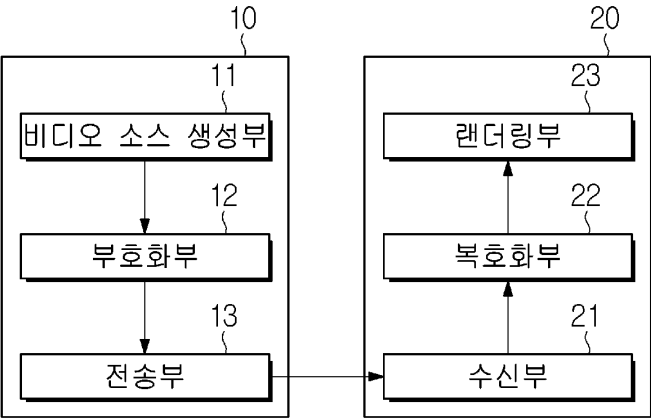
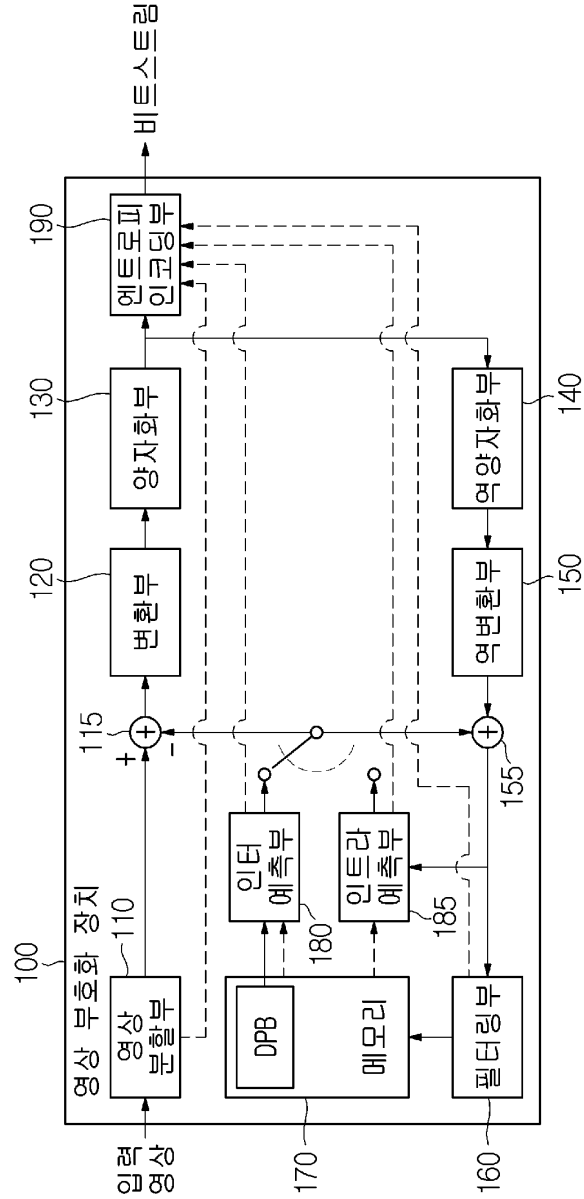


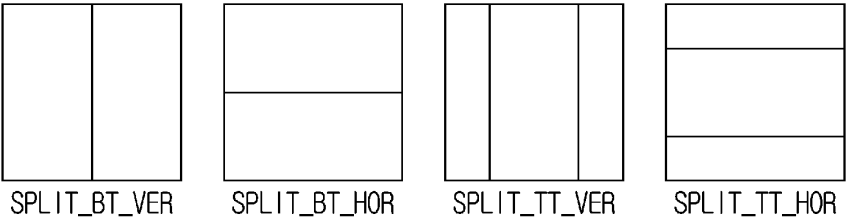
[도1]



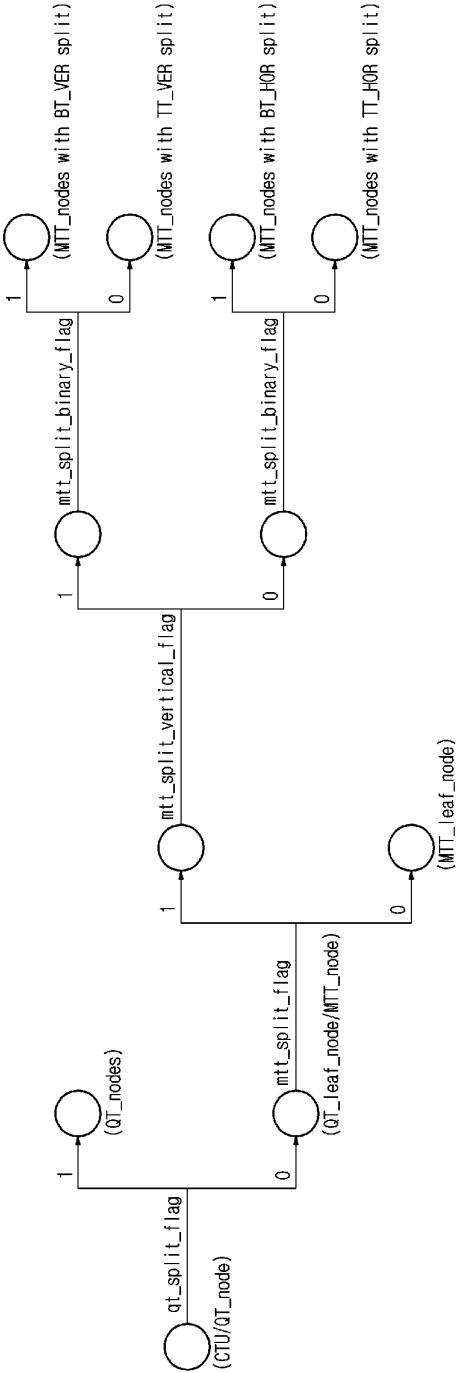
[도2]



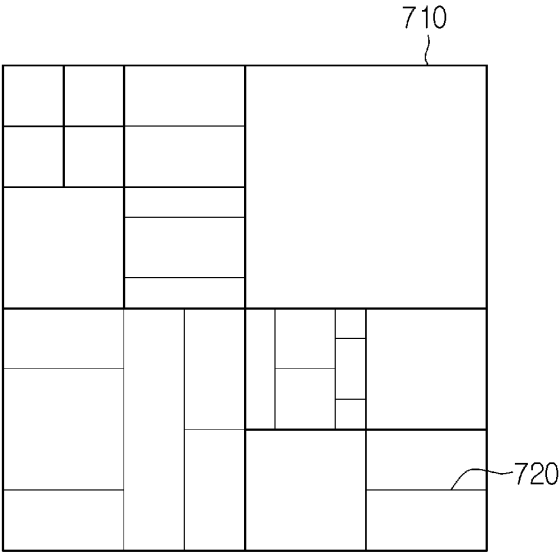
[도5]



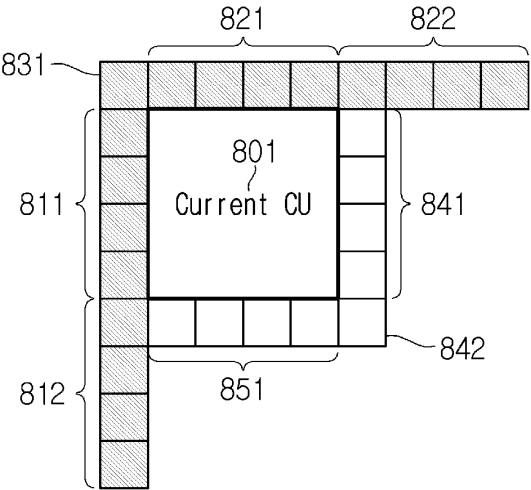
[도6]



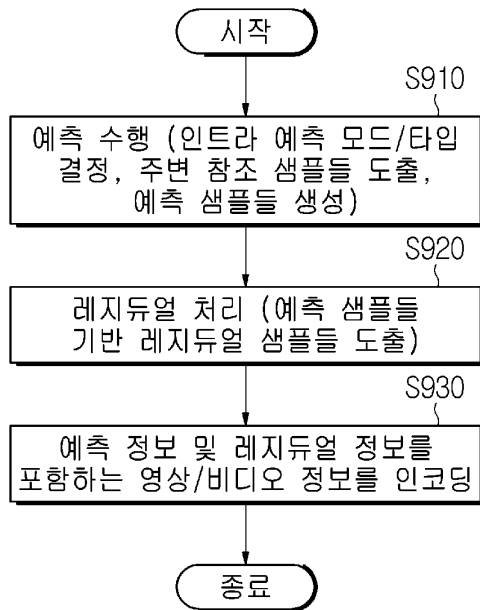
[도7]



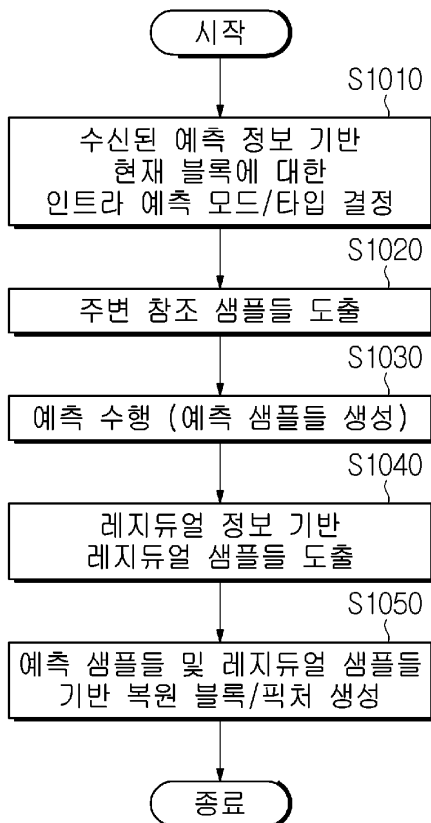
[도8]



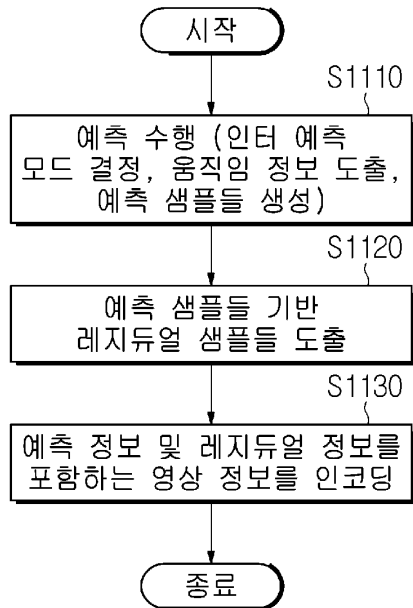
[도9]



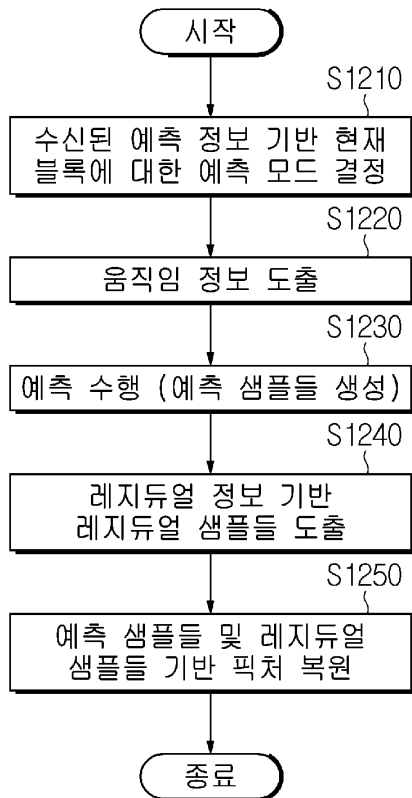
[도10]



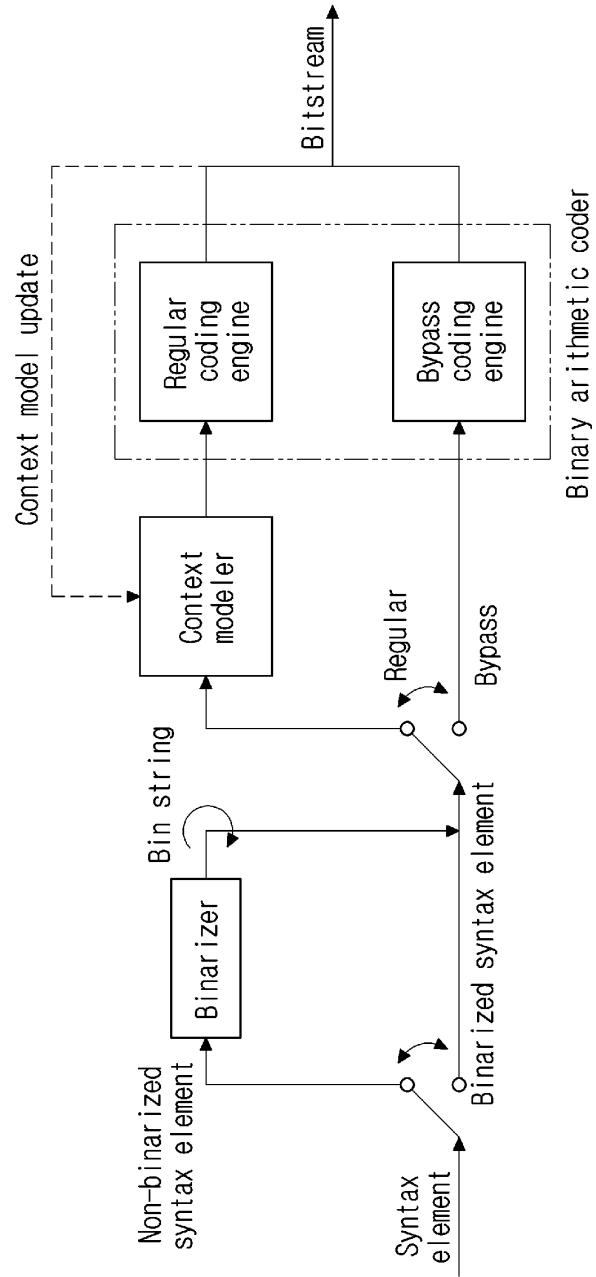
[도11]



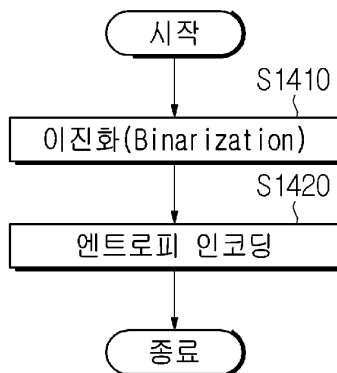
[도12]



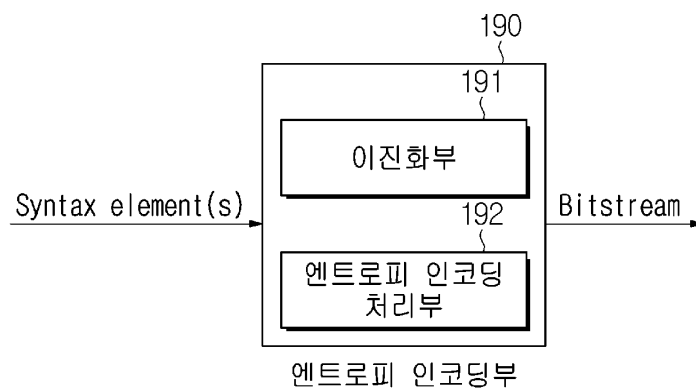
[도13]



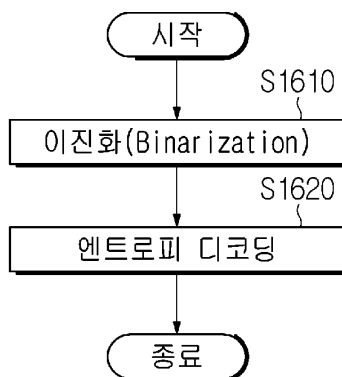
[도14]



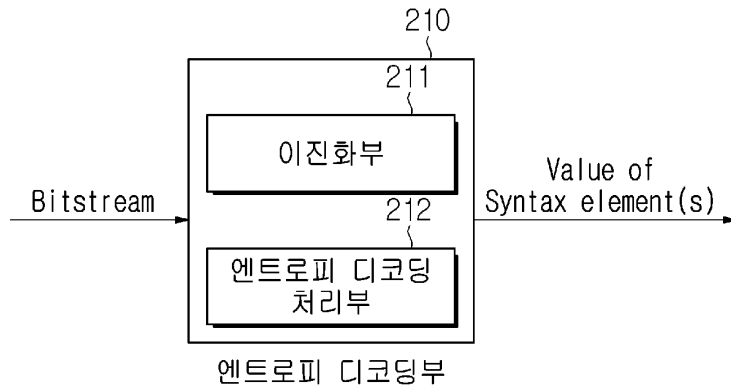
[도15]



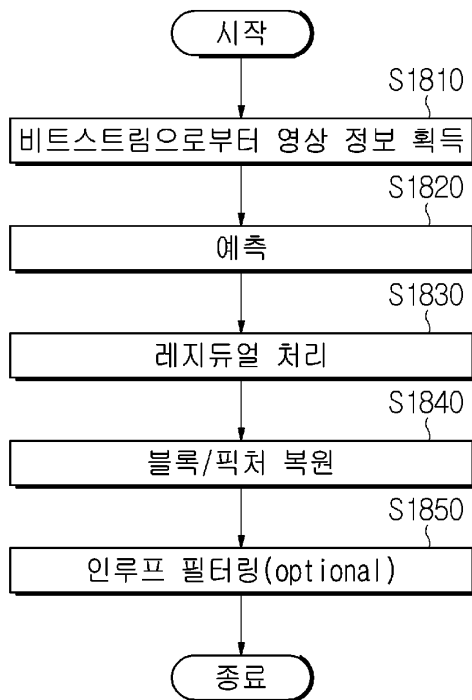
[도16]



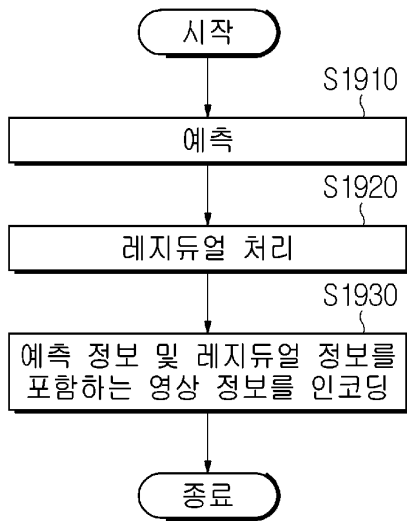
[도17]



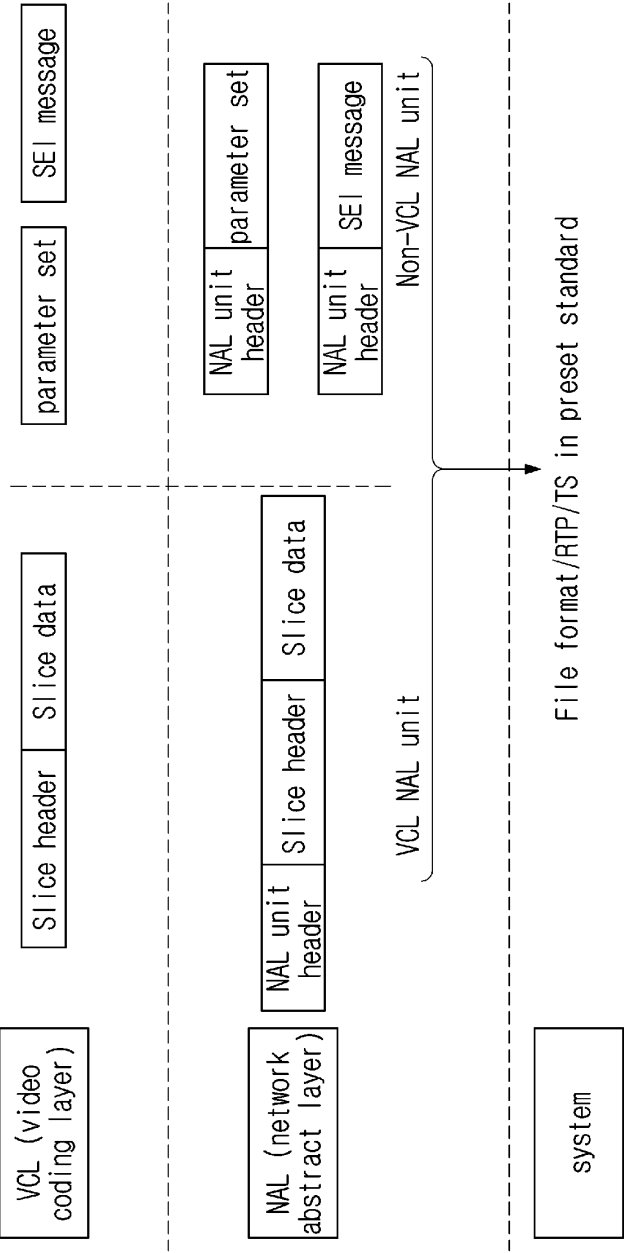
[도18]



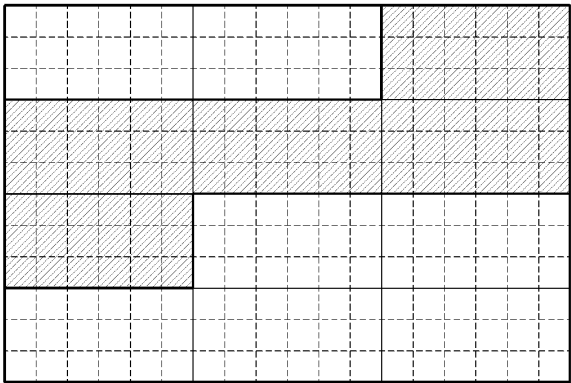
[도19]



[도 20]

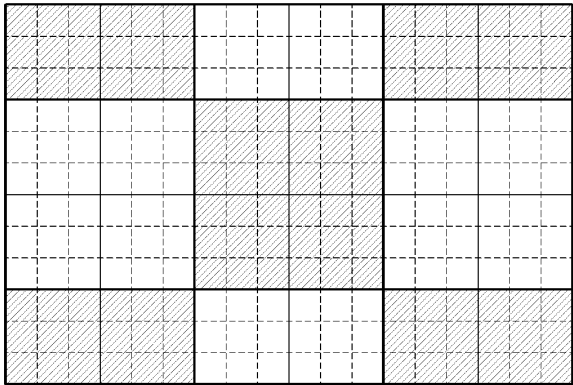


[도21]



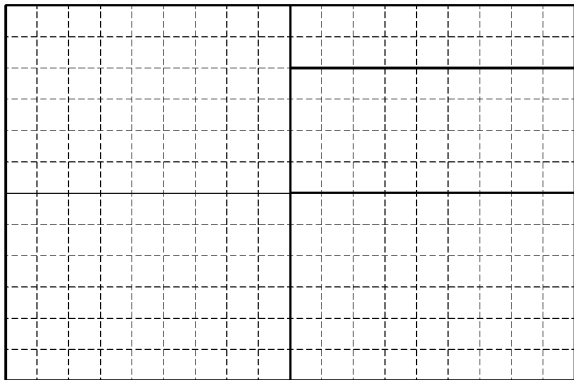
CTU Tile Slice

[도22]



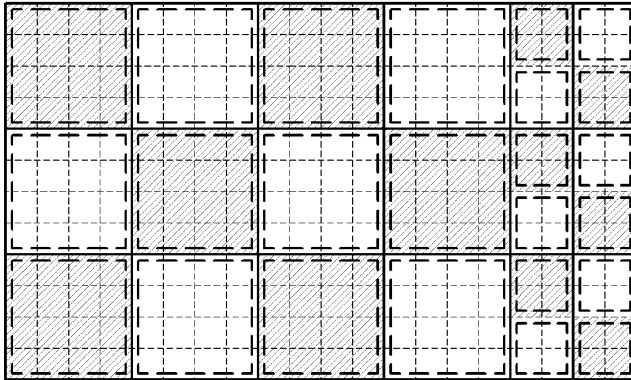
CTU Tile Slice

[도23]



CTU Tile Slice

[도24]



 CTU
 Tile
 Subpicture/Slice

[도25]

seq_parameter_set_rbsp() {	Descriptor
...	
subpic_info_present_flag	u(1)
if(subpic_info_present_flag) {	
sps_num_subpics_minus1	ue(v)
sps_independent_subpics_flag	u(1)
for(i = 0; sps_num_subpics_minus1 > 0 && i <= sps_num_subpics_minus1; i++) {	
if(i > 0 && pic_width_max_in_luma_samples > CtbSizeY)	
subpic_ctu_top_left_x[i]	u(v)
if(i > 0 && pic_height_max_in_luma_samples > CtbSizeY) {	
subpic_ctu_top_left_y[i]	u(v)
if(i < sps_num_subpics_minus1 && pic_width_max_in_luma_samples > CtbSizeY)	
subpic_width_minus1[i]	u(v)
if(i < sps_num_subpics_minus1 && pic_height_max_in_luma_samples > CtbSizeY)	
subpic_height_minus1[i]	u(v)
if(!sps_independent_subpics_flag) {	
subpic_treated_as_pic_flag[i]	u(1)
loop_filter_across_subpic_enabled_flag[i]	u(1)
}	
}	
}	
...	
}	

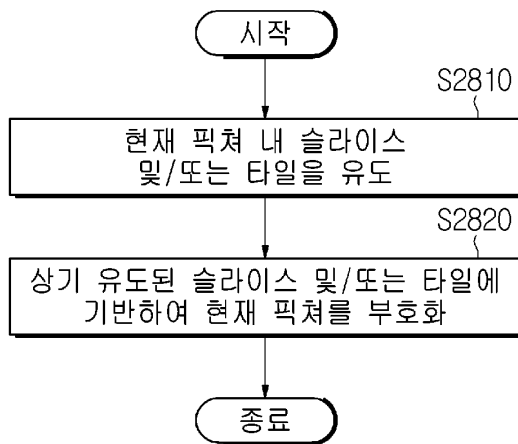
[도26]

pic_parameter_set_rbsp() {	Descriptor
...	
no_pic_partition_flag	u(1)
if(!no_pic_partition_flag) {	
pps_log2_ctu_size_minus5	u(2)
num_exp_tile_columns_minus1	ue(v)
num_exp_tile_rows_minus1	ue(v)
for(i=0; i <= num_exp_tile_columns_minus1; i++)	
tile_column_width_minus1[i]	uc(v)
for(i=0; i <= num_exp_tile_rows_minus1; i++)	
tile_row_height_minus1[i]	ue(v)
if(NumTilesInPic > 1)	
rect_slice_flag	u(1)
if(rect_slice_flag)	
single_slice_per_subpic_flag	u(1)
if(rect_slice_flag && !single_slice_per_subpic_flag) {	
num_slices_in_pic_minus1	ue(v)
if(num_slices_in_pic_minus1 > 0)	
tile_idx_delta_present_flag	u(1)
for(i = 0; i < num_slices_in_pic_minus1; i++) {	
if(NumTileColumns > 1)	
slice_width_in_tiles_minus1[i]	ue(v)
if(NumTileRows > 1 && (tile_idx_delta_present_flag SliceTopLeftTileIdx[i] % NumTileColumns == 0))	
slice_height_in_tiles_minus1[i]	ue(v)
if(slice_width_in_tiles_minus1[i] == 0 && slice_height_in_tiles_minus1[i] == 0 && RowHeight[SliceTopLeftTileIdx[i] / NumTileColumns] > 1) {	
num_exp_slices_in_tile[i]	uc(v)
for(j=0; j < num_exp_slices_in_tile[i]; j++)	
exp_slice_height_in_ctus_minus1[i][j]	ue(v)
i += NumSlicesInTile[i] - 1	
}	
if(tile_idx_delta_present_flag && i < num_slices_in_pic_minus1)	
tile_idx_delta[i]	se(v)
}	
}	
loop_filter_across_tiles_enabled_flag	u(1)
loop_filter_across_slices_enabled_flag	u(1)
}	
...	
}	

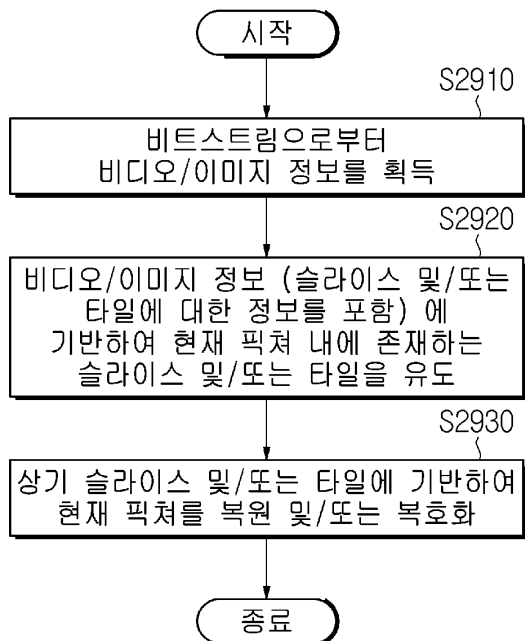
[도27]

slice_header() {	Descriptor
...	
if(subpic_info_present_flag)	
slice_subpic_id	u(v)
if((rect_slice_flag && NumSlicesInSubpic[CurrSubpicIdx] > 1) (!rect_slice_flag && NumTilesInPic > 1))	
slice_address	u(v)
for(i = 0; i < NumExtraShBits; i++)	
sh_extra_bit[i]	u(1)
if(!rect_slice_flag && NumTilesInPic > 1)	
num_tiles_in_slice_minus1	ue(v)
...	
}	

[도28]



[도29]



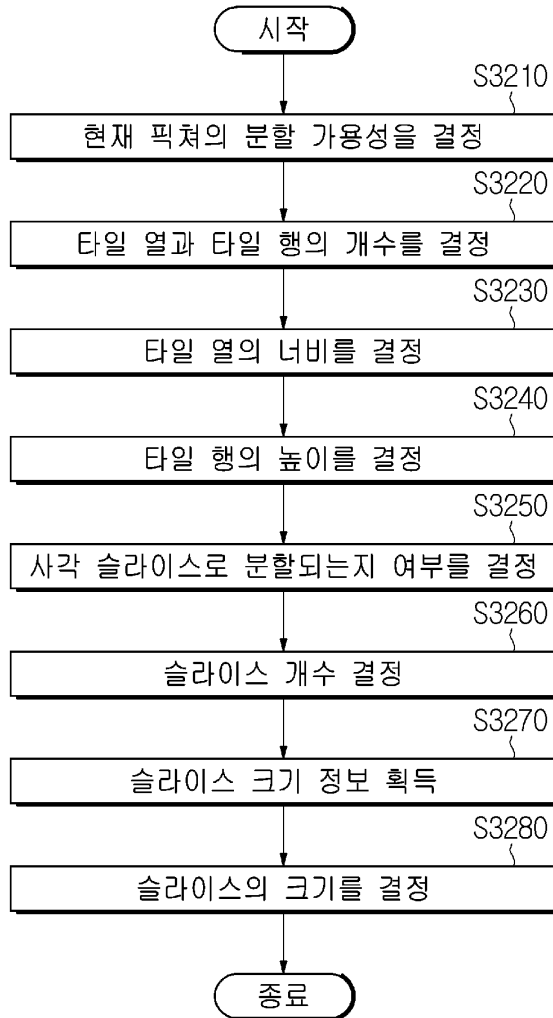
[도30]

pic_parameter_set_rbsp() {	Descriptor
...	
no_pic_partition_flag	u(1)
if(!no_pic_partition_flag) {	
...	
if(rect_slice_flag && !single_slice_per_subpic_flag) {	
num_slices_in_pic_minus1	ue(v)
if(num_slices_in_pic_minus1 > 0)	
tile_idx_delta_present_flag	u(1)
for(i = 0; i < num_slices_in_pic_minus1; i++) {	
if(NumTileColumns > 1 && (SliceTopLeftTileIdx[i] % NumTileColumns != NumTileColumns - 1))	
slice_width_in_tiles_minus1[i]	ue(v)
if(NumTileRows > 1 &&(tile_idx_delta_present_flag SliceTopLeftTileIdx[i] % NumTileColumns == 0) && (SliceTopLeftTileIdx[i] / NumTileColumns != NumTileRows - 1))	
slice_height_in_tiles_minus1[i]	ue(v)
...	
}	
}	
...	
}	
...	
}	

[도31]

pic_parameter_set_rbsp() {	Descriptor
...	
no_pic_partition_flag	u(1)
if(!no_pic_partition_flag) {	
...	
if(rect_slice_flag && !single_slice_per_subpic_flag) {	
num_slices_in_pic_minus1	ue(v)
if(num_slices_in_pic_minus1 > 0)	
tile_idx_delta_present_flag	u(1)
for(i = 0; i < num_slices_in_pic_minus1; i++) {	
if(SliceTopLeftTileIdx[i] % NumTileColumns != NumTileColumns - 1)	
slice_width_in_tiles_minus1[i]	ue(v)
if((SliceTopLeftTileIdx[i] / NumTileColumns != NumTileRows - 1)	
&&(tile_idx_delta_present_flag	
SliceTopLeftTileIdx[i] % NumTileColumns == 0))	
slice_height_in_tiles_minus1[i]	ue(v)
...	
}	
}	
...	
}	
...	
}	

[도32]



[도33]

```

tileIdx = 0
for( i = 0; i <= pps_num_slices_in_pic_minus1; i++ )
    NumCtusInSlice[ i ] = 0
for( i = 0; i <= pps_num_slices_in_pic_minus1; i++ ) {
    SliceTopLeftTileIdx[ i ] = tileIdx
    tileX = tileIdx % NumTileColumns
    tileY = tileIdx / NumTileColumns
    if( i < pps_num_slices_in_pic_minus1 ) {
        sliceWidthInTiles[ i ] = pps_slice_width_in_tiles_minus1[ i ] + 1
        sliceHeightInTiles[ i ] = pps_slice_height_in_tiles_minus1[ i ] + 1
    } else {
        sliceWidthInTiles[ i ] = NumTileColumns - tileX
        sliceHeightInTiles[ i ] = NumTileRows - tileY
        NumSlicesInTile[ i ] = 1
    }
    if( sliceWidthInTiles[ i ] == 1 && sliceHeightInTiles[ i ] == 1 ) {
        if( pps_num_exp_slices_in_tile[ i ] == 0 ) {
            NumSlicesInTile[ i ] = 1
            sliceHeightInCtus[ i ] = RowHeightVal[ SliceTopLeftTileIdx[ i ] / NumTileColumns ]
        } else {
            remainingHeightInCtbsY = RowHeightVal[ SliceTopLeftTileIdx[ i ] / NumTileColumns ]
            for( j = 0; j < pps_num_exp_slices_in_tile[ i ]; j++ ) {
                sliceHeightInCtus[ i + j ] = pps_exp_slice_height_in_ctus_minus1[ i ][ j ] + 1
                remainingHeightInCtbsY -= sliceHeightInCtus[ i + j ]
            }
            uniformSliceHeight = sliceHeightInCtus[ i + j - 1 ]
            while( remainingHeightInCtbsY >= uniformSliceHeight ) {
                sliceHeightInCtus[ i + j ] = uniformSliceHeight
                remainingHeightInCtbsY -= uniformSliceHeight
                j++
            }
            if( remainingHeightInCtbsY > 0 ) {
                sliceHeightInCtus[ i + j ] = remainingHeightInCtbsY
                j++
            }
        }
    }
}

```

[도34]

```

    NumSlicesInTile[ i ] = j
}
ctbY = TileRowBdVal[ tileY ]
for( j = 0; j < NumSlicesInTile[ i ]; j++ ) {
    AddCtbsToSlice( i + j, TileColBdVal[ tileX ], TileColBdVal[ tileX + 1 ],
        ctbY, ctbY + sliceHeightInCtus[ i + j ] )
    ctbY += sliceHeightInCtus[ i + j ]
    sliceWidthInTiles[ i + j ] = 1
    sliceHeightInTiles[ i + j ] = 1
}
i += NumSlicesInTile[ i ] - 1
} else
    for( j = 0; j < sliceHeightInTiles[ i ]; j++ )
        for( k = 0; k < sliceWidthInTiles[ i ]; k++ )
            AddCtbsToSlice( i, TileColBdVal[ tileX + k ], TileColBdVal[ tileX + k + 1 ],
                TileRowBdVal[ tileY + j ], TileRowBdVal[ tileY + j + 1 ] )
if( i < pps_num_slices_in_pic_minus1 ) {
    if( pps_tile_idx_delta_present_flag )
        tileIdx += pps_tile_idx_delta_val[ i ]
    else {
        tileIdx += sliceWidthInTiles[ i ]
        if( tileIdx % NumTileColumns == 0 )
            tileIdx += ( sliceHeightInTiles[ i ] - 1 ) * NumTileColumns
    }
}
}
}

```

[도35]



[도36]

