message; and

means for coding a copy of the SEI message in the access unit based on the determination that there is not a restriction on the contents of the multiple instances of the SEI message.

19. The device of claim 18, further comprising:

means for including the SEI message before a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in the access unit; and

means for including the copy of the SEI message after the first VCL NAL unit in decoding order and before a last VCL NAL unit in decoding order in the access unit,

wherein the means for coding the SEI message comprises means for encoding the SEI message that is included before the first VCL NAL unit, and

wherein the means for coding the copy of the SEI message comprises means for encoding the copy of the SEI message that included after the first VCL NAL unit and before the last VCL NAL unit.

20. The device of claim 18, further comprising:

means for decoding a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in the access unit; and

means for decoding a last VCL NAL unit in decoding order in the access unit,

wherein the means for coding the SEI message comprises means for decoding the SEI message prior to decoding the first VCL NAL unit, and

wherein the means for coding the copy of the SEI message comprises means for decoding the copy of the SEI message after decoding the first VCL NAL unit and prior to decoding the last VCL NAL unit.

CLAIMS

1. A method for decoding video data, the method comprising:

decoding, from a bitstream, a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in an access unit, wherein the access unit includes the video data for reconstructing at least one picture;

decoding, from the bitstream, a second VCL NAL unit in decoding order in the access unit;

decoding, from the bitstream, a supplemental enhancement information (SEI) message of a particular type in the access unit prior to decoding, from the bitstream, the first VCL NAL unit, wherein SEI messages contain information associated with processing of the video data; and

decoding, from the bitstream, a copy of the SEI message of the particular type in the access unit after decoding, from the bitstream, the first VCL NAL unit and prior to decoding, from the bitstream, the second VCL NAL unit, wherein content of the copy of the SEI message of the particular type in the bitstream is restricted to be identical to content of the decoded SEI message of the particular type.

2. The method of claim 1, further comprising:

determining the particular type of the SEI message;

determining a temporal identification value of the access unit; and

determining whether a presence of the SEI message is allowed based on the temporal identification value of the access unit and the particular type of the SEI message,

wherein decoding the SEI message comprises decoding the SEI message based on the determination of whether the presence of the SEI message is allowed.

3. The method of claim **1**, wherein the particular type of the SEI message comprises one of:

a buffering period SEI message;
a picture timing SEI message;
a pan-scan rectangle SEI message;
a filler payload SEI message;
a user data registered SEI message;
a user data unregistered SEI message;
a recovery point SEI message;
a scene information SEI message;
a full-frame snapshot SEI message;
a progressive refinement segment start SEI message;
a progressive refinement segment end SEI message;
a film grain characteristics SEI message;
a deblocking filter display preference SEI message;
a post-filter hint SEI message;
a tone mapping information SEI message;
a frame packing arrangement SEI message;
a display orientation SEI message;
a structure of pictures description SEI message;
a field indication SEI message;
a decoded picture hash SEI message;
an active parameter sets SEI message; or
a sub-picture timing SEI message.

4. The method of claim **1**, wherein decoding the SEI message comprises decoding the SEI message in the access unit for a multi-session transmission, and wherein decoding the copy of the SEI message comprises decoding the copy of the SEI message in the access unit for the multi-session transmission.

5. A device for decoding video data, the device comprising:

a memory unit configured to store the video data; and

a video decoder configured to:

decode, from a bitstream, a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in an access unit, wherein the access unit includes the video data for reconstructing at least one picture;

decode, from the bitstream, a second VCL NAL unit in decoding order in the access unit;

decode, from the bitstream, a supplemental enhancement information (SEI) message of a particular type in the access unit prior to decoding, from the bitstream, the first VCL NAL unit, wherein SEI messages contain information associated with processing of the video data; and

decode, from the bitstream, a copy of the SEI message of the particular type in the access unit after decoding, from the bitstream, the first VCL NAL unit and prior to decoding, from the bitstream, the second VCL NAL unit, wherein content of the copy of the SEI message of the particular type in the bitstream is restricted to be identical to content of the decoded SEI message of the particular type.

6. The device of claim **5**, wherein the video decoder is configured to:

determine the particular type of the SEI message;

determine a temporal identification value of the access unit; and

determine whether a presence of the SEI message is allowed based on the temporal identification value of the access unit and the particular type of the SEI message, and

wherein the video decoder is configured to decode the SEI message based on the determination of whether the presence of the SEI message is allowed.

7. The device of claim **5**, wherein the particular type of SEI message comprises one of:

a buffering period SEI message;
a picture timing SEI message;
a pan-scan rectangle SEI message;
a filler payload SEI message;
a user data registered SEI message;
a user data unregistered SEI message;
a recovery point SEI message;
a scene information SEI message;
a full-frame snapshot SEI message;
a progressive refinement segment start SEI message;
a progressive refinement segment end SEI message;
a film grain characteristics SEI message;
a deblocking filter display preference SEI message;
a post-filter hint SEI message;
a tone mapping information SEI message;
a frame packing arrangement SEI message;
a display orientation SEI message;
a structure of pictures description SEI message;
a field indication SEI message;
a decoded picture hash SEI message;
an active parameter sets SEI message; or
a sub-picture timing SEI message.

8. The device of claim **5**, wherein the video decoder is configured to decode the SEI message in the access unit for a multi-session transmission, and wherein the video decoder is configured to decode the copy of the SEI message in the access unit for the multi-session transmission.

9. The device of claim **5**, wherein the device comprises at least one of:

a microprocessor, an integrated circuit, a digital signal processor (DSP), a field programmable gate array (FPGA), a desktop computer, a laptop computer, a tablet computer, a wireless communication device, a phone, a television, a camera, a display device, a digital media player, a video game console, a video game device, or a video streaming device.

10. The device of claim **5**, further comprising:

a display configured to display the at least one picture.

11. The device of claim **5**, further comprising:

a receiver, wherein the receiver is configured to, via wired communication or wireless communication, receive the video data.

12. A non-transitory computer-readable storage medium having stored computer executable instructions thereon that when executed by one or more processors of a device for decoding video data cause the one or more processors to:

decode, from a bitstream, a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in an access unit, wherein the access unit includes the video data for reconstructing at least one picture;

decode, from the bitstream, a second VCL NAL unit in decoding order in the access unit;

decode, from the bitstream, a supplemental enhancement information (SEI) message of a particular type in the access unit prior to decoding, from the bitstream, the first VCL NAL unit, wherein SEI messages contain information associated with processing of the video data; and

decode, from the bitstream, a copy of the SEI message of the particular type in the access unit after decoding, from the bitstream, the first VCL NAL unit and prior to

decoding, from the bitstream, the second VCL NAL unit, wherein content of the copy of the SEI message of the particular type in the bitstream is restricted to be identical to content of the decoded SEI message of the particular type.

13. The non-transitory computer-readable storage medium of claim **12**, further comprising instructions that cause the one or more processors to:

determine the particular type of the SEI message;

determine a temporal identification value of the access unit; and

determine whether a presence of the SEI message is allowed based on the temporal identification value of the access unit and the type of SEI message, and

wherein the instructions that cause the one or more processors to decode the SEI message comprise instructions that cause the one or more processors to decode the SEI message based on the determination of whether the presence of the SEI message is allowed.

14. The non-transitory computer-readable storage medium of claim **12**, wherein the particular type of SEI message comprises one of:

a buffering period SEI message;

a picture timing SEI message;

a pan-scan rectangle SEI message;

a filler payload SEI message;

a user data registered SEI message;

a user data unregistered SEI message;

a recovery point SEI message;

a scene information SEI message;

a full-frame snapshot SEI message;

a progressive refinement segment start SEI message;

a progressive refinement segment end SEI message;

a film grain characteristics SEI message;
a deblocking filter display preference SEI message;
a post-filter hint SEI message;
a tone mapping information SEI message;
a frame packing arrangement SEI message;
a display orientation SEI message;
a structure of pictures description SEI message;
a field indication SEI message;
a decoded picture hash SEI message;
an active parameter sets SEI message; or
a sub-picture timing SEI message.

15. The non-transitory computer-readable storage medium of claim **12**, wherein the instructions that cause the one or more processors to decode the SEI message comprise instructions that cause the one or more processors to decode the SEI message in the access unit for a multi-session transmission, and wherein the instructions that cause the one or more processors to decode the copy of the SEI message comprise instructions that cause the one or more processors to decode the copy of the SEI message in the access unit for the multi-session transmission.

16. A device for decoding video data, the device comprising:

means for decoding, from a bitstream, a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in an access unit, wherein the access unit includes the video data for reconstructing at least one picture;

means for decoding, from the bitstream, a second VCL NAL unit in decoding order in the access unit;

means for decoding, from the bitstream, a supplemental enhancement information (SEI) message of a particular

type in the access unit prior to decoding, from the bitstream, the first VCL NAL unit, wherein SEI messages contain information associated with processing of the video data; and

means for decoding, from the bitstream, a copy of the SEI message of the particular type in the access unit after decoding, from the bitstream, the first VCL NAL unit and prior to decoding, from the bitstream, the second VCL NAL unit, wherein content of the copy of the SEI message of the particular type in the bitstream is restricted to be identical to content of the decoded SEI message of the particular type.

17. A method for encoding video data, the method comprising:

encoding, in an access unit, a supplemental enhancement information (SEI) message of a particular type, wherein the access unit includes the video data for reconstructing at least one picture, and SEI messages contain information associated with processing of the video data;

including the SEI message of the particular type before a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in the access unit;

encoding, based on a restriction on content of multiple instances of the SEI message of the particular type within the access unit, a copy of the SEI message of the particular type in the access unit, the restriction being that content of the encoded copy of the SEI message of the particular type be identical to content of the encoded SEI message of the particular type; and

including the copy of the SEI message after the first VCL NAL unit in decoding order and before a second VCL NAL unit in decoding order in the access unit.

18. A device for encoding video data, the device comprising:

a memory unit configured to store the video data; and

a video encoder configured to:

encode, in an access unit, a supplemental enhancement information (SEI) message of a particular type, wherein the access unit includes the video data for reconstructing at least one picture, and SEI messages contain information associated with processing of the video data;

include the SEI message of the particular type before a first video coding layer (VCL) network abstraction layer (NAL) unit in decoding order in the access unit;

encode, based on a restriction on content of multiple instances of the SEI message of the particular type within the access unit, a copy of the SEI message of the particular type in the access unit, the restriction being that content of the encoded copy of the SEI message of the particular type be identical to content of the encoded SEI message of the particular type; and

include the copy of the SEI message after the first VCL NAL unit in decoding order and before a second VCL NAL unit in decoding order in the access unit.

19. The device of claim **18**, wherein the device comprises at least one of:

a microprocessor, an integrated circuit, a digital signal processor (DSP), a field programmable gate array (FPGA), a desktop computer, a laptop computer, a tablet computer, a wireless communication device, a phone, a television, a camera, a display device, a digital media player, a video game console, a video game device, or a video streaming device.

20. The device of claim **18**, further comprising:

a camera configured to capture the at least one picture.