

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT6158483

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
JINHO KIM	05/20/2020
TETSUYA SHIGETA	05/21/2020
TAESOOON PARK	05/21/2020
SANGMIN SHIN	05/22/2019
YOUNGKI JUNG	05/21/2020
RECEIVING PARTY DATA	
Name:	SAMSUNG ELECTRONICS CO., LTD.
Street Address:	129, SAMSUNG-RO, YEONGTONG-GU, GYEONGGI-DO
City:	SUWON-SI
State/Country:	KOREA, REPUBLIC OF
Postal Code:	16677
PROPERTY NUMBERS Total: 1	
Property Type	Number
Application Number:	16903934
CORRESPONDENCE DATA	
Fax Number:	(202)293-7860
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>	
Phone:	2022937060
Email:	cannes@sughrue.com, sughrue@sughrue.com
Correspondent Name:	SUGHRUE MION, PLLC
Address Line 1:	2000 PENNSYLVANIA AVENUE NW
Address Line 2:	SUITE 800
Address Line 4:	WASHINGTON, D.C. 20006
ATTORNEY DOCKET NUMBER:	Q255357
NAME OF SUBMITTER:	CHRISTOPHER ANNES - TEAMS DEPARTMENT
SIGNATURE:	/CHRISTOPHER ANNES/
DATE SIGNED:	06/17/2020
This document serves as an Oath/Declaration (37 CFR 1.63).	

Total Attachments: 9

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ASSIGNMENT WITH DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

Whereas, We, the undersigned inventors hereinafter called assignors, have invented certain improvements described in the application identified below; and

Whereas, SAMSUNG ELECTRONICS CO., LTD. of 129, Samsung-ro, Yeongtong-gu, Gyeonggi-do, Suwon-si, 16677, Republic of Korea, (assignee), desires to acquire the entire right, title, and interest in the application and invention, and to any United States patents to be obtained therefor;

Now therefore, for valuable consideration, receipt whereof is hereby acknowledged,

We, the above named assignors, hereby sell, assign and transfer to the above named assignee, its successors and assigns, the entire right, title and interest in the application and the invention disclosed therein for the United States of America and all other countries, including all divisions, and continuations thereof, and all Letters Patent of the United States that may be granted thereon, and all reissues thereof, and including rights of priority under the International Convention of Paris (1883) as amended, the laws of all foreign countries, and the laws of the United States including the right to claim priority under 35 USC 119 and the right to sue for past damages, and we request the Director of the U.S. Patent and Trademark Office to issue any Letters Patent granted upon the invention set forth in the application to the assignee, its successors and assigns; and we hereby agree that the assignee may apply for foreign Letters Patent on the invention and we will execute without further consideration all papers deemed necessary by the assignee in connection with the United States and foreign applications when called upon to do so by the assignee.

(Legalization not required for recording but is prima facie evidence of execution under 35 USC 261)

As the below named inventor, I hereby declare that:

This assignment with declaration is The attached application, or directed to:
 United States Application or PCT International Application Number _____ filed on _____.

The application is entitled:

DISPLAY MODULE AND DRIVING METHOD THEREOF

The above identified application was made or was authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I have reviewed and understand the contents of the application for which this assignment with declaration is being submitted.

I am aware of the duty to disclose to the Office all information known to me to be material to patentability as defined in 37 CFR 1.56.

I hereby acknowledge that any willful false statement made in this assignment with declaration is punishable under 18 USC 1001 by fine or imprisonment of not more than five (5) years, or both.

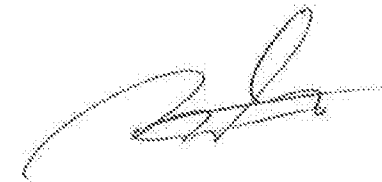
NAME OF SOLE OR FIRST INVENTOR:	
Given Name (first and middle [if any])	Inho
Family Name or Surname	KIM
Inventor's signature	<i>Jimho Kim</i>
Date	<i>May 20, 2020</i>
Residence: Suwon-si, Republic of Korea	
Mailing Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Republic of Korea	
NAME OF SECOND INVENTOR:	
Given Name (first and middle [if any])	Tetsuya
Family Name or Surname	SHIGETA
Inventor's signature	<i>Tetsuya Shigeta</i>
Date	<i>May 21, 2020</i>
Residence: Suwon-si, Republic of Korea	
Mailing Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Republic of Korea	
NAME OF THIRD INVENTOR:	
Given Name (first and middle [if any])	Taeseon
Family Name or Surname	PARK
Inventor's signature	<i>Park Tae Seon</i>
Date	<i>May 21, 2020</i>
Residence: Suwon-si, Republic of Korea	
Mailing Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Republic of Korea	
NAME OF FOURTH INVENTOR:	
Given Name (first and middle [if any])	Sangmin
Family Name or Surname	SHIN
Inventor's signature	
Date	
Residence: Suwon-si, Republic of Korea	
Mailing Address: 327-704, 132, Cheongmyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16707, Republic of Korea	
NAME OF FIFTH INVENTOR:	
Given Name (first and middle [if any])	Youngki
Family Name or Surname	JUNG
Inventor's signature	<i>Youngki Jung</i>
Date	<i>May 21, 2020</i>
Residence: Suwon-si, Republic of Korea	
Mailing Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Republic of Korea	

VERIFICATION OF A TRANSLATION

I, the below undersigned translator, hereby state and declare that:

- a) My name and post office address are as stated below.
- b) That I am well acquainted with the English and Korean languages.
- c) That the following is a correct translation into English of the Employee's invention report of Samsung Electronics Co., Ltd., for the invention of this application, and I make the solemn declaration conscientiously believing the same to be true.

June 11, 2020
Date



Moonyoung, KIM
Signature of Translator

c/o Nawoo Patent & Law Firm

9th Floor, Shinduk Building 343

Gangnam-daero, Seocho-gu, Seoul

Employee's invention report

* I (We) assign a right to receive a patent right for the below invention to the company under Article 4 of the employee's invention compensation standards of the company.

Title of Invention(KR)	별도의 PWM VDD(VSS)가 적용된 TFT PWM 화소 구동회로	Reporting ID	J2019-05-0923
Title of Invention(US)	TFT PWM Pixel Circuit with Separated VDD(VSS) of PWM Part		

Basic Information

Invention related to the duties report department	SET	Drafted by	KIM, JIN-HO	Department Name	Product Development Lab (VD)
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Project connection or not	Connection
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Project title	TFT circuit design technology for micro LED display
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Inventor(s)	In-house or not	Name (Korean)	Working condition	Name (English)	Company	Department
		In-house	김진호	In office	KIMJIN-HO	Samsung Electronics Co., Ltd.
	In-house	테츠야시게타	In office	SHIGETATETSU YA	Samsung Electronics Co., Ltd.	Advanced Display Lab(VD)
	In-house	박태순	In office	PARKTAE SOON	Samsung Electronics Co., Ltd.	C-Lab(SR)
	In-house	신상민	Retired	SHINSANGMIN	Samsung Electronics Co., Ltd.	Advanced Display Development Lab(VD)
	In-house	정영기	In office	JUNGYOUNGKI	Samsung Electronics Co., Ltd.	Advanced Display Lab(VD)

Inventors' checklist	Checklist Items	YES	NO
		Is a co-work done with an outsourcing company? (industry-academy cooperation corresponds to co-work)	<input checked="" type="radio"/>
	Is an agreement made about sole application or co-application?	<input checked="" type="radio"/>	<input type="radio"/>
	Is there a signed or agreed contract regarding an application with an outsourcing company? (sole/co-application, share ratio, fee sharing, etc.)	<input checked="" type="radio"/>	<input type="radio"/>
	Is the detail consented with the outsourcing company included in the invention report?	<input checked="" type="radio"/>	<input type="radio"/>
	Is a confirmation on a contribution to an invention present?	<input checked="" type="radio"/>	<input type="radio"/>
	Is a staff of an outsourcing company included as an inventor?	<input checked="" type="radio"/>	<input type="radio"/>
	If there any material or internal document (minutes, development log, etc.) provided to the outsourcing company associated with the invention?	<input checked="" type="radio"/>	<input type="radio"/>
	Is the contract and the confirmation of the contribution to the invention signed?	<input checked="" type="radio"/>	<input type="radio"/>
	If a return for technology (royalty) associated with the output of the co-work paid?	<input checked="" type="radio"/>	<input type="radio"/>

Product Type	Code	Type System	*Representative classification
	PA020199	Audio/Visual Device > TV > Others	Micro-LED display <input checked="" type="radio"/>

Technology Type	Code	Type System	* Representative classification
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TA02011299	Audio/Visual Device > TV > Display module structure > Others	Micro LED display  TFT BP
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Applicant(s) information

Co-work with outsourcing company	N/A					
Co-application	Self-invention		right ownership type		Sole application	
Applicant	Domestic/Oversea	Classification	Corporation Name	Applicant or not (ownership of right)	Cost Sharing(%)	Right share (%)
	Domestic	Corporation	Samsung Electronics Co. Ltd.	V	100	
Contract						
Confirmation of contribution to invention						
Contribution proving documents (minutes, e-mail, drawings, etc.)						
Cost bearing information						

Prior Art Search

Prior Art	Registration ID	Application title (Title of Invention)	Nation	Application No.	Applicant	Application Date	Publication No.
		CA-201806-049 -1	<u>TFT with improved light emitting time PWM pixel driving circuit</u>	US	US16/263253		2019013
	CA-201806-048 -1	<u>Internal TFT PWM and PAM pixel driving circuit</u>	US	US16/263271		2019013	

Search Dissertation	Title of Dissertation	Writer	Journal Name	Pages	Publication Date

Comment of Prior Art	
Other Prior Art Reference	

Invention

Invention Abstract	
Invention keyword	PWM driving circuit, grayscale deviation, VDD separation, IR drop

PATENT

REEL: 052966 FRAME: 0505

Invention excavation activity (Weather pertaining to Collective Intelligence)	No	Name of invention excavation activity		Details of invention excavation activity	
Employee's invention report					

Reference

Urgent Application	URGENT	Reason for Urgent Application	Application for products		
Detailed Reason(s) for Urgent Application	This is the technology that should be urgently reflected to micro-LED products.				
Attach data for Urgent Application					
Publication	No	Publication Country/Organization			
Publication Date			Published Method		
Subject to a standard	No	Date to be a Standardization candidate	Weather there is a contribution	The initial (or an expected) date of contribution	
Standardization Organization	Name of Standardization Organization	Name of Standard Subject			
Application product	A Smart Pixel or Tablet or Etc.				
Notice to the IP department Application	This is the technology that should be urgently reflected to micro-LED products. Prompt handling is deemed necessary.				

Review of a co-worker

Date		Reviewer	
Review			

History of approval

Title	TFT PWM pixel driving circuit applied with a separate PWM VDD (VSS)
Status	Finally approved

Order	Type	Name	Career Development	Processed time and date	Department	Opinion on the report
0	Filed the draft	KIMJIN-HO	Principal Engineer	2019-05-22 15:10:56	Product Development Lab (VD)	Needs to be reflected to micro-LED product. Please approve.
1	Agreed	PARKTAE SOON	Principal Engineer	2019-05-22 15:13:34	Product Development Lab (VD)	I agreed.
1	Agreed	SHINSANGMIN	Principal Engineer	2019-05-22 15:13:47	Product Development Lab (VD)	
1	Agreed	JUNGYOUNG KI	Staff Engineer	2019-05-22 15:14:44	Product Development Lab (VD)	This is the pixel circuit required for securing PWM uniformity.

Management on employee's invention proceeding date

Inventor's reporting date	2019.05.22	Approval date of department head	2019.05.22	Filing date in patent department	2019.05.22
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List

※ 당사 직무발명 보호규정 제 4조에 의거하여 하기 발명에 대하여 특허를 받을 수 있는 권리로서 회사에 양도합니다.

발명명칭(한글)	별도의 PWM VDD(VSS)가 적용된 TFT PWM 화소 구동회로	신고 ID	J2019-05-0923
발명명칭(영어)	TFT PWM Pixel Circuit with Separated VDD(VSS) of PWM Part		

기본정보

직무발명신고부서	SET	작성자	김진호	부서명	제품개발Lab(VD)
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과제연계여부	연계
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과제명	Micro LED display 용 TFT 회로 설계 기술 확보
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발명자인적사항	사내/외	성명(국문)	재직상태	성명(영문)	소속기관	소속부서
	사내	김진호	재직	KIMJIN-HO	삼성전자	선행Display Lab(VD)
사내	태초야시계	재직	SHIGETATETSUYA	삼성전자	선행Display Lab(VD)	
사내	박태순	재직	PARKTAE SOON	삼성전자	C-Lab(SR)	
사내	신상민	퇴직	SHINSANGMIN	삼성전자	선행Display개발Lab(VD)	
사내	정영기	재직	JUNGYOUNGKI	삼성전자	선행Display Lab(VD)	

발명자 체크리스트	체크리스트 항목		예	아니요
		협력사와 협업하였습니까?(산학의 경우도 협업에 해당)	<input type="radio"/>	<input checked="" type="radio"/>
	단독출원 또는 공동출원에 대해 합의를 하였습니까?	<input type="radio"/>	<input type="radio"/>	
	협력사와 출원에 대하여 합의 또는 서명한 계약서가 있습니까? (단독/공동출원여부, 지분율, 비용분담 등)	<input type="radio"/>	<input type="radio"/>	
	협력사와 협업한 내용이 직무발명서에 포함되어 있습니까?	<input type="radio"/>	<input type="radio"/>	
	발명기여도 확인서가 있습니까?	<input type="radio"/>	<input type="radio"/>	
	협력사 임직원이 발명자에 포함되어 있습니까?	<input type="radio"/>	<input type="radio"/>	
	발명과 관련하여 당사가 협력사에게 제공한 자료 또는 당사 내부 자료(회의록, 개발일지 등)이 있습니까?	<input type="radio"/>	<input type="radio"/>	
	계약서와 발명기여도 확인서에 서명은 받았습니까?	<input type="radio"/>	<input type="radio"/>	
	협업 결과물에 대하여 기술대가(기술료)를 지급 했습니까?	<input type="radio"/>	<input type="radio"/>	

제품분류	코드	분류체계	대표분류
	PA020199	Audio/Visual Device > TV > Others	Micro - LED display <input checked="" type="radio"/>

기술분류	코드	분류체계	대표분류
	TA02011299	Audio/Visual Device > TV > Display 모듈 구조 > Others	Micro LED display 용 TFT BP <input checked="" type="radio"/>

출원인 정보

직무발명신고

협력사 없음 여부	없음					
공동발명 여부	자체발명	권리소유형태		단독출원		
접수 발명 기 관 명 칭	국내/해외	구분	기관명칭	출원인여부 (권리소유권)	비용분담율(%)	권리지분율(%)
	국내	기업	삼성전자	<input checked="" type="checkbox"/>	100	
계약서						
발명기여도 확인서						
발명기여도 입증서류 (회의록, 이메일, 도면 등)						
비용분담 정보						

선행기술조사

선행특허	접수 ID	출원명칭(발명명칭)	국가	출원번호	출원인	출원일	공개번호
	CA-201806-049-1	발광 시간이 향상된 TFT PWM 회소 구동 회로	US	US16/263253		20190131	
	CA-201806-048-1	내부보상 TFT PWM 및 PAM 회소 구동 회로	US	US16/263271		20190131	
조사논문	논문제목	저자명	저널명	페이지	발행일		
선행기술 검토의견							
기타선행 기술자료							

발명내용

발명요약서						
발명키워드	PWM 회소 구동 회로, 계조 편차, VDD 분리, IR drop					
발명발굴활동 (집단지성여부)	No	발명발굴활동명칭	발명발굴활동상세			
직무발명 신고서						

특허출원참고사항

긴급출원여부	긴급	긴급출원사유	제품적용
긴급출원세부사유	micro-LED 제품에 반영이 시급한 기술입니다.		
긴급출원첨부자료			

직무발명신고

공표여부	No	공표국가/단체	
공표일자		공표방법	
표준대상여부	No	표준화후보결정일	기고문 여부
표준화기구	표준화기구명칭	표준과제명	
적용제품	<input type="checkbox"/> Smart Phone <input type="checkbox"/> Tablet <input type="checkbox"/> Etc.		
특허부서 전달사항	micro-LED 제품에 반영이 시급한 기술입니다. 긴급진행 부탁드립니다.		

동료검토

실시일자		검토자	
검토내용			

결재이력

제목	별도의 PWM VDD(VSS)가 적용된 TFT PWM 화소 구동회로
상태	완료

항목	구분	의견	발명자(의견)	심사관(의견)	특허관(의견)	의견내용
1	기안	발명명	발명명(의견)	심사관(의견)	특허관(의견)	발명명(의견)
2	합의	발명명	발명명(의견)	심사관(의견)	특허관(의견)	발명명(의견)
3	합의	발명명	발명명(의견)	심사관(의견)	특허관(의견)	발명명(의견)
4	합의	발명명	발명명(의견)	심사관(의견)	특허관(의견)	발명명(의견)

직무발명진행일지관리

발명자상신일	2019.05.22	부서장승인일	2019.05.22	특허부서접수일	2019.05.22
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