

CLAIMS

What is claimed is:

1. An apparatus for splitting an image into coding units, the apparatus including a processing circuitry which is configured to:
 - 5 subdivide the image into coding tree units, CTUs, including a non-boundary CTU with a size in a horizontal and a vertical direction and a boundary CTU having a portion within the image delimited by a horizontal or vertical image boundary, the portion having a size smaller than the size in a direction perpendicular to the image boundary; and
 - 10 partition the non-boundary CTU and the boundary CTU hierarchically into respective coding units, wherein
 - 15 the hierarchical partitioning of the non-boundary CTU includes multi-type splitting with a maximum non-boundary multi-type partition depth, multi-type splitting being splitting with the splitting direction being either the vertical or the horizontal direction, and
 - 15 the hierarchical partitioning of the boundary CTU includes multi-type splitting with a maximum boundary multi-type partition depth.
2. The apparatus for splitting an image according to claim 1, wherein the maximum boundary multi-type partition depth is a sum of at least an adaptive boundary multi-type partition depth and a predefined multi-type partition depth, the adaptive boundary multi-type partition depth being a depth of multi-type splitting with splitting direction being the direction of the image boundary.
3. The apparatus for splitting an image according to claim 2, wherein the predefined multi-type partition depth is equal to the maximum non-boundary multi-type partition depth.
4. The apparatus for splitting an image according to claim 2 or 3, wherein the sum further includes a function of a ratio of sizes in the direction of the image boundary and the direction perpendicular to the image boundary of a boundary partition block of the boundary CTU, the boundary partition block being a block of the adaptive boundary multi-type partition depth.

5. The apparatus for splitting an image according to claim 4, wherein the function is the binary logarithm.
6. The apparatus for splitting an image according to claim 1, the maximum boundary multi-type partition depth being predefined.
7. The apparatus for splitting an image according to any of claims 1 to 6, wherein the hierarchical splitting of the boundary CTU further includes quad tree splitting.
8. The apparatus for splitting an image according to any of claims 1 to 7, wherein the maximum boundary multi-type partition depth is equal to or greater than the maximum non-boundary multi-type partition depth.
9. An apparatus for encoding an image of a video sequence comprising:
the apparatus for splitting an image according to any of claims 1 to 8,
an image coding unit configured to encode the coding units; and
a bitstream forming unit configured to generate a bitstream including the encoded coding units and a partitioning information indicating how the coding tree units are partitioned.
10. The apparatus for encoding an image of a video sequence according to claim 9, wherein
the apparatus for splitting an image is the apparatus according to claim 6, and
the bitstream further includes an encoded sequence parameter set including the maximum boundary multi-type partitioning depth.
11. An apparatus for decoding an image of a video sequence comprising:
a bitstream parser for parsing a bitstream including encoded coding units;

the apparatus for determining splitting of an image according to any of claims 1 to 8;
and

an image decoding unit for decoding the encoded coding units based on the determined
splitting of the image.

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12. The apparatus for decoding an image according to claim 11, wherein

the apparatus for determining splitting of an image is the apparatus according to claim
6,

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the bitstream further includes an encoded sequence parameter set including the
maximum boundary multi-type partitioning depth, and

the apparatus for determining splitting of an image is further configured to obtain the
second maximum multi-type partitioning depth from the sequence parameter set.

13. A method for splitting an image into coding units, the method including:

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subdividing the image into coding tree units, CTUs, including a non-boundary CTU with
a size in a horizontal and a vertical direction and a boundary CTU having a portion
within the image delimited by a horizontal or vertical image boundary, the portion having
a size smaller than the size in a direction perpendicular to the image boundary; and

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partitioning the non-boundary CTU and the boundary CTU hierarchically into respective
coding units wherein

the hierarchical partitioning of the non-boundary CTU includes multi-type splitting with
a maximum non-boundary multi-type partition depth, multi-type splitting being splitting
with the splitting direction being either the vertical or the horizontal direction, and

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the hierarchical partitioning of the boundary CTU includes multi-type splitting with a
maximum boundary multi-type partition depth.

14. A method for encoding an image of a video sequence, the method including

the steps of splitting an image into coding units according to claim 13,

an image coding step of encoding the coding units; and

a bitstream forming step of generating a bitstream including the encoded coding units and a partitioning information indicating how the coding tree units are partitioned.

15. A method for decoding an image of a video sequence, the method including
- 5 a step of parsing a bitstream including the encoded coding units;
- the steps of determining splitting of an image according claim 13; and
- an image decoding step of decoding the encoded coding units based on the determined splitting of the image.
- 10 16. A computer readable medium storing instructions which, when executed by a processing circuitry, cause the processing circuitry to execute the method according to any of claims 13 to 15.