#### Binarization process for palette\_escape\_val

Input to this process is a request for a binarization for the syntax element palette\_escape\_val, cu\_transquant\_bypass\_flag and colour component index cIdx.

Output of this process is the binarization of palette\_escape\_val.

The variable bitDepth is derived as follows:

bitDepth = ( cIdx = = 0 ) ? BitDepthY : BitDepthC

The binarization of palette\_escape\_val is derived as follows:

* If cu\_transquant\_bypass\_flag is true, the binarization of palette\_escape\_val is derived by invoking the FL binarization process specified in subclause  with the input parameter set to (1<<bitdepth) − 1.
* Otherwise (cu\_transquant\_bypass\_flag is false) the following ordered steps apply

1. The quantization parameter qP is derived as follows:

qP = ( cIdx = = 0 ) ? Qp′Y : ( ( cIdx = = 1 ) Qp′Cb ? Qp′Cr ) [Ed. (GJS): Equation formatting problem.]

1. The value of the variable cMax is determined as specified in Table 9-43-bitDepth based on qP.
2. ~~A quantization step size parameter qStep is derived as follows:~~

~~qStep = ( qP= =0 ) ? Round( 2~~~~(qP − 4) / 6~~~~) : 1~~

1. ~~A maximum possible quantized value maxValue is derived as follows:~~

~~maxValue = ( ( 1<<bitDepth ) − 1 ) / Qstep~~

1. ~~The number of bins numBins of the fixed length binarization codeword is derived as follows~~

~~while( maxValue ) {  
 maxValue = maxValue >> 1  
 numBins++  
 }~~

1. ~~The maximum parameter cMax for the fixed length binarization is derived as follows~~

~~cMax = ( 1 << numBins ) – 1~~

The binarization for the palette\_escape\_value is derived by invoking the TB binarization process specified in subclause  with cMax.

Table 9-43-8 Derivation of cMax for palette\_escape\_val when bitDepth is equal to 8.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| QP | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| cMax | 255 | 255 | 255 | 255 | 255 | 227 | 204 | 181 | 127 | 127 | 127 | 113 | 102 |
| QP | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| cMax | 91 | 80 | 63 | 63 | 57 | 51 | 45 | 40 | 36 | 31 | 28 | 25 | 23 |
| QP | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| cMax | 20 | 18 | 15 | 14 | 13 | 11 | 10 | 9 | 7 | 7 | 6 | 6 | 5 |
| QP | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| cMax | 4 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |

Table 9-43-9 Derivation of cMax for palette\_escape\_val when bitDepth is equal to 9.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| QP | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| cMax | 511 | 511 | 511 | 511 | 511 | 454 | 409 | 363 | 255 | 255 | 255 | 227 | 204 |
| QP | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| cMax | 182 | 160 | 127 | 127 | 114 | 102 | 91 | 80 | 72 | 63 | 57 | 51 | 45 |
| QP | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| cMax | 40 | 36 | 31 | 28 | 26 | 23 | 20 | 18 | 15 | 14 | 13 | 11 | 10 |
| QP | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| cMax | 9 | 7 | 7 | 6 | 6 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 2 |

Table 9-43-10 Derivation of cMax for palette\_escape\_val when bitDepth is equal to 10.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| QP | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| cMax | 1023 | 1023 | 1023 | 1023 | 1023 | 909 | 818 | 727 | 511 | 511 | 511 | 455 | 409 |
| QP | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| cMax | 364 | 321 | 255 | 255 | 227 | 205 | 182 | 160 | 144 | 127 | 114 | 102 | 91 |
| QP | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| cMax | 80 | 72 | 63 | 57 | 51 | 45 | 40 | 36 | 31 | 28 | 26 | 23 | 20 |
| QP | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| cMax | 18 | 15 | 14 | 13 | 11 | 10 | 9 | 7 | 7 | 6 | 6 | 5 | 4 |

Table 9-43-11 Derivation of cMax for palette\_escape\_val when bitDepth is equal to 11.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| QP | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| cMax | 2047 | 2047 | 2047 | 2047 | 2047 | 1820 | 1638 | 1456 | 1023 | 1023 | 1023 | 910 | 819 |
| QP | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| cMax | 728 | 642 | 511 | 511 | 455 | 409 | 364 | 321 | 287 | 255 | 227 | 205 | 182 |
| QP | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| cMax | 161 | 144 | 127 | 114 | 102 | 91 | 80 | 72 | 63 | 57 | 51 | 45 | 40 |
| QP | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| cMax | 36 | 31 | 28 | 26 | 23 | 20 | 18 | 15 | 14 | 13 | 11 | 10 | 9 |

Table 9-43-12 Derivation of cMax for palette\_escape\_val when bitDepth is equal to 12.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| QP | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| cMax | 4095 | 4095 | 4095 | 4095 | 4095 | 3640 | 3276 | 2912 | 2047 | 2047 | 2047 | 1820 | 1638 |
| QP | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| cMax | 1456 | 1285 | 1023 | 1023 | 910 | 819 | 728 | 642 | 575 | 511 | 455 | 409 | 364 |
| QP | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| cMax | 321 | 287 | 255 | 228 | 205 | 182 | 161 | 144 | 127 | 114 | 102 | 91 | 80 |
| QP | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| cMax | 72 | 63 | 57 | 51 | 46 | 40 | 36 | 31 | 28 | 26 | 23 | 20 | 18 |

Table 9-43-13 Derivation of cMax for palette\_escape\_val when bitDepth is equal to 13.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| QP | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| cMax | 8191 | 8191 | 8191 | 8191 | 8191 | 7281 | 6553 | 5825 | 4095 | 4095 | 4095 | 3641 | 3276 |
| QP | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| cMax | 2912 | 2570 | 2047 | 2047 | 1820 | 1638 | 1456 | 1285 | 1150 | 1023 | 910 | 819 | 728 |
| QP | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| cMax | 642 | 575 | 511 | 455 | 410 | 364 | 321 | 287 | 255 | 228 | 205 | 182 | 161 |
| QP | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| cMax | 144 | 127 | 114 | 102 | 91 | 80 | 72 | 63 | 57 | 51 | 46 | 40 | 36 |

Table 9-43-14 Derivation of cMax for palette\_escape\_val when bitDepth is equal to 14.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| QP | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| cMax | 16383 | 16383 | 16383 | 16383 | 16383 | 14563 | 13106 | 11650 | 8191 | 8191 | 8191 | 7282 | 6553 |
| QP | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| cMax | 5825 | 5140 | 4095 | 4095 | 3641 | 3277 | 2913 | 2570 | 2299 | 2047 | 1820 | 1638 | 1456 |
| QP | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| cMax | 1285 | 1150 | 1023 | 910 | 819 | 728 | 642 | 575 | 511 | 455 | 410 | 364 | 321 |
| QP | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| cMax | 287 | 255 | 228 | 205 | 182 | 161 | 144 | 127 | 114 | 102 | 91 | 80 | 72 |

Table 9-43-15 Derivation of cMax for palette\_escape\_val when bitDepth is equal to 15.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| QP | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| cMax | 32767 | 32767 | 32767 | 32767 | 32767 | 29127 | 26213 | 23301 | 16383 | 16383 | 16383 | 14564 | 13107 |
| QP | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| cMax | 11651 | 10280 | 8191 | 8191 | 7282 | 6553 | 5825 | 5140 | 4599 | 4095 | 3641 | 3277 | 2913 |
| QP | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| cMax | 2570 | 2299 | 2047 | 1820 | 1638 | 1456 | 1285 | 1150 | 1023 | 910 | 819 | 728 | 642 |
| QP | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| cMax | 575 | 511 | 455 | 410 | 364 | 321 | 287 | 255 | 228 | 205 | 182 | 161 | 144 |

Table 9-43-16 Derivation of cMax for palette\_escape\_val when bitDepth is equal to 16.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| QP | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| cMax | 65535 | 65535 | 65535 | 65535 | 65535 | 58255 | 52427 | 46603 | 32767 | 32767 | 32767 | 29128 | 26214 |
| QP | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| cMax | 23302 | 20560 | 16383 | 16383 | 14564 | 13107 | 11651 | 10280 | 9198 | 8191 | 7282 | 6553 | 5825 |
| QP | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| cMax | 5140 | 4599 | 4095 | 3641 | 3277 | 2913 | 2570 | 2299 | 2047 | 1820 | 1638 | 1456 | 1285 |
| QP | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| cMax | 1150 | 1023 | 910 | 819 | 728 | 642 | 575 | 511 | 455 | 410 | 364 | 321 | 287 |