CLAIMS

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

receiving, by a receiver of the decoder, a bitstream comprising one or more layers and a scalable nesting supplemental enhancement information (SEI) message in a current SEI network abstraction layer (NAL) unit, wherein the scalable nesting SEI message contains one or more scalable-nested SEI messages and one or more scalable nesting layer identifiers (Ids) that specify layer Id values of the layers to which the scalable-nested SEI messages apply;

decoding, by a processor of the decoder, a coded picture from the one or more layers to produce a decoded picture;

forwarding, by the processor, the decoded picture for display as part of a decoded video sequence;

deriving, by the processor, a number of nesting layers (nestingNumLayers) variable that specifies a number of layers to which the scalable-nested SEI messages apply; and

deriving, by the processor, a list of nesting layer Ids (NestingLayerId[i]) that specifies a list of nuh_layer_id values of the layers to which the scalable-nested SEI messages apply for i in a range of zero to nestingNumLayers minus one, inclusive;

wherein the scalable nesting layer Ids are a scalable nesting layer_id[i] syntax element that specifies a NAL unit header layer Id (nuh_layer_id) value of an i-th layer to which the scalable-nested SEI messages apply when a scalable nesting all layers flag (all_layers_flag) is equal to zero,

wherein the nestingNumLayers and the NestingLayerId[i] are derived as follows:

```
if( scalable nesting all_layers_flag ) {
   nestingNumLayers = vps_max_layers_minus1 + 1 −  GeneralLayerIdx[ nuh_layer_id ]
   for( i = 0; i < nestingNumLayers; i ++)
        NestingLayerId[ i ] = vps_layer_id[ GeneralLayerIdx[ nuh_layer_id ] + i ]
} else {
    nestingNumLayers = scalable nesting num_layers_minus1 + 1
    for( i = 0; i < nestingNumLayers; i ++)
        NestingLayerId[ i ] = ( i  = = 0 ) ? nuh_layer_id : scalable nesting layer_id[ i ]
}
```

where scalable nesting all_layers_flag specifies whether the scalable-nested SEI messages apply to all layers, vps_max_layers_minus1 plus one specifies a number of layers specified by a video parameter set (VPS), GeneralLayerIdx is a variable specifying a layer index of a layer with nuh_layer_id equal to vps_layer_id[i], vps_layer_id[i] specifies a nuh_layer_id value of an i-th layer, and scalable nesting num_layers_minus1 plus one specifies a number of layers to which the scalable-nested SEI messages apply.

2. The method of claim 1, wherein each value of scalable nesting layer_id[i] is greater than a nuh_layer_id value of the current SEI NAL unit.

3. The method of any of claims 1-2, wherein scalable nesting num_layers_minus1 is in a range of zero to vps_max_layers_minus1− GeneralLayerIdx[nuh_layer_id], inclusive, where nuh_layer_id is the nuh_layer_id of the current SEI NAL unit.

4. A method implemented in an encoder, the method comprising:

encoding, by a processor of the encoder, a bitstream comprising one or more layers;

encoding into the bitstream, by the processor, a scalable nesting supplemental enhancement information (SEI) message in a current SEI network abstraction layer (NAL) unit, wherein the scalable nesting SEI message contains one or more scalable-nested SEI messages and one or more scalable nesting layer identifiers (Ids) that specify layer Id values of the layers to which the scalable-nested SEI messages apply while applying a constraint to omit a layer Id value of the current SEI NAL unit;

performing, by the processor, a set of bitstream conformance tests on the layers based on the scalable-nested SEI messages; and

storing, by a memory coupled to the processor, the bitstream for communication toward a decoder,

wherein performing the set of bitstream conformance tests further comprises deriving a number of nesting layers (nestingNumLayers) variable that specifies a number of layers to which the scalable-nested SEI messages apply,

wherein performing the set of bitstream conformance tests further comprises deriving a list of nesting layer Ids (NestingLayerId[i]) that specifies a list of nuh_layer_id values of the layers to which the scalable-nested SEI messages apply for i in a range of zero to nestingNumLayers minus one, inclusive,

wherein the scalable nesting layer Id is a scalable nesting layer_id[i] syntax element that specifies a NAL unit header layer Id (nuh_layer_id) value of an i-th layer to which the scalable-nested SEI messages apply when a scalable nesting all layers flag (all_layers_flag) is equal to zero,

wherein the nestingNumLayers and the NestingLayerId[i] are derived as follows:

```
if( scalable nesting all_layers_flag ) {
   nestingNumLayers = vps_max_layers_minus1 + 1 −  GeneralLayerIdx[ nuh_layer_id ]
   for( i = 0; i < nestingNumLayers; i ++)
         NestingLayerId[ i ] = vps_layer_id[ GeneralLayerIdx[ nuh_layer_id ] + i ]
} else {
    nestingNumLayers = scalable nesting num_layers_minus1 + 1
    for( i = 0; i < nestingNumLayers; i ++)
         NestingLayerId[ i ] = ( i  = = 0 ) ? nuh_layer_id : scalable nesting layer_id[ i ]
}
```

where scalable nesting all_layers_flag specifies whether the scalable-nested SEI messages apply to all layers, vps_max_layers_minus1 plus one specifies a number of layers specified by a video parameter set (VPS), GeneralLayerIdx is a variable specifying a layer index of a layer with nuh_layer_id equal to vps_layer_id[i], vps_layer_id[i] specifies a nuh_layer_id value of an i-th layer, and scalable nesting num_layers_minus1 plus one specifies a number of layers to which the scalable-nested SEI messages apply.

5. The method of claim 4, wherein each value of scalable nesting layer_id[i] is greater than a nuh_layer_id value of the current SEI NAL unit.

6. A decoder comprising:

a receiving means for receiving a bitstream comprising one or more layers and a scalable nesting supplemental enhancement information (SEI) message in a current SEI network abstraction layer (NAL) unit, wherein the scalable nesting SEI message contains one or more scalable-nested SEI messages and one or more scalable nesting layer identifiers (Ids) that specify layer Id values of the layers to which the scalable-nested SEI messages apply except a layer Id value of the current SEI NAL unit;

a decoding means for decoding a coded picture from the one or more layers to produce a decoded picture; and

a forwarding means for forwarding the decoded picture for display as part of a decoded video sequence,

a deriving means for deriving a number of nesting layers (nestingNumLayers) variable that specifies a number of layers to which the scalable-nested SEI messages apply; and

a deriving means for deriving a list of nesting layer Ids (NestingLayerId[i]) that specifies a list of nuh_layer_id values of the layers to which the scalable-nested SEI messages apply for i in a range of zero to nestingNumLayers minus one, inclusive;

wherein the scalable nesting layer Ids are a scalable nesting layer_id[i] syntax element that specifies a NAL unit header layer Id (nuh_layer_id) value of an i-th layer to which the scalable-nested SEI messages apply when a scalable nesting all layers flag (all_layers_flag) is equal to zero,

wherein the nestingNumLayers and the NestingLayerId[i] are derived as follows:

```
if( scalable nesting all_layers_flag ) {
   nestingNumLayers = vps_max_layers_minus1 + 1 −  GeneralLayerIdx[ nuh_layer_id ]
   for( i = 0; i < nestingNumLayers; i ++)
        NestingLayerId[ i ] = vps_layer_id[ GeneralLayerIdx[ nuh_layer_id ] + i ]
} else {
    nestingNumLayers = scalable nesting num_layers_minus1 + 1
    for( i = 0; i < nestingNumLayers; i ++)
        NestingLayerId[ i ] = ( i  = = 0 ) ? nuh_layer_id : scalable nesting layer_id[ i ]
}
```

where scalable nesting all_layers_flag specifies whether the scalable-nested SEI messages apply to all layers, vps_max_layers_minus1 plus one specifies a number of layers specified by a video parameter set (VPS), GeneralLayerIdx is a variable specifying a layer index of a layer with nuh_layer_id equal to vps_layer_id[i], vps_layer_id[i] specifies a nuh_layer_id value of an i-th layer, and scalable nesting num_layers_minus1 plus one specifies a number of layers to which the scalable-nested SEI messages apply.

7. An encoder comprising:

an encoding means for:

encoding a bitstream comprising one or more layers; and

encoding into the bitstream a scalable nesting supplemental enhancement information (SEI) message in a current SEI network abstraction layer (NAL) unit, wherein the scalable nesting SEI message contains one or more scalable-nested SEI messages and one or more scalable nesting layer identifiers (Ids) that specify layer Id values of the layers to which the scalable-nested SEI messages apply while applying a constraint to omit a layer Id value of the current SEI NAL unit;

a hypothetical reference decoder (HRD) means for performing a set of bitstream conformance tests on the layers based on the scalable-nested SEI messages; and

a storing means for storing the bitstream for communication toward a decoder,

wherein performing the set of bitstream conformance tests further comprises deriving a number of nesting layers (nestingNumLayers) variable that specifies a number of layers to which the scalable-nested SEI messages apply,

wherein performing the set of bitstream conformance tests further comprises deriving a list of nesting layer Ids (NestingLayerId[i]) that specifies a list of nuh_layer_id values of the layers to which the scalable-nested SEI messages apply for i in a range of zero to nestingNumLayers minus one, inclusive,

wherein the scalable nesting layer Id is a scalable nesting layer_id[i] syntax element that specifies a NAL unit header layer Id (nuh_layer_id) value of an i-th layer to which the scalable-nested SEI messages apply when a scalable nesting all layers flag (all_layers_flag) is equal to zero,

wherein the nestingNumLayers and the NestingLayerId[i] are derived as follows:

```
if( scalable nesting all_layers_flag ) {
   nestingNumLayers = vps_max_layers_minus1 + 1 −  GeneralLayerIdx[ nuh_layer_id ]
   for( i = 0; i < nestingNumLayers; i ++)
         NestingLayerId[ i ] = vps_layer_id[ GeneralLayerIdx[ nuh_layer_id ] + i ]
} else {
    nestingNumLayers = scalable nesting num_layers_minus1 + 1
    for( i = 0; i < nestingNumLayers; i ++)
         NestingLayerId[ i ] = ( i  = = 0 ) ? nuh_layer_id : scalable nesting layer_id[ i ]
}
```

where scalable nesting all_layers_flag specifies whether the scalable-nested SEI messages apply to all layers, vps_max_layers_minus1 plus one specifies a number of layers specified by a video parameter set (VPS), GeneralLayerIdx is a variable specifying a layer index of a layer with nuh_layer_id equal to vps_layer_id[i], vps_layer_id[i] specifies a nuh_layer_id value of an i-th layer, and scalable nesting num_layers_minus1 plus one specifies a number of layers to which the scalable-nested SEI messages apply.