

## 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 data of one or more sub-pictures partitioned from a picture such that a first sub-picture comprises a sub-picture width that is not an integer multiple of a~~includes an incomplete~~ coding tree unit (CTU) size when the first sub-picture includes a right boundary that coincides with the right boundary of the picture; wherein the bitstream further comprises a sequence parameter set (SPS), the SPS comprises a sub-picture identifier (ID), a sub-picture size and a sub-picture location for each of the one or more sub-pictures partitioned from the picture;  
parsing the SPS to obtain the sub-picture ID, the sub-picture size and the sub-picture location for each of the one or more sub-pictures; and  
decoding, ~~by the processor,~~ the one or more sub-pictures to create a video sequence from the bitstream.
2. The method of claim 1, wherein a second sub-picture comprises a sub-picture height that is an integer multiple of the CTU size~~includes an integer number of complete CTUs~~ when the second sub-picture includes a bottom boundary that does not coincide with a bottom boundary of the picture.
3. The method of any one of claims 1-2, wherein a third sub-picture comprises a sub-picture width that is an integer multiple of the CTU size~~includes an integer number of complete CTUs~~ when the third sub-picture includes a right boundary that does not coincide with a right boundary of the picture.
4. The method of any one of claims 1-3, wherein a fourth sub-picture comprises a sub-picture height that is not an integer multiple of the CTU size~~includes an incomplete CTU~~ when the fourth sub-picture includes a bottom boundary that coincides with the bottom boundary of the picture.
5. ~~— A method implemented in a decoder, the method comprising:  
— receiving, by a receiver of the decoder, a bitstream comprising data of one or more sub-pictures partitioned from a picture such that each sub-picture includes a sub-picture width that~~

~~is an integer multiple of a coding tree unit (CTU) size when the each sub-picture includes a right boundary that does not coincide with a right boundary of the picture;~~

~~—decoding, by the processor, the one or more sub-pictures to create a video sequence from the bitstream.~~

~~6. The method of claim 5, wherein each sub-picture includes a sub-picture height that is an integer multiple of the CTU size when the each sub-picture includes a bottom boundary that does not coincide with a bottom boundary of the picture.~~

~~7. The method of any of claims 5-6, wherein at least one of the sub-pictures includes a sub-picture width that is not an integer multiple of the CTU size when the each sub-picture includes a right boundary that coincides with the right boundary of the picture.~~

~~8. The method of any of claims 5-7, wherein at least one of the sub-pictures includes a sub-picture height that is not an integer multiple of the CTU size when the each sub-picture includes a bottom boundary that coincides with the bottom boundary of the picture.~~

95. The method of any one of claims 51-84, wherein the picture includes a picture width that is not an integer multiple of the CTU size.

106. The method of any one of claims 51-95, wherein the picture includes a picture height that is not an integer multiple of the CTU size.

117. The method of any one of claims 51-106, wherein the CTU size is measured in units of luma samples.

~~128.~~ A method implemented in an encoder, the method comprising:  
partitioning, ~~by a processor of the encoder,~~ a picture into a plurality of sub-pictures such that a first sub-picture comprises a sub-picture width that is not an integer multiple of a coding tree unit (CTU) size when the first sub-picture includes a right boundary that coincides with the right boundary of the picture~~each sub-picture includes a sub-picture width that is an integer multiple of a coding tree unit (CTU) size when the each sub-picture includes a right boundary that does not coincide with a right boundary of the picture;~~

encoding a sequence parameter set (SPS) into a bitstream, wherein the SPS comprises a sub-picture identifier (ID), a sub-picture size and a sub-picture location for each of the plurality of sub-pictures partitioned from the picture; and

encoding, ~~by the processor,~~ one or more of the sub-pictures into a the bitstream.

~~139.~~ The method of claim ~~128,~~ the method further comprising:  
storing, in a memory of the encoder, the bitstream for communication toward a decoder.

~~1410.~~ The method of ~~any of claims 12-13~~claim 8 or 9, wherein each sub-picture includes a sub-picture height that is an integer multiple of the CTU size when the each sub-picture includes a bottom boundary that does not coincide with a bottom boundary of the picture.

~~15.—The method of any of claims 12-14, wherein at least one of the sub-pictures includes a sub-picture width that is not an integer multiple of the CTU size when the each sub-picture includes a right boundary that coincides with the right boundary of the picture.~~

~~1611.~~ The method of any one of claims ~~128-1510,~~ wherein at least one of the sub-pictures includes a sub-picture height that is not an integer multiple of the CTU size when the each sub-picture includes a bottom boundary that coincides with the bottom boundary of the picture.

~~1712.~~ The method of any one of claims ~~128-1611,~~ wherein the picture includes a picture width that is not an integer multiple of the CTU size.

~~1813.~~ The method of any one of claims ~~128-1711,~~ wherein the picture includes a picture height that is not an integer multiple of the CTU size.

~~19~~14. The method of any one of claims ~~128-18~~13, wherein the CTU size is measured in units of luma samples.

~~20~~15. A video coding device comprising:

a processor, a memory, a receiver coupled to the processor, and a transmitter coupled to the processor, the processor, memory, receiver, and transmitter configured to perform the method of any one of claims 1-~~19~~14.

~~21~~16. 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 one of claims 1-~~19~~14.

~~22~~17. A decoder comprising:

a receiving unit, configured to receive a bitstream comprising data of one or more sub-pictures partitioned from a picture such that a first sub-picture comprises a sub-picture width that is not an integer multiple of a coding tree unit (CTU) size when the first sub-picture includes a right boundary that coincides with the right boundary of the picture~~each sub-picture includes a sub-picture width that is an integer multiple of a coding tree unit (CTU) size when the each sub-picture includes a right boundary that does not coincide with a right boundary of the picture;~~ wherein the bitstream further comprises a sequence parameter set (SPS), the SPS comprises a sub-picture identifier (ID), a sub-picture size and a sub-picture location for each of the one or more sub-pictures partitioned from the picture;

a parsing unit, configured to parse the SPS to obtain the sub-picture ID, the sub-picture size and the sub-picture location for each of the one or more sub-pictures; and

a ~~generating-decoding~~ unit, configured to ~~generate-decode~~ the one or more sub-pictures to create a video sequence from the bitstream.

~~23~~18. The decoder of claim ~~22~~17, wherein the decoder is further configured to perform the method of any one of claims ~~12-11~~7.

**2419.** An encoder comprising:

a partitioning unit, configured to partition a picture into a plurality of sub-pictures such that a first sub-picture comprises a sub-picture width that is not an integer multiple of a coding tree unit (CTU) size when the first sub-picture includes a right boundary that coincides with the right boundary of the picture~~each sub-picture includes a sub-picture width that is an integer multiple of a coding tree unit (CTU) size when the each sub-picture includes a right boundary that does not coincide with a right boundary of the picture;~~

an encoding unit, configured to encode a sequence parameter set (SPS) into a bitstream, wherein the SPS comprises a sub-picture identifier (ID), a sub-picture size and a sub-picture location for each of the plurality of sub-pictures partitioned from the picture;

the encoding unit, configured to encode one or more of the sub-pictures into a bitstream.

**2520.** The encoder of claim **2419**, the encoder further comprising:

a storing unit, configured to store the bitstream for communication toward a decoder.

**2621.** The encoder of ~~any of claims 24-25~~claim 19 or 20, wherein the encoder is further configured to perform the method of any one of claims ~~129-1914~~.

**2722.** A non-transitory storage medium which includes an encoded bitstream, the bitstream comprising one or more sub-pictures partitioned from a picture such that a first sub-picture comprises a sub-picture width that is not an integer multiple of a~~includes an incomplete~~ coding tree unit (CTU) size when the first sub-picture includes a right boundary that coincides with the right boundary of the picture; wherein the bitstream further comprises a sequence parameter set (SPS), the SPS comprises a sub-picture identifier (ID), a sub-picture size and a sub-picture location for each of the one or more sub-pictures partitioned from the picture;

**2823.** A device for coding, comprising:

receiving unit, configured to receive a bitstream to decode;

transmission unit coupled to the receiving unit, the transmission unit, configured to transmit a decoded image to a display unit;

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

processing unit coupled to the storage unit, the processing unit, configured to execute the instructions stored in the storage unit to perform the method in any one of claims 1 to ~~1514~~.

~~29~~24. An decoder comprising processing circuitry for carrying out the method according to any one of claims 1 to ~~11~~7.

~~30~~25. A n encoder comprising processing circuitry for carrying out the method according to any one of claims ~~12-8~~ to ~~19~~14.

~~31~~26. A computer program product comprising program code for performing the method according to any one of claims 1 to ~~19-14~~ when executed on a computer or a processor.

~~32~~27. 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 ~~19~~14.