

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
Stylesheet Version v1.2

EPAS ID: PAT6852479

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	SECURITY INTEREST
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
HUGHES NETWORK SYSTEMS	07/22/2021
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	U.S. BANK NATIONAL ASSOCIATION, AS COLLATERAL AGENT
<b>Street Address:</b>	60 LIVINGSTON AVENUE
<b>City:</b>	SAINT PAUL
<b>State/Country:</b>	MINNESOTA
<b>Postal Code:</b>	55107
<b>PROPERTY NUMBERS Total: 19</b>	
<b>Property Type</b>	<b>Number</b>
Patent Number:	11032176
Patent Number:	11029412
Patent Number:	10986756
Patent Number:	11032751
Patent Number:	10972177
Patent Number:	10984791
Patent Number:	11044007
Patent Number:	10980069
Patent Number:	11012361
Patent Number:	11012273
Patent Number:	10979365
Patent Number:	11025365
Application Number:	17329082
Application Number:	17325289
Application Number:	17325341
Application Number:	17325383
Application Number:	17326736
Application Number:	17340830
Application Number:	17245301

**CORRESPONDENCE DATA****Fax Number:**

*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.*

**Email:** cory.myers@hughes.com**Correspondent Name:** HUGHES NETWORK SYSTEMS, LLC**Address Line 1:** 11717 EXPLORATION LANE**Address Line 4:** GERMANTOWN, MARYLAND 20876

<b>NAME OF SUBMITTER:</b>	CORY MYERS
<b>SIGNATURE:</b>	/Cory Myers/
<b>DATE SIGNED:</b>	08/06/2021

**Total Attachments: 5**

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## Patent Security Agreement

**Patent Security Agreement**, dated as of July 22, 2021, by Hughes Network Systems, LLC, a Delaware limited liability company (the "Pledgor"), in favor of U.S. Bank National Association, in its capacity as collateral agent (the "Collateral Agent") pursuant to that certain Secured Indenture dated as of July 27, 2016, by and among Hughes Satellite Systems Corporation, the guarantors party thereto, and the Collateral Agent as collateral agent and trustee (as supplemented, the "2016 Indenture").

### WITNESSETH:

WHEREAS, the Pledgor is a party to a Security Agreement dated as of June 8, 2011 as supplemented by the Joinder Agreement, dated as of March 28, 2014, the Additional Secured Party Joinder, dated as of July 27, 2016 and the Joinder Agreements dated as of March 23, 2017, August 10, 2017 and June 12, 2019 (as amended, amended and restated, supplemented or otherwise modified from time to time, the "Security Agreement") in favor of the Collateral Agent pursuant to which the Pledgor is required to execute and deliver this Patent Security Agreement;

NOW, THEREFORE, in consideration of the premises and to induce the Collateral Agent, for the benefit of the Secured Parties, to enter into each Indenture, the Pledgor hereby agrees with the Collateral Agent as follows:

SECTION 1. Defined Terms. Unless otherwise defined herein, terms defined in the Security Agreement and used herein have the meaning given to them in the Security Agreement.

SECTION 2. Grant of Security Interest in Patent Collateral. The Pledgor hereby pledges and grants to the Collateral Agent for the benefit of the Secured Parties a lien on and security interest in and to all of its right, title and interest in, to and under all the following Pledged Collateral of the Pledgor:

- (a) Patents of the Pledgor listed on Schedule I attached hereto; and
- (b) all Proceeds of any and all of the foregoing (other than Excluded Property).

SECTION 3. Security Agreement. The security interest granted pursuant to this Patent Security Agreement is granted pursuant to the security interest granted to the Collateral Agent under the Security Agreement and the Pledgor hereby acknowledges and affirms that the rights and remedies of the Collateral Agent with respect to the security interest in the Patents made and granted hereby are more fully set forth in the Security Agreement, the terms and provisions of which are incorporated by reference herein as if fully set forth herein. In the event that any provision of this Patent Security Agreement is deemed to conflict with the Security Agreement, the provisions of the Security Agreement shall control unless the Collateral Agent shall otherwise determine.

SECTION 4. Termination. Upon the payment in full of the Secured Obligations and termination of the Security Agreement, the Collateral Agent shall execute, acknowledge, and deliver to the Pledgor an instrument in writing in recordable form releasing the collateral pledge, grant, assignment, lien and security interest in the Patents under this Patent Security Agreement.

SECTION 5. Counterparts. This Patent Security Agreement may be executed in any number of counterparts, all of which shall constitute one and the same instrument, and any party hereto may execute this Patent Security Agreement by signing and delivering one or more counterparts.

SECTION 6. Governing Law. This Patent Security Agreement and the transactions contemplated hereby, and all disputes between the parties under or relating to this Patent Security Agreement or the facts or circumstances leading to its execution, whether in contract, tort or otherwise, shall be construed in accordance with and governed by the laws (including statutes of limitation) of the State of New York, without regard to conflicts of law principles that would require the application of the laws of another jurisdiction.

[signature page follows]

IN WITNESS WHEREOF, the Pledgor and the Collateral Agent have caused this Patent Security Agreement to be duly executed and delivered by their duly authorized officer as of the date first set forth above.

**HUGHES NETWORK SYSTEMS, LLC,**  
as Pledgor

By: 

Name: Dean A. Manson

Title: Executive Vice President, General Counsel  
and Secretary

**U.S. BANK NATIONAL ASSOCIATION,**  
as Collateral Agent

By: 

Name: Benjamin J. Krueger

Title: Vice President

**SCHEDULE I**  
to  
**PATENT SECURITY AGREEMENT**  
**PATENT REGISTRATIONS AND PATENT APPLICATIONS**

**United States Patent Registrations:**

Company	Patent No.	Patent Name
Hughes Network Systems, LLC	11,032,176	PASSIVE CHARACTERIZATION OF DYNAMIC NETWORK PATHS USING TRANSPORT LAYER STATISTICS
Hughes Network Systems, LLC	11,029,412	SYSTEM AND METHOD FOR EFFICIENT BROADCAST OF CONSTELLATION EPHEMERIS
Hughes Network Systems, LLC	10,986,756	COOLING APPARATUS FOR AN ELECTRICAL COMPONENT
Hughes Network Systems, LLC	11,032,751	METHODS FOR HANDOVER PREDICTION IN SATELLITE SYSTEMS
Hughes Network Systems, LLC	10,972,177	EFFICIENT RESOURCE SHARING ACROSS DIVERSE NETWORKS
Hughes Network Systems, LLC	10,984,791	SYSTEM AND METHOD OF USING MACHINE LEARNING FOR PREDICTING NETWORK HEALTH IN A SATELLITE COMMUNICATION SYSTEM
Hughes Network Systems, LLC	11,044,007	SYSTEM AND APPARATUS FOR DISASTER BACKUP GATEWAY FOR A MULTI-GATEWAY SPOT BEAM SATELLITE
Hughes Network Systems, LLC	10,980,069	WIRELESS CONNECTION MODE ACTIVATION
Hughes Network Systems, LLC	11,012,361	SYSTEM AND METHOD FOR TCP/IP TRAFFIC OPTIMIZATION IN LEO/MEO NETWORKS USING TCP WINDOW SIZE MANIPULATION
Hughes Network Systems, LLC	11,012,273	LOW COMPLEXITY DEVICE FOR COMPENSATION OF FREQUENCY-DEPENDENT I-Q PHASE IMBALANCE
Hughes Network Systems, LLC	10,979,365	ACCELERATED STARTUP OF SATELLITE HIGH-BANDWIDTH COMMUNICATION SESSIONS

Company	Patent No.	Patent Name
Hughes Network Systems, LLC	11,025,365	SATELLITE FORWARD LINK NON-LINEAR NOISE AND APSK I/Q IMBALANCE ERROR CANCELLATION USING ARTIFICIAL INTELLIGENCE

**Applications:<sup>1</sup>**

Company	Application No.	Application Name
Hughes Network Systems, LLC	17/329,082	DYNAMIC OUTROUTE LOAD BALANCING AND MULTICAST
Hughes Network Systems, LLC	17/325,289	INTERNET-OF THINGS NARROWBAND COMMUNICATIONS WITH MOBILE SATELLITE
Hughes Network Systems, LLC	17/325,341	NEXT GENERATION MOBILE SATELLITE SERVICE (MSS)
Hughes Network Systems, LLC	17/325,383	CONSERVING RESOURCES OF A NEXT GENERATION SATELLITE
Hughes Network Systems, LLC	17/326,736	COMMUNITY BROADBAND LTE ACCESS OVER SATELLITE
Hughes Network Systems, LLC	17/340,830	SYSTEM AND METHOD FOR SINGLE-HOP SESSIONS IN SATELLITE SYSTEM
Hughes Network Systems, LLC	17/245,301	TRACKING NON-GEO SYNCHRONOUS ORBIT SATELLITES ON ORBITING PLANES OF REGULAR MOTION PATTERNS

<sup>1</sup> List excludes unpublished applications.