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Datasheet for the decision of 2 February 2017

Case Number: T 1509/11 - 3.5.04

Application Number: 07118187.9

Publication Number: 1914980

IPC: H04N1/60

Language of the proceedings: EN

Title of invention:
Apparatus and method for improving visibility of image

Applicant:
Samsung Electronics Co., Ltd.

Headword:

Relevant legal provisions:
RPBA Art. 15(3), 15(5), 15(6)
EPC 1973 Art. 84
EPC 1973 R. 71(2)

Keyword:
Oral proceedings - held in absence of appellant
Claims - clarity (no) - support in the description (no)

Decisions cited:
T 0602/03, T 0991/07

Catchword:

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Case Number: T 1509/11 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 2 February 2017

Appellant: (Applicant)	Samsung Electronics Co., Ltd. 129, Samsung-ro Yeongtong-gu Suwon-si, Gyeonggi-do, 443-742 (KR)
Representative:	Grünecker Patent- und Rechtsanwälte PartG mbB Leopoldstraße 4 80802 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 17 January 2011 refusing European patent application No. 07118187.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairwoman	T. Karamanli
Members:	M. Paci
	R. Gerdes

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division refusing European patent application No. 07118187.9 published as EP 1 914 980 A1.

II. The decision under appeal was based on the grounds that claim 1 according to each of the main and (first) auxiliary requests did not meet the requirements of Article 84 EPC because it was unclear and lacked essential features.

III. With the statement of grounds of appeal the appellant (applicant) filed amended claims according to second and third auxiliary requests.

IV. In a communication under Article 15(1) RPBA (Rules of Procedure of the Boards of Appeal, OJ EPO 2007, 536), annexed to the summons to oral proceedings, the board informed the appellant *inter alia* that claim 1 according to each of the four requests on file did not meet the requirements of Article 84 EPC 1973 because its subject-matter was unclear, was not supported by the description and lacked essential features.

V. With a letter dated 2 January 2017, the appellant filed four sets of amended claims according to a main request and first to third auxiliary requests and maintained the previous main and first to third auxiliary requests as further auxiliary requests.

VI. By a letter dated 25 January 2017, the appellant informed the board that it would not attend the oral proceedings scheduled for 2 February 2017 and withdrew its request for oral proceedings, but maintained its requests on file.

VII. The board held oral proceedings on 2 February 2017. As announced, the duly summoned appellant did not attend.

During the oral proceedings, the Chairwoman noted that, from the written submissions on file, the board understood the appellant's final requests to be that the decision under appeal be set aside and that a patent be granted on the basis of the claims according to the main request filed with letter dated 2 January 2017, or according to one of the first to third auxiliary requests filed with letter dated 2 January 2017, of the fourth auxiliary request filed as "Main Request" with letter dated 7 October 2010, of the fifth auxiliary request filed as "Auxiliary Request" with letter dated 7 October 2010 or of the sixth to seventh auxiliary requests filed as "Auxiliary Requests 2 and 3" with the statement of grounds of appeal.

At the end of the oral proceedings, the Chairwoman announced the board's decision.

VIII. Claim 1 according to the appellant's **main request** reads as follows:

"An apparatus (100) for improving visibility of an image, the apparatus comprising:
an image input module (120) configured to receive an image the image input module (120) including image capturing elements configured to capture an image and a captured image is input to the image input module (120) as input image;
an illuminance sensing module (140) configured to sense external illuminance;
a visibility compensating module (200) configured to compensate the input image by being configured to map

the input image from a first color gamut to a second color gamut of an image display screen for the apparatus; and an image output module (160) configured to output the compensated image;
wherein the visibility compensating module (200) comprises:
a first color space converting module (210) configured to convert image data of the input image into coordinates in a color space for a color gamut mapping in consideration of characteristics of a screen of the image output module (160) under a darkroom environment;
a color gamut mapping module (220) configured to map (420, S340) the converted image data from the first color gamut (430) to the second color gamut (410) according to the sensed external illuminance supplied by the illuminance sensing module (140) such that the visibility can be ensured in the high illuminance environment, the mapping (420, S340) comprising the following sequence of steps: lightness enhancement (S510), hue data correction (S520), chroma enhancement (S530), hue data correction one more time (S540);
and
a second color space converting module (230) configured to convert the color-gamut-mapped image data into an image to be displayed to a user according to the sensed external illuminance."

IX. Claim 1 according to the appellant's **first auxiliary request** reads as follows (additions to claim 1 of the main request are underlined, deletions are ~~struck-through~~, long identical text portions are replaced by "[...]"):

"An apparatus (100) for improving visibility of an image, the apparatus comprising:
[...]

wherein the visibility compensating module (200) comprises:
a first color space converting module (210) configured to convert image data of the input image into coordinates in a color space for a color gamut mapping in consideration of characteristics of a screen of the image output module (160) under a darkroom environment, wherein when the input image is composed of RGB image data the first color space convertion module (210) is configured to perform the following sequence of steps: a conversion of the RGB image data into coordinates in a CIEXYZ color space (S310), subsequently a conversion of the coordinates in the CIEXYZ color space into coordinates in a CIELab color space (S320), subsequently a conversion of the coordinates in the CIELab color space into coordinates in an LCH color space (S330);
a color gamut mapping module (220) [...]."

X. Claim 1 according to the appellant's **second auxiliary request** reads as follows (additions to claim 1 of the main request are underlined, deletions are ~~struck-through~~, long identical text portions are replaced by "[...]"):

"An apparatus (100) for improving visibility of an image, the apparatus comprising:
[...];
a visibility compensating module (200) including predetermined color gamut data of an image display screen for the apparatus in two different environments, the environments being a darkroom environment and a high illuminance environment, configured to compensate the input image by being configured to map the input image from ~~a~~the first color gamut to ~~a~~the second color gamut ~~of an image display screen for the apparatus~~; and

an image output module (160) configured to output the compensated image;
wherein the visibility compensating module (200) comprises:
a first color space converting module (210) configured to convert image data of the input image into coordinates in a color space for a color gamut mapping in consideration of characteristics of a screen of the image output module (160) under ~~a~~the darkroom environment;
[...]."

XI. Claim 1 according to the appellant's **third auxiliary request** reads as follows (additions to claim 1 of the main request are underlined, deletions are ~~struck-through~~, long identical text portions are replaced by "[...]"):

"An apparatus (100) for improving visibility of an image, the apparatus comprising:
[...];
a visibility compensating module (200) including predetermined color gamut data an image display screen for the apparatus in two different environments, the environments being a darkroom environment and a high illuminance environment, configured to compensate the input image by being configured to map the input image from ~~a~~the first color gamut to ~~a~~the second color gamut ~~of an image display screen for the apparatus~~; and an image output module (160) configured to output the compensated image;
wherein the visibility compensating module (200) comprises:
a first color space converting module (210) configured to convert image data of the input image into coordinates in a color space for a color gamut mapping

in consideration of characteristics of a screen of the image output module (160) under ~~a~~the darkroom environment;
[...];
wherein the corrected hue data corresponds to hue data other than a bluish hue."

XII. Claim 1 according to the appellant's **fourth auxiliary request** reads as follows (additions to claim 1 of the main request are underlined, deletions are ~~struck-through~~, long identical text portions are replaced by "[...]"):

"An apparatus (100) for improving visibility of an image, the apparatus comprising:
an image input module (120) configured to receive an image~~ the image input module (120) including image capturing elements configured to capture an image and a captured image is input to the image input module (120) as input image~~;
an illuminance sensing module (140) configured to sense external illuminance;
a visibility compensating module (200) configured to compensate the input image by being configured to map the input image from a first color gamut to a second color gamut~~ of an image display screen for the apparatus~~; and an image output module (160) configured to output the compensated image;
wherein the visibility compensating module (200) comprises:
a first color space converting module (210) configured to convert image data of the input image into coordinates in a color space for a color gamut mapping in consideration of characteristics of a screen of the image output module (160) under a darkroom environment;

a color gamut mapping module (220) configured to map (420, S340) the converted image data from the first color gamut (430) to the second color gamut (410) according to the sensed external illuminance ~~supplied by the illuminance sensing module (140) such that the visibility can be ensured in the high illuminance environment~~, the mapping (420, S340) comprising the following sequence of steps: lightness enhancement (S510), hue data correction (S520), chroma enhancement (S530), hue data correction one more time (S540); and
a second color space converting module (230) configured to convert the color-gamut-mapped image data into an image to be displayed to a user according to the sensed external illuminance."

XIII. Claim 1 according to the appellant's **fifth auxiliary request** reads as follows (additions to claim 1 of the main request are underlined, deletions are ~~struck-through~~, long identical text portions are replaced by "[...]"):

"An apparatus (100) for improving visibility of an image, the apparatus comprising:
an image input module (120) configured to receive an image ~~the image input module (120) including image capturing elements configured to capture an image and a captured image is input to the image input module (120) as input image~~;
an illuminance sensing module (140) configured to sense external illuminance;
a visibility compensating module (200) configured to compensate the input image by being configured to map the input image from a first color gamut to a second color gamut ~~of an image display screen for the~~

~~apparatus~~; and an image output module (160) configured to output the compensated image;
wherein the visibility compensating module (200) comprises:
a first color space converting module (210) configured to convert image data of the input image into coordinates in a color space for a color gamut mapping in consideration of characteristics of a screen of the image output module (160) under a darkroom environment, wherein when the input image is composed of RGB image data the first color space convertion module (210) is configured to perform the following sequence of steps: a conversion of the RGB image data into coordinates in a CIEXYZ color space (S310), subsequently a conversion of the coordinates in the CIEXYZ color space into coordinates in a CIELab color space (S320), subsequently a conversion of the coordinates in the CIELab color space into coordinates in an LCH color space (S330);
a color gamut mapping module (220) configured to map (420, S340) the converted image data from the first color gamut (430) to the second color gamut (410) according to the sensed external illuminance ~~supplied by the illuminance sensing module (140) such that the visibility can be ensured in the high illuminance environment~~, the mapping (420, S340) comprising the following sequence of steps: lightness enhancement (S510), hue data correction (S520), chroma enhancement (S530), hue data correction one more time (S540);
and
a second color space converting module (230) configured to convert the color-gamut-mapped image data into an image to be displayed to a user according to the sensed external illuminance."

XIV. Claim 1 according to the appellant's **sixth auxiliary request** reads as follows (additions to claim 1 of the main request are underlined, deletions are ~~struck-through~~, long identical text portions are replaced by "[...]"):

"An apparatus (100) for improving visibility of an image, the apparatus comprising:
an image input module (120) configured to receive an image ~~the image input module (120) including image capturing elements configured to capture an image and a captured image is input to the image input module (120) as input image~~;
an illuminance sensing module (140) configured to sense external illuminance;
a visibility compensating module (200) including predetermined color gamut data in two different environments, the environments being a darkroom environment and a high illuminance environment, configured to compensate the input image by being configured to map the input image from ~~a~~the first color gamut to ~~a~~the second color gamut ~~of an image display screen for the apparatus~~; and an image output module (160) configured to output the compensated image;
wherein the visibility compensating module (200) comprises:
a first color space converting module (210) configured to convert image data of the input image into coordinates in a color space for a color gamut mapping in consideration of characteristics of a screen of the image output module (160) under ~~a~~the darkroom environment;
a color gamut mapping module (220) configured to map (420, S340) the converted image data from the first color gamut (430) to the second color gamut (410) according to the sensed external illuminance ~~supplied~~

~~by the illuminance sensing module (140) such that the visibility can be ensured in the high illuminance environment~~, the mapping (420, S340) comprising the following sequence of steps: lightness enhancement (S510), hue data correction (S520), chroma enhancement (S530), hue data correction one more time (S540);
and
a second color space converting module (230) configured to convert the color-gamut-mapped image data into an image to be displayed to a user according to the sensed external illuminance."

XV. Claim 1 according to the appellant's **seventh auxiliary request** reads as follows (additions to claim 1 of the main request are underlined, deletions are ~~struck-through~~, long identical text portions are replaced by "[...]"):

"An apparatus (100) for improving visibility of an image, the apparatus comprising:
an image input module (120) configured to receive an image ~~the image input module (120) including image capturing elements configured to capture an image and a captured image is input to the image input module (120) as input image~~;
an illuminance sensing module (140) configured to sense external illuminance;
a visibility compensating module (200) including predetermined color gamut data in two different environments, the environments being a darkroom environment and a high illuminance environment, configured to compensate the input image by being configured to map the input image from ~~a~~the first color gamut to ~~a~~the second color gamut ~~of an image display screen for the apparatus~~; and an image output module (160) configured to output the compensated image;

wherein the visibility compensating module (200) comprises:
a first color space converting module (210) configured to convert image data of the input image into coordinates in a color space for a color gamut mapping in consideration of characteristics of a screen of the image output module (160) under ~~a~~the darkroom environment;
a color gamut mapping module (220) configured to map (420, S340) the converted image data from the first color gamut (430) to the second color gamut (410) according to the sensed external illuminance ~~supplied by the illuminance sensing module (140) such that the visibility can be ensured in the high illuminance environment~~, the mapping (420, S340) comprising the following sequence of steps: lightness enhancement (S510), hue data correction (S520), chroma enhancement (S530), hue data correction one more time (S540);
and
a second color space converting module (230) configured to convert the color-gamut-mapped image data into an image to be displayed to a user according to the sensed external illuminance;
wherein the corrected hue data corresponds to a bluish hue."

XVI. The examining division's reasons for the decision under appeal regarding claim 1 of the main request underlying the decision under appeal [Note by the board: identical to claim 1 of the **fourth auxiliary request underlying the present decision of the board**] and claim 1 of the auxiliary request underlying the decision under appeal [Note by the board: identical to claim 1 of the **fifth auxiliary request underlying the present decision of the board**] may be summarised as follows:

Claim 1 according to the main request underlying the decision under appeal did not meet the requirements of Article 84 EPC because it lacked clarity and did not comprise all the essential features needed to define the invention, for the following reasons:

(E1) Claim 1 mentioned the use of a sensed external luminance but did not give any indication as to how this information should be used in the process of gamut mapping, even though the use of this information was an essential feature of the invention according to the application.

(E2) The four steps of the "sequence of steps" were defined in such broad terms (e.g. "lightness enhancement") that it was not clear what was done and what technical effect was achieved, even though this was central to the invention according to the application.

(E3) Even though several of the terms used in claim 1 were clear as such, they had such a broad meaning that a clear limitation of the claimed subject-matter could not be established. Even an attempt to interpret the claim in the light of the description did not overcome this lack of clarity.

The above objections (E1) to (E3) also applied to claim 1 according to the auxiliary request underlying the decision under appeal.

XVII. The appellant's line of argument in the statement of grounds of appeal, as far as it is relevant to the present decision, may be summarised as follows:

Claim 1 according to each of the then main and first to third auxiliary requests [Note by the board: identical to claim 1 according to the appellant's **fourth to seventh auxiliary requests underlying the present decision of the board**, respectively] was clear for the following reasons:

Claim 1 specified the "color gamut mapping module" by functional features which precisely defined its technical features. Moreover, the skilled person would have considered the description of the application, which represented its own dictionary by defining the terms used in claim 1. As acknowledged by the examining division, these terms were clear as such. In the light of the description and drawings the skilled person would have been able to determine how to interpret the terms of claim 1. The clarity of a claim was not diminished by the mere breadth of a term of art contained in it if the meaning of said term was unambiguous for the person skilled in the art, either per se or in the light of the description.

XVIII. The board's objections raised in its communication under Article 15(1) RPBA (see point IV above) which are relevant to the present decision may be summarised as follows:

(B1) The interaction between the "image input module (120)" and the other features of the apparatus of claim 1 was not clearly defined. Indeed, the expression "the input image" used further down in claim 1 had no antecedent and, even if it were

construed as relating to the image input module, it would still have been unclear whether it referred to the input or output of that module (see point 4(a) of the board's communication).

(B2) The embodiment of the invention using a lookup table (LUT) illustrated in figures 9 and 10 was not covered by the wording of claim 1 because the conversion was done in one step in a LUT, not in a sequence of successive steps as defined in claim 1, even though the end result might have been the same (see point 9 of the board's communication).

Objections (B1) and (B2) applied to claim 1 according to each of the four requests then on file [Note by the board: identical to claim 1 of the **fourth to seventh auxiliary requests underlying the present decision of the board**, respectively].

XIX. The appellant's line of argument in its letter of reply dated 2 January 2017 to the board's communication under Article 15(1) RPBA may be summarised as follows:

Regarding the claims according to the **fourth to seventh auxiliary requests underlying the present decision of the board**, the arguments submitted with the statement of grounds of appeal were maintained.

In the newly filed **main and first to third auxiliary requests underlying the present decision**, the wording of the claims had been further clarified.

Reasons for the Decision

1. The appeal is admissible.

Non-attendance of the appellant at the oral proceedings

2. The duly summoned appellant did not attend the oral proceedings. According to Rule 71(2) EPC 1973, the proceedings could however continue without him. In accordance with Article 15(3) RPBA the board relied for its decision only on the appellant's written submissions. The board was in a position to decide at the conclusion of the oral proceedings, since the case was ready for decision (Article 15(5) and (6) RPBA), and the voluntary absence of the appellant was not a reason for delaying a decision (Article 15(3) RPBA).

3. It is established case law of the boards of appeal that an appellant who submits amended claims shortly before the oral proceedings and subsequently does not attend those proceedings must expect a decision based on objections which may arise against such claims in its absence (see e.g. T 602/03, point 7 of the Reasons). Therefore, an appellant who submits new claims after oral proceedings have been arranged but does not attend those proceedings must expect that the board might decide that the new claims are not allowable because of deficiencies, such as lack of clarity (see e.g. T 991/07, point 2.4 of the Reasons).

Main request and first to third auxiliary requests

4. Article 84 EPC 1973

4.1 The apparatus of claim 1 according to each of the main and first to third auxiliary requests comprises an "image input module" defined as follows:

"an image input module (120) configured to receive an image the image input module (120) including image capturing elements configured to capture an image and a captured image is input to the image input module (120) as input image" (underlining added by the board).

In this feature, the new wording underlined above was apparently added by the appellant in reaction to the objection of lack of clarity raised by the board under point 4(a) of its communication under Article 15(1) RPBA, i.e. that the relationship between the "image input module (120)" and "the input image" used further down in claim 1 was not defined (see objection (B1) under point XVIII *supra*).

The board, however, regards this new wording as unclear and in contradiction with the disclosure in figures 1 and 2 of the application.

Indeed, according to this new wording, the "input image" is both generated inside the "image input module (120)" and input to said image input module. These two propositions, however, contradict each other: how can an "input image" be input to the image input module if it is generated inside, not outside, of said image input module? The new wording is thus unclear.

Moreover, according to figures 1 and 2 of the application, the "input image" of claim 1, i.e. the image which is input to the "visibility compensation module (200)", is not at the input to said "image input module (120)", but at the output of said image input module (120): see "input image" on left side of figure 2. Hence the new wording contradicts the disclosure of figures 1 and 2.

The appellant submitted that said new wording was based on paragraph [0023] of the application as filed, reading as follows: "The image input module 120 includes image capturing elements for capturing an image and a captured image is input to the image input module 120".

The board does not dispute that said new wording of claim 1 and the above sentence of paragraph [0023] of the description are similar. However, both suffer from the same deficiencies, i.e. an intrinsic inconsistency and a contradiction to the clear disclosure of figures 1 and 2. The fact that unclear wording present in a claim is also present in the description does not alleviate the resultant lack of clarity arising in the claim.

For the above reasons, claim 1 according to each of the main request and first to third auxiliary requests does not meet the requirement of clarity under Article 84 EPC 1973.

4.2 Moreover, the board had explained under point 9 of its communication under Article 15(1) RPBA that the embodiment of the invention using a lookup table (LUT) (shown in figures 9 and 10) was not covered by the wording of claim 1 according to the main request then

on file because the conversion was done in one step in a LUT, not in a sequence of successive steps as defined in claim 1, even though the end result might have been the same. Under points 12, 15 and 17 of that communication, the board had made clear that this objection also applied to all three auxiliary requests then on file.

The appellant did not address this objection in either of its two letters of reply (dated 2 and 25 January 2017), either by providing arguments, or by way of relevant amendments to claim 1.

Hence, the board affirms its view expressed in the communication under Article 15(1) RPBA that the "sequence of steps" in claim 1 is not supported by the embodiment of the invention shown in figures 9 and 10.

For the above reasons, claim 1 according to each of the main request and first to third auxiliary requests does not meet the requirement of support by the description under Article 84 EPC 1973.

5. Conclusion on the main request and the first to third auxiliary requests

Since the requirements of Article 84 EPC 1973 are not met, these requests are not allowable.

Fourth to seventh auxiliary requests

6. Preliminary observations

The claims of the fourth to seventh auxiliary requests are respectively identical to those of the main and

first to third auxiliary requests considered in the board's communication under Article 15(1) RPBA.

7. Article 84 EPC 1973

7.1 Under point 4(a) of said communication under Article 15(1) RPBA, the board had explained that the interaction between the "image input module (120)" and the other features of the apparatus of claim 1 according to the main request then on file was not clearly defined. Indeed, the expression "the input image" used further down in claim 1 had no antecedent and, even if it were construed as relating to the image input module, it would still have been unclear whether it referred to the input or output of that module.

Under points 12, 15 and 17 of that communication the board had made clear that this objection also applied to claim 1 according to the then first to third auxiliary requests.

The appellant did not amend claim 1 according to these four requests, which are now the appellant's fourth to seventh auxiliary requests, nor did it submit any argument against the board's objection under Article 84 EPC 1973.

Hence, the board affirms its view expressed under point 4(a) of the communication under Article 15(1) RPBA.

For the above reasons, claim 1 according to each of the fourth to seventh auxiliary requests does not meet the requirement of clarity under Article 84 EPC 1973.

7.2 Moreover, claim 1 according to each of the fourth to seventh auxiliary requests also does not meet the requirement of support by the description under Article 84 EPC 1973 for the reasons given under point 4.2 *supra*.

8. Conclusion on the fourth to seventh auxiliary requests

Since the requirements of Article 84 EPC 1973 are not met, these requests are not allowable.

Conclusion

9. Since none of the appellant's requests is allowable, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairwoman:

K. Boelicke T. Karamanli

Decision electronically authenticated