PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT5585129

SUBMISSION TYPE:	CORRECTIVE ASSIGNMENT
NATURE OF CONVEYANCE:	Corrective Assignment to correct the ASSIGNEE IS THOMSON LICENSING NOT THOMSON LICENSING/INTERDIGITAL CE PATENT HOLDINGS previously recorded on Reel 047460 Frame 0592. Assignor(s) hereby confirms the I COVENANT WITH THOMSON LICENSING,, ITS SUCCESSORS, ASSIGNS, LEGAL REPRESENTATIVES,

CONVEYING PARTY DATA

Name	Execution Date
FRANCK AUMONT	11/10/2017
DIDIER GUILLEMOT	11/22/2017
CYRIL QUINQUIS	11/10/2017

RECEIVING PARTY DATA

Name:	THOMSON LICENSING	
Street Address:	1-5 RUE JEANNE D'ARC	
City:	ISSY-LES-MOULINEAUX	
State/Country:	FRANCE	
Postal Code:	92130	

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	16098189

CORRESPONDENCE DATA

Fax Number: (609)212-2990

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.

Phone: 609-436-5847

Email: kathleen.lyles@interdigital.com **Correspondent Name:** BRIAN J. DORINI, INTERDIGITAL Address Line 1: 4 RESEARCH WAY, 3RD FLOOR PRINCETON, NEW JERSEY 08543 Address Line 4:

ATTORNEY DOCKET NUMBER:	PF160002
NAME OF SUBMITTER:	KATHLEEN LYLES
SIGNATURE:	/Kathleen Lyles/
DATE SIGNED:	06/21/2019

Total Attachments: 6

source=PF160002-Assignment#page1.tif

source=PF160002-Assignment#page2.tif

source=PF160002_WO PCT_LEGAL_10NOV2017_ASSIGNMENT_exe assignment - AUMONT#page3.tif source=PF160002_WO PCT_LEGAL_10NOV2017_ASSIGNMENT_exe assignment - QUINQUIS#page3.tif source=PF160002_WO PCT_LEGAL_22NOV2017_ASSIGNMENT_exe assignment - GUILLEMOT#page3.tif source=PF160002-Assignment Cover Sheet#page1.tif



UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

NOVEMBER 12, 2018

PTAS

BRIAN J. DORINI 4 RESEARCH WAY, 3RD FLOOR PRINCETON, NJ 08540 505183448

UNITED STATES PATENT AND TRADEMARK OFFICE NOTICE OF RECORDATION OF ASSIGNMENT DOCUMENT

THE ENCLOSED DOCUMENT HAS BEEN RECORDED BY THE ASSIGNMENT RECORDATION BRANCH OF THE U.S. PATENT AND TRADEMARK OFFICE. A COMPLETE COPY IS AVAILABLE AT THE ASSIGNMENT SEARCH ROOM ON THE REEL AND FRAME NUMBER REFERENCED BELOW.

PLEASE REVIEW ALL INFORMATION CONTAINED ON THIS NOTICE. THE INFORMATION CONTAINED ON THIS RECORDATION NOTICE REFLECTS THE DATA PRESENT IN THE PATENT AND TRADEMARK ASSIGNMENT SYSTEM. IF YOU SHOULD FIND ANY ERRORS OR HAVE QUESTIONS CONCERNING THIS NOTICE, YOU MAY CONTACT THE ASSIGNMENT RECORDATION BRANCH AT 571-272-3350. PLEASE SEND REQUEST FOR CORRECTION TO: U.S. PATENT AND TRADEMARK OFFICE, MAIL STOP: ASSIGNMENT RECORDATION BRANCH, P.O. BOX 1450, ALEXANDRIA, VA 22313.

RECORDATION DATE: 11/09/2018 REEL/FRAME: 047460/0592

NUMBER OF PAGES: 9

BRIEF: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

DOCKET NUMBER: PF160002

ASSIGNOR:

AUMONT, FRANCK DOC DATE: 11/10/2017

ASSIGNOR:

GUILLEMOT, DIDIER DOC DATE: 11/22/2017

ASSIGNOR:

QUINQUIS, CYRIL DOC DATE: 11/10/2017

ASSIGNOR:

THOMSON LICENSING DOC DATE: 07/30/2018

ASSIGNEE:

THOMSON LICENSING 1-5 RUE JEANNE D'ARC ISSY-LES-MOULINEAUX, FRANCE 92130

ASSIGNEE:

INTERDIGITAL CE PATENT HOLDINGS 3 RUE DU COLONEL MOLL PARIS, FRANCE 75017

P.O. Box 1450, Alexandria, Virginia 22313-1450 - WWW.USPTO.GOV PATENT

REEL: 049557 FRAME: 0838

APPLICATION NUMBER: 16098189 FILING DATE: PATENT NUMBER: ISSUE DATE:

TITLE: METHOD AND APPARATUS FOR BANDWIDTH OPTIMIZATION USING

STAGGERCAST

ASSIGNMENT RECORDATION BRANCH PUBLIC RECORDS DIVISION

As a below named inventor, I hereby declare that:

I believe I am the original inventor or an original joint inventor of the subject matter which is claimed and for which a patent is sought on the inventor entitled

METHOD AND APPARATUS FOR BANDWIDTH OPTIMIZATION USING STAGGERCAST

the specification of which was filed on May 11, 2017

11, 2017 as Application Serial No.

PCT/EP2017/061389 and was amended on

, or, if not identified here by filing date and serial number, is attached hereto.

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

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment of not more than five (5) years, or both, under 18 USC 1001.

ASSIGNMENT AND AGREEMENT IN AN APPLICATION FOR LETTERS PATENT

For valuable consideration received, I hereby sell, assign and transfer to Thomson Licensing, a corporation duly organized and existing under the laws of the country of France, its successors, and assigns my entire right, title and interest, for all countries in and to said inventions, and all the rights and privileges under any and all Letters Patent that may be granted therefor, and any divisions, continuations, reissues and extensions thereof.

I agree that, when requested, I will, without charge to said corporation but at its expense, sign all papers, take all rightful oaths, make all rightful declarations and do all acts which may be necessary, desirable or convenient for securing and maintaining patents or other forms of protection for said inventions in any and all countries and for vesting title thereto in said corporation, its successors, assigns or nominees.

I agree that I will communicate to said corporation or its representatives any facts known to me respecting said inventions and when requested by said corporation and at its expense will testify in any legal proceedings, and generally do everything possible to aid said corporation, its successors, assigns and legal representatives or nominees, to obtain or enforce proper protection for said inventions in any and all countries.

I authorize and empower said corporation, its successors, assigns or nominees, to make application for patent or other form of protection for said inventions in its or their own name, or in mylour name, in any and all countries and to invoke and claim for any application for patent or other form of protection for said inventions filed by it or them, the benefit of the right of priority provided by the international Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it, and to invoke and claim such right of priority without further written or oral authorization from me.

I hereby consent that a copy of this assignment shall be deemed a full legal and formal equivalent of any assignment, consent to file or like document which may be required in any country for any purpose and more particularly in proof of the right of the said corporation or its successors, assigns or nominees to apply for patent or other proper protection for said inventions, and to claim the aforesaid benefits of the right of priority provided by the International Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it.

I covenant with Thomson Licensing, its successors, assigns, legal representatives, and nominees, that to the best of my knowledge the right, title and interest herein conveyed by me are free and clear of any encumbrance, and that I have full right to convey the same as herein expressed.

Signed at	<u>Cesson Sevigne FRANCE</u>	Date	10/4/2017
Inventor Name	Franck AUMONT (Type or Print)		(Signature in Fuil ← No Initials)
Post Office Address	c/o Technicolor 975, avenue des Champ	s Blancs, 35	A Late
1 st Witness	_ANRONY PESIX		
	(Type or Print)		(Signature in Full – No Initials)
2 nd Witness	Cyril QuiNovis		4
	(Type or Print)		(Signature in Full - No Initials)

50 9670

DECLARATION

Docket No. PF160002

10,11.2017

As a below named inventor, I hereby declare that:

I believe I am the original inventor or an original joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND APPARATUS FOR BANDWIDTH OPTIMIZATION USING STAGGERCAST

May 11, 2017 the specification of which was filed on

PCT/EP2017/061389 and was amended on

y 11, 2017 as Application Serial No. PCT/EP2017/061389 , or, if not identified here by filing date and serial number, is attached hereto.

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

Cossnu-Seviano

Abdullah Haskow
(Type or Print)

2nd Witness

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

Lacknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-inpart applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment of not more than five (5) years, or both, under 18 USC 1001.

ASSIGNMENT AND AGREEMENT IN AN APPLICATION FOR LETTERS PATENT

For valuable consideration received, I hereby sell, assign and transfer to Thomson Licensing, a corporation duly organized and existing under the laws of the country of France, its successors, and assigns my entire right, title and inferest, for all countries in and to said inventions, and all the rights and privileges under any and all Letters Patent that may be granted therefor, and any divisions, continuations, reissues and extensions thereof.

agree that, when requested, I will, without charge to said corporation but at its expense, sign all papers, take all rightful paths, make all rightful declarations and go all acts which may be necessary, desirable or convenient for securing and maintaining patents or other forms of protection for said inventions in any and all countries and for vesting title thereto in said corporation, its successors, assigns or

I agree that I will communicate to said corporation or its representatives any facts known to me respecting said inventions and when requested by said corporation and at its expense will testify in any legal proceedings, and generally do everything possible to aid said corporation, its successors, assigns and legal representatives or nominees, to obtain or enforce proper protection for said inventions in any and all countries.

I authorize and empower said corporation, its successors, assigns or nominees, to make application for patent or other form of protection for said inventions in its or their own name, or in my/our name, in any and all countries and to invoke and claim for any application for patent or other form of protection for said inventions filed by it or them, the benefit of the right of priority provided by the international Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it, and to invoke and claim such right of priority without further written or oral authorization from me.

I hereby consent that a copy of this assignment shall be deemed a full legal and formal equivalent of any assignment, consent to file or like document which may be required in any country for any purpose and more particularly in proof of the right of the said corporation or its successors, assigns or nominees to apply for patent or other proper protection for said inventions, and to claim the aforesaid benefits of the right of priority provided by the International Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it.

Loovenant with Thomson Licensing, its successors, assigns, legal representatives, and nominees, that to the best of my knowledge the right, title and interest herein conveyed by me are free and clear of any encumbrance, and that I have full right to convey the same as herein expressed.

olyneu al	<u> </u>	Date
Inventor Name	Cyril QUINQUIS(Type or Print)	(Signature in Full – No Initials)
Post Office Address	c/o Technicolor 975, avenue des Champs &	Blancs, 35576 Cesson-Sevigne, France
1 st Witness	GAUTIER EC'C (Type or Print)	(Signature in Full – No Initials)
	N 21 % "	Note: No

PATENT REEL: 049557 FRAME: 0841

(Signature in Full - No Initials)

As a below named inventor, I hereby declare that:

I believe I am the original inventor or an original joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND APPARATUS FOR BANDWIDTH OPTIMIZATION USING STAGGERCAST

the specification of which was filed on May 11, 2017 as Application Serial No.

and was amended on

, or, if not identified here by filing date and serial number, is attached hereto. The above-identified application was made or authorized to be made by me.

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

Lacknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment of not more than five (5) years, or both, under 18 USC 1001.

Assignment and agreement in an application for letters patent

For valuable consideration received, I hereby sell, assign and transfer to Thomson Licensing, a corporation duly organized and existing under the laws of the country of France, its successors, and assigns my entire right, title and interest, for all countries in and to said inventions, and all the rights and privileges under any and all Letters Patent that may be granted therefor, and any divisions; continuations, reissues and extensions thereof.

I agree that, when requested, I will, without charge to said corporation but at its expense, sign all papers, take all rightful oaths, make all rightful declarations and do all acts which may be necessary, desirable or convenient for securing and maintaining patents or other forms of protection for said inventions in any and all countries and for vesting title thereto in said corporation, its successors, assigns or nominees

I agree that I will communicate to said corporation or its representatives any facts known to me respecting said inventions and when requested by said corporation and at its expense will testify in any legal proceedings, and generally do everything possible to aid said corporation, its successors, assigns and legal representatives or nominees, to obtain or enforce proper protection for said inventions in any and all countries.

I authorize and empower said corporation, its successors, assigns or nominees, to make application for patent or other form of protection for said inventions in its or their own name, or in my/our name, in any and all countries and to invoke and claim for any application for patent or other form of protection for said inventions filed by it or them, the benefit of the right of priority provided by the International Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it, and to invoke and claim such right of priority without further written or oral authorization from me

I hereby consent that a copy of this assignment shall be deemed a full legal and formal equivalent of any assignment, consent to file or like document which may be required in any country for any purpose and more particularly in proof of the right of the said corporation or its successors, assigns or nominees to apply for patent or other proper protection for said inventions, and to claim the aforesaid benefits of the right of priority provided by the international Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it...

I covenant with Thomson Licensing, its successors, assigns, legal representatives, and nominees, that to the best of my knowledge the right, title and interest herein conveyed by me are free and clear of any encumbrance, and that I have full right to convey the same as herein expressed

Signed at	<u>KENNES</u> DE	ate 22/11/17
Inventor Name	Didier GUILLEMOT	
; 	(Type or Print)	(Signature in Full – No Initials)
Post Office Address	c/o Technicolor 975, avenue des Champs Blad	ics, 35576 Cesson-Sevigne, France
1 st Witness	Cyril Quinquis	Cling
	(Type or Print)	(Signature in Full – No Initials)
2 nd Witness	Franch MUNOWT	
\	(Type or Print)	(Signature in Full – No Initials)

PATENT

REEL: 049557 FRAME: 0842

505183448 11/09/2018

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT5230217

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
FRANCK AUMONT	11/10/2017
DIDIER GUILLEMOT	11/22/2017
CYRIL QUINQUIS	11/10/2017
THOMSON LICENSING	07/30/2018

RECEIVING PARTY DATA

Name:	THOMSON LICENSING
Street Address:	1-5 RUE JEANNE D'ARC
City:	ISSY-LES-MOULINEAUX
State/Country:	FRANCE
Postal Code:	92130
Name:	INTERDIGITAL CE PATENT HOLDINGS
Street Address:	3 RUE DU COLONEL MOLL
City:	PARIS
State/Country:	FRANCE
Postal Code:	75017

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	16098189

CORRESPONDENCE DATA

Fax Number: (609)212-2990

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.

Phone: 609-436-5847

Email: kathleen.lyles@interdigital.com

Correspondent Name: BRIAN J. DORINI

Address Line 1:4 RESEARCH WAY, 3RD FLOORAddress Line 4:PRINCETON, NEW JERSEY 08540

ATTORNEY DOCKET NUMBER:	PF160002
NAME OF SUBMITTER:	JOSEPH J. OPALACH

PATENT RECORDED: 06/21/2019 REEL: 049557 FRAME: 0843