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**Datasheet for the decision
of 8 July 2021**

Case Number: T 0806/18 - 3.4.03

Application Number: 14195097.2

Publication Number: 2889860

IPC: G09G3/32, G09G5/14

Language of the proceedings: EN

Title of invention:

Organic light emitting diode display device and method of driving the same

Applicant:

LG Display Co., Ltd.

Headword:

Relevant legal provisions:

EPC Art. 52(1), 56, 82, 84, 123(2)

EPC R. 44, 62(1), 64(1), 64(2)

Keyword:

Inventive step - (yes)

Reimbursement of additional search fee - (yes)

Decisions cited:

G 0001/91

Catchword:

In determining whether or not to request further search fees from an applicant, the Search Division should not adopt a purely algorithmic approach, but should consider whether it would be reasonable, under the circumstances of the case and in the light of the subject-matter already searched and the prior art found, to demand additional fees for extending the search to the remaining claims (see Reasons, point 5.5).



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Case Number: T 0806/18 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 8 July 2021

Appellant: LG Display Co., Ltd.
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 19 December
2017 refusing European patent application No.
14195097.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman G. Eliasson
Members: S. Ward
E. Mille

Summary of Facts and Submissions

- I. The appeal is against the decision of the Examining Division to refuse European patent application No. 14 195 097 on the grounds that the subject-matter of the claims of the main request did not meet the requirements of Article 84 EPC. The first auxiliary request was not admitted into the proceedings pursuant to Rules 137(3) EPC and 116(1) EPC. Furthermore, a request for reimbursement of an additional search fee was refused.
- II. At the end of the oral proceedings held before the Board the appellant requested that the decision under appeal be set aside, that a patent be granted on the basis of claims 1 to 3 of the amended main request and pages 1-9 of the amended description submitted during the oral proceedings before the Board, and that the additional search fee be reimbursed.
- III. The following documents are referred to:
- D1: US 2005/0052446 A1
D2: US 2013/0076803 A1
D3: US 2013/0257913 A1
D4: US 2004/0150653 A1
- IV. Claim 1 of the main request reads as follows:
- "An organic light emitting diode (OLED) display device comprising:*
- a system (60) configured to:*
- split a display panel (10) into a plurality of regions including a first region (WIN1) and a second region*

(WIN2) and operate in separate modes including a split window mode for transmitting split image data corresponding to respective regions to display different images (IMAGE1, IMAGE2) on the respective regions and a normal mode for transmitting normal image data to display one image on the entire display panel (10); and

- a panel driving circuit (100) configured to: drive the display panel (10) according to the split image data or the normal image data provided from the system (60), separately control luminance of each of the first and second regions (WIN1, WIN2) according to a result obtained by analyzing the split image data in the split window mode, and

control a specific region in a lowest luminance state until a user input signal is generated when the user input signal is not present during a predetermined period of time or more in the specific region of the first and second regions (WIN1, WIN2);

wherein the panel driving circuit (100) includes: a gate driver (30) configured to sequentially supply scan pulses to gate lines of the display panel (10) and sequentially scan the first and second regions (WIN1, WIN2);

a data driver (20) configured to apply data voltages to data lines of the display panel (10);

a timing controller (40) configured to:

align the split image data or the normal image data provided from the system (60) and supply the split image data or the normal image data to the data driver (20),

generate a gate control signal for control of the gate driver (30) and a data control signal for control of the data driver (20) using an external input synchronization signal, and

output a luminance control signal according to a result obtained by analyzing the split image data or the normal image data; and

a gamma voltage generating circuit (50) configured to: generate a plurality of reference gamma voltages, supply the plurality of reference gamma voltages to the data driver (20), and

vary the plurality of reference gamma voltages in response to the luminance control signal;

wherein, in the split window mode, the timing controller (40) is configured to vary the luminance control signal according to the result obtained by analyzing each split image data and vary the luminance control signal in synchronization with respective periods in which the gate driver (30) scans the first and second regions (WIN1, WIN2),

wherein the gamma voltage generating circuit is configured to vary the plurality of reference gamma voltages to separately control luminance of each of the first and second regions (WIN1, WIN2) during a blank period between a period for scanning the first region (WIN 1) and a period for scanning the second region (WIN2) to reduce unnecessary power consumption, and

wherein the data driver (20) is further configured to generate and output blank data during the blank period to prevent reduction in image quality when the plurality of reference gamma voltages are varied."

Reasons for the Decision

1. The appeal is admissible.

In the present decision, where reference is made to paragraphs of the application, the paragraph numbers of the description as originally filed are cited (the paragraph numbering of the published application is different).

2. *Article 123(2) EPC*

- 2.1 Claim 1 is chiefly based on claims 1 and 2 as originally filed. The final two paragraphs are based on paragraph [0062] (or alternatively paragraph [0061] or [0054]). The feature that the gamma voltage generating circuit is configured to generate, supply and vary a plurality of reference gamma voltages is disclosed throughout the description, for example in paragraphs [0048], [0049], [0054], [0061] and [0062].

- 2.2 Claims 2 and 3 are based on claims 3 and 4 as originally filed, and the description has been satisfactorily adapted to the amended claims.

- 2.3 The Board is therefore satisfied that the requirements of Article 123(2) EPC are met.

3. *Article 84 EPC*

Claim 1 of the present main request differs considerably from the version which was rejected by the Examining Division on the grounds that it failed to meet the requirements of Article 84 EPC. The Board sees

no reason to object to the present version under Article 84 EPC.

4. *Inventive Step*

4.1 Although the contested decision did not deal with the issue of inventive step, the Examining Division gave a preliminary opinion on this matter, starting from document D1 (see point 6.2 of the annex to the summons to oral proceedings dated 27 June 2017); the appellant also appears to see this document as the starting point for the assessment of inventive step (see e.g. point E5 on page 15 of the statement of grounds of appeal). The Board sees no reason to differ, and hence D1 is considered to be the closest prior art.

4.2 D1 discloses a display device, which may be an OLED device (see e.g. paragraph [0083]), in which information may be displayed in regions in the form of windows (5 and 7 in Fig. 1A/1B) or alternatively in a full screen mode (see D1, paragraph [0085]).

4.3 Claim 1 differs from D1 at least in the following features:

(a) *"a panel driving circuit (100) configured to ... separately control luminance of each of the first and second regions (WIN1, WIN2) according to a result obtained by analyzing the split image data in the split window mode";*

(b) *"a timing controller (40) configured to ... output a luminance control signal according to a result obtained by analyzing the split image data or the normal image data";*

- (c) *"a gamma voltage generating circuit (50) configured to: generate a plurality of reference gamma voltages, supply the plurality of reference gamma voltages to the data driver (20), and vary the plurality of reference gamma voltages in response to the luminance control signal";*
- (d) *"wherein, in the split window mode, the timing controller (40) is configured to vary the luminance control signal according to the result obtained by analyzing each split image data and vary the luminance control signal in synchronization with respective periods in which the gate driver (30) scans the first and second regions (WIN1, WIN2)";*
- (e) *"wherein the gamma voltage generating circuit is configured to vary the plurality of reference gamma voltages to separately control luminance of each of the first and second regions (WIN1, WIN2) during a blank period between a period for scanning the first region (WIN 1) and a period for scanning the second region (WIN2) to reduce unnecessary power consumption"; and*
- (f) *wherein the data driver (20) is further configured to generate and output blank data during the blank period to prevent reduction in image quality when the plurality of reference gamma voltages are varied."*

4.4 The technical problem solved by the invention is, according to paragraph [0006] of the application, to provide an OLED display device with enhanced image quality and reduced power consumption for split window technology.

4.5 According to the invention, the gamma voltage generating circuit generates a plurality of reference gamma voltages which, in the split window mode, are varied in response to a luminance control signal obtained by analyzing the split image data, the luminance control signal being varied in synchronization with respective periods in which the gate driver scans the first and second regions. An appropriate plurality of reference gamma voltages is therefore supplied for each of the respective split images according to its luminance, thereby enhancing image quality, and reducing power consumption by decreasing the luminance where it is unnecessarily high. In addition, outputting blank data during a period between the scanning of the first and second regions, when the plurality of reference gamma voltages are being varied, prevents a reduction in image quality at the edges of the images. The Board therefore sees no reason not to accept the formulation of the problem solved by the invention cited above under point 4.4.

4.6 D1 discloses reducing the power consumption of the display by reducing the luminance in an inactive portion of the display area (see e.g. paragraph [0010]). Essentially the same measure is present in claim 1 of the present main request:

"control a specific region in a lowest luminance state until a user input signal is generated when the user input signal is not present during a predetermined period of time or more in the specific region of the first and second regions (WIN1, WIN2)".

However, this feature is provided in claim 1 in addition to the measures defined in features (a)-(f), which are not disclosed in D1. Specifically, D1 does

not disclose varying the luminosity in a region in response to a luminance control signal obtained by analyzing image data; D1 also does not disclose any gamma voltage generating circuit or varying the luminance of a region by varying a plurality of reference gamma voltages in response to a luminance control signal; finally D1 does not disclose outputting blank data during a period between the scanning of different regions when the plurality of reference gamma voltages are being varied.

4.7 Document D4 discloses a display drive control device in a device having two liquid crystal panels. The device may typically be "a mobile telephone having liquid crystal panels on both the inside and outside of the body thereof" (paragraph [0009]; Fig. 2).

4.8 In paragraph [0053] of D4 the following is disclosed:

"If the two liquid crystal panels as the drive target have different characteristics, the γ adjustment circuit 217 is designed to be able to generate such gradation voltages as to correct the γ characteristics of each liquid crystal panels [sic]."

Hence, in D4, the adjustment of the gamma voltages addresses a problem which arises in a system where two different display panels having different characteristics are addressed by a single LCD driver having a single gamma adjustment circuit. This problem would not arise in the display device of D1 which comprises a single screen. For this reason alone it is not plausible that the skilled person would consider incorporating the above feature from D4 into the display device of D1.

4.9 Moreover, such incorporation would not lead to a device having the features of claim 1, which requires that gamma voltages are varied in response to a luminance control signal obtained by analyzing the split image data, and not in response to the characteristics of the panel.

4.10 In addition, D4 does not disclose distinguishing feature (f). The problem of deterioration of display quality during the period in which the gamma voltage is varied is recognised in D4 (see paragraph [0095]), and a solution is proposed involving an adjustment of the timing of the signal sent from the timing controller 203. Specifically, when the display transfers from one panel to the other a time lag (the "middle porch" MP) is introduced, during which period no voltage pulses are applied to any of the gate lines, and the gamma voltage is switched during this time lag period, thereby preventing a deterioration of display quality during the transfer (see paragraphs [0096] and [0097] and Figs. 9B and 10).

This is a different solution to that of claim 1 of the present application, according to which the data driver generates and outputs blank data during the "blank period" in which the gamma voltages are switched. For this reason also, D4 would not lead the skilled person to the claimed invention, but rather away from it.

4.11 The other documents cited in the decision (D2 and D3) do not relate to split screen arrangements, and are less relevant.

4.12 The Board therefore judges that the subject-matter of claim 1 of the main request involves an inventive step within the meaning of Articles 52(1) and 56 EPC.

5. *Request for a Refund of the Additional Search Fee*

5.1 As a result of a finding of lack of unity of invention (Article 82 EPC), a partial European Search Report pursuant to Rule 64(1) EPC was drawn up. An attached communication (supplemental sheet B) explained that the common concept linking the dependent claims was considered to be the subject-matter of claim 1, which was not new in the light of D1. The subject-matter of claims 2 and 6 did not fulfill the requirement of unity of invention (Article 82 and Rule 44 EPC), and hence two inventions which were not so linked as to form a single general inventive concept could be identified based on the following groupings of claims:

Invention 1: claims 1-5, 7-11

Invention 2: claims 6, 12.

The partial European search report included the following statement: "The present partial European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims"; hence, the subject-matter of claims 1-5 and 7-11 was searched. Three documents (D1-D3) were cited as follows: D1 as "X" for claims 1 and 7; D1 and D2 as "Y" for claims 2-5 and 8-11; D3 as "Y" for claims 3, 4, 9 and 10.

5.2 In a communication under Rule 64(1) EPC, the applicant was invited to pay a further search fee for the second invention identified, and this fee was subsequently paid. A European search report covering all originally filed claims was drawn up pursuant to Article 92 EPC comprising the further document D4, which was cited as Y for claims 6 and 12. An opinion (hereinafter: "the

search opinion") pursuant to Rule 62(1) EPC was also issued.

5.3 In examination, the applicant-appellant requested *inter alia* a reimbursement of the additional search fee. The Examining Division reviewed the non-unity finding pursuant to Rule 64(2) EPC to determine whether the request for a further search fee was justified, and in the contested decision the request for reimbursement was rejected (Reasons, points 14 to 15.5).

5.4 The Search Division found non-unity *a posteriori*, i.e. following the finding that claim 1 lacked novelty over D1. Where an independent claim is found to lack novelty, it is often the case that a formal objection of lack of unity of invention could be envisaged between two or more groups of dependent claims. However, the Search Division (or the Examining Division reviewing a non-unity finding pursuant to Rule 64(2) EPC) should bear in mind that unity of invention under Article 82 EPC is "merely an administrative regulation" (G 1/91, Reasons, point 4.1), and should give due consideration to the following advice from the Guidelines:

"Lack of unity is not a ground of revocation in later proceedings. Therefore, although the objection is certainly made and amendment insisted upon in clear cases, it is neither raised nor insisted upon on the basis of a narrow, literal or academic approach. This is particularly so where the possible lack of unity does not necessitate a further search."

This is cited at F-V, 2.2 in the current edition of March 2021; essentially the same passage is cited at F-V, 8 in the November 2017 edition of the Guidelines

which was in force at the time of the contested decision, as confirmed in OJ September 2017, A75.

5.5 Hence, in determining whether or not to request further search fees from an applicant, the Search Division should not adopt a purely algorithmic approach, but should consider whether it would be reasonable, under the circumstances of the case and in the light of the subject-matter already searched and the prior art found, to demand additional fees for extending the search to the remaining claims.

5.6 In the present case, given the finding that original claim 1 lacked novelty, the Board does not dispute that a formal case could be made that the features of original claims 2 and 6 do not meet the requirements of unity of invention according to Article 82 and Rule 44(1) EPC.

5.7 However, original claim 3 was considered part of the first invention, and it was indicated in the partial search report that this claim had been fully searched. Original claim 3 reads as follows:

"The OLED display device according to claim 2, wherein, in the split window mode, the data driver (20) sets image data corresponding to a last horizontal line of an N^{th} region as blank data, sets a specific horizontal period after scanning of the N^{th} region is terminated, as a blank period, converts the blank data into the data voltage and outputs the data voltage during the blank period and simultaneously stores split image data of an $(N+1)^{\text{th}}$ region, provided from the timing controller (40), in a line memory (28) in an order in which the split data is input, and converts and outputs the split image data of the $(N+1)^{\text{th}}$ region into the

data voltage in an order in which the split image data is stored in the line memory (28) after the blank period is terminated."

5.8 Claim 6 as originally filed reads as follows:

"The OLED display device according to any one of claims 1 to 5, wherein, in the split window mode, the system (60) inserts blank data into split data of neighboring regions and transmits the split data."

5.9 Claim 6 therefore relates to essentially the same subject-matter as claim 3, with claim 3 going into more detail concerning the manner in which blank data is inserted between the two (e.g. first and second) regions. Claim 3 was searched when the partial search report was drawn up, and any documents identified as being relevant for the subject-matter of claim 3 would also constitute the relevant prior art for the subject-matter of claim 6.

5.10 The Board accepts that the dependencies of the two claims are not identical: original claim 3 is dependent on claim 2, and original claim 6 is dependent on "any one of claims 1-5". However, it is clear from the search opinion that the Search Division considered the additional features of claim 3 to be incapable of contributing to inventive step on the basis of documents already present in the partial search report. According to point 8.1 of the search opinion, inserting blank data in the claimed manner could be read onto the disclosure of document D1, and was in any event a "commonly known technique in display technology to improve image quality (as exemplified by document D3 - see fig. 3 - black row insertion)". In the light of this, the Board does not see why a further search,

requiring the payment of an additional search fee, could logically be deemed necessary for the subject-matter of claim 6.

Original claim 9 (part of the first invention) and original claim 12 (part of the second invention) are the method claim analogues of claims 3 and 6, and the same arguments apply.

- 5.11 In its decision the Examining Division stated that "claim 6 required a further search, resulting in the further cited prior art document D4, based on which an inventive step objection was raised based on the problem-solution approach" (Reasons, point 15.1, final paragraph). In this passage the Examining Division appears to be arguing that because a document relevant to claim 6 was found in the second search, this proves that the second search was necessary.

It can plausibly be argued that D4 is indeed more relevant than the other cited prior art for the subject-matter of claim 6. However, it would follow from the same argument that D4 is also more relevant for the very similar subject-matter of claim 3, and should therefore have been included in the partial search report.

- 5.12 The Board accepts that prior art searching can never be an exact science, and it cannot be excluded that a second search for the same or very similar subject-matter may reveal a relevant document which was missed in the first search. However, in its review of the non-unity finding, the Examining Division should have recognised that the mere fact that a more relevant document happened to be found in the second search is not a justification for refusing to refund the

additional fee for a second search on subject-matter which had already been covered by the first search.

- 5.13 In point 15.3 of the Reasons of the contested decision, the Examining Division states the following:

"The applicant argued that original claim 6 dealt with matter similar to that of original claim 3 and thus did not justify a further search fee.

"This line of argumentation is not convincing since the non-unity objection was raised based on original claims 2 and 6 (as explained in detail above) and not based on original claims 3 and 6."

This response is based on formal considerations, and fails to address the applicant's point that, according to the partial search report, the subject-matter of claim 3 had been fully searched, and so any documents relevant for claim 6 logically should already have been found in the search for claim 3; hence it was unreasonable to demand a further search fee.

- 5.14 The Board therefore does not agree with the Examining Division's finding pursuant to Rule 64(2) EPC that the Search Division's request for a further search fee was justified. As a result, the further search fee paid according to Rule 64(1) EPC is to be refunded.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent on the basis of claims 1-3 of the amended main request and pages 1-9 of the amended description, both submitted by the appellant during the oral proceedings before the Board, and sheets 1/9-9/9 of drawings as originally filed.
3. The additional search fee is to be reimbursed.

The Registrar:

The Chairman:



S. Sánchez Chiquero

G. Eliasson

Decision electronically authenticated