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**Datasheet for the decision  
of 20 July 2011**

**Case Number:** T 0659/08 - 3.5.04

**Application Number:** 04254280.3

**Publication Number:** 1501312

**IPC:** H04N 7/26

**Language of the proceedings:** EN

**Title of invention:**

Image encoding and decoding apparatus and method

**Applicant:**

SAMSUNG ELECTRONICS CO., LTD.

**Opponent:**

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**Headword:**

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**Relevant legal provisions:**

EPC Art. 123(2)

**Relevant legal provisions (EPC 1973):**

EPC Art. 84

**Keyword:**

"Clarity (main request - no)"

"Added subject-matter (auxiliary request - yes)"

**Decisions cited:**

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**Catchword:**

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Case Number: T 0659/08 - 3.5.04

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.04  
of 20 July 2011

**Appellant:** SAMSUNG ELECTRONICS CO., LTD.  
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**Representative:** Greene, Simon Kenneth  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 12 November 2007  
refusing European patent application  
No. 04254280.3 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** F. Edlinger  
**Members:** R. Gerdes  
C. Vallet

## Summary of Facts and Submissions

I. The appeal is against the decision of the examining division refusing European patent application No. 04 254 280.3, published as EP 1 501 312 A2.

The patent application was refused by the examining division in accordance with Article 97(1) EPC 1973 because, *inter alia*, the subject-matter of claims 2 and 27 according to the applicant's main request was found to contain subject-matter extending beyond the content of the application as filed (Article 123(2) EPC 1973).

II. The appellant filed an appeal against this decision. Together with his statement setting out the grounds of appeal the appellant submitted claims of a main request.

III. In a communication annexed to a summons to oral proceedings, the board expressed doubts as to whether the claims according to the appellant's amended main request fulfilled the requirements of Article 123(2) EPC. It also indicated that the clarity of the claims would have to be discussed in the oral proceedings.

IV. With a letter dated 29 June 2011 the appellant filed replacement claims of the main request.

V. Oral proceedings were held on 20 July 2011. During the oral proceedings the appellant submitted an auxiliary request comprising claim 1.

VI. The appellant requested that the decision under appeal be set aside and that a patent be granted according to

the **main request**, on the basis of claims 1 to 30 filed with the letter of 29 June 2011, and alternatively, according to the **auxiliary request**, on the basis of claim 1 submitted in the oral proceedings before the board and claims 2 to 30 filed with the letter of 29 June 2011, subject to the removal of claim 9 and corresponding amendments to the remaining claims 10 to 30.

VII. Claims 1 of the main request reads as follows.

"An image encoding and decoding apparatus comprising:  
an encoding unit (10) for, predicting a pixel value of a block of interest by performing an operation on a pixel value of at least one block having a pixel value similar to the pixel value of the block of interest among blocks included in a previous image and at least one adjusted weight value, and encoding the pixel value of the block of interest using the predicted pixel value of the block of interest; and  
a decoding unit (12) for, restoring the predicted pixel value of the block of interest by performing an operation on the pixel value of at least one block having pixel value similar to the pixel value of the block of interest among blocks included in the restored previous image and the at least one adjusted weight value, and decoding the pixel value of the block of interest using the restored pixel value,  
wherein the previous image refers to an image displayed prior to the current image, and the block of interest is a target block of interest among blocks belonging to the current image,  
and characterized in that the encoding unit (10) and the decoding unit are arranged to adjust at least one

weight value adaptively to the number of bits expressing each pixel of a current image using the following equation:

$$W' = W \cdot 2^{(N-M)}$$

where W is a weight value before the adjustment, W' is a weight value after the adjustment, N is the number of bits, and M is a constant."

Claim 9 of the main request, which depends indirectly on claim 1, reads as follows:

"The image encoding and decoding apparatus of claim 7, wherein the encoding weight value adjusting portion (126) is arranged to adjust the weight values to be operated on the pixel values of the blocks having pixel value similar to the pixel value of the block of interest among the blocks included in the previous image adaptively to the number of bits using the following equation:

$$W_1' = W_1$$

$$W_2' = W_2$$

$$O_1' = O_1 \cdot 2^{(N-M)}$$

$$O_2' = O_2 \cdot 2^{(N-M)}$$

where W<sub>1</sub>' and W<sub>2</sub>' represent the weight values after the adjustment to be used in the multiplication, W<sub>1</sub> and W<sub>2</sub> represent weight values before the adjustment, and O<sub>1</sub>', and O<sub>2</sub>' represent the weight values after the adjustment to be added to the products of the multiplication, N represents the number of bits, and M represents a constant."

VIII. The preamble of claim 1 according to the auxiliary request is identical to the preamble of claim 1 of the main request. The characterising portion of claim 1 of

the auxiliary request reads as follows (amendments marked in bold by the board):

"... characterized in that the encoding unit (10) and the decoding unit are arranged to adjust at least one weight value adaptively to the number of bits expressing each pixel of a current image using the following equation:

$$W' = W \cdot 2^{(N-M)}$$

where W is a weight value before the adjustment, W' is a weight value after the adjustment, N is the number of bits **expressing each pixel of a current image**, and M is a constant **representing an expected number of bits expressing each pixel of the current image.**"

IX. The appellant's arguments may be summarised as follows.

With respect to the clarity of the main request the appellant argued that the equations in claims 1 and 9 were consistent if N were taken to be equal to M.

Claim 1 according to the auxiliary request was amended to further define the terms N and M. N is specified as "the number of bits expressing each pixel of a current image", whereas M is defined as "a constant representing an expected number of bits expressing each pixel of a current image". There is no explicit disclosure of these amended features in the original application documents. However, they are implicitly disclosed in the passage bridging pages 9 and 10.

The definition of N on page 9, line 28 as "the number of bits" refers back to "the number of bits to

represent the pixel value" in lines 24 and 25 of the same page.

M is disclosed to be a constant (page 9, line 28). It follows from the subsequent passage (page 9, line 29 to page 10, line 5) that M is a hardware constant, which expresses the expected number of bits of a current image. The "conventional weighted prediction encoding and decoding apparatus" mentioned on page 20, lines 19 and 20 of the description refers to an encoder/decoder complying with the H.264/MPEG-4 Part 10 AVC - standard, which presumes 8 bits as an expected number of bits per pixel. It is implicit from this passage that M should be 8 for the case of the above standard and "a constant representing an expected number of bits expressing each pixel of the current image" in general.

## Reasons for the Decision

1. The appeal is admissible.
2. *Main request*
  - 2.1 According to Article 84 EPC 1973, the claims shall define the matter for which protection is sought. They shall be clear and concise and be supported by the description.
  - 2.2 Claim 1 states that at least one weight value W is adjusted to become a weight value W'. According to the description (see page 10, line 12 to 17), "**the** adjusted weight values" are multiplied with pixel values and "**other** adjusted weight values" are added to the

products (emphasis added by the board). Hence, a distinction is made between "**the** adjusted weight values" corresponding to the weight factors  $W'_i$  in equation (2) and "**other** adjusted weight values", which correspond to the offsets  $O'_i$  in equation (2). This terminology corresponds to the one employed in claim 7. It follows from the above passage and claim 7 that the wording of claim 1 is to be understood in the sense that the adjusted weight values  $W'$  of claim 1 and equation (1) correspond to the adjusted weight values  $W'_i$  - which are multiplied with pixel values - of equation (2). This interpretation also appears to be consistent with usual practice in the technical field, according to which  $W'_i$  indicates an  $i$ th value of a sequence of values represented by  $W'$ .

In contrast to claim 1, claim 9, which depends on claim 7 and indirectly also on claim 1, states that

$$\begin{aligned}W_1' &= W_1 \\W_2' &= W_2 \\O_1' &= O_1 \cdot 2^{(N-M)} \\O_2' &= O_2 \cdot 2^{(N-M)}\end{aligned}$$

According to these equations, the adjusted weight values  $W_1'$  and  $W_2'$  are identical to the weight values  $W_1$  and  $W_2$  before the adjustment, which is inconsistent with the feature "to adjust at least one weight value" according to the equation in claim 1

$$W' = W \cdot 2^{(N-M)}.$$

The subject-matter of claims 1 and 9 is, therefore, unclear (Article 84 EPC 1973).



2.3 The appellant's argument that the equations in claims 1 and 9 were consistent if N were equal to M did not convince the board.

If N equals M, the equations of claim 1 and claim 9 mean that the weight factors and offsets are both identical before and after the adjustment. In other words, for this specific case there is no adaptive adjustment of weights. The claimed image encoding and decoding apparatus is, however, defined as being "arranged to adjust at least one weight value adaptively" (see characterising feature of claim 1). Hence, if the appellant's argument is followed, the invention as defined in claim 1 does not solve the technical problem set out in the description (see e.g. page 20, lines 14 to 22).

Furthermore, according to the description, the parameter N representing "the number of bits" (see page 9, line 28) may be "input via an input port" to the system (see page 7, lines 23 to 28, and page 17, line 31 to page 18, line 2). There is no disclosure in the description as to how the number of bits expressing each pixel of a current image is input. Nor is there any information that the number of pixels may change during an encoding process, for instance by deriving the number for each pixel in a block of interest from overhead information and sending it to the input port IN4. On the other hand, it is at least not excluded that the number of pixels is input by a user similar to what is disclosed for the input of a user-defined weight value "via an input port IN5" (see page 8, lines 22 and 23). As a consequence there is no

support in the description that the value of N may be equal to the constant M for certain pixels only (or for each pixel of certain blocks) and that the weight values of the other pixels would be adjusted.

2.4 Consequently, claims 1 and 9 are inconsistent and do not comply with Article 84 EPC 1973. As a result, the main request is not allowable.

### 3. *Auxiliary request*

3.1 Claim 9 as defined in the main request was deleted from the set of claims forming the basis of the auxiliary request. Moreover, claim 1 of the auxiliary request further defines the parameters N and M. Both of these amendments address objections raised by the board in the oral proceedings (see section 2 above). Thus, the board decided to admit the auxiliary request (Article 13(1) RPBA).

3.2 According to Article 123(2) EPC the European patent application may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed. An amendment should be regarded as introducing subject-matter which extends beyond the content of the application as filed, if the overall change in the content of the application results in the skilled person being presented with information which is not directly and unambiguously derivable from the whole technical content of the application as originally filed.

The appellant accepted that there was no explicit disclosure for the feature "M is a constant

representing an expected number of bits" in the context of claim 1 of the auxiliary request.

The board notes that, according to the original application documents, M is defined as a constant (for example, page 9, line 28) and that M may be 8, 10, or 12 (page 10, lines 4 to 5), which is the number of bits per pixel "in most cases" or "in the field of high quality image display", respectively (page 10, lines 2 to 4). There is no indication in the cited passages that M represents an **expected** number of bits. If any of the above phrases relating to M comes close to the notion of an "expected number of bits", then this is the phrase "[i]n most cases, the number of bits is 8". The fact that a parameter may take a certain value in most cases is, however, to be distinguished from the assertion that this value is the expected value, in particular if the expected value is defined to be a constant value as in the amendment to claim 1.

As a consequence, at least the second aspect of the amendment to claim 1 is not directly and unambiguously disclosed in the original application documents.

Hence, the subject-matter of claim 1 according to the auxiliary request extends beyond the content of the application as filed (Article 123(2) EPC).

3.3 With respect to the appellant's arguments the following is noted.

The paragraph bridging pages 9 and 10 of the application as filed discloses that the number of bits was 8 in most cases (as in the conventional method; see

page 2, lines 3 and 4). Furthermore, it is stated in this passage that the "number of bits is increased to 10 or 12 in the field of high quality image display. Considering this, the constant M may be, for example, 8, 10 or 12." This passage gives an indication that the constant M would be increased to 10 or 12 in a field where the number of bits would normally be increased (in order to obtain higher image quality). This might be achieved by making M a hardware constant (if the particular hardware deals primarily with higher image quality coding), as argued by the appellant. But the passage does not disclose that the constant M should represent an "expected" number of bits expressing each pixel of the "current image", i.e. a relationship between the constant M and a particular image of a coding process, namely the image being currently coded.

The board does not dispute the appellant's argument that the "conventional weighted prediction encoding and decoding apparatus" mentioned on page 20, lines 19 and 20 of the description refers to an encoder/decoder complying with the H.264/MPEG-4 Part 10 AVC - standard, which - in the version referred to on page 1, lines 14 to 16 - presumes 8 bits as the number of bits per pixel. However, there is no disclosure in the cited passage that M should represent this expected number of bits.

The board therefore concludes that at least the amendment of claim 1 which specifies that "M is a constant representing an expected number of bits expressing each pixel of the current image" cannot be directly and unambiguously derived from the original application documents.

4. Conclusions

None of the appellant's main and auxiliary requests is allowable. It follows that the appealed decision cannot be set aside.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

K. Boelicke

F. Edlinger