

CLAIMS

1. A method of coding implemented by a decoding apparatus, the method comprises:
obtaining information of Intra Sub-Partitions (ISP), wherein the information of ISP indicates
whether ISP is used for splitting a luma coding block of a coding unit;
determining a size of a chroma transform block (TB) of the coding unit based on SubWidthC
and SubHeightC when at least a first condition is fulfilled, wherein SubWidthC and
SubHeightC are variables depending on chroma format information, wherein the chroma
format information indicates a chroma format of a picture the coding unit belongs to, the
chroma format includes at least one of: ~~4:2:0~~, or 4:2:2, or 4:4:4, and wherein the first
condition comprises: 1) a single tree is used to partition the coding unit, and 2) the
information of ISP indicates that ISP is used for splitting the luma coding block;

wherein the size of the chroma transform block satisfies:

$wC = \text{CbWidth}[x0][y0] / \text{SubWidthC}$; and

$hC = \text{CbHeight}[x0][y0] / \text{SubHeightC}$;

wherein wC represents a width of the chroma transform block, hC represents a height of
the chroma transform block, CbWidth represents a width of the luma coding block, and
CbHeight represents a height of the luma coding block.

~~2. The method of claim 1, wherein the size of the chroma transform block also depends on a
size of the luma coding block.~~

~~3. The method of claim 2, wherein the size of the chroma transform block satisfies:~~

~~$wC = \text{CbWidth}[x0][y0] / \text{SubWidthC}$; and~~

~~$hC = \text{CbHeight}[x0][y0] / \text{SubHeightC}$;~~

~~wherein wC represents a width of the chroma transform block, hC represents a height of
the chroma transform block, CbWidth represents a width of the luma coding block, and
CbHeight represents a height of the luma coding block.~~

~~4.~~ 2. The method of ~~any one of~~ claims 1-3, wherein SubWidthC and SubHeightC satisfy:

$\text{SubWidthC} = (1 + \log_2(w_{\text{luma}} / w_{\text{chroma}}));$

$\text{SubHeightC} = (1 + \log_2(h_{\text{luma}} / h_{\text{chroma}}));$

wherein w_{luma} , h_{luma} are the dimensions corresponding to a luma array; w_{chroma} , h_{chroma} are the dimensions corresponding to a chroma array.

53. The method of claim ~~2~~~~or~~~~31~~, wherein a size of the chroma transform block is determined according to the following rule:

-if the chroma format equals to 4:4:4, the size of the chroma transform block equals to the size of the luma coding block;
-otherwise, the size of the chroma transform block is determined as a function of the size of the luma coding block and the chroma format.

64. The method of any one of claims 1-53, wherein determining the size of the chroma transform block of the coding unit based on the SubWidthC and SubHeightC when the first condition and a second condition are fulfilled, wherein the second condition comprises that a variable ChromaArrayType is not equal to a default value.

75. The method of any one of claims 1-64, wherein the information of ISP is indicated by IntraSubPartitionsSplitType; and
when IntraSubPartitionsSplitType $\neq$ ISP_NO_SPLIT, ISP is used for splitting the luma coding block of the coding unit.

86. A method of coding implemented by an encoding apparatus, the method comprises:
determining a size of a chroma transform block of a coding unit based on SubWidthC and SubHeightC when at least a first condition is fulfilled,
wherein SubWidthC and SubHeightC are variables depending on chroma format information,
wherein the chroma format information indicates a chroma format of a picture the coding unit belongs to, the chroma format includes at least one of: 4:2:0, ~~or~~ 4:2:2, or 4:4:4, and wherein the first condition comprises: 1) a single tree is used to partition the coding unit, and 2) ISP is used for splitting a luma coding block of the coding unit, and
encoding a bitstream, wherein the bitstream includes information to indicate that ISP is used for splitting the luma coding block of the coding unit;

wherein the size of the chroma transform block is determined according to:

$wC = \text{CbWidth}[x0][y0] / \text{SubWidthC}$; and

$hC = \text{CbHeight}[x0][y0] / \text{SubHeightC}$;

wherein w_C represents a width of the chroma transform block, h_C represents a height of the chroma transform block, $CbWidth$ represents a width of the luma coding block, and $CbHeight$ represents a height of the luma coding block.

~~9. The method of claim 8, wherein the size of the chroma transform block also depends on a size of the luma coding block.~~

~~10. The method of claim 8 or 9, wherein the size of the chroma transform block is determined according to:~~

~~$w_C = CbWidth[x_0][y_0] / SubWidthC$; and~~

~~$h_C = CbHeight[x_0][y_0] / SubHeightC$;~~

~~wherein w_C represents a width of the chroma transform block, h_C represents a height of the chroma transform block, and $CbWidth$ represents a width of the luma coding block, and $CbHeight$ represents a height of the luma coding block.~~

~~117.~~ The method of ~~any one of~~ claims 8-106, wherein $SubWidthC$ and $SubHeightC$ are determined as follows:

$SubWidthC = (1 + \log_2(w_{luma} / w_{chroma}));$

$SubHeightC = (1 + \log_2(h_{luma} / h_{chroma}));$

wherein w_{luma} , h_{luma} are the dimensions corresponding to a luma array; w_{chroma} , h_{chroma} are the dimensions corresponding to a chroma array.

~~128.~~ The method of claim ~~9 or 106~~, wherein a size of the chroma transform block is determined according to the following rule:

-if the chroma format equals to 4:4:4, the size of the chroma transform block equals to the size of the luma coding block;

-otherwise, the size of the chroma transform block is determined as a function of the size of the luma coding block and the chroma format.

~~139.~~ The method of any one of claims ~~86-128~~, wherein determining the size of the chroma transform block of the coding unit based on the $SubWidthC$ and $SubHeightC$ when the first condition and a second condition are fulfilled, wherein the second condition comprises that a variable $ChromaArrayType$ is not equal to a default value.

~~1410~~. The method of any one of claims ~~86-139~~, wherein the information of ISP is indicated by IntraSubPartitionsSplitType; and
when IntraSubPartitionsSplitType != ISP_NO_SPLIT, ISP is used for splitting the luma coding block of the coding unit.

~~1511~~. A decoding apparatus for Intra Sub-Partitions (ISP), the apparatus comprises:
an obtaining unit, configured to obtain information of ISP, wherein the information of ISP indicates whether ISP is used for splitting a luma coding block of a coding unit;
a determining unit, configured to determine a size of a chroma transform block (TB) of the coding unit based on SubWidthC and SubHeightC when at least a first condition is fulfilled, wherein SubWidthC and SubHeightC are variables depending on chroma format information, wherein the chroma format information indicates a chroma format of a picture the coding unit belongs to, the chroma format includes at least one of: ~~4:2:0, or~~ 4:2:2, or 4:4:4, and wherein the first condition comprises: 1) a single tree is used to partition the coding unit, and 2) the information of ISP indicates that ISP is used for splitting the luma coding block;

wherein the size of the chroma transform block satisfies:

$wC = \text{CbWidth}[x0][y0] / \text{SubWidthC}$; and

$hC = \text{CbHeight}[x0][y0] / \text{SubHeightC}$;

wherein wC represents a width of the chroma transform block, hC represents a height of the chroma transform block, CbWidth represents a width of the luma coding block, and CbHeight represents a height of the luma coding block.

~~16. The apparatus of claim 15, wherein the size of the chroma transform block also depends on a size of the luma coding block.~~

~~17. The apparatus of claim 16, wherein the size of the chroma transform block satisfies:~~

~~$wC = \text{CbWidth}[x0][y0] / \text{SubWidthC}$; and~~

~~$hC = \text{CbHeight}[x0][y0] / \text{SubHeightC}$;~~

~~wherein wC represents a width of the chroma transform block, hC represents a height of the chroma transform block, CbWidth represents a width of the luma coding block, and CbHeight represents a height of the luma coding block.~~

~~1812~~. The apparatus of ~~any one of claims 15-1711~~, wherein SubWidthC and SubHeightC satisfy:

$$\text{SubWidthC} = (1 + \log_2(w_{\text{luma}} / w_{\text{chroma}}));$$

$$\text{SubHeightC} = (1 + \log_2(h_{\text{luma}} / h_{\text{chroma}}));$$

- 5 wherein w_{luma} , h_{luma} are the dimensions corresponding to a luma array; w_{chroma} , h_{chroma} are the dimensions corresponding to a chroma array.

~~1913~~. The apparatus of claim ~~16 or 1711~~, wherein the determining unit is configured to determine the size of the chroma transform block according to the following rule:

- 10 -if the chroma format equals to 4:4:4, the size of the chroma transform block equals to the size of the luma coding block;
-otherwise, the size of the chroma transform block is determined as a function of the size of the luma coding block and the chroma format.

- 15 ~~2014~~. The apparatus of any one of claims ~~15-1911-13~~, wherein the determining unit is configured to determine the size of the chroma transform block of the coding unit based on the SubWidthC and SubHeightC when the first condition and a second condition are fulfilled, wherein the second condition comprises that a variable ChromaArrayType is not equal to a default value.

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~~2115~~. The apparatus of any one of claims ~~15-2011-14~~, wherein the information of ISP is indicated by IntraSubPartitionsSplitType; and
when $\text{IntraSubPartitionsSplitType} \neq \text{ISP_NO_SPLIT}$, ISP is used for splitting the luma coding block of the coding unit.

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- ~~2216~~. An encoding apparatus for Intra Sub-Partitions (ISP), the apparatus comprises:
a determining unit, configured to determine a size of a chroma transform block of a coding unit based on SubWidthC and SubHeightC when at least a first condition is fulfilled, wherein SubWidthC and SubHeightC are variables depending on chroma format information, wherein
30 the chroma format information indicates a chroma format of a picture the coding unit belongs to, the chroma format includes at least one of: 4:2:0, or 4:2:2, or 4:4:4, and wherein the first condition comprises: 1) a single tree is used to partition the coding unit, and 2) ISP is used for splitting a luma coding block of the coding unit, and

an encoding unit, configured to encode a bitstream, wherein the bitstream includes information to indicate that ISP is used for splitting the luma coding block of the coding unit; wherein the determining unit configured to determine the size of the chroma transform block according to:

5 $w_C = \text{CbWidth}[x_0][y_0] / \text{SubWidthC}$; and

$h_C = \text{CbHeight}[x_0][y_0] / \text{SubHeightC}$;

wherein w_C represents a width of the chroma transform block, h_C represents a height of the chroma transform block, and CbWidth represents a width of the luma coding block, and CbHeight represents a height of the luma coding block.

10 ~~23. The apparatus of claim 22, wherein the size of the chroma transform block also depends on a size of the luma coding block.~~

15 ~~24. The apparatus of claim 23, wherein the determining unit configured to determine the size of the chroma transform block according to:~~

~~$w_C = \text{CbWidth}[x_0][y_0] / \text{SubWidthC}$; and~~

~~$h_C = \text{CbHeight}[x_0][y_0] / \text{SubHeightC}$;~~

~~wherein w_C represents a width of the chroma transform block, h_C represents a height of the chroma transform block, and CbWidth represents a width of the luma coding block, and~~

20 ~~CbHeight represents a height of the luma coding block.~~

~~25~~17. The apparatus of ~~any one of claims 22-24~~16, wherein the determining unit configured to determine SubWidthC and SubHeightC as follows:

$\text{SubWidthC} = (1 + \log_2(w_{\text{luma}} / w_{\text{chroma}}));$

25 $\text{SubHeightC} = (1 + \log_2(h_{\text{luma}} / h_{\text{chroma}}));$

wherein w_{luma} , h_{luma} are the dimensions corresponding to a luma array; w_{chroma} , h_{chroma} are the dimensions corresponding to a chroma array.

30 ~~26~~18. The apparatus of any one of claims ~~23-24~~16-2417, wherein the determining unit configured to determine the size of the chroma transform block according to the following rule:

-if the chroma format equals to 4:4:4, the size of the chroma transform block equals to the size of the luma coding block;

-otherwise, the size of the chroma transform block is determined as a function of the size of the luma coding block and the chroma format.

5 ~~27~~19. The apparatus of any one of claims ~~22~~16-~~26~~18, wherein the determining unit configured to determine the size of the chroma transform block of the coding unit based on the SubWidthC and SubHeightC when the first condition and a second condition are fulfilled, wherein the second condition comprises that a variable ChromaArrayType is not equal to a default value.

10 ~~28~~20. The apparatus of any one of claims ~~22~~16-~~27~~19, wherein the information of ISP is indicated by IntraSubPartitionsSplitType; and when IntraSubPartitionsSplitType != ISP_NO_SPLIT, ISP is used for splitting the luma coding block of the coding unit.

15 ~~29~~21. An encoder (20) comprising processing circuitry for carrying out the method according to any one of claims ~~8~~6 to ~~14~~10.

20 ~~30~~22. A decoder (30) comprising processing circuitry for carrying out the method according to any one of claims 1 to ~~7~~5.

~~31~~23. A computer program product comprising a program code for performing the method according to any one of claims 1 to ~~14~~10.

25 ~~32~~24. A decoder, comprising:
one or more processors; and
a non-transitory computer-readable storage medium coupled to the processors and storing programming for execution by the processors, wherein the programming, when executed by the processors, configures the decoder to carry out the method according to any one of claims 1 to ~~7~~5.

30 ~~33~~25. An encoder, comprising:
one or more processors; and
a non-transitory computer-readable storage medium coupled to the processors and storing programming for execution by the processors, wherein the programming, when executed by

the processors, configures the encoder to carry out the method according to any one of claims ~~86~~ to ~~14~~10.