

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

# PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To: SELIM INTELLECTUAL PROPERTY LAW FIRM  10F and 11F, Taewoo Bldg., 285, Gangnamdaero Seocho-gu Seoul 06729 Republic of Korea		Date of mailing (day/month/year) <b>01 September 2020 (01.09.2020)</b>	
Applicant's or agent's file reference PSD20-0116		<b>FOR FURTHER ACTION</b> See paragraph 2 below	
International application No. <b>PCT/KR2020/005798</b>	International filing date (day/month/year) <b>29 April 2020 (29.04.2020)</b>	Priority date(day/month/year) 03 May 2019 (03.05.2019)	
International Patent Classification (IPC) or both national classification and IPC <b>H01L 27/15(2006.01)i, H01L 33/02(2010.01)i, H01L 33/62(2010.01)i, H01L 33/38(2010.01)i</b>			
Applicant <b>SAMSUNG ELECTRONICS CO., LTD.</b>			

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.  
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR International Application Division Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578	Date of completion of this opinion  01 September 2020 (01.09.2020)	Authorized officer  KANG MIN JEONG  Telephone No. +82-42-481-8131
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WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
**PCT/KR2020/005798**

**Box No. I Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of :
  - the international application in the language in which it was filed
  - a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
2.  This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(b))
3.  With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
  - a.  forming part of the international application as filed:
    - in the form of an Annex C/ST.25 text file.
    - on paper or in the form of an image file.
  - b.  furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
  - c.  furnished subsequent to the international filing date for the purposes of international search only:
    - in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
    - on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4.  In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

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**PCT/KR2020/005798**

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	<u>1-15</u>	YES
	Claims	<u>NONE</u>	NO
Inventive step (IS)	Claims	<u>1-15</u>	YES
	Claims	<u>NONE</u>	NO
Industrial applicability (IA)	Claims	<u>1-15</u>	YES
	Claims	<u>NONE</u>	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: WO 2019-045549 A1 (SEOUL SEMICONDUCTOR CO., LTD.) 07 March 2019

D2: US 2019-0027534 A1 (X-CELEPRINT LIMITED) 24 January 2019

D3: US 2009-0033856 A1 (IRINA KIRYUSCHEV et al.) 05 February 2009

D4: US 2018-0190631 A1 (LG DISPLAY CO., LTD.) 05 July 2018

D5: KR 10-2019-0041413 A (LUMENS CO., LTD.) 22 April 2019

**\*\* NOTE:** For clarity, this Written Opinion has been established on the assumption that claim 15 refers to claim 14 (see Box VIII).

I. Novelty and Inventive Step (PCT Article 33(2) and (3))

1. Claims 1-7

The subject matter of claim 1 differs from these prior art documents in a plurality of reference electrodes configured to ground a plurality of LEDs; and a conductive pattern provided on at least one surface of an integrated substrate, and connected to at least one of the plurality of reference electrode or a ground. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination.

Claims 2-7 are dependent on claim 1.

Therefore, claims 1-7 are novel and involve an inventive step.

2. Claims 8-13

The subject matter of claim 8 differs from these prior art documents in a plurality of

Continued on Supplemental Box

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**Box No. VIII Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 15 is referring to claim 16. As claim 16 does not exist in the present invention, claim 15 is unclear (PCT Article 6).

(\*\* NOTE: Considering the claims and description, it seems that claim 15 refers to claim 14.)

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of : Box No. V

reference electrodes configured to ground a plurality of LEDs; and a conductive pattern provided on at least one second surface of a LED module, different from at least one first surface, the conductive pattern being connected to at least one of the plurality of reference electrodes. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination.

Claims 9-13 are dependent on claim 8.

Therefore, claims 8-13 are novel and involve an inventive step.

3. Claims 14-15

The subject matter of claim 14 differs from these prior art documents in a conductive pattern provided on a third side surface of a glass substrate and a fourth side surface of the glass substrate that are different from a first side surface and a second side surface, the third side surface facing opposite to the fourth side surface, and the conductive pattern being connected to a ground. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination.

Claim 15 is dependent on claim 14.

Therefore, claims 14-15 are novel and involve an inventive step.

II. Industrial Applicability (PCT Article 33(4))

Claims 1-15 are industrially applicable.

**\*\* NOTE**

The phrases "LEDsand" and "the a ground" mentioned in claim 1 are considered to be a writing error for "LEDs and" and "a ground", respectively.

The phrase "wirinwhg layer" mentioned in claim 8 is considered to be a writing error for "wiring layer."