

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT7477688

SUBMISSION TYPE:	NEW ASSIGNMENT	
NATURE OF CONVEYANCE:	SUPPLEMENTAL SECURITY AGREEMENT	
CONVEYING PARTY DATA		
	Name	Execution Date
	CHARTER COMMUNICATIONS OPERATING, LLC	08/03/2022
	TIME WARNER CABLE ENTERPRISES LLC	08/03/2022
RECEIVING PARTY DATA		
Name:	BANK OF AMERICA, N.A., AS ADMINISTRATIVE AGENT	
Street Address:	ONE BRYANT PARK	
City:	NEW YORK	
State/Country:	NEW YORK	
Postal Code:	10036	
PROPERTY NUMBERS Total: 448		
	Property Type	Number
	Patent Number:	10674209
	Patent Number:	10462233
	Patent Number:	10477349
	Patent Number:	10492204
	Patent Number:	10531130
	Patent Number:	10536859
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	Patent Number:	10595251
	Patent Number:	10602221
	Patent Number:	10602551
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Property Type	Number
Patent Number:	10736114
Patent Number:	10771956
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Patent Number:	10797927
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Patent Number:	10805655
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Patent Number:	11032010
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Patent Number:	11057865
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Application Number:	17385710
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Application Number:	16927573
Application Number:	16999606
Application Number:	17089947
Application Number:	17088036
Application Number:	16919350
Application Number:	15594635

CORRESPONDENCE DATA

Fax Number: (202)408-3141

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: 202-408-3121 X62348

Email: jean.paterson@cscglobal.com

Correspondent Name: CSC

Address Line 1: 1090 VERMONT AVENUE NW, SUITE 430

Address Line 4: WASHINGTON, D.C. 20005

NAME OF SUBMITTER: JEAN PATERSON

SIGNATURE: /jep/

DATE SIGNED: 08/10/2022

Total Attachments: 30

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Supplemental Patent Security Agreement

Supplemental Patent Security Agreement, dated as of August 3, 2022, by the entities identified as Grantors on the signature pages hereto (individually, a “Grantor” and, collectively the “Grantors”), in favor of BANK OF AMERICA, N.A., in its capacity as collateral agent pursuant to the Credit Agreement (in such capacity, the “Administrative Agent”).

WITNESSETH:

WHEREAS, each of the Grantors are party to the Amended and Restated Guarantee and Collateral Agreement, dated as of May 18, 2016, as amended and restated on May 26, 2022 (as further amended, amended and restated, supplemented or otherwise modified from time to time, the “Guarantee and Collateral Agreement”) in favor of the Administrative Agent pursuant to which each of the Grantors are required to execute and deliver this Supplemental Patent Security Agreement;

NOW, THEREFORE, in consideration of the premises each of the Grantors hereby agree with the Administrative Agent as follows:

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

SECTION 2. Grant of Security Interest in Patent Collateral. Each of the Grantors hereby pledge and grant to the Administrative 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 Collateral of each Grantor (subject to the last paragraph of Section 3 of the Guarantee and Collateral Agreement, collectively, the “Patent Collateral”):

(a) Patents of each Grantor, including those listed on Schedule I attached hereto;
and

(b) all Proceeds of any and all of the foregoing.

SECTION 3. Guarantee and Collateral Agreement. The security interest granted pursuant to this Supplemental Patent Security Agreement is granted in conjunction with the security interest granted to the Administrative Agent pursuant to the Guarantee and Collateral Agreement and each Grantor hereby acknowledges and affirms that the rights and remedies of the Administrative Agent with respect to the security interest in the Patent Collateral made and granted hereby are more fully set forth in the Guarantee and Collateral 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 Supplemental Patent Security Agreement is deemed to conflict with the Guarantee and Collateral Agreement, the provisions of the Guarantee and Collateral Agreement shall control.

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

SECTION 5. Counterparts. This Supplemental 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 Supplemental Patent Security Agreement by signing and delivering one or more counterparts.

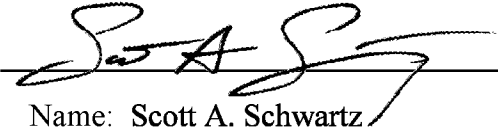
SECTION 6. Governing Law. This Supplemental Patent Security Agreement and the transactions contemplated hereby, and all disputes between the parties under or relating to this Supplemental Patent Security Agreement or the facts or circumstances leading to its execution, whether in contract, tort or otherwise, 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]

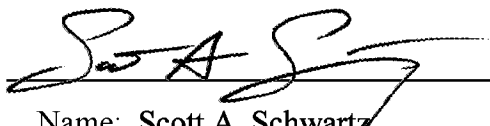
IN WITNESS WHEREOF, each Grantor has caused this Supplemental Patent Security Agreement to be executed and delivered by its duly authorized officer as of the date first set forth above.

Very truly yours,

CHARTER COMMUNICATIONS OPERATING,
LLC, as a Grantor

By: 
Name: Scott A. Schwartz
Title: Group Vice President, Corporate
Finance and Treasurer

TIME WARNER CABLE ENTERPRISES LLC, as
a Grantor

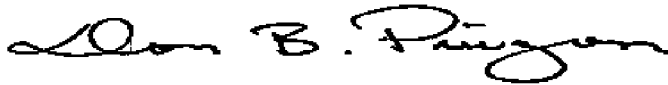
By: 
Name: Scott A. Schwartz
Title: Group Vice President, Corporate
Finance and Treasurer

[Signature Page to Supplemental Patent Security Agreement]

PATENT
REEL: 061633 FRAME: 0085

Accepted and Agreed:

BANK OF AMERICA, N.A.,
as Administrative Agent

A handwritten signature in black ink, appearing to read "Don B. Pinzon". The signature is fluid and cursive, with the first name "Don" being the most prominent.

By:

Name: Don B. Pinzon
Title: Vice President

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

Patent Registrations and Applications:

	Owner	Patent Title	Appl. No. Filing Date	Patent No. Issue Date
1.	Charter Communications Operating, LLC	Enhanced Control Of A Device Based On Detected User Presence	15610234 05/31/2017	10674209 06/02/2020
2.	Charter Communications Operating, LLC	Protocol For Anycast Based Discovery Of Local Resources	15903834 02/23/2018	10462233 10/29/2019
3.	Charter Communications Operating, LLC	Apparatus And Methods For Device Location Determination	15895875 02/13/2018	10477349 11/12/2019
4.	Charter Communications Operating, LLC	Methods And Apparatus For Utilization Of Quasi-Licensed Wireless Spectrum For IOT (Internet-Of-Things) Services	15814133 11/15/2017	10492204 11/26/2019
5.	Charter Communications Operating, LLC	Protocol And Architecture For The Decentralization Of Content Delivery	15903760 02/23/2018	10531130 01/07/2020
6.	Charter Communications Operating, LLC	Methods And Apparatus For Dynamic Control And Utilization Of Quasi-Licensed Wireless Spectrum	15677940 08/15/2017	10536859 01/14/2020
7.	Charter Communications Operating, LLC	Wireless Channel Allocation Amongst Multiple Base Stations	15791653 10/24/2017	10542549 01/21/2020
8.	Charter Communications Operating, LLC	Shared Use Of Cellular Networks To Provide Wireless Services	15873244 01/17/2018	10595251 03/17/2020
9.	Charter Communications Operating, LLC	Set Top Box Security Tracking	15969960 05/03/2018	10602221 03/24/2020
10.	Charter Communications Operating, LLC	Methods And Apparatus For Testing Alternative Wireless Connections And Selecting A Wireless Connection	16020919 06/27/2018	10602551 03/24/2020
11.	Charter Communications Operating, LLC	Redundant Power Supplies And In-Field Testing	15450320 03/06/2017	10613154 04/07/2020
12.	Charter Communications Operating, LLC	System Architecture and Methods for Controlling and Managing Networking Devices and Expediting New Service Delivery in a Subscriber's Home Network Using Micro-domains	16576245 09/19/2019	10616077 04/07/2020
13.	Charter Communications Operating, LLC	Dynamic Allocation Of Resources To Support Split Processing Of Wireless Network Communication Layers	15717143 09/27/2017	10616879 04/07/2020

	Owner	Patent Title	Appl. No. Filing Date	Patent No. Issue Date
14.	Charter Communications Operating, LLC	Device And Method For Discovery And Announcement Of Secondary End-Point Reachability Information	15794608 10/26/2017	10623369 04/14/2020
15.	Charter Communications Operating, LLC	Methods And Apparatus For Dynamic Control Of Connections To Co-Existing Radio Access Networks	15615686 06/06/2017	10638361 04/28/2020
16.	Charter Communications Operating, LLC	Border Gateway Protocol (BGP) Security Measures Along Autonomous System (AS) Paths	15990861 05/29/2018	10644990 05/05/2020
17.	Charter Communications Operating, LLC	Apparatus And Methods For Providing Wireless Service In A Venue	15612630 06/02/2017	10645547 05/05/2020
18.	Charter Communications Operating, LLC	Secure Anonymous Communications Methods And Apparatus	15799747 10/31/2017	10652215 05/12/2020
19.	Charter Communications Operating, LLC	Methods And Apparatus For Providing Backhaul Services To A Citizens Broadband Radio Service Device	16049354 07/30/2018	10667142 05/26/2020
20.	Charter Communications Operating, LLC	RF Channel Analysis And Improved Usage Of Wireless Channels In A Wireless Network	15866737 01/10/2018	10736114 08/04/2020
21.	Charter Communications Operating, LLC	Subscriber Identification Module (SIM) Task Scheduler for Dual SIM Devices Using Citizens Broadband Radio Service Network	16736006 01/07/2020	10771956 09/08/2020
22.	Charter Communications Operating, LLC	Wireless Base Stations And Backhaul Management	15978600 05/14/2018	10785811 09/22/2020
23.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Use Of Multiple Beams For Communications Purposes	15839351 12/12/2017	10797927 10/06/2020
24.	Charter Communications Operating, LLC	Internet Protocol (IP) Multimedia Subsystem (IMS) Based Session Initiation Protocol (SIP) Call Setup Retry	15938399 03/28/2018	10798134 10/06/2020
25.	Charter Communications Operating, LLC	Universal Smart Switch Management	16019292 06/26/2018	10798801 10/06/2020
26.	Charter Communications Operating, LLC	Set Top Box Software Stack Provisioning	16675855 11/06/2019	10805655 10/13/2020
27.	Charter Communications Operating, LLC	Network Distributed Programmable Forwarding Plane Packet Processor	16009577 06/15/2018	10817269 10/27/2020
28.	Charter Communications Operating, LLC	Service Provider Selection In A Wireless Network	16662490 10/24/2019	10841873 11/17/2020
29.	Charter Communications Operating, LLC	Automated Methods And Apparatus For Facilitating The Design And Deployment Of Monitoring Systems	15694753 09/01/2017	10855482 12/01/2020
30.	Charter Communications Operating, LLC	Bi-Directional Speed Test Method And System For Customer Premises Equipment (CPE) Devices	15880338 01/25/2018	10880196 12/29/2020

	Owner	Patent Title	Appl. No. Filing Date	Patent No. Issue Date
31.	Charter Communications Operating, LLC	Wireless Channel Allocation Amongst Multiple Base Stations	16679628 11/11/2019	10893528 01/12/2021
32.	Charter Communications Operating, LLC	Distributed Denial-Of-Service Attack Detection And Mitigation Based On Autonomous System Number	15692762 08/31/2017	10911473 02/02/2021
33.	Charter Communications Operating, LLC	Methods and Apparatus for Estimating Wireless Network Coverage	16718518 12/18/2019	10912086 02/02/2021
34.	Charter Communications Operating, LLC	Monitoring and Switchover of Shared Spectrum Allocation Manager in a Wireless Network	15999262 08/17/2018	10932143 02/23/2021
35.	Charter Communications Operating, LLC	Method and System for Reducing the Sizes of Electronic Messages	16661165 10/23/2019	10944704 03/09/2021
36.	Charter Communications Operating, LLC	Set Top Box Security Tracking	16826766 03/23/2020	10945036 03/09/2021
37.	Charter Communications Operating, LLC	Protocol For Anycast Based Discovery Of Local Resources	16576075 09/19/2019	10951718 03/16/2021
38.	Charter Communications Operating, LLC	Capacity Management Methods And Apparatus For Use In A Citizens Broadband Radio Service Network	16013103 06/20/2018	10952098 03/16/2021
39.	Charter Communications Operating, LLC	Apparatus And Methods For Latency Reduction In Digital Content Switching Operations	15689733 08/29/2017	10958948 03/23/2021
40.	Charter Communications Operating, LLC	Secured Communications Routing In A Network	16656314 10/17/2019	10959100 03/23/2021
41.	Charter Communications Operating, LLC	Contextual Awareness Determination For A Mobile Device	16852779 04/20/2020	10965805 03/30/2021
42.	Charter Communications Operating, LLC	Apparatus And Methods For Premises Device Existence And Capability Determination	15821218 11/22/2017	10966073 03/30/2021
43.	Charter Communications Operating, LLC	Enhanced Domain Name System (DNS) Server	16746199 01/17/2020	10972426 04/06/2021
44.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Network Access Using Cable And Radio Communications Links	15820302 11/21/2017	10979343 04/13/2021
45.	Charter Communications Operating, LLC	Hybrid Hub-And-Spoke Communications Network With Hub-Bypass Communications Paths	16802082 02/26/2020	10979346 04/13/2021
46.	Charter Communications Operating, LLC	Dynamic Configuration And Use Of Wireless Base Stations In A Network	15942892 04/02/2018	10979911 04/13/2021
47.	Charter Communications Operating, LLC	VOTING TO CONNECT TO A WIRELESS NETWORK	16870594 05/08/2020	10979969 04/13/2021

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48.	Charter Communications Operating, LLC	Distributed Denial-Of-Service Attack Detection And Mitigation Based On Autonomous System Number	15692854 08/31/2017	11005865 05/11/2021
49.	Charter Communications Operating, LLC	Dynamic Advertisement Insertion And Monitoring	15982123 05/17/2018	11006172 05/11/2021
50.	Charter Communications Operating, LLC	Distributed Denial-Of-Service Prevention Using Floating Internet Protocol Gateway	15919942 03/13/2018	11012410 05/18/2021
51.	Charter Communications Operating, LLC	Reducing The Impact Of Border Gateway Protocol (BGP) Hijacks	15973778 05/08/2018	11012470 05/18/2021
52.	Charter Communications Operating, LLC	Apparatus And Methods For Device Location Determination	16678900 11/08/2019	11019454 05/25/2021
53.	Charter Communications Operating, LLC	Apparatus And Methods For Device Location Determination	17328950 05/24/2021	
54.	Charter Communications Operating, LLC	Methods And Apparatus For Allocating Spectrum In Wireless Networks	16865389 05/03/2020	11019502 05/25/2021
55.	Charter Communications Operating, LLC	Handover Methods And Apparatus	16020959 06/27/2018	11019545 05/25/2021
56.	Charter Communications Operating, LLC	Customer Premises Equipment (Cpe) Self-Organization In Fixed Wireless Access (Fwa) Network	16744000 01/15/2020	11019563 05/25/2021
57.	Charter Communications Operating, LLC	Methods And Apparatus For Device Registration In A Quasi-Licensed Wireless System	16661865 10/23/2019	11026205 06/01/2021
58.	Charter Communications Operating, LLC	Method And Apparatus For A Dynamic Search Keyboard	16940799 07/28/2020	11029846 06/08/2021
59.	Charter Communications Operating, LLC	Methods And Apparatus For Reducing Power Consumption In Optical Devices	16816206 03/11/2020	11032010 06/08/2021
60.	Charter Communications Operating, LLC	Distributed Denial-Of-Service Attack Mitigation With Reduced Latency	15880522 01/25/2018	11032315 06/08/2021
61.	Charter Communications Operating, LLC	Protocol And Architecture For The Decentralization Of Content Delivery	16699970 12/02/2019	11032581 06/08/2021
62.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Devices Of Different Types Using A Residential Gateway	16699640 11/30/2019	11032743 06/08/2021
63.	Charter Communications Operating, LLC	Systems and Methods for Using Out-of-Band Spectrum for Shared Spectrum Registration and Increased Link Reliability and Capacity	16564409 09/09/2019	11032786 06/08/2021
64.	Charter Communications Operating, LLC	Dynamic Data Flow Management Based On Device Identity	16024571 06/29/2018	11044119 06/22/2021

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65.	Charter Communications Operating, LLC	Systems and Methods for Updating A Resource Address	16658717 10/21/2019	11050707 06/29/2021
66.	Charter Communications Operating, LLC	Apparatus And Methods For Enhanced Paging In Wireless Networks	16879345 05/20/2020	11057865 07/06/2021
67.	Charter Communications Operating, LLC	Systems And Methods For Testing A Router Device	16698710 11/27/2019	11063858 07/13/2021
68.	Charter Communications Operating, LLC	Methods And Apparatus For Providing Wireless Services To A Customer Premises	16729246 12/27/2019	11064389 07/13/2021
69.	Charter Communications Operating, LLC	Order Management System With Recovery Capabilities	15648783 07/13/2017	11080648 08/03/2021
70.	Charter Communications Operating, LLC	Generating Test Cases For Augmented Reality (AR) Application Testing	17075458 10/20/2020	11808939 08/03/2021
71.	Charter Communications Operating, LLC	Vehicle Traffic Management Via Wireless System	16673577 11/04/2019	11080998 08/03/2021
72.	Charter Communications Operating, LLC	Measuring quality-of-experience (QoE) for virtual reality (VR) streaming content	16743805 01/15/2020	11082475 08/03/2021
73.	Charter Communications Operating, LLC	Methods and apparatus for distributing time, frequency, and/or phase information using nb-iot	16663066 10/24/2019	11082937 08/03/2021
74.	Charter Communications Operating, LLC	Apparatus And Methods For Uplink Mimo Enhancement In Wireless Systems	15931290 05/13/2020	11088741 08/10/2021
75.	Charter Communications Operating, LLC	System And Method For Remotely Identifying Physical Location Of Communications Device	17175989 02/15/2021	11102054 08/24/2021
76.	Charter Communications Operating, LLC	Service Integrated Domain Name Server	16592964 10/04/2019	11102105 08/24/2021
77.	Charter Communications Operating, LLC	Video Quality Monitoring In A Network Environment	16683546 11/14/2019	11109082 08/31/2021
78.	Charter Communications Operating, LLC	Intelligent Tap With Dynamically Configurable Amplifier Gain	17062665 10/05/2020	11122339 09/14/2021
79.	Charter Communications Operating, LLC	Wireless Channel Access And Power Adjust Access Requests	16910410 06/24/2020	11122525 09/14/2021
80.	Charter Communications Operating, LLC	Apparatus And Methods For Cell Identification In Wireless Networks	16601345 10/14/2019	11129213 09/21/2021
81.	Charter Communications Operating, LLC	Centralized Layer 1 To Layer 2 Mapping Engine	17152197 01/19/2021	11140122 10/05/2021

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82.	Charter Communications Operating, LLC	Location-Based Tracking In A Wireless Network Environment	16684548 11/14/2019	11140606 10/05/2021
83.	Charter Communications Operating, LLC	Repetition Of Paging Notifications In Wireless Networks	16789301 02/12/2020	11140657 10/05/2021
84.	Charter Communications Operating, LLC	Method And Apparatus For Out Of Path Border Gateway Protocol Validation	16590664 10/02/2019	11146587 10/12/2021
85.	Charter Communications Operating, LLC	Location-Based Beamforming Management In A Network	16842148 04/07/2020	11152989 10/19/2021
86.	Charter Communications Operating, LLC	Apparatus And Methods For Synchronization Pattern Configuration In An Optical Network	16040219 07/19/2018	11159365 10/26/2021
87.	Charter Communications Operating, LLC	Connecting To A Wireless Network Based On A Device Mobility State	15669151 08/04/2017	11160003 10/26/2021
88.	Charter Communications Operating, LLC	Methods And Apparatus For Distributing Timing Information	16829702 03/25/2020	11160043 10/26/2021
89.	Charter Communications Operating, LLC	Methods And Apparatus For Allocation And Reconciliation Of Quasi-Licensed Wireless Spectrum Across Multiple Entities	16557498 08/30/2019	11190948 11/30/2021
90.	Charter Communications Operating, LLC	Methods And Apparatus For Allocation And Reconciliation Of Quasi-Licensed Wireless Spectrum Across Multiple Entities	17536960 11/29/2021	
91.	Charter Communications Operating, LLC	Methods And Apparatus For Monitoring Contested Spectrum And/Or Responding To The Detection Of An Incumbent User	16693221 11/22/2019	11190949 11/30/2021
92.	Charter Communications Operating, LLC	Compensating For Latency In A Streaming Virtual Reality Environment	16743765 01/15/2020	11195498 12/07/2021
93.	Charter Communications Operating, LLC	Smart Remote Agent on an Access CPE with an Agile OpenWrt Software Architecture	17007584 08/31/2020	11196841 12/07/2021
94.	Charter Communications Operating, LLC	Methods And Apparatus To Communicate With An End Point Device	16752480 01/24/2020	11197248 12/07/2021
95.	Charter Communications Operating, LLC	Methods And Apparatus For Testing Alternative Wireless Connections And Selecting A Wireless Connection	16822642 03/18/2020	11197328 12/07/2021
96.	Charter Communications Operating, LLC	Multi-Domain Quality Of Service Software-Defined Networking Controller	16744612 01/16/2020	11201819 12/14/2021
97.	Charter Communications Operating, LLC	Method And Apparatus For Transporting Data Traffic Using Classifications	16656365 10/17/2019	11201839 12/14/2021
98.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting UE Handover Using A Narrow Band - Internet Of Things (NB-IOT)	16729238 12/27/2019	11202238 12/14/2021

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99.	Charter Communications Operating, LLC	Method And Apparatus For Overlaying Themed Imagery Onto Real-World Objects In A Head-Mounted Display Device	16741297 01/13/2020	11206365 12/21/2021
100.	Charter Communications Operating, LLC	Border Gateway Protocol (BGP) Hijacks Prefix Signing Using Public/Private Keys	16554798 08/29/2019	11212139 12/28/2021
101.	Charter Communications Operating, LLC	Border Gateway Protocol (BGP) Security Measures Along Autonomous System (AS) Paths	16829797 03/25/2020	11212216 12/28/2021
102.	Charter Communications Operating, LLC	Prioritizing Preferred Networks	16708024 12/09/2019	11212817 12/28/2021
103.	Charter Communications Operating, LLC	Network Load Management Methods And Apparatus	16706264 12/06/2019	11218935 01/04/2022
104.	Charter Communications Operating, LLC	Millimeter Wave Access System For Device To Device Communication	17116145 12/09/2020	11219028 01/04/2022
105.	Charter Communications Operating, LLC	Method and Apparatus for Location Based Broadcast Channel Selection and Update for Mobile Devices	17035859 09/29/2020	11234038 01/25/2022
106.	Charter Communications Operating, LLC	Automatic Local Gateway Router Backup Of A Network Gateway Router	16839998 04/03/2020	11240098 02/01/2022
107.	Charter Communications Operating, LLC	Method And Apparatus For Continuous Integration Testing Of Network Access Devices	16839130 04/03/2020	11249873 02/15/2022
108.	Charter Communications Operating, LLC	Methods And System For Automated Ad Hoc Customer Premise Equipment Bi-Directional Vulnerability Scanning	16922573 07/07/2020	11252177 02/15/2022
109.	Charter Communications Operating, LLC	Methods And Apparatus For Providing Backhaul Services	16840934 04/06/2020	11297515 04/05/2022
110.	Charter Communications Operating, LLC	Methods And Apparatus For Transmission Power Management In Wireless Networks	16937356 07/23/2020	11317360 04/26/2022
111.	Charter Communications Operating, LLC	Paging Related Methods And Apparatus	16908732 06/22/2020	11343795 05/24/2022
112.	Charter Communications Operating, LLC	Network Unit	29718354 12/23/2019	D934846 11/02/2021
113.	Charter Communications Operating, LLC	Methods And Apparatus For Allocation And Reconciliation Of Quasi-Licensed Wireless Spectrum Across Multiple Entities	15902833 02/22/2018	10405192 09/03/2019
114.	Charter Communications Operating, LLC	Multi-Option Authentication Portal Implementation In A Network Environment	15813599 11/15/2017	
115.	Charter Communications Operating, LLC	Methods and Apparatus for Automatically Generating and Managing Test Customer Accounts	15674476 08/10/2017	

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116.	Charter Communications Operating, LLC	Apparatus And Methods For Packetized Data Management And Delivery In A Digital Content Distribution Network	15631423 06/23/2017	
117.	Charter Communications Operating, LLC	Automatic Provisioning Of A Network Access Point	15331128 10/21/2016	10432465 10/01/2019
118.	Charter Communications Operating, LLC	Multi-Option Authentication Portal Implementation In A Network Environment	15813599 11/15/2017	
119.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Quality Of Service In A System Including A Cable Modem Termination System And Wireless Communications Link	15916096 03/08/2018	
120.	Charter Communications Operating, LLC	Use Of Dynamic Connection Priority Information To Control Network Connectivity	15939575 03/29/2018	10701608 06/30/2020
121.	Charter Communications Operating, LLC	Dynamic Use Of Header Compression In A Wireless Network	15945146 04/04/2018	
122.	Charter Communications Operating, LLC	Apparatus And Methods For Cell Activation In Wireless Networks	15945657 04/04/2018	
123.	Charter Communications Operating, LLC	Methods And Apparatus For Intra-Cell And Inter-Frequency Mobility Optimization And Mitigation Of Session Disruption In A Quasi-Licensed Wireless System	15986614 05/22/2018	
124.	Charter Communications Operating, LLC	LTE Network Extension (LNE) System, Methods, And Apparatus	15992165 05/29/2018	10708855 07/07/2020
125.	Charter Communications Operating, LLC	Resilient Mobile Meshed Network With Extended Range	15994066 05/31/2018	
126.	Charter Communications Operating, LLC	Antenna Hardware Disposed On A Substrate To Provide Enhanced Wireless Connectivity	16036268 07/16/2018	10686244 06/16/2020
127.	Charter Communications Operating, LLC	Anonymous Content Recommendation Engine	16562691 09/06/2019	
128.	Charter Communications Operating, LLC	Apparatus And Methods For Multicarrier Unlicensed Heterogeneous Channel Access	16567509 09/11/2019	
129.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Platform And Application Development And Operation	16573770 09/17/2019	
130.	Charter Communications Operating, LLC	Methods And Apparatus For Secure Voice Communications	16575290 09/18/2019	
131.	Charter Communications Operating, LLC	Dynamic Split Of Communication Layer Processing	16580532 09/24/2019	
132.	Charter Communications Operating, LLC	Item Integrity Verification	16580570 09/24/2019	

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133.	Charter Communications Operating, LLC	Methods And Apparatus For Characterization Of Digital Content	16582837 09/25/2019	
134.	Charter Communications Operating, LLC	Wireless Enabled Distributed Data Apparatus And Methods	16675098 11/05/2019	
135.	Charter Communications Operating, LLC	Methods and Apparatus for Enhancing Coverage in Quasi-Licensed Wireless Systems	16676188 11/06/2019	
136.	Charter Communications Operating, LLC	Network Quality Of Service Controller	16685743 11/15/2019	
137.	Charter Communications Operating, LLC	Method and System for Using Lip Sequences to Control Operations of a Device	16688174 11/19/2019	
138.	Charter Communications Operating, LLC	Location-Based Performance Offloading In A Network	16690476 11/21/2019	
139.	Charter Communications Operating, LLC	Delivering On-Demand Video Viewing Angles Of An Arena	16692662 11/22/2019	
140.	Charter Communications Operating, LLC	Efficient Collection And Communication Of Wireless Data	16700119 12/02/2019	
141.	Charter Communications Operating, LLC	Supplemental Narrowband Wireless Access Channel	16700133 12/02/2019	
142.	Charter Communications Operating, LLC	Detection And Remediation Of Malicious Network Traffic Using Tarpitting	16702494 12/03/2019	
143.	Charter Communications Operating, LLC	Method and Apparatus for Coverage Determination and Download Opportunity Notification	16710129 12/11/2019	
144.	Charter Communications Operating, LLC	Wireless Communication Link Management	16719017 12/18/2019	
145.	Charter Communications Operating, LLC	Methods And Apparatus For Service Provision To Out-Of-Coverage Apparatus In Wireless Systems	16738889 01/09/2020	
146.	Charter Communications Operating, LLC	Methods And Apparatus For Controlling And Making Link Bundle Advertisements To Support Routing Decisions	16740478 01/12/2020	
147.	Charter Communications Operating, LLC	Device Power Savings And Extended Telemetry Messaging	16740873 01/13/2020	
148.	Charter Communications Operating, LLC	Methods And Apparatus For Radio Configuration In A Wireless System	16741509 01/13/2020	
149.	Charter Communications Operating, LLC	Methods And Apparatus For Dynamic Control And Utilization Of Quasi-Licensed Wireless Spectrum	16741626 01/13/2020	

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150.	Charter Communications Operating, LLC	Method And Apparatus For Determining Conditions For Non-Terminated Service Provider Network Connections	16744476 01/16/2020	
151.	Charter Communications Operating, LLC	Expandable Network Device	16745196 01/16/2020	
152.	Charter Communications Operating, LLC	Network Management, Monitoring, Modelling, And Troubleshooting Of Communication Gateways	16747732 01/21/2020	
153.	Charter Communications Operating, LLC	Multi-Mode Wireless Apparatus And Methods Of Operation	16748507 01/21/2020	
154.	Charter Communications Operating, LLC	Methods And Apparatus For Antenna Optimization In A Quasi-Licensed Wireless System	16749539 01/22/2020	
155.	Charter Communications Operating, LLC	Data Transfer Using A Dual Sim Phone	16777751 01/30/2020	
156.	Charter Communications Operating, LLC	Dynamic Bandwidth Service Limits	16778275 01/31/2020	
157.	Charter Communications Operating, LLC	Method For Providing Continuous Connectivity To A Device	16779098 01/31/2020	
158.	Charter Communications Operating, LLC	System And Method For Detecting And Responding To Theft Of Service Devices	16784625 02/07/2020	
159.	Charter Communications Operating, LLC	Virtual Reality Content Streaming Based On Quality Of Experience Level	16786565 02/10/2020	
160.	Charter Communications Operating, LLC	Providing Selectable Virtual Reality (VR) Viewpoints Within A VR Experience	16786621 02/10/2020	
161.	Charter Communications Operating, LLC	Watch-Time Variability Determination And Credential Sharing	16787263 02/11/2020	
162.	Charter Communications Operating, LLC	Apparatus And Methods For Providing High-Capacity Data Services Over A Content Delivery Network	16788138 02/11/2020	
163.	Charter Communications Operating, LLC	Systems And Methods For Access Point Device Recovery Using Mobile Devices	16788356 02/12/2020	
164.	Charter Communications Operating, LLC	Wireless Network Switchover Via Tune-Away Notifications	16789280 02/12/2020	
165.	Charter Communications Operating, LLC	Paging Notification Conflict And Management In Multiple Wireless Networks	16789290 02/12/2020	
166.	Charter Communications Operating, LLC	Communication Of Paging Notifications Associated With Multiple Wireless Networks	16789297 02/12/2020	

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167.	Charter Communications Operating, LLC	Shared Use Of Cellular Networks To Provide Wireless Services	16789896 02/13/2020	
168.	Charter Communications Operating, LLC	Dynamic Allocation Of Resources To Support Split Processing Of Wireless Network Communication Layers	16789915 02/13/2020	
169.	Charter Communications Operating, LLC	Apparatus And Methods For User Device Buffer Management In Wireless Networks	16790527 02/13/2020	
170.	Charter Communications Operating, LLC	Apparatus And Methods For Generating And Distributing Policy In Wireless Networks	16791352 02/14/2020	
171.	Charter Communications Operating, LLC	Enhanced Downlink Message Delivery In Wide Area Networks	16798422 02/23/2020	11317471 04/26/2022
172.	Charter Communications Operating, LLC	Method And Apparatus For Multifactor Authentication And Authorization	16806329 03/02/2020	
173.	Charter Communications Operating, LLC	Methods And Apparatus For Fall Prevention	16806390 03/02/2020	
174.	Charter Communications Operating, LLC	Dual Subscriber Identification Module (SIM) Customer Premises Equipment (CPE) For Wireless Network Power Measurements	16807054 03/02/2020	11330421 05/10/2022
175.	Charter Communications Operating, LLC	Metadata-Based Smart Home Automation	16807842 03/03/2020	
176.	Charter Communications Operating, LLC	Combinable Conference Rooms	16817752 03/13/2020	
177.	Charter Communications Operating, LLC	Allocation Of Wireless Resources In A Shared Wireless Band	16818365 03/13/2020	
178.	Charter Communications Operating, LLC	Methods And Apparatus For Assessing A Cable Connection	16818695 03/13/2020	
179.	Charter Communications Operating, LLC	Methods And Apparatus For Using Wide Area Networks To Support Parking Systems	16820608 03/16/2020	
180.	Charter Communications Operating, LLC	Methods And Apparatus For System Information Management In A Wireless System	16830062 03/25/2020	
181.	Charter Communications Operating, LLC	Method And Apparatus For Continuous Integration Testing Of Network Access Devices	16839130 04/03/2020	
182.	Charter Communications Operating, LLC	Remote Control With Automated Audio And Video Selection Control	16839569 04/03/2020	
183.	Charter Communications Operating, LLC	Implementing Network Constraint Exceptions On A Per Device Basis	16839913 04/03/2020	11303580 04/12/2022

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184.	Charter Communications Operating, LLC	Automatic Local Gateway Router Backup Of A Network Gateway Router	16839998 04/03/2020	
185.	Charter Communications Operating, LLC	Secure Anonymous Communications Methods And Apparatus	16840442 04/05/2020	
186.	Charter Communications Operating, LLC	Apparatus And Methods For Interworking In Wireless Networks	16842352 04/07/2020	
187.	Charter Communications Operating, LLC	Content Management And Playback Control	16846875 04/13/2020	
188.	Charter Communications Operating, LLC	Vehicle And Notification Management In A Wireless Network	16847961 04/14/2020	
189.	Charter Communications Operating, LLC	Modificationless Packet Prioritization For Frame Generation	16848469 04/14/2020	
190.	Charter Communications Operating, LLC	Packet Prioritization For Frame Generation	16848511 04/14/2020	
191.	Charter Communications Operating, LLC	Wireless Management And Connectivity Across Multiple Networks	16850133 04/16/2020	11310845 04/19/2022
192.	Charter Communications Operating, LLC	Communication System Management And Performance Reporting	16852796 04/20/2020	
193.	Charter Communications Operating, LLC	Scheduled Amplifier Wireless Base Station Apparatus And Methods	16854689 04/21/2020	
194.	Charter Communications Operating, LLC	Node Apparatus And Methods For Providing High-Capacity Data Services Via A Content Delivery Network Architecture	16855747 04/22/2020	
195.	Charter Communications Operating, LLC	Premises Apparatus And Methods For Aggregated High-Capacity Data Services	16855913 04/22/2020	
196.	Charter Communications Operating, LLC	Methods And Apparatus For Dynamic Control Of Connections To Co-Existing Radio Access Networks	16859588 04/27/2020	
197.	Charter Communications Operating, LLC	Apparatus And Methods For Spatial And Operational Differentiation And Optimization In A Wireless System	16861107 04/28/2020	
198.	Charter Communications Operating, LLC	System and Method to Deliver Converged Public and Private Network Services over Disparate Access Mediums Across Regional Markets	16861763 04/29/2020	
199.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Wireless Medium Sharing	16864072 04/30/2020	
200.	Charter Communications Operating, LLC	Apparatus And Methods For Providing Wireless Service In A Venue	16866358 05/04/2020	

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201.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Prioritized Transmission Opportunity (TXOP) Sharing	16870685 05/08/2020	
202.	Charter Communications Operating, LLC	Tiered Re-Allocation Of Wireless Channels	16871840 05/11/2020	
203.	Charter Communications Operating, LLC	Antenna Hardware Disposed On A Substrate To Provide Enhanced Wireless Connectivity	16871849 05/11/2020	11322822 05/03/2022
204.	Charter Communications Operating, LLC	Channel Allocation Based On Adjacent Channel Interference	16874541 05/14/2020	
205.	Charter Communications Operating, LLC	Delivering And Monitoring Emergency Alert System (EAS) Media Files Via Router Computing Devices Using Redirection Responses	16883409 05/26/2020	
206.	Charter Communications Operating, LLC	Use Of Dynamic Connection Priority Information To Control Network Connectivity	16884192 05/27/2020	
207.	Charter Communications Operating, LLC	RF Channel Analysis And Improved Usage Of Wireless Channels In A Wireless Network	16884206 05/27/2020	
208.	Charter Communications Operating, LLC	Enhancing Security In A Content Management System	16888078 05/29/2020	
209.	Charter Communications Operating, LLC	System And Method For Bypassing A Content Delivery Network (CDN)	16892576 06/04/2020	11316776 04/26/2022
210.	Charter Communications Operating, LLC	Method and Framework for Internet of Things Network Security	16897597 06/10/2020	11258830 02/22/2022
211.	Charter Communications Operating, LLC	Management Of Access Credentials	16901942 06/15/2020	
212.	Charter Communications Operating, LLC	Lte Network Extension (Lne) System, Methods, And Apparatus	16922933 07/07/2020	
213.	Charter Communications Operating, LLC	Time-Division Communication Analysis And Bandwidth Allocation In A Wireless Network	16924498 07/09/2020	
214.	Charter Communications Operating, LLC	Apparatus And Methods For Heterogeneous Coverage And Use Cases In A Quasi-Licensed Wireless System	16927781 07/13/2020	
215.	Charter Communications Operating, LLC	Wireless Base Stations And Backhaul Management	17004696 08/27/2020	
216.	Charter Communications Operating, LLC	Enhanced Domain Name System Response Caching	17012520 09/04/2020	11122138 09/14/2021
217.	Charter Communications Operating, LLC	Methods And Apparatus For Reserving And/Or Utilizing Resources In A Wireless Network	17018490 09/11/2020	

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218.	Charter Communications Operating, LLC	Methods And Apparatus For Using Wireless Base Station Antennas To Support Macro Base Station Mimo Communications With User Equipment Devices	17027878 09/22/2020	
219.	Charter Communications Operating, LLC	Method and Apparatus for Location Based Broadcast Channel Selection and Update for Mobile Devices	17035859 09/29/2020	
220.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Use Of Multiple Beams For Communications Purposes	17063694 10/05/2020	11252007 02/15/2022
221.	Charter Communications Operating, LLC	Service Provider Selection In A Wireless Network	17069062 10/13/2020	
222.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Dynamic Network Scaling Based On Learned Patterns And Sensed Data	17098375 11/14/2020	
223.	Charter Communications Operating, LLC	Apparatus And Methods For Multi-Cell Random Access Channel	17116853 12/09/2020	
224.	Charter Communications Operating, LLC	Priority Access License Holder Protection	17141369 01/05/2021	
225.	Charter Communications Operating, LLC	Monitoring And Switchover Of Shared Spectrum Allocation Manager In A Wireless Network	17141390 01/05/2021	
226.	Charter Communications Operating, LLC	Protocol For Anycast Based Discovery Of Local Resources	17161775 01/29/2021	11297148 04/05/2022
227.	Charter Communications Operating, LLC	Enhanced Domain Name System (Dns) Server	17193944 03/05/2021	
228.	Charter Communications Operating, LLC	Monitoring And Switchover Of Shared Spectrum Allocation Manager To Provide Improved Wireless Service	17203515 03/16/2021	
229.	Charter Communications Operating, LLC	Secure Data At Rest	17206308 03/19/2021	
230.	Charter Communications Operating, LLC	Reducing The Impact Of Border Gateway Protocol (BGP) Hijacks	17235998 04/21/2021	
231.	Charter Communications Operating, LLC	Channel Monitoring And Shared Use Of A Wireless Channel	17239964 04/26/2021	
232.	Charter Communications Operating, LLC	Protocol And Architecture For The Decentralization Of Content Delivery	17245051 04/30/2021	
233.	Charter Communications Operating, LLC	Open-Source Architecture for Remote Physical or Remote Physical-Media Access Control Device	17245055 04/30/2021	
234.	Charter Communications Operating, LLC	Systems and Methods for Using Out-of-Band Spectrum for Shared Spectrum Registration and Increased Link Reliability and Capacity	17307133 05/04/2021	

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235.	Charter Communications Operating, LLC	System And Method For Remotely Filtering Network Traffic Of A Customer Premise Device	17356710 06/24/2021	
236.	Charter Communications Operating, LLC	Measuring Quality-Of-Experience (QOE) For Virtual Reality (VR) Streaming Content	17374565 07/13/2021	
237.	Charter Communications Operating, LLC	Video Quality Monitoring In A Network Environment	17375664 07/14/2021	
238.	Charter Communications Operating, LLC	System and Method to Deliver Converged Public and Private Network Services over Disparate Access Mediums Within a Single Market	17412335 08/26/2021	
239.	Charter Communications Operating, LLC	Citizens Broadband Radio Service Network Interference Management Using Dual Subscriber Identification Module Devices	17443263 07/23/2021	
240.	Charter Communications Operating, LLC	Time Interleaved Coverage Zones In Wireless Networks	17584525 01/26/2022	
241.	Charter Communications Operating, LLC	Licensed Assisted Access In A Converged Network	17091396 11/06/2020	
242.	Charter Communications Operating, LLC	Apparatus And Methods For Digital Ledger-Based Integrated Interactive Digital Tv Applications	17091715 11/06/2020	
243.	Charter Communications Operating, LLC	Method And Apparatus For Determining Conditions For Non-Terminated Service Provider Network Connections	17585928 01/27/2022	
244.	Charter Communications Operating, LLC	Jamming Mitigation In Cbrs Network	17091068 11/06/2020	
245.	Charter Communications Operating, LLC	Wireless Backhaul Monitoring And Wireless Link Management	17084048 10/29/2020	
246.	Charter Communications Operating, LLC	Methods And Apparatus For Data Traffic Prioritization In Small-Cell Wireless Systems	17084476 10/29/2020	
247.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Band Steering And/Or Channel Steering In Wifi Communications Systems	17090861 11/05/2020	
248.	Charter Communications Operating, LLC	Implementing Network Constraint Exceptions On A Per Device Basis	17576074 01/14/2022	
249.	Charter Communications Operating, LLC	Methods And Apparatus For Enhancing Wireless Link Throughput In Small-Cell Wireless Systems	17086134 10/30/2020	
250.	Charter Communications Operating, LLC	System And Method For Establishing A Virtual Access Point	17079782 10/26/2020	
251.	Charter Communications Operating, LLC	Smart Remote Agent on an Access CPE with an Agile OpenWrt Software Architecture	17519140 11/04/2021	

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252.	Charter Communications Operating, LLC	Method and Framework for Internet of Things Network Security	17572782 01/11/2022	
253.	Charter Communications Operating, LLC	Methods And System For Automated Ad Hoc Customer Premise Equipment Bi-Directional Vulnerability Scanning	17568006 01/04/2022	
254.	Charter Communications Operating, LLC	External Border Gateway Protocol Peer Analysis	17079201 10/23/2020	
255.	Charter Communications Operating, LLC	Methods And Apparatus For Enhancing Scheduler Fairness In Small-Cell Wireless Systems	17083144 10/28/2020	
256.	Charter Communications Operating, LLC	Carrier Aggregation Enhancements For New Radio (Nr)	17071952 10/15/2020	
257.	Charter Communications Operating, LLC	Network Load Management Methods And Apparatus	17567869 01/03/2022	
258.	Charter Communications Operating, LLC	Methods And Systems For Determining Disliked Content	17071035 10/15/2020	
259.	Charter Communications Operating, LLC	Ip Support In Non-Cellular Low-Power Wide Area Networks	17076722 10/21/2020	
260.	Charter Communications Operating, LLC	Routing Network Traffic Using Router-Terminated Virtual Private Network (Vpn) Client Sessions	17075394 10/20/2020	
261.	Charter Communications Operating, LLC	Methods And Systems For Underlying Operating System Shell Discovery	17076047 10/21/2020	
262.	Charter Communications Operating, LLC	Methods And Apparatus For Communicating Uplink Control Information	17556727 12/20/2021	
263.	Charter Communications Operating, LLC	Connecting To A Wireless Network Based On A Device Mobility State	17510145 10/25/2021	
264.	Charter Communications Operating, LLC	5g Network Having An External Multi-Path Transport Protocol Proxy Node	17070539 10/14/2020	
265.	Charter Communications Operating, LLC	Method And Apparatus For Overlaying Themed Imagery Onto Real-World Objects In A Head-Mounted Display Device	17553898 12/17/2021	
266.	Charter Communications Operating, LLC	Validation And Implementation Of Flow Specification (Flowspec) Rules	17066065 10/08/2020	
267.	Charter Communications Operating, LLC	Apparatus And Methods For Synchronization Pattern Configuration In An Optical Network	17510172 10/25/2021	
268.	Charter Communications Operating, LLC	Tdd Configuration Coordination For Networks Using Adjacent Bands	17069294 10/13/2020	

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270.	Charter Communications Operating, LLC	Immediate Authorization For High-Power Customer Premises Equipment In Citizens Broadband Radio Service Systems	17061843 10/02/2020	
271.	Charter Communications Operating, LLC	Intelligent Tap With Dynamically Configurable Amplifier Gain	17443343 07/26/2021	
272.	Charter Communications Operating, LLC	Key System Module For Softphone Or Embedded Voice Applications	17036089 09/29/2020	
273.	Charter Communications Operating, LLC	Network Anomaly Detection And Mitigation Simulation Tool	17035656 09/28/2020	
274.	Charter Communications Operating, LLC	System And Method For Recording A Routing Path Within A Network Packet	17038781 09/30/2020	
275.	Charter Communications Operating, LLC	Methods And Apparatus For Testing Alternative Wireless Connections And Selecting A Wireless Connection	17543707 12/06/2021	
276.	Charter Communications Operating, LLC	Accommodating Priority Service Users In Ieee 802.11be Bss	17025599 09/18/2020	
277.	Charter Communications Operating, LLC	Wireless Station Location Detection And Management	17026559 09/21/2020	
278.	Charter Communications Operating, LLC	Methods And Apparatus To Communicate With An End Point Device	17543653 12/06/2021	
279.	Charter Communications Operating, LLC	Methods And Apparatus For Monitoring Contested Spectrum And/Or Responding To The Detection Of An Incumbent User	17537478 11/29/2021	
280.	Charter Communications Operating, LLC	Caching And Delivering Media Content From Multiple Streaming Providers	17029001 09/22/2020	
281.	Charter Communications Operating, LLC	Compensating For Latency In A Streaming Virtual Reality Environment	17543208 12/06/2021	
282.	Charter Communications Operating, LLC	Wireless Repeater Apparatus And Methods Of Operation	17019033 09/11/2020	
283.	Charter Communications Operating, LLC	Multiple-Layer Wireless Station Implementations And Management	17015745 09/09/2020	
284.	Charter Communications Operating, LLC	Methods And Apparatus For Wireless Data Traffic Management In Wireline Backhaul Systems	17015769 09/09/2020	
285.	Charter Communications Operating, LLC	Methods And Apparatus For Wireless Signal Maximization And Management In A Quasi-Licensed Wireless System	17479662 09/20/2021	

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287.	Charter Communications Operating, LLC	Wireless Base Station And Location Management	17004653 08/27/2020	
288.	Charter Communications Operating, LLC	Bandwidth Allocation And Management In A Wireless Network	17008965 09/01/2020	
289.	Charter Communications Operating, LLC	Wireless Management And Connectivity Across Multiple Networks	17001935 08/25/2020	
290.	Charter Communications Operating, LLC	Method And System For Network Discovery And Management And Associated E-Commerce	17524468 11/11/2021	
291.	Charter Communications Operating, LLC	Augmenting Dynamic Ad Insertion Inventory with Unused Inventory	17521454 11/08/2021	
292.	Charter Communications Operating, LLC	Enhanced Implementation Of A Random Access Channel	17519094 11/04/2021	
293.	Charter Communications Operating, LLC	Wireless Connectivity Management And Handoff Control	16997414 08/19/2020	
294.	Charter Communications Operating, LLC	Single Mac Device Feeding Multiple Physical Layer Devices	17313537 05/06/2021	
295.	Charter Communications Operating, LLC	Method And Apparatus For Real-Time Gunshot Detection And Reporting	16997678 08/19/2020	
296.	Charter Communications Operating, LLC	Multi-Domain Quality Of Service Software-Defined Networking Controller	17520971 11/08/2021	
297.	Charter Communications Operating, LLC	Methods And Apparatus For Coordination Between Wireline Backhaul And Wireless Systems	16997776 08/19/2020	
298.	Charter Communications Operating, LLC	Methods And Apparatus For Wireless Device Attachment In A Managed Network Architecture	16996496 08/18/2020	
299.	Charter Communications Operating, LLC	Border Gateway Protocol (BGP) Hijacks Prefix Signing Using Public/Private Keys	17512972 10/28/2021	
300.	Charter Communications Operating, LLC	Methods And Apparatus For Distributing Timing Information	17510364 10/25/2021	
301.	Charter Communications Operating, LLC	APPARATUS AND METHODS FOR INTEGRATED HIGH-CAPACITY DATA AND WIRELESS IOT (INTERNET OF THINGS) SERVICES	17409579 08/23/2021	
302.	Charter Communications Operating, LLC	Secure Cloaking of Data	17499176 10/12/2021	

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304.	Charter Communications Operating, LLC	Communication Management System And Handoffs	16918518 07/01/2020	
305.	Charter Communications Operating, LLC	Method and Apparatus for Out of Path Border Gateway Protocol Validation	17469956 09/09/2021	
306.	Charter Communications Operating, LLC	Locking Latch And Mount For Secure Attachment And Support Of Enclosures	16917559 06/30/2020	
307.	Charter Communications Operating, LLC	Location-Based Tracking In A Wireless Network Environment	17467597 09/07/2021	
308.	Charter Communications Operating, LLC	Apparatus And Methods For Enhanced Paging In Wireless Networks	17367239 07/02/2021	
309.	Charter Communications Operating, LLC	Switching Connections Over Frequency Bands Of A Wireless Network	17461787 08/30/2021	
310.	Charter Communications Operating, LLC	Apparatus And Methods For Uplink Mimo Enhancement In Wireless Systems	17397616 08/09/2021	
311.	Charter Communications Operating, LLC	Methods And Apparatus For Maintaining And Using Geolocation Data In A Wireless System	17409176 08/23/2021	
312.	Charter Communications Operating, LLC	Methods And Apparatus For Distributing Time, Frequency, And/Or Phase Information	17392239 08/02/2021	
313.	Charter Communications Operating, LLC	Methods And Apparatus For Facilitating Configuration, Testing And/Or Deployment Of A Wireless System Including A Wireless Extender	17392224 08/02/2021	
314.	Charter Communications Operating, LLC	Apparatus And Methods For Device Location Determination	17328950 05/24/2021	
315.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Transmission Bursts	17397875 08/09/2021	
316.	Charter Communications Operating, LLC	Methods And Apparatus For Reducing Power Consumption In Optical Devices	17341373 06/07/2021	
317.	Charter Communications Operating, LLC	Handover Methods And Apparatus	17327715 05/22/2021	
318.	Charter Communications Operating, LLC	Efficient Real Time Vehicular Traffic Reporting And Sharing	17385434 07/26/2021	
319.	Charter Communications Operating, LLC	Methods And Apparatus For Providing Wireless Services To A Customer Premises	17359298 06/25/2021	

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321.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Multiple-Input And Multiple-Output (Mimo) Advertisements	17228613 04/12/2021	
322.	Charter Communications Operating, LLC	Methods And Apparatus For Device Registration In A Quasi-Licensed Wireless System	17334343 05/28/2021	
323.	Charter Communications Operating, LLC	Distributed Denial-Of-Service Attack Mitigation With Reduced Latency	17334881 05/31/2021	
324.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Devices Of Different Types Using A Residential Gateway	17341350 06/07/2021	
325.	Charter Communications Operating, LLC	Apparatus And Methods For Coordinated Delivery Of Multiple Data Channels Over Physical Medium	17334313 05/28/2021	
326.	Charter Communications Operating, LLC	Methods And Apparatus For Allocating And/Or Using Partial And Bulk Spectrum In A Network	17306940 05/03/2021	
327.	Charter Communications Operating, LLC	Apparatus And Methods For Latency Reduction In Digital Content Switching Operations	17208447 03/22/2021	
328.	Charter Communications Operating, LLC	Apparatus And Methods For Premises Device Existence And Capability Determination	17216548 03/29/2021	
329.	Charter Communications Operating, LLC	Apparatus And Methods For Content Storage, Distribution And Security Within A Content Distribution Network	17189068 03/01/2021	
330.	Charter Communications Operating, LLC	Multi-Domain Software Defined Network Controller	17239675 04/25/2021	
331.	Charter Communications Operating, LLC	Capacity Management Methods And Apparatus For Use In A Wireless Network	17156335 01/22/2021	
332.	Charter Communications Operating, LLC	Methods And Apparatus For Supporting Network Access Using Cable And Radio Communications Links	17228681 04/12/2021	
333.	Charter Communications Operating, LLC	Methods And Apparatus For Configuring And/Or Managing Communications Devices	17216154 03/29/2021	
334.	Charter Communications Operating, LLC	Dynamic Configuration And Use Of Wireless Base Stations In A Network	17203509 03/16/2021	
335.	Charter Communications Operating, LLC	Methods and Apparatus for Securely Storing, Using and/or Updating Credentials Using a Network Device at a Customer Premises	17196534 03/09/2021	
336.	Charter Communications Operating, LLC	Communications Methods And Apparatus Using Multiple Beams	17182204 02/22/2021	

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338.	Charter Communications Operating, LLC	Apparatus And Methods For Selective Secondary Content Insertion In A Digital Network	17164727 02/01/2021	
339.	Charter Communications Operating, LLC	Apparatus And Methods For Enhanced Content Control, Consumption And Delivery In A Content Distribution Network	16654662 10/16/2019	
340.	Charter Communications Operating, LLC	Data Cache Mechanism Through Dual Sim Phone	16656525 10/17/2019	
341.	Charter Communications Operating, LLC	Denial-Of-Service Detection And Mitigation Solution	16599117 10/10/2019	
342.	Charter Communications Operating, LLC	Distributed Trigger-Based Function Execution in a Mesh Network	16592716 10/03/2019	
343.	Charter Communications Operating, LLC	Item Integrity Verification	16580570 09/24/2019	
344.	Charter Communications Operating, LLC	Methods And Apparatus For Determining A Number Of Connections To Use At A Given Time And/Or The Level Of Error Correcting Coding To Use Based On Connection Scores	17107896 11/30/2020	
345.	Charter Communications Operating, LLC	Paging Related Methods And Apparatus	17108674 12/01/2020	
346.	Charter Communications Operating, LLC	Automated Methods And Apparatus For Facilitating The Design And Deployment Of Monitoring Systems	17108902 12/01/2020	
347.	Charter Communications Operating, LLC	Methods And Apparatus For Maintaining And Using Geolocation Data In A Wireless System	17001640 08/24/2020	11102610 08/24/2021
348.	Charter Communications Operating, LLC	Paging Related Methods And Apparatus	17007996 08/31/2020	11343797 05/24/2022
349.	Charter Communications Operating, LLC	Disabling, Using A Designated Process, Hybrid Automatic Repeat Request (Harq) Acknowledgments For Packets For Which Acknowledgements Are Supported At Network Or Higher Layer	17080824 10/26/2020	
350.	Charter Communications Operating, LLC	Methods And Apparatus For Scheduling And/Or Granting Uplink Resources	17074603 10/19/2020	
351.	Charter Communications Operating, LLC	Real-Time Enrichment For Deep Packet Inspection	17020169 09/14/2020	11336541 05/17/2022
352.	Charter Communications Operating, LLC	Dynamic Adaptation Of Mobile Network Coverage	16897878 06/10/2020	11330448 05/10/2022
353.	Charter Communications Operating, LLC	Location-Based Video Lineup Selection	17347719 06/15/2021	11323782 05/03/2022

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355.	Charter Communications Operating, LLC	Transport Control Based On Layer 1 Channel Characteristics	17152232 01/19/2021	11323178 05/03/2022
356.	Charter Communications Operating, LLC	Apparatus And Methods For Interference Handling And Switching Operating Frequencies For Devices Being Supported By A Wireless Access Node	16837751 04/01/2020	11317296 04/26/2022
357.	Charter Communications Operating, LLC	Hardware Address Consistency Management	17089687 11/04/2020	11316826 04/26/2022
358.	Charter Communications Operating, LLC	Modular Communication System	16741811 01/14/2020	11316745 04/26/2022
359.	Charter Communications Operating, LLC	Quality Of Service Continuity In Converged Networks	17090214 11/05/2020	11297539 04/05/2022
360.	Charter Communications Operating, LLC	Methods And Apparatus For Utilization Of Quasi-Licensed Wireless Spectrum For Iot (Internet-Of-Things) Services	16694959 11/25/2019	11219026 01/04/2022
361.	Charter Communications Operating, LLC	Switching Connections Over Frequency Bands Of A Wireless Network	15669182 08/04/2017	11109290 08/31/2021
362.	Charter Communications Operating, LLC	Apparatus And Methods For Content Management And Account Linking Across Multiple Content Delivery Networks	15905704 02/26/2018	10917694 02/09/2021
363.	Charter Communications Operating, LLC	User Selection of Software Components in a Television Set-Top Box	15331828 10/22/2016	10911834 02/02/2021
364.	Charter Communications Operating, LLC	Paging Related Methods And Apparatus	16584763 09/26/2019	10856256 12/01/2020
365.	Charter Communications Operating, LLC	LTE Network Extension (LNE) System, Methods, And Apparatus	15992165 05/29/2018	10708855 07/07/2020
366.	Charter Communications Operating, LLC	Silent Start When Connecting to Fiber Access Network	16733555 01/03/2020	10707967 07/07/2020
367.	Charter Communications Operating, LLC	Subscriber Identification Module (SIM) Task Scheduler for Dual SIM Devices Using Citizens Broadband Radio Service Network	16735892 01/07/2020	10701548 06/30/2020
368.	Charter Communications Operating, LLC	Universal Alias And Dependency Models And Network Analysis	15721250 09/29/2017	10693737 06/23/2020
369.	Charter Communications Operating, LLC	Device Discovery In A Network Environment	15633170 06/26/2017	10616066 04/07/2020
370.	Charter Communications Operating, LLC	Prioritizing Preferred Networks	15669167 08/04/2017	10506616 12/10/2019

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372.	Charter Communications Operating, LLC	Methods And Apparatus For Allocation And Reconciliation Of Quasi-Licensed Wireless Spectrum Across Multiple Entities	15902833 02/22/2018	10405192 09/03/2019
373.	Time Warner Cable Enterprises LLC	Method And Apparatus For Passpoint EAP Session Tracking	15983698 05/18/2018	10477397 11/12/2019
374.	Time Warner Cable Enterprises LLC	Wireless Network Management And Online Signup Of Services	16595838 10/08/2019	10911958 02/02/2021
375.	Time Warner Cable Enterprises LLC	System And Method For Delivering Media Based On Viewer Behavior	16690488 11/21/2019	11115699 09/07/2021
376.	Time Warner Cable Enterprises LLC	Registration Of Devices For Use Of One Or More Services	16783480 02/06/2020	11166252 11/02/2021
377.	Time Warner Cable Enterprises LLC	Communication Management And Wireless Roaming Support	16679631 11/11/2019	
378.	Time Warner Cable Enterprises LLC	Situation-Dependent Dynamic Bit Rate Encoding And Distribution Of Content	16884225 05/27/2020	
379.	Time Warner Cable Enterprises LLC	Configuration Settings Management In A Network Environment	16916429 06/30/2020	
380.	Time Warner Cable Enterprises LLC	Provisioning Of Wireless Security Configuration Information In A Wireless Network Environment	17141380 01/05/2021	
381.	Time Warner Cable Enterprises LLC	Content Consumption And Notification In A Network	17375613 07/14/2021	
382.	Time Warner Cable Enterprises LLC	System And Method For Delivering Media Based On Viewer Behavior	17393436 08/04/2021	
383.	Time Warner Cable Enterprises LLC	System And Method For Delivering Media Based On Viewer Behavior	17393436 08/04/2021	
384.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Premises Content Distribution	15865103 01/08/2018	10965727 03/30/2021
385.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Predictive Capacity Allocation	15213132 07/18/2016	10911313 02/02/2021
386.	Time Warner Cable Enterprises LLC	Use Of DNS Information As Trigger For Dynamic IPV4 Address Allocation	16010420 06/16/2018	10893017 01/12/2021
387.	Time Warner Cable Enterprises LLC	Technique For Securely Communicating Programming Content	15979318 05/14/2018	10848806 11/24/2020
388.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Selective Enforcement Of Digital Content Viewing	15853468 12/22/2017	10721504 07/21/2020
389.	Time Warner Cable Enterprises LLC	Multicast Video Program Switching Architecture	15682430 08/21/2017	10694257 06/23/2020
390.	Time Warner Cable Enterprises LLC	Apparatus And Method For Wireless Network Services In Moving Vehicles	15919030 03/12/2018	10687371 06/16/2020
391.	Time Warner Cable Enterprises LLC	Wireless Session Configuration Persistence	15882827 01/29/2018	10659962 05/19/2020
392.	Time Warner Cable Enterprises LLC	Media Bridge Apparatus And Methods	15688721 08/28/2017	10652607 05/12/2020
393.	Time Warner Cable Enterprises LLC	Personal Content Server Apparatus And Methods	15823059 11/27/2017	10623462 04/14/2020
394.	Time Warner Cable Enterprises LLC	Packetized Content Delivery Apparatus And Methods	15289803 10/10/2016	10581721 03/03/2020
395.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Efficient Delivery Of Electronic Program Guide Data	15954478 04/16/2018	10567814 02/18/2020

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397.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Delivery Of Multicast And Unicast Content In A Content Delivery Network	15219083 07/25/2016	10531161 01/07/2020
398.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Monitoring And Optimizing Delivery Of Content In A Network	15376306 12/12/2016	10455262 10/22/2019
399.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Packetized Content Delivery Over A Bandwidth-Efficient Network	15967343 04/30/2018	10448117 10/15/2019
400.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Carrier Allocation In A Communications Network	15676797 08/14/2017	10432990 10/01/2019
401.	Time Warner Cable Enterprises LLC	Digital Domain Content Processing And Distribution Apparatus And Methods	15948943 04/09/2018	10411939 09/10/2019
402.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Provisioning In A Download-Enabled System	15614383 06/05/2017	10404752 09/03/2019
403.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Selecting Digital Access Technology For Programming And Data Delivery	16017945 06/25/2018	10743066 08/11/2020
404.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Ensuring Delivery Of Geographically Relevant Content	15898485 02/17/2018	10516755 12/24/2019
405.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Using Bandwidth Subject To Cellular Interference	16046839 07/26/2018	10462797 10/29/2019
406.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Context-Specific Content Delivery	16042982 07/23/2018	10445784 10/15/2019
407.	Time Warner Cable Enterprises LLC	Resource Allocation In A Wireless Mesh Network Environment	15681676 08/21/2017	10440713 10/08/2019
408.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Synchronized Viewing Experience Across Multiple Devices	15659483 07/25/2017	10412695 09/10/2019
409.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Controlling Digital Video Recorders	16041772 07/21/2018	10812866 10/20/2020
410.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Context-Specific Content Delivery	16601361 10/14/2019	10991009 04/27/2021
411.	Time Warner Cable Enterprises LLC	Method And Apparatus For Boundary-Based Network Operation	15936270 03/26/2018	11032518 06/08/2021
412.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Providing And Uploading Content To Personalized Network Storage	15969597 05/02/2018	11076203 07/27/2021
413.	Time Warner Cable Enterprises LLC	Secondary Content Insertion Apparatus And Methods	15201181 07/01/2016	11082723 08/03/2021
414.	Time Warner Cable Enterprises LLC	Digital Domain Content Processing And Distribution Apparatus And Methods	16895977 06/08/2020	11153622 10/19/2021
415.	Time Warner Cable Enterprises LLC	Resource Allocation In A Wireless Mesh Network Environment	16559973 09/04/2019	11206665 12/21/2021
416.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Efficient Delivery Of Electronic Program Guide Data	16792089 02/14/2020	11212561 12/28/2021
417.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Initiating A Playback Pause Operation On One Device And Resuming Playback On Another Playback Device	15860433 01/02/2018	11212575 12/28/2021
418.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Revenue-Optimized Delivery Of Content In A Network	15443992 02/27/2017	11223860 01/11/2022
419.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Hardware Registration In A Network Device	15332912 10/24/2016	11252055 02/15/2022
420.	Time Warner Cable Enterprises LLC	Packetized Content Delivery Apparatus And Methods	16806992 03/02/2020	11252075 02/15/2022
421.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Centralized Message Exchange In A User Premises Device	16557619 08/30/2019	11258832 02/22/2022

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423.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Carrier Allocation In A Communications Network	16588804 09/30/2019	11303944 04/12/2022
424.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Ensuring Delivery Of Geographically Relevant Content	16725725 12/23/2019	11323539 05/03/2022
425.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Identifying And Characterizing Latency In A Content Delivery Network	16939989 07/27/2020	11336551 05/17/2022
426.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Presenting Social Network Content In Conjunction With Video Content	16292127 03/04/2019	
427.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Controlling Unauthorized Streaming Of Content	16592745 10/03/2019	
428.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Serving Content To Customer Devices Based On Dynamic Content Popularity	16673958 11/04/2019	
429.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Provisioning In A Download-Enabled System	16557474 08/30/2019	
430.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Monitoring And Optimizing Delivery Of Content In A Network	16659268 10/21/2019	
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433.	Time Warner Cable Enterprises LLC	Domain Management And Configuration Settings	16821173 03/17/2020	
434.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Selective Data Network Access	16786825 02/10/2020	
435.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Secondary Content Management And Fraud Prevention	16813471 03/09/2020	
436.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Presentation Of Key Frames In Encrypted Content	16872060 05/11/2020	
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438.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Cross Platform Monitoring And Customer Targeting	17015050 09/08/2020	
439.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Selective Enforcement Of Secondary Content Viewing	16933701 07/20/2020	
440.	Time Warner Cable Enterprises LLC	Methods, Apparatus And User Interface For Providing Content On Demand	17157743 01/25/2021	
441.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Managing Service Delivery Telemetry	17164719 02/01/2021	
442.	Time Warner Cable Enterprises LLC	Apparatus And Method For Wireless Network Extensibility And Enhancement	17202184 03/15/2021	
443.	Time Warner Cable Enterprises LLC	Apparatus And Methods For Content Management And Account Linking Across Multiple Content Delivery Networks	17170514 02/08/2021	
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445.	Time Warner Cable Enterprises LLC	Methods And Apparatus For Providing And Uploading Content To Personalized Network Storage	17385710 07/26/2021	
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448.	Time Warner Cable Enterprises LLC	Methods and Apparatus for Communicating Messages Between Mobile Communications Devices and Internet Enabled Devices	16183645 11/07/2018	RE48699 08/17/2021
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451.	Charter Communications Operating, LLC	Time interleaved coverage zones in wireless networks	16999606 8/21/2020	11272428 3/8/2022
452.	Charter Communications Operating, LLC	Lte and wifi transmission coordination using network allocation vector	17089947 11/5/2020	11272542 3/8/2022
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