CLAIMS:

1. An apparatus for splitting a portion of a picture into coding units, the apparatus including a processing circuitry configured to:

subdivide the portion of the picture into an integer number of coding tree units with a predetermined size and a boundary coding tree unit located on a picture boundary, wherein the boundary coding tree unit comprises a first portion located inside the picture with a size smaller than the predetermined size in at least a first direction, which is either a horizontal or a vertical direction, and a second portion located outside the picture; and

partition the boundary coding tree unit by quad-tree partitioning in N shallowest levels, N being an integer larger than zero and smaller than a number of partitioning hierarchy levels of the boundary coding tree unit, and partition at least one coding unit resulting from the quad-tree partitioning into a number of coding units with different sizes in the horizontal direction and the vertical direction according to a binary-tree partitioning,

wherein, responsive to determining that a current coding unit of the number of coding units is located on the picture boundary with a first portion of the current coding unit located inside the picture and a second portion of the current coding unit located outside the picture, the processing circuitry is configured to recursively partition the current coding unit according to the binary-tree partitioning until each coding unit resulting from the recursive partitioning is located inside the picture.

2. The apparatus according to claim 1, wherein the current coding unit is partitioned using a horizontal binary-tree partitioning responsive to determining that the current coding unit is located on a bottom boundary of the picture and no sample of the current coding unit is located beyond a right boundary of the picture, or wherein the current coding unit is partitioned using a vertical binary-tree partitioning responsive to determining that the current coding unit is located on a right boundary of the picture and no sample of the current coding unit is located beyond a bottom boundary of the picture.

3. The apparatus according to claim 1, wherein the apparatus comprises an encoder, the encoder is further configured to generate a bitstream to encode the portion of the picture, and a partition flag for the current coding unit is not included in the bitstream.

4. The apparatus according to claim 1, wherein the apparatus comprises a decoder, the decoder is further configured to receive a bitstream that encodes the portion of the picture, and the bitstream does not include a partition flag for the current coding unit.

5. The apparatus according to claim 1, wherein the processing circuitry is further configured to:

recursively partition a corner boundary coding tree unit according to a quad-tree partitioning until a right bottom sample of each coding unit resulting from the partitioning is located inside the picture.

6. The apparatus according to claim 1, wherein the processing circuitry is further configured to partition a particular coding unit partitioned from the current coding unit and having a bottom right sample located inside the picture based on rate-distortion optimization.

7. An apparatus for encoding an image of a video sequence, the apparatus comprising:

the apparatus for splitting a portion of the image into coding units according to claim 1;

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, wherein a partition flag indicating the partitioning of the at least one coding unit resulting from the partitioning of the boundary coding tree unit is not included in the bitstream.

8. An apparatus for decoding an image of a video sequence comprising:

the apparatus for splitting a portion of the image into coding units according to claim 1;

a bitstream parser for parsing a bitstream including encoded coding units, wherein the bitstream does not include a partition flag for the at least one coding unit resulting from the partitioning of the boundary coding tree unit; and

an image decoding unit for decoding the encoded coding units.

9. A method for splitting a portion of an image into coding units, the method comprising:

subdividing the portion of the image into an integer number of coding tree units with a predetermined size and a boundary coding tree unit located on a picture boundary, wherein the boundary coding tree unit comprises a first portion located inside the picture with a size smaller than the predetermined size in at least a first direction, which is either a horizontal or a vertical direction, and a second portion located outside the picture; and

partitioning the boundary coding tree unit by quad-tree partitioning in N shallowest levels, N being an integer larger than zero and smaller than a number of partitioning hierarchy levels of the boundary coding tree unit, and partitioning at least one coding unit resulting from the quad-tree partitioning into a number of coding units with different sizes in the horizontal direction and the vertical direction according to a binary-tree partitioning,

wherein, responsive to determining that a current coding unit of the number of coding units is located on the picture boundary with a first portion of the current coding unit located inside the picture and a second portion of the current coding unit located outside the picture, the processor is configured to recursively partition the current coding unit according to the binary-tree partitioning until each coding unit resulting from the recursive partitioning is located inside the picture.

10. A non-transitory computer readable medium storing instructions that, when executed by a processor, cause the processor to split a portion of an image into coding units by:

subdividing the portion of the image into an integer number of coding tree units with a predetermined size and a boundary coding tree unit located on a picture boundary, wherein the boundary coding tree unit comprises a first portion located inside the picture with a size smaller than the predetermined size in at least a first direction, which is either a horizontal or a vertical direction, and a second portion located outside the picture; and

partitioning the boundary coding tree unit by quad-tree partitioning in N shallowest levels, N being an integer larger than zero and smaller than a number of partitioning hierarchy levels of the boundary coding tree unit, and partitioning at least one coding unit resulting from the quad-tree partitioning into a number of coding units with different sizes in the horizontal direction and the vertical direction according to a binary-tree partitioning,

wherein, responsive to determining that a current coding unit of the number of coding units is located on the picture boundary with a first portion of the current coding unit located inside the picture and a second portion of the current coding unit located outside the picture, the processor is configured to recursively partition the current coding unit according to the binary-tree partitioning until each coding unit resulting from the recursive partitioning is located inside the picture.