

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

NAGRAVISION SA and NAGRA
FRANCE SAS,

Plaintiffs,

vs.

COMCAST CORPORATION, COMCAST
CABLE COMMUNICATIONS, LLC,
COMCAST CABLE
COMMUNICATIONS MANAGEMENT,
LLC, COMCAST BUSINESS
COMMUNICATIONS, LLC, COMCAST
OF HOUSTON, LLC, COMCAST
HOLDINGS CORPORATION, and
COMCAST SHARED SERVICES, LLC,

Defendants.

Case No.: 2:16-cv-1362-JRG

JURY TRIAL DEMANDED

FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiffs Nagravision SA and Nagra France SAS (collectively, “Plaintiffs”), by and through their undersigned attorneys, for their First Amended Complaint against defendants Comcast Corporation, Comcast Cable Communications, LLC, Comcast Cable Communications Management, LLC, Comcast Business Communications, LLC, Comcast of Houston, LLC, Comcast Holdings Corporation, and Comcast Shared Services, LLC (collectively, “Defendants” or “Comcast”), hereby allege as follows, upon actual knowledge with respect to themselves and their own acts, and upon information and belief as to all other matters:

NATURE OF THE ACTION

1. Plaintiffs bring this patent infringement action to stop Comcast from continuing its wrongful and unlicensed use of Plaintiffs' patented technologies in its products and services, including Xfinity digital video, audio, and other content services provided to Comcast's customers with the Xfinity X1 set-top boxes and other Comcast hardware provided to Comcast's customers.

2. Comcast infringes the following of Plaintiffs' United States Patents, which are attached hereto as Exhibits A, B, C, D, and E (collectively "the Asserted Patents"):

- U.S. Patent No. 7,725,720 ("the '720 Patent");
- U.S. Patent No. 7,725,740 ("the '740 Patent");
- U.S. Patent No. 8,356,188 ("the '188 Patent");
- U.S. Patent No. RE40,334 ("the '334 Patent"); and
- U.S. Patent No. 7,251,825 ("the '825 Patent").

3. Comcast directly and indirectly infringes the Asserted Patents by making, using, testing, importing, offering for sale/lease, selling, and leasing infringing products and services to Comcast's customers. Plaintiffs seek damages and injunctive and other relief for Comcast's infringement of the Asserted Patents.

THE PARTIES

4. Plaintiff Nagravision SA ("Nagravision") is a Swiss corporation with its principal place of business in Cheseaux, Switzerland. Nagravision is a wholly owned subsidiary of Kudelski SA ("the Kudelski Group").

5. Plaintiff Nagra France SAS ("Nagra France") is a French corporation with its principal place of business in Paris, France. Nagra France is a wholly owned subsidiary of the Kudelski Group.

6. Upon information and belief, Defendant Comcast Corporation is a Pennsylvania corporation with its principal place of business in Philadelphia, Pennsylvania. Upon information and belief, through its wholly-owned subsidiaries, Comcast Corporation provides “Comcast” branded services, including Xfinity digital video, audio, and other content services to customers, including in this judicial district. Upon information and belief, Comcast Corporation, jointly with the other Defendants, develops the infringing Xfinity services and equipment and provides the infringing set-top boxes, television systems, and components thereof to customers, including in this judicial district.

7. Upon information and belief, Defendant Comcast Cable Communications, LLC is a limited liability company organized and existing under the laws of Delaware with its principal place of business in Philadelphia, Pennsylvania. Upon information and belief, Comcast Cable Communications, LLC is a subsidiary of Comcast Corporation. Upon information and belief, Comcast Cable Communications, LLC, jointly with the other Defendants, develops the infringing Xfinity services and equipment and provides the infringing set-top boxes, television systems, and components thereof to customers, including in this judicial district.

8. Upon information and belief, Defendant Comcast Cable Communications Management, LLC is a limited liability company organized and existing under the laws of Delaware with its principal place of business in Philadelphia, Pennsylvania. Upon information and belief, Comcast Cable Communications Management, LLC is a subsidiary of Comcast Corporation. Upon information and belief, Comcast Cable Communications Management, LLC, jointly with the other Defendants, develops the infringing Xfinity services and equipment and provides the infringing set-top boxes, television systems, and components thereof to customers, including in this judicial district.

9. Upon information and belief, Defendant Comcast Business Communications, LLC is a limited liability company organized and existing under the laws of Pennsylvania with its principal place of business in Philadelphia, Pennsylvania. Upon information and belief, Comcast Business Communications, LLC is a subsidiary of Comcast Corporation. Upon information and belief, Comcast Business Communications, LLC, jointly with the other Defendants, develops the infringing Xfinity services and equipment and provides the infringing set-top boxes, television systems, and components thereof to customers, including in this judicial district.

10. Upon information and belief, Defendant Comcast of Houston, LLC is a limited liability company organized and existing under the laws of Delaware with its principal place of business in Houston, Texas. Upon information and belief, Comcast of Houston, LLC is a subsidiary of Comcast Corporation. Upon information and belief, Comcast of Houston, LLC, jointly with the other Defendants, develops the infringing Xfinity services and equipment and provides the infringing set-top boxes, television systems, and components thereof to customers, including in this judicial district.

11. Upon information and belief, Defendant Comcast Holdings Corporation is a Pennsylvania corporation with its principal place of business in Philadelphia, Pennsylvania. Upon information and belief, Comcast Holdings Corporation is a subsidiary of Comcast Corporation. Upon information and belief, Comcast Holdings Corporation, jointly with the other Defendants, develops the infringing Xfinity services and equipment and provides the infringing set-top boxes, television systems, and components thereof to customers, including in this judicial district.

12. Upon information and belief, Defendant Comcast Shared Services, LLC is a limited liability company organized and existing under the laws of Delaware with its principal place of business in Chicago, Illinois. Upon information and belief, Comcast Shared Services, LLC is a subsidiary of Comcast Corporation. Upon information and belief, Comcast Shared Services, LLC, jointly with the other Defendants, develops the infringing Xfinity services and equipment and provides the infringing set-top boxes, television systems, and components thereof to customers, including in this judicial district.

JURISDICTION AND VENUE

13. This is an action for patent infringement of United States Patent Nos. 7,725,720; 7,725,740; 8,356,188; RE40,334; and 7,251,825 arising under the United States patent laws, Title 35, United States Code, including but not limited to 35 U.S.C. § 271.

14. This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331 and 1338(a) because this action arises under the patent laws of the United States, 35 U.S.C. §§ 1 *et seq.*

15. This Court has personal jurisdiction over Defendants. Each defendant, directly or in combination with Comcast Corporation, Comcast Corporation subsidiaries, or through its agents, conducts business in this judicial district and elsewhere in Texas and throughout the United States. Further, Defendants have committed and continue to commit acts of patent infringement in this district and elsewhere in Texas by marketing, selling, offering to sell, and/or using the Xfinity digital video, audio, and other content services with the infringing television set-top boxes, television systems, and components thereof that were used within this district, or that they knew would be used within this district.

16. Venue in this district is proper pursuant to 28 U.S.C. § 1391 and 28 U.S.C. § 1400(b), at least because, upon information and belief, each Defendant, directly or in

combination with Comcast Corporation, Comcast Corporation subsidiaries, or through its agents, has marketed, sold, offered to sell, or used the Xfinity digital video, audio, and other content services with the infringing television set-top boxes, television systems, and components thereof in this district.

BACKGROUND

17. Plaintiffs design and manufacture widely used, critically acclaimed, and award-winning digital media technologies, and protect their research and development investment with a robust patent portfolio comprising thousands of patents that represent the results of years of innovation, investment, and effort by numerous inventors and engineers. Plaintiffs encourage innovation by licensing their intellectual property portfolio, and enforce their patent rights when necessary to protect their research investment and the fruits of the efforts of their employees from unauthorized use.

18. The Kudelski Group was founded in 1951 by Stefan Kudelski, successfully launching portable recording devices for cinema, TV, and radio recording. This included the launch of the now legendary “Nagra” line of portable recording devices for cinema, TV, and radio. Mr. Kudelski’s recording devices, and the inventions in them, were considered revolutionary throughout the movie industry. The Nagra devices allowed precise synchronization of audio tape with film, providing filmmakers with studio sound quality during on-location filming.

19. Throughout his career, Mr. Kudelski received numerous awards and honors for his technological achievements, including four Academy Awards, two Emmy Awards, and Gold Medals from the Society of Motion Picture and Television Engineers, the Audio Engineering Society, Lyra, and Eurotechnica. Mr. Kudelski also was recognized by the Federal Bureau of Investigation for his technological contributions to audio recording. After Mr. Kudelski’s death in

2013, he was honored in the “in memoriam” presentation during the 86th Annual Academy Awards in March 2014, described by a single word: Inventor.

20. The success of its products allowed the Kudelski Group to expand its technology into the digital television domain. In 1989, the Kudelski Group launched its first conditional access systems for pay TV. Over the next decade, the Kudelski Group continued to expand its technology development in the digital TV space, providing global, universally compatible solutions to manage, organize, enhance, market, and secure digital content, regardless of whether it was transmitted over managed or unmanaged networks and broadcasted linearly or on-demand.

21. Today, digital television is the Kudelski Group’s core business. With that, the Kudelski Group has become a world leader in digital security and convergent media solutions for the delivery of digital and interactive content. The Kudelski Group’s innovations are continuously contributing to the evolution of the digital television ecosystem, enabling operators to extend their multimedia offerings across the entire digital ecosystem to numerous client devices through traditional managed networks as well as Internet delivery.

22. The Kudelski Group has also grown as a leader in the digital television domain through acquisitions of pioneering technology companies, including such notable companies as Lysis (2001), Livewire (2001), MediaGuard (2004), SmarDTV (2006), OpenTV (2007), and Conax (2014).

23. NagraVision is the digital television division of the Kudelski Group, and the global leader in delivering secure, end-to-end digital media technologies. NagraVision works with the world’s leading television operators to bring the next generation of pay-TV services to market,

while ensuring that content is protected. NagraVision's core business is content protection in a dynamic, connected, and multiscreen TV landscape.

24. Nagra France first formed as a subsidiary of French television broadcasting company Canal+ and German media corporation Bertelsmann, as a technology provider for conditional access system and digital television services. Originally known as "Société Européenne de Contrôle d'Accès" or "SECA," the company later became a wholly-owned subsidiary of Canal+ and was renamed Canal+ Technologies SA. The conditional access part of the business and its intellectual property assets were subsequently acquired by the Kudelski Group, and the company became known as Nagra France.

25. Nagra France's products include conditional access system technology on cards that contain highly specialized microchips with advanced software and encryption algorithms. The cards, commonly referred to as "smart cards," limit access to digital pay-TV programs to lawful subscribers who pay for access. "Conditional access" is a term used generally to describe products that control and secure access to digital TV signals.

26. Using compression techniques and other technological advances, digital TV allows network operators to deliver more channels, better picture quality, improved security, and a wide range of interactive services that are unavailable using traditional analog signals. To deliver digital content to TVs and consumer devices, network operators typically deploy a digital set-top box or device equipped with a smart card or other conditional access module to convert incoming secure digital TV signals into a format that can be processed and displayed on the consumer's TV or display. The performance and security of digital set-top boxes with smart cards are critical competitive factors in the digital broadcast industry.

27. The conditional access systems provided by Nagra France and its predecessors enable television network operators to deliver secure programs and interactive services over digital television networks through set-top boxes. The conditional access systems provided by Nagra France were first sold in 1996. These advanced software technology implementations enable and secure digital interactive TV through set-top boxes, enable network operators to manage and control delivery of pay-TV content, and provide a secure platform for interactive transactions. Nagra France has more than 400 issued patents and pending applications covering various aspects of its innovative conditional access solutions.

28. Comcast is currently the largest cable provider in the United States. Much of its recent growth has been due to its focus on providing “advanced services,” including video on demand (“VOD”), digital video recording (“DVR”), advanced channel guide services, interactive features, and now cloud-enabled video services, to its customers through its set-top boxes. Comcast has an installed base of more than ten million users on X1—its latest cable TV platform—since the 2012 launch of X1.

29. The Reference Design Kit (“RDK”) is a standardized software stack with localization plugins created to accelerate the deployment of next-generation video products and services by multichannel video providers. It is administered by RDK Management LLC, which is a joint venture between Comcast and two other cable companies. RDK sits below the application and services layer and provides a common interface between software and system-on-chips. RDK interfaces with the Comcast Xfinity X1 operating system. The Comcast Xfinity X1 operating system includes multiple products and services, and it is the interaction between these products—Comcast Xfinity X1 software and RDK—that comprises the Comcast Xfinity X1 operating system.

30. Comcast provides various products to consumers, including but not limited to Xfinity-branded set-top boxes with hardware and software components (“Comcast Set-Top Box Products”), used alone or in conjunction with other set-top boxes, Comcast servers, and/or mobile applications as part of Comcast’s Xfinity digital video, audio, and other content services (“Comcast Services”). The Comcast Set-Top Box Products include, but are not limited to, XG1 models including ARRIS-Motorola XG1-A, ARRIS-Motorola ACQ-XG1, ARRIS XG1-V3, ARRIS-Motorola AX013AN, AX013ANM, ARRIS-Motorola MX011ANM, ARRIS-Motorola MX011BNM, Pace XG1-V3, Pace XG1-P, Pace PX013ANM, Pace PX001ANM, Pace PX001BNM, Pace PX001ANC, Pace PX012ANM, Pace PX012ANC, and Pace PX013ANC; XG2 models including Pace XG2, Pace XG2v2-P, Pace PX022ANM, and Pace PX022ANC; RNG models including Pace RNG110, Pace RNG150N, Pace RNG150N P2, Pace RNG 200N, Pace PR150BNC, and Pace PR150BNM X1; Xi3 models including ARRIS-Motorola Xi3 and Pace Xi3; XiD models including Pace XiD X1 and Pace PXD01ANI; Xi5 models including Pace Xi5; and other products that are the same as or substantially similar to these devices.

31. Comcast also provides consumers with Xfinity-branded set-top boxes with ARRIS CableCARDs (“Comcast Set-Top Box Products with CableCARDs”), used alone or in conjunction with other set-top boxes and/or Comcast servers as part of Comcast Services. The Comcast Set-Top Box Products with CableCARDs include, but are not limited to, XG1 models including ARRIS-Motorola XG1-A, ARRIS-Motorola ACQ-XG1, ARRIS XG1-V3, ARRIS-Motorola AX013AN, AX013ANM, ARRIS-Motorola MX011ANM, ARRIS-Motorola MX011BNM, Pace XG1-V3, Pace XG1-P, Pace PX013ANM, Pace PX001ANM, Pace PX001BNM, Pace PX001ANC, Pace PX012ANM, Pace PX012ANC, and Pace PX013ANC; XG2 models including Pace XG2, Pace XG2v2-P, Pace PX022ANM, and Pace PX022ANC; RNG

models including Pace RNG110, Pace RNG150N, Pace RNG150N P2, Pace RNG 200N, Pace PR150BNC, and Pace PR150BNM X1; and other products that are the same as or substantially similar to these devices.

32. Comcast also provides consumers with CableCARDs (“Comcast CableCARD Products”), used in conjunction with set-top boxes and other devices as part of Comcast Services. The Comcast CableCARD Products include, for example, ARRIS CableCARDs.

33. Comcast has infringed and continues to infringe the Asserted Patents by making, using, testing, importing, offering for sale, selling, leasing, and/or offering to lease, infringing Comcast Set-Top Box Products, Comcast Set-Top Box Products with CableCARDs, Comcast CableCARD Products, and Comcast Services.

34. More specifically, Comcast infringes the Asserted Patents by providing certain features as part of Comcast Services, including on the Comcast Set-Top Box Products, Comcast Set-Top Box Products with CableCARDs, and Comcast CableCARD Products. These features are an integral part of Comcast’s revenue and profit generating model.

COUNT I: INFRINGEMENT OF U.S. PATENT NO. 7,725,720

35. On May 25, 2010, United States Patent No. 7,725,720 (“the ’720 Patent”), which is entitled “Method for Generating and Managing a Local Area Network,” was lawfully issued by the United States Patent and Trademark Office (“the USPTO”). A true and correct copy of the ’720 Patent is attached as Exhibit A.

36. Pursuant to 35 U.S.C. § 282, the ’720 Patent is presumed valid.

37. When issued, the ’720 Patent was assigned to NagraVision, and NagraVision was the sole owner of the patent. Through an assignment dated December 9, 2005, the inventor of the ’720 Patent, Guy Moreillon, assigned his interest in the invention to NagraVision. As of the

filing of this First Amended Complaint, Nagravision retains the exclusive right to enforce the '720 Patent.

38. The '720 Patent is directed to creating and managing secure local area networks. For example, an embodiment of the '720 Patent comprises creating and managing a local network using a restitution device and a diffusion and re-encrypting device, including at least one security module. Through use of a local key and a network key to secure the transfer of data in a local area network in the manner described in the specification, the invention of the '720 Patent reduces vulnerabilities present in conventional local area networks.

39. Upon information and belief, Comcast manufactures and/or imports Comcast Set-Top Box Products, including gateway and secondary set-top boxes, into the United States, and sells or leases them to customers separately or as part of Comcast Services. Comcast has infringed and continues to infringe one or more claims of the '720 Patent. The infringing acts include, but are not limited to, the manufacture, use, test, sale, lease, importation, and/or offer for sale/lease in or within the United States of Comcast Set-Top Box Products and Comcast Services that implement Multimedia over Coax Alliance ("MoCA") networks in a manner that practices all steps of at least Claim 1 of the '720 Patent. By manufacturing, using, testing, selling, leasing, importing, and/or offering to sell/lease Comcast Set-Top Box Products and Comcast Services, and operating them such that all steps of at least Claim 1 of the '720 Patent are performed, Comcast has in the past infringed, and continues to infringe, the '720 Patent, including under 35 U.S.C. § 271(a), either literally or under the doctrine of equivalents. Upon information and belief, Comcast distributes its gateway and secondary set-top boxes in Texas, including within this district, and uses them in a manner consistent with at least Claim 1 of the '720 Patent and/or

induces its customers to do so. Based on these activities, Comcast has committed the tort of patent infringement in this district, and this action arises at least in part from such infringement.

40. Upon information and belief, users (e.g., Comcast customers and/or employees) of Comcast Set-Top Box Products and Comcast Services infringe at least Claim 1 of the '720 Patent in the exemplary manner described below:

A. Comcast Set-Top Box Products and Comcast Services, for example, the Xfinity-branded XG1, RNG150 and Xi3 set-top boxes, allow users to create and manage a MoCA network, which is a local network. The MoCA network includes at least one “hub” or gateway set-top box, and at least one “terminal” or secondary set-top box. For example, the XG1 can operate as the “hub,” and the RNG150 and Xi3 can operate as the “terminal”:

X1 Entertainment Operating system currently is supported by three devices: XG1, RNG150, and Xi3.

XG1

Device used to support DVR services; known as the Hub in AnyRoom scenario. Two models: Pace and Arris (HDMI output only).



RNG150

Device used to support HD only services; known as a Terminal in AnyRoom scenario. Two models: Pace and Samsung.

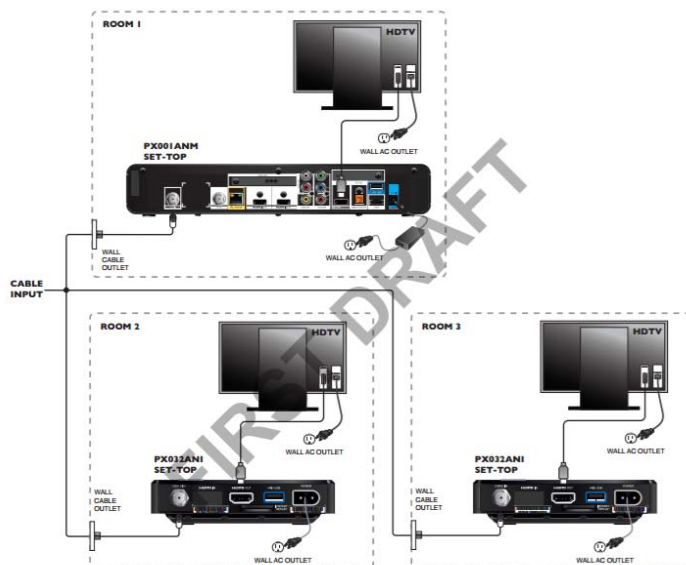


Xi3

Device used to pair with XG1 in a home; known as a terminal in AnyRoom scenario. Xi3 is a MoCA and IP only device. Xi3s do not have a QAM tuner, they leverages tuners from the XG1. One Model: Pace.



See X1 Installation Guide, <http://textlab.io/doc/463330/x1-installation-guide> (last visited Mar. 17, 2017).



See User Guide Pace Xi3-P (PX032ANI), <https://fccid.io/pdf.php?id=2150838> (last visited Mar. 17, 2017) (watermark in original).

Manufacturer > System Descriptor > Host

Summary

- Manufacturer
- HDMI
- M-Card
- Host**
- System
- Card
- DVR Info
- Reboot STB
- OSD Diagnostics
- System Debug
- MoCA Diagnostics

tru2way

Hardware Revision:	CAD-3
Vendor:	PaceMicroTechnologyplc
BOOTR:	PX001AN_2.5p6s3_PROD_HYBse
Software Revision:	PX001AN_2.5p6s3_PROD_HYBse
Model:	PX001ANM

Host Properties

Host ID:	2
Vendor ID:	000000
Board Revision:	CAD-3
Serial Number:	
BOOT ROM Ver:	PX001AN_2.5p6s3_PROD_HYBse
Model Name:	PX001ANM
Vendor Name:	Pace Micro Technology plc
Created Date:	28-04-2013
Video Memory:	131072 kilobytes
Total Memory:	576232 kB

MOCA Info > Diagnostic details

Diagnostic details

MoCA Network Status:	Enabled
MoCA Link Status:	linkUp
MoCA IP:	169.254.40.137
MoCA MAC:	99

(Screenshots of Comcast Xfinity Cable TV.)

The gateway set-top box transmits an encrypted data stream to the secondary set-top box, and hardware and/or software security modules feature in the set-top boxes.

B. Upon information and belief, during the initialization stage, the user powers up the gateway set-top box that includes the MoCA network module. Typically, the gateway set-top box will be the first device that is powered up, and there will be no existing network to join. Indeed, Comcast encourages users to “always establish [the gateway set-top box] first before [the secondary set-top boxes]”:

2. Add the Device and Authenticate

- When contractors see this screen, they should add the device to the account via TechNet and press **Activate** (which will automatically send an INIT/REHIT to the STB).
- Then enter the information from the Work Order into the Activation screen on the right.

NOTE: Xi3s cannot be installed until after the XG1 has been installed. Best practice is to always establish XG1(s) first before RNG150s or Xi3s.

See X1 Installation Guide, <http://textlab.io/doc/463330/x1-installation-guide>, p. 4 (last visited Mar. 17, 2017); *see also* Reboot Your X1 TV Box with X1 AnyRoom DVR Service at <https://customer.xfinity.com/help-and-support/cable-tv/reboot-anyroom-dvr/>.

C. In the absence of an existing network, the MoCA network module in the gateway set-top box assumes the role of a Network Coordinator (master security module). The user therefore connects the master security module with the diffusion and re-encryption device.

D. Upon information and belief, the MoCA network module operating as the Network Coordinator (master security module) establishes an AES Privacy Management Key (“APMK”), which is a network key. For example, United States Patent Application Publication No. 2014/0169558, which provides a general overview of the MoCA 2.0 standard, explains in paragraph 7 that “[i]n a MoCA 2.0 network ... the well-known Advanced Encryption Standard (AES) cipher is used to encrypt messages with encryption keys.” It is further explained that “[i]n

accordance with MoCA 2.0, a MoCA 2.0 [Network Coordinator] is used to admit new MoCA 2.0 nodes.” US Patent Application Publication No. 2014/0169558 at ¶ 8.

E. Upon information and belief, once the terminal or secondary set-top boxes are powered-up, they seek admittance to the MoCA network established by the gateway set-top box. To complete the admission of the secondary set-top boxes, the APMK is transmitted over the local network to the security module included in the secondary set-top box. *See id.* ¶¶ 41–42 (“The first of the dynamic keys is referred to as AES Privacy Management Key (‘APMK’) Link Privacy Messages include messages used to transfer the dynamic keys to [a new node] during admission.”). The transfer of the APMK is secured through encryption with the “APMKInitial” key. *See id.* (“The Link Privacy Messages during the admission process are encrypted using the APMKInitial.”). Therefore, while the MoCA network module operating as the Network Coordinator is connected to the gateway set-top box, the APMK is securely transferred to the security module in the secondary set-top box(es).

F. Upon information and belief, the gateway set-top box decrypts the incoming data stream (the “scrambled cable services”) using a CableCARD or other device, for use by the gateway and terminal set-top boxes:

The Card provides the conditional access operation and the network connectivity for the Host. MPEG transport streams are received by the Host and passed to the Card for decryption. The streams are returned to the Host device to be displayed.

See, e.g., CableCARD Interface 2.0 Specification (“CableCARD Specification”) at <https://community.cablelabs.com/wiki/plugins/servlet/cablelabs/alfresco/download?id=1fb56ae3-c147-48d2-bb07-3ca436b4827a>, p. 32 (last visited Mar. 31, 2017).

Xi3

Device used to pair with XG1 in a home; known as a terminal in AnyRoom scenario. Xi3 is a MoCA and IP only device. Xi3s do not have a QAM tuner, they leverages tuners from the XG1. One Model: Pace.

**Additional Info on Xi3**

- HDMI output only
- Maximum of (3) Xi3s per XG1
- Xi3s require MoCA network for ALL communication
- Relies upon the XG1 (gateway) for:
 - Tuning Linear TV Channels
 - Entitlements
 - Recordings (does not take up tuner)
 - Access to Guide
 - Access to On-Demand shows/movies (does not take up tuner)
- Has a 30-minute time-shift buffer for pause/fast-forward/reverse (**pending firmware release**)



See X1 Installation Guide at <http://textlab.io/doc/463330/x1-installation-guide>, p. 3 (last visited Nov. 25, 2016).

G. Upon information and belief, the secondary set-top boxes rely on the gateway set-top box for decrypting incoming scrambled cable services and transmitting it to them. *Id.* (The Xi3 secondary set-top boxes “[rely] upon the XG1 (gateway) for: Tuning Linear TV Channels; Entitlements; Recordings . . . ; Access to Guide; Access to On-Demand shows/movies.”). Regular traffic between the nodes in a MoCA network is encrypted with the local key, AES Traffic Encryption Key (“ATEK”). See, e.g., U.S. Patent Application Publication No. 2014/0169558 ¶44 (“After admission and during normal network operations, ATEK is used to encrypt data messages.”). The gateway set-top box, therefore, re-encrypts the decrypted data stream using the ATEK, which is a randomly generated session key generated by the master security module in the gateway set-top box. Additionally, the ATEK is encrypted by the network key APMK. Dynamic keys, including the ATEK, are transmitted from the gateway set-top box to the secondary set-top box as Link Privacy Messages. While the initial Link Privacy Message is encrypted using the APMKInitial Key, the subsequent ones are encrypted using the APMK. See *id.* (“[I]n normal network operations, APMK is used to encrypt Link Privacy messages after a node has been admitted.”). Thus, the gateway set-top box sends an ATEK to the secondary set-top box encrypted using the APMK. See *id.* ¶59 (“From time to time, the [Network Coordinator] sends updated keys

to the network nodes using the APMK. In this manner, keys are updated to provide an extra measure of security to the network.”).

H. As noted above, the secondary set-top boxes rely on the gateway set-top box to decrypt the incoming scrambled data and then transmit it to the secondary set-top boxes after re-encrypting it with the ATEK.

X1 TV Box Comparison - DVR vs. Non-DVR

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If you have multiple XFINITY X1 TV boxes in your home, you most likely have a DVR and one or more non-DVR TV boxes. This article explains the differences between these TV boxes, including the XG1, RNG150N, XG2, Xi3 and other X1 equipment.

DVR vs. Non-DVR TV Boxes

There are a few key differences between the DVR and the non-DVR TV boxes.

- All recording is done from the DVR. Non-DVR TV boxes can schedule recordings and play back recorded content, but do not record content.
- X1 DVR connects to the Comcast network to buffer live TV and access certain applications. As a result:
 - The ability to pause and rewind live TV, recordings and XFINITY On Demand programs varies by TV box. Please see the [feature comparison chart](#) for more information.

See X1 AnyRoom DVR at <https://customer.xfinity.com/help-and-support/cable-tv/x1-anyroom-dvr-overview> (last visited Nov. 28, 2016).

I. The secondary set-top box is able to utilize the re-encrypted data, for example, by displaying it on the connected display device, because the secondary set-top box has the capacity to decrypt it. Decryption requires the associated security module in the secondary set-top box to obtain the ATEK from the Link Privacy Message using the APMK, and then use the ATEK to decrypt the re-encrypted data received from the gateway set-top box.

41. Comcast has thus infringed, and continues to infringe, one or more claims of the '720 Patent by making, using, testing, selling, leasing, importing, and/or offering for sale/lease the Comcast Set-Top Box Products and Comcast Services, and operating them such that

all steps of at least Claim 1 of the '720 Patent are performed, including within this district. Moreover, Comcast fully implements, manages, and supports the infringing method of using the Comcast Set-Top Box Products and Comcast Services by its customers.

42. Comcast's customers have been and are now infringing, including under 35 U.S.C. § 271(a), one or more claims of the '720 Patent by using the Comcast Set-Top Box Products and Comcast Services.

43. Comcast has, since at least the filing of the December 5, 2016 Complaint (Dkt. 1), known or been willfully blind to the fact that such acts by its customers of using Comcast Set-Top Box Products and Comcast Services directly infringe the '720 Patent.

44. Comcast's knowledge of the '720 Patent, which covers operating the Comcast Set-Top Box Products and Comcast Services in their intended manner and such that all steps of at least Claim 1 of the '720 Patent are performed, made it known to Comcast that its customers' use of the Comcast Set-Top Box Products and Comcast Services would directly infringe the '720 Patent, or, at the very least, rendered Comcast willfully blind to such infringement.

45. Having known or been willfully blind to the fact that its customers' use of Comcast Set-Top Box Products and Comcast Services in their intended manner and such that all steps of at least Claim 1 of the '720 Patent are performed would directly infringe the '720 Patent, Comcast, upon information and belief, actively encouraged and continues to actively encourage its customers to directly infringe the '720 Patent by using, selling, leasing, offering to sell/lease, or importing the said Comcast Set-Top Box Products and Comcast Services, and, by, for example, marketing the Comcast Set-Top Box Products and Comcast Services to customers; working with its customers to implement and install the Comcast Set-Top Box Products and Comcast Services

and components thereof; fully supporting and managing its customers' continued use of the Comcast Set-Top Box Products and Comcast Services; and providing technical assistance to customers during their continued use of the Comcast Set-Top Box Products and Comcast Services. *See, e.g.,* www.xfinity.com/Comcast.

46. Comcast induces its users to infringe one or more claims of the '720 Patent at least by encouraging them to use the said gateway and secondary set-top boxes, which, alone or in combination with other Comcast devices or the users' devices, implement MoCA networks in a manner that practices all steps of at least Claim 1 of the '720 Patent. For example, Comcast advertises its AnyRoom service on its website www.xfinity.com, promotes the features in its gateway and secondary set-top boxes (*see, e.g.,* <https://customer.xfinity.com/help-and-support/cable-tv/x1-hub-vs-companion-box>), and encourages its users to configure and operate the set-top boxes in an infringing manner (*see, e.g.,* <https://customer.xfinity.com/help-and-support/cable-tv/reboot-anyroom-dvr/>). In response, Comcast's users acquire, configure and operate the gateway and secondary set-top boxes such that all steps of at least Claim 1 of the '720 Patent are practiced. Comcast has been aware of the '720 Patent since at least the filing of the December 5, 2016 Complaint (Dkt. 1).

47. Thus, Comcast has specifically intended to induce, and has induced, its customers to infringe one or more claims of the '720 Patent, and Comcast has known of or been willfully blind to such infringement. Comcast has advised, encouraged, and/or aided its customers to engage in direct infringement, including through its encouragement, advice, and assistance to customers to use the infringing Comcast Set-Top Box Products and Comcast Services.

48. Based on, among other things, the foregoing facts, Comcast has induced, and continues to induce, infringement under 35 U.S.C. § 271(b) of one or more claims of the '720 Patent.

49. Further, Comcast sells or leases to its customers Comcast Set-Top Box Products and Comcast Services that are especially made and adapted—and specifically intended by Comcast—to be used as components and material parts of the methods covered by the '720 Patent. For example, Comcast leases set-top boxes to customers, which customers configure and use in a manner that all steps of at least Claim 1 of the '720 Patent are performed, and without which customers would be unable to use and avail themselves of the Comcast Set-Top Box Products and Comcast Services in their intended manner.

50. Upon information and belief, Comcast also knew that Comcast set-top boxes implement MoCA networks in a manner that practice all steps of at least Claim 1 of the '720 Patent through the MoCA 2.0 specification documents that, upon information and belief, Comcast had access to.

51. The MoCA network functionality in Comcast Set-Top Box Products and Comcast Services is especially made and adapted to infringe at least Claim 1 of the '720 Patent. Upon information and belief, the MoCA network functionality in the Comcast Set-Top Box Products and Comcast Services, such as the AnyRoom DVR service, is not a staple article or commodity of commerce, and, because the functionality is designed to work only with the Comcast Set-Top Box Products and Comcast Services in a manner that is covered by the '720 Patent, it does not have a substantial non-infringing use. At least since the filing of the December 5, 2016 Complaint (Dkt. 1), based on the foregoing facts, Comcast has known or been willfully blind to the fact that such functionality is especially made and adapted for—and is in fact used in—

Comcast Set-Top Box Products and Comcast Services in a manner that is covered by the '720 Patent.

52. Based on, among other things, the foregoing facts, Comcast has contributorily infringed, and continues to contributorily infringe, one or more claims of the '720 Patent under 35 U.S.C. § 271(c).

53. Defendants' acts of direct and indirect infringement have caused, and continue to cause, damage to NagraVision, and NagraVision is entitled to recover from Defendants the damages sustained as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of NagraVision's exclusive rights under the '720 Patent has damaged and will continue to damage NagraVision, causing irreparable harm, for which there is no adequate remedy at law, with the balance of hardships between NagraVision and Defendants, and the public interest, warranting an injunction.

COUNT II: INFRINGEMENT OF U.S. PATENT NO. 7,725,740

54. On May 25, 2010, United States Patent No. 7,725,740 ("the '740 Patent"), which is entitled "Generating a Root Key for Decryption of a Transmission Key Allowing Secure Communications," was lawfully issued by the USPTO. A true and correct copy of the '740 Patent is attached as Exhibit B.

55. Pursuant to 35 U.S.C. § 282, the '740 Patent is presumed valid.

56. When issued, the '740 Patent was assigned to NagraCard SA, and NagraCard SA was the sole owner of the '740 Patent. On May 15, 2009, the '740 Patent was assigned to NagraVision, and NagraVision was the sole owner of the '740 Patent. As of the filing of this First Amended Complaint, NagraVision retains the exclusive right to enforce the '740 Patent.

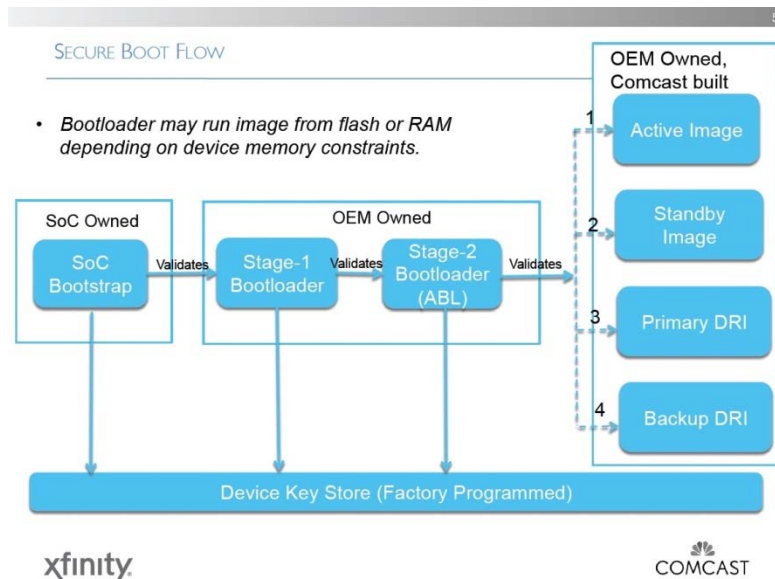
57. The '740 Patent is generally directed to restoring security of a secure assembly such as a chip card. For example, the '740 Patent teaches and claims a method for generation of at least one root key based on at least one item of secret information stored in a first memory zone and on an imprint of the second zone data. The '740 Patent explains that “[o]ne of the known types of attacks used to discover the contents of the second zone is to search a security defect such as a memory overflow that allows control to be taken of the processor.” *See* Ex. B (the '740 Patent) at 2:24–27. “Once control has successfully been taken, a third party transfers the contents of the second zone . . . and is able to analyse the security mechanism and the keys used.” *Id.* at 2:27–31. Even if a change of keys take place, the third party has the information it needs to generate new keys. Therefore, “[t]he breach cannot be stopped even if the security breach has been corrected in the application.” *Id.* at 2:48–50.

58. Upon information and belief, Comcast manufactures and/or imports Comcast Set-Top Box Products into the United States, and sells or leases them to customers separately or as part of Comcast Services. Comcast has infringed and continues to infringe one or more claims of the '740 Patent. The infringing acts include, but are not limited to, the manufacture, use, test, sale, lease, importation, and/or offer for sale/lease in or within the United States of products that generate a root key in a manner that practice all steps of at least Claim 1 of the '740 Patent. By manufacturing, using, testing, selling, leasing, importing, and/or offering to sell/lease Comcast Set-Top Box Products and Comcast Services, and operating them such that all steps of at least Claim 1 of the '740 Patent are performed, Comcast has in the past infringed, and continues to infringe the '740 Patent, including under 35 U.S.C. § 271(a), either literally or under the doctrine of equivalents. Upon information and belief, Comcast distributes Comcast Set-Top Box Products and Comcast Services in Texas, including within this district, and uses them in a manner consistent

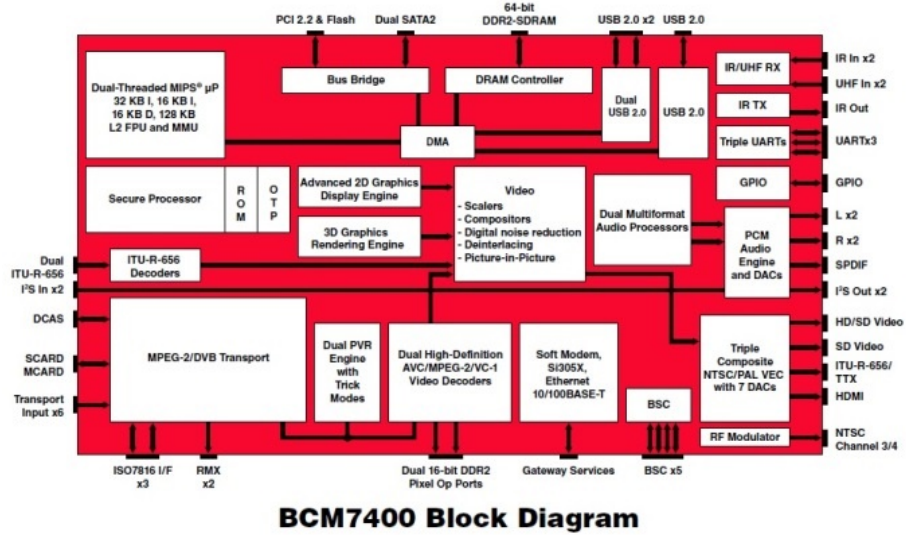
with at least Claim 1 of the '740 Patent and/or induces its customers to do so. Based on these activities, Comcast has committed the tort of patent infringement in this district, and this action arises at least in part from such infringement.

59. Upon information and belief, users (Comcast customers and/or employees) of Comcast Set-Top Box Products and Comcast Services infringe at least Claim 1 of the '740 Patent in the exemplary manner described below:

A. Upon information and belief, Comcast Set-Top Box Products and Comcast Services generate various transport keys to decrypt content sent over the cable. These set-top boxes include a security module and a system-on-chip processor; a system-on-chip bootstrap memory and the one time programmable ("OTP") memory; DRAM and/or SRAM memory associated with the system-on-chip; and flash memory.



See Boot Architecture for RDK, <http://www.slideshare.net/linaroorg/sfo15201-boot-architecture-for-rdk-53087865>, slide 5, (last visited Nov. 28, 2016).



See Broadcom Information sheet,
http://www.datasheetlib.com/datasheet/157986/bcm7400_broadcom-corporation.html#datasheet
 (last visited Nov. 28, 2016).



See id.

B. Upon information and belief, Comcast Set-Top Box Products contain first and second portions of a second memory zone. DRAM and/or SRAM memory associated with the system-on-chip is a first portion of a second memory zone. Flash memory is a second portion of a second memory zone. Comcast user programs are stored in the flash memory. The code in Stage 1 & 2 Bootloaders is a “user program.”

BOOTLOADER CHARACTERISTICS

- Stage-1 Bootloader
 - Factory Programmed
 - Can validate signatures
 - Not field upgradeable
 - Chain of trust leading to SoC bootstrap
 - No support for firmware upgrade. Only launches the stage-2 bootloader.
- Stage-2 Bootloader
 - Factory Programmed
 - Field Upgradeable under special circumstances using a special firmware image. Strongly discouraged.
 - Supports Comcast Configuration Management System based firmware upgrade using TFTP, TR-69 and HTTP protocols.
 - Support for UBI, UBIFS, JFFS2, SQUASHFS, MTD based partitions.

xfinity

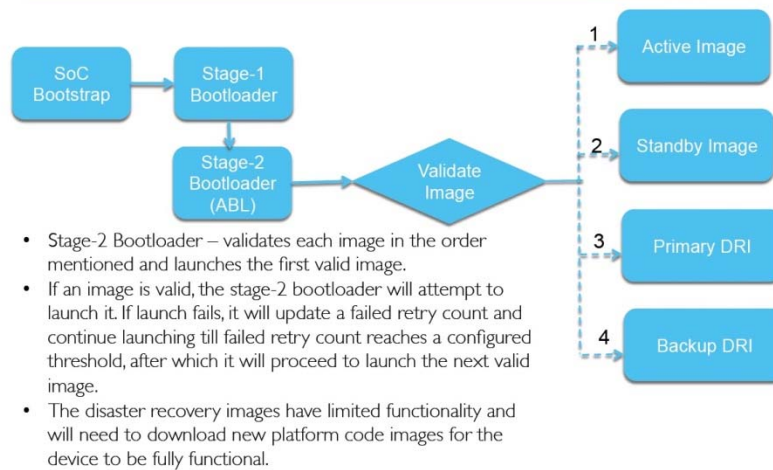
COMCAST

See Boot Architecture for RDK, <http://www.slideshare.net/linaroorg/sfo15201-boot-architecture-for-rdk-53087865>, slide 6 (last visited Nov. 28, 2016).

C. Upon information and belief, during the set-top box initialization process,

Comcast Set-Top Box Products and Comcast Services execute code from the Boot ROM.

STARTUP FLOW



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COMCAST

See *id.* at slide 4.

TYPICAL FIRMWARE MAKEUP ON RDK DEVICES

STAGE-1 BOOTLOADER
STAGE-2 BOOTLOADER
BACKUP DISASTER RECOVERY IMAGE (B-DRI)
PRIMARY DISASTER RECOVERY IMAGE (P-DRI)
PLATFORM CODE IMAGE - 1 (PCI-1)
PLATFORM CODE IMAGE -2 (PCI-2)
DATA – certs, image data etc.

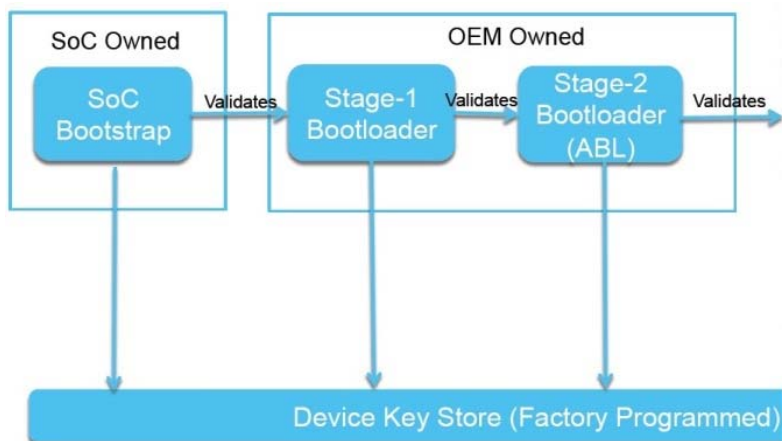
- Stage-2 Bootloader (goal flexibility & robustness) also known as the advanced bootloader (ABL) is responsible for validating and loading the correct platform image
- Stage-1 Bootloader is rather dumb (goal is robustness) and is mainly responsible for booting the stage-2 bootloader.
- There are two platform code images to ensure that a platform image is readily available as a backup in case the active image fails.

xfinity

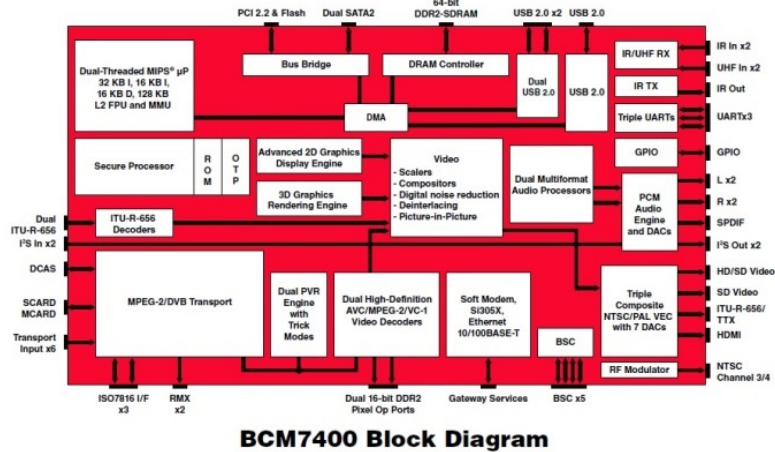
COMCAST

See *id.* at slide 3.

D. Upon information and belief, the bootstrap program validates the Stage 1 Bootloader. To do so, it uses a key stored in the OTP memory. This key is “secret information.” Upon information and belief, the secret information is read from a “first conditional access memory zone.” Specifically, the secret information is read at boot time (“during the initialization of the secure device”) from the OTP memory into RAM (“the first portion of second memory zone”).

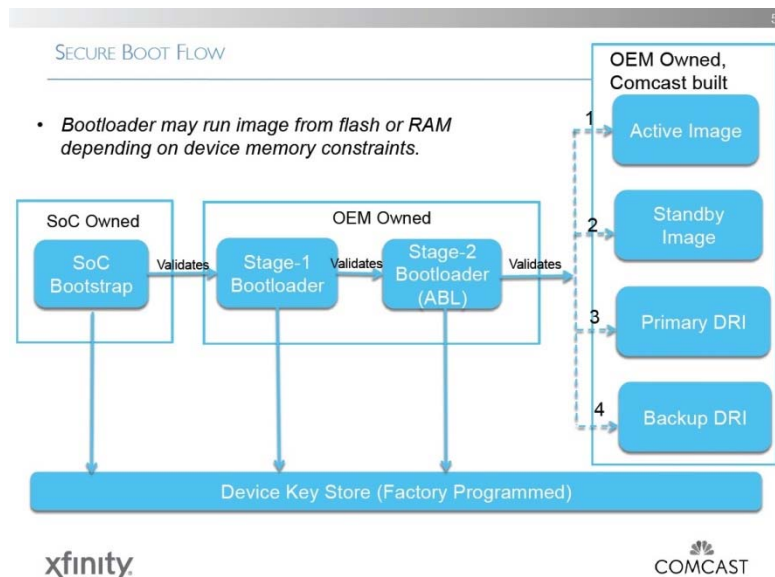


See *id.* at slide 5.



See Broadcom Information sheet, http://www.datasheetlib.com/datasheet/157986/bcm7400_broadcom-corporation.html#datasheet (last visited Nov. 28, 2016).

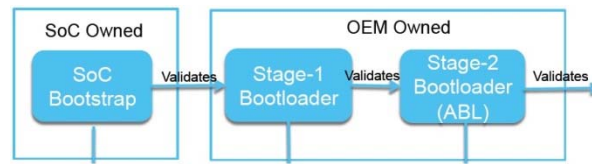
E. Upon information and belief, during the boot stage, Comcast Set-Top Box Products and Comcast Services read data from the flash memory. The Bootstrap starts the hardware and then reads (and validates) the Stage 1 Bootloader.



See Boot Architecture for RDK, <http://www.slideshare.net/linaroorg/sfo15201-boot-architecture-for-rdk-53087865>, slide 5 (last visited Nov. 28, 2016).

F. Upon information and belief, the boot process requires verification that the boot blocks are not tampered with. Comcast Set-Top Box Products and Comcast Services execute

the Xfinity software on the Reference Design Kit (“RDK”) software platform. RDK requires that each stage validate via a signature check that a block has not been tampered with. Signature checks include a hash check where blocks of flash memory are checked by calculating a Secure Hash Algorithm (“SHA”) hash value, i.e., an imprint. SHA is “a unidirectional function.” The root key is generated based on the imprint of the flash memory and the secret information from the OTP memory.



See id.

BOOTLOADER CHARACTERISTICS

- Stage-1 Bootloader
 - Factory Programmed
 - Can validate signatures
 - Not field upgradeable
 - Chain of trust leading to SoC bootstrap
 - No support for firmware upgrade. Only launches the stage-2 bootloader.

See id. at slide 6.

G. Upon information and belief, the key used to authenticate is then eliminated from RAM, and no access is granted to the first conditional access memory zone at the time of execution by the processor in the second memory zone.

H. Upon information and belief, the root key is used to allow decryption of an Entitlement Management Message (“EMM”), which contains a symmetric key typically referred to as a session key or category key. Upon information and belief, this session key or category key allows secure communication from Comcast’s management center to the Comcast Set-Top Box Products.

60. Comcast has thus infringed, and continues to infringe, one or more claims of the '740 Patent by making, using, testing, selling, leasing, importing, and/or offering for sale/lease the Comcast Set-Top Box Products and Comcast Services, and operating them such that all steps of at least Claim 1 of the '740 Patent are performed, including within this district. Moreover, Comcast fully implements, manages, and supports the infringing method of using the Comcast Set-Top Box Products and Comcast Services by its customers.

61. Comcast's customers have been and are now infringing, including under 35 U.S.C. § 271(a), one or more claims of the '740 Patent by using the Comcast Set-Top Box Products and Comcast Services.

62. Comcast has, since at least the filing of the December 5, 2016 Complaint (Dkt. 1), known or been willfully blind to the fact that such acts by its customers of using the Comcast Set-Top Box Products and Comcast Services directly infringe the '740 Patent.

63. Comcast's knowledge of the '740 Patent, which covers the Comcast Set-Top Box Products and Comcast Services, made it known to Comcast that its customers' use of the Comcast Set-Top Box Products and Comcast Services would directly infringe the '740 Patent, or, at the very least, rendered Comcast willfully blind to the fact that such use of the Comcast Set-Top Box Products and Comcast Services would directly infringe the '740 Patent.

64. Having known or been willfully blind to the fact that its customers' use of Comcast Set-Top Box Products and Comcast Services would directly infringe the '740 Patent, Comcast, upon information and belief, actively encouraged and continues to actively encourage its customers to directly infringe the '740 Patent by using, selling, offering to sell, or importing the Comcast Set-Top Box Products and Comcast Services and, by, for example, marketing the Comcast Set-Top Box Products and Comcast Services to customers; working with its customers

to implement and install the Comcast Set-Top Box Products and Comcast Services and components thereof; fully supporting and managing its customers' continued use of the Comcast Set-Top Box Products and Comcast Services; and providing technical assistance to customers during their continued use of the Comcast Set-Top Box Products and Comcast Services. *See, e.g.*, www.xfinity.com/Comcast.

65. Comcast induces its users to infringe one or more claims of the '740 Patent at least by encouraging them to use Comcast Set-Top Box Products and Comcast Services, which, alone or in combination with other Comcast devices or the users' devices, generate a root key in a manner that practices all steps of at least Claim 1 of the '740 Patent. For example, Comcast advertises its Xfinity service on its website www.xfinity.com and encourages its users to configure and operate the Comcast Set-Top Box Products and Services in an infringing manner. In response, Comcast's users acquire, configure and operate the Comcast Set-Top Box Products and Services such that all steps of at least Claims 1 of the '740 Patent are practiced.

66. Thus, Comcast has specifically intended to induce, and has induced, its customers to infringe one or more claims of the '740 Patent, and Comcast has known of or been willfully blind to such infringement. Comcast has advised, encouraged, and/or aided its customers to engage in direct infringement, including through its encouragement, advice, and assistance to customers to use the infringing Comcast Set-Top Box Products and Comcast Services.

67. Based on, among other things, the foregoing facts, Comcast has induced, and continues to induce, infringement under 35 U.S.C. § 271(b) of one or more claims of the '740 Patent.

68. Further, Comcast sells or leases to its customers Comcast Set-Top Box Products and Comcast Services that are especially made and adapted—and specifically intended

by Comcast—to be used as components and material parts of the methods covered by the '740 Patent. For example, Comcast leases Comcast Set-Top Box Products to customers, which customers use to access and implement the infringing Comcast Set-Top Box Products and Comcast Services, and without which customers would be unable to use the infringing Comcast Set-Top Box Products and Comcast Services.

69. Upon information and belief, Comcast also knew that Comcast Set-Top Box Products infringe the '740 Patent through publicly available data sheets describing the functioning of the Broadcom system-on-chips that are included in Comcast Set-Top Box Products or through information received from Broadcom.

70. The generation of a root key in Comcast Set-Top Box Products and Comcast Services is a feature especially made and adapted to infringe the '740 Patent. Upon information and belief, such feature is not a staple article or commodity of commerce, and, because it is designed to work only with the Comcast Set-Top Box Products and Comcast Services in a manner that infringes the '740 Patent, it does not have a substantial non-infringing use. At least since the filing of the December 5, 2016 Complaint (Dkt. 1), based on the foregoing facts, Comcast has known or been willfully blind to the fact that such feature is especially made and adapted for—and is in fact used in—Comcast Set-Top Box Products and Comcast Services that are covered by the '740 Patent.

71. Based on, among other things, the foregoing facts, Comcast has contributorily infringed, and continues to contributorily infringe, one or more claims of the '740 Patent under 35 U.S.C. § 271(c).

72. Comcast's acts of direct and indirect infringement have caused, and continue to cause, damage to NagraVision, and NagraVision is entitled to recover from Defendants

the damages sustained as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of NagraVision's exclusive rights under the '740 Patent has damaged and will continue to damage NagraVision, causing irreparable harm, for which there is no adequate remedy at law, with the balance of hardships between NagraVision and Defendants, and the public interest, warranting an injunction.

COUNT III: INFRINGEMENT OF U.S. PATENT NO. 8,356,188

73. On January 15, 2013, United States Patent No. 8,356,188 ("the '188 Patent"), which is entitled "Secure System-on-Chip," was lawfully issued by the USPTO. A true and correct copy of the '188 Patent is attached as Exhibit C.

74. Pursuant to 35 U.S.C. § 282, the '188 Patent is presumed valid.

75. When issued, the '188 Patent was assigned to NagraCard SA, and NagraCard SA was the sole owner of the '188 Patent. On May 15, 2009, the '188 Patent was assigned to NagraVision, and NagraVision was the sole owner of the '188 Patent. As of the filing of this First Amended Complaint, NagraVision retains the exclusive right to enforce the '188 Patent.

76. The '188 Patent is generally directed to the field of systems-on-chip and the security around it. For example, the '188 Patent teaches and claims a method for the use of encrypted data within a system-on-chip so that data stored in the systems-on-chip have at least one encryption layer. For example, the '188 Patent explains that "[t]he main feature of the invention is to add an encryption layer within the system-on-chip. The data entering into and exiting the system on chip are usually encrypted." *See* Ex. C (the '188 Patent) at 1:58-60. "The removal of the internal encryption layer occurs only at the later stage when the data are really used by the central unit, the clear data being never accessible in a static state." *Id.* at 2:9-11.

77. Upon information and belief, Comcast manufactures and/or imports Comcast Set-Top Box Products into the United States and sells or leases them to customers separately or as part of Comcast Services. Comcast has infringed and continues to infringe one or more claims of the '188 Patent. The infringing acts include, but are not limited to, the manufacture, use, test, sale, lease, importation, and/or offer for sale/lease in or within the United States of products that implement a method adding an additional encryption layer to data entering the system-on-chip in a manner that practice all steps of at least Claim 9 of the '188 Patent. By manufacturing, using, testing, selling, leasing, importing, and/or offering to sell/lease Comcast Set-Top Box Products and Comcast Services, and operating them such that all steps of at least Claim 9 of the '188 Patent are performed, Comcast has in the past infringed, and continues to infringe the '188 Patent, including under 35 U.S.C. § 271(a), either literally or under the doctrine of equivalents. Upon information and belief, Comcast distributes its Comcast Set-Top Box Products and Services in Texas, including within this district, and uses them in a manner consistent with at least Claim 9 of the '188 Patent and/or induces its customers to do so. Based on these activities, Comcast has committed the tort of patent infringement in this district, and this action arises at least in part from such infringement.

78. Upon information and belief, users (Comcast customers and/or employees) of Comcast Set-Top Box Products and Comcast Services infringe at least Claim 9 of the '188 Patent in the exemplary manner described below:

A. Upon information and belief, Comcast Set-Top Box Products include a BCM7400 series (e.g., 7425) SoC processor. Each BCM7400 series processor is a secure system-on-chip.



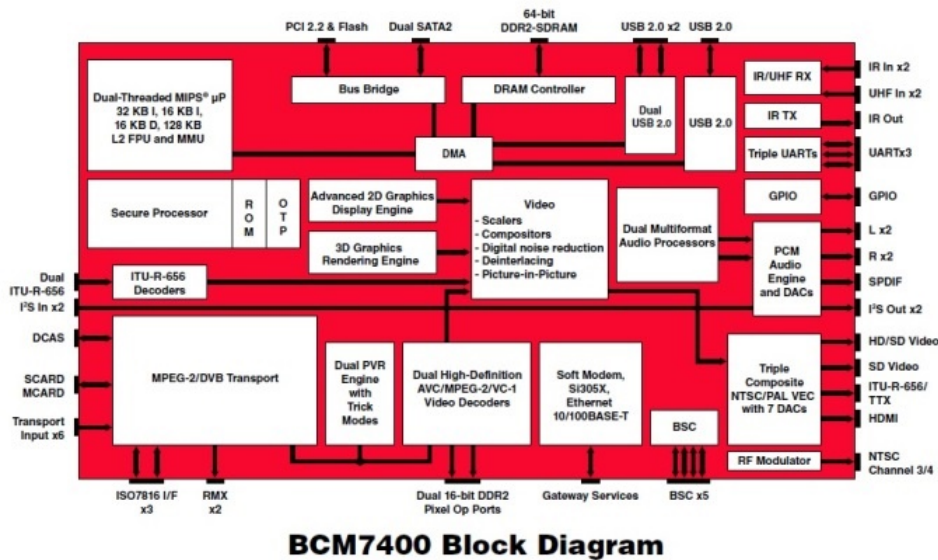
BCM7400 PRODUCT Brief



**DUAL AVC/MPEG-2/VC-1/MPEG-4 PART 2/DIVX® HD DIGITAL VIDEO SYSTEM-ON-A-CHIP
SOLUTION FOR SATELLITE, IP, AND CABLE WITH WATCH-AND-RECORD DVR**

See Broadcom Information sheet,
http://www.datasheetlib.com/datasheet/157986/bcm7400_broadcom-corporation.html#datasheet
(last visited Nov. 28, 2016).

B. The BCM7400 includes a MIPS CPU which is a central processing unit.



See *id.*

C. Upon information and belief, data comes into the Secure Processor for encryption via the DMA interface. The DMA interface is an input channel

channels to interface to audio and video decoders. The transport provides 1DES/3DES/DVB/Multi2/AES descrambling support. A memory-to-memory DMA security module may be programmed for supporting AES/1DES/3DES/CSS/CPRM/CPPM/DTCP copy protection algorithms/standards. The BCM7400 features the Broadcom secure processor, providing secure key generation, management, and protection.

See *id.*

D. Upon information and belief, the BCM7400 includes an HDMI output which supports high-bandwidth digital content protection 1.3 (“HDCP”). The HDMI channel is an output channel.

FEATURES (CONT.)	
•	64-bit DDR2 DRAM controller and dual 16-bit pixel-op DDR2 ports
•	Dual SATA II I/F for DVR applications
•	HD analog video encoder with simultaneous SD outputs
•	NTSC-M, NTSC-J, PAL-BDGHIN, PAL-M, PAL-Nc analog outputs
•	480i/480p/576i/576p/720p/1080i/1080p 24/30 output formats
•	Component RGB or YPrPb output
•	Macrovision® 7.1 support
•	SCART 1 and 2
•	Component, S-Video, and composite via seven on-chip V-DACs
•	VBI encoders for CC/TTX with NABTS/CGMSA/WSS/Gemstar® standards and dedicated TTX sideband
•	RF modulator with BTSC encoder
•	Dual ITU-R-656 inputs and ITU-R-656 output port
•	HDMI 1.3a/DVI 1.0 MAC and PHY with HDCP 1.3

See id.

E. Upon information and belief, the BCM7400 includes a security processor that performs encryption and decryption.

FEATURES (CONT.)	
•	64-bit DDR2 DRAM controller and dual 16-bit pixel-op DDR2 ports
•	Dual SATA II I/F for DVR applications
•	HD analog video encoder with simultaneous SD outputs
•	NTSC-M, NTSC-J, PAL-BDGHIN, PAL-M, PAL-Nc analog outputs
•	480i/480p/576i/576p/720p/1080i/1080p 24/30 output formats
•	Component RGB or YPrPb output
•	Macrovision® 7.1 support
•	SCART 1 and 2
•	Component, S-Video, and composite via seven on-chip V-DACs
•	VBI encoders for CC/TTX with NABTS/CGMSA/WSS/Gemstar® standards and dedicated TTX sideband
•	RF modulator with BTSC encoder
•	Dual ITU-R-656 inputs and ITU-R-656 output port
•	HDMI 1.3a/DVI 1.0 MAC and PHY with HDCP 1.3
•	Broadcom security processor
•	AES/1DES/3DES/CSS/CPRM/DTCP copy protection

See id.

F. Upon information and belief, the BCM7400 includes OTP memory for securely storing secret information.

G. Upon information and belief, Comcast Set-Top Box Products and Comcast Services use the BCM7400 to process video data received from their cable network. This video data is decoded and then passed to the HDMI output encrypted with HDCP encryption. HDMI content protection requires that the encrypting device (i.e., the Comcast Set-Top Box Products)

have a set of Device Private Keys. These keys are injected either by or for Comcast at the time of device manufacture. The Device Private Keys are examples of input data.

Device Key Set. Each HDCP Device has a *Device Key Set*, which consists of a set of Device Private Keys along with the associated Key Selection Vector.

Device Private Keys. A set of Device Private Keys consists of 40 different 56-bit values. These keys are to be protected from exposure outside of the HDCP Device. A set of Device Private Keys is associated with a unique Key Selection Vector.

See High-bandwidth Digital Content Protection System v1.3, Amendment for Gigabit Multimedia Serial Link, Revision 1.0 (dated Mar. 1, 2010), https://www.digital-cp.com/sites/default/files/specifications/HDCP_GMSL_Amendment_04Mar10.pdf (last visited Nov. 28, 2016).

H. Upon information and belief, the security processor within the BCM7400 includes an encryption/decryption engine. The security processor multiplexes this engine between the input and output channels and acts as a virtual encryption module.

I. According to the HDCP specification, HDCP implementation requires forty 56-bit HDCP keys. Upon information and belief, these are stored encrypted in the OTP memory. This encryption is the first internal encryption layer.

1.2 **Keep Secrets.** Licensed Products shall be designed and manufactured in a manner that is clearly intended to effectively frustrate attempts to discover or reveal Device Keys or other Highly Confidential Information.

See HDCP License Agreement Review Version, https://www.digital-cp.com/sites/default/files/licenses/HDCP_License_Agreement_Review_Only.pdf (last visited Nov. 28, 2016).

J. Upon information and belief, the HDCP Device private keys are stored in the OTP memory.

K. Upon information and belief, in order to perform an HDCP operation, such as encrypting video transmitted to the HDMI port of a Comcast Set-Top Box Product, the Comcast Set-Top Box Product and the television connected via the HDMI port must validate (authenticate)

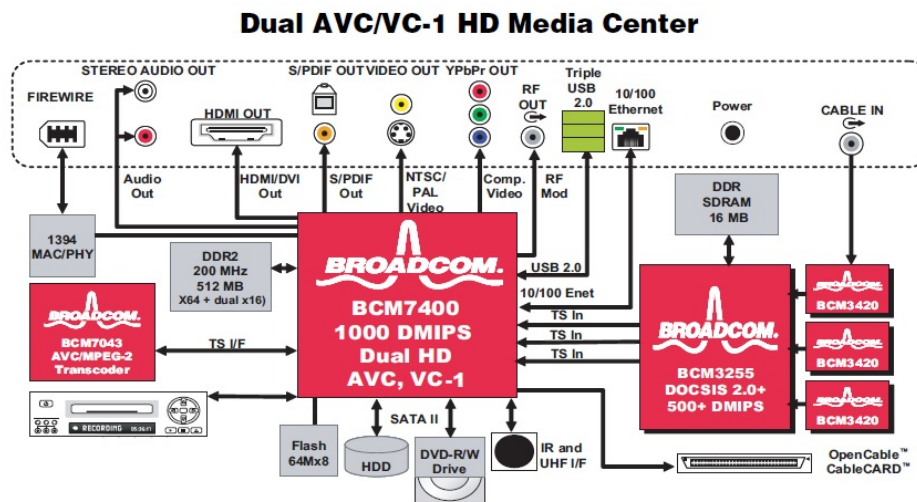
each other. The authentication process requires the creation and use of a key selection vector (“KSV”). The KSV includes information about the Device Private Keys.

Key Selection Vector (KSV). Each HDCP Device contains a set of Device Private Keys. A set of Device Private Keys is associated with a *Key Selection Vector (KSV)*. Each HDCP Transmitter is assigned a unique *KSV*. Also, each HDCP Receiver is assigned a unique *KSV*.

See High-bandwidth Digital Content Protection System v1.3, Amendment for Gigabit Multimedia Serial Link, Revision 1.0 (dated Mar. 1, 2010), https://www.digital-cp.com/sites/default/files/specifications/HDCP_GMSL_Amendment_04Mar10.pdf (last visited Nov. 28, 2016).

L. Upon information and belief, the security processor is the only part of the BCM7400 that has access to the OTP and must process the fetch request. The Device Private Keys (input data) are retrieved from the OTP and decrypted for use by the security processor (i.e., passing the input data retrieved from the memory through the virtual encryption module to the encryption/decryption engine). Decryption removes the first internal encryption layer from the input data retrieved from the memory.

M. Upon information and belief, the Device Private Keys are converted into a KSV by the BCM7400 and used to encrypt the video signal and to provide HDCP encrypted content (processed data), which is output on the HDMI port.



See Broadcom Information sheet,
http://www.datasheetlib.com/datasheet/157986/bcm7400_broadcom-corporation.html#datasheet
 (last visited Nov. 28, 2016).

N. The Device Private Keys never leave the Security Processor perimeter.



See *id.*

79. Comcast has thus infringed, and continues to infringe, one or more claims of the '188 Patent by making, using, testing, selling, leasing, importing, and/or offering for sale/lease the Comcast Set-Top Box Products and Comcast Services, and operating them such that all steps of at least Claim 9 of the '188 Patent are performed, including within this District. Moreover, Comcast fully implements, manages, and supports the infringing method of using the Comcast Set-Top Box Products and Comcast Services by its customers.

80. Comcast's customers have been and are now infringing, including under 35 U.S.C. § 271(a), one or more claims of the '188 Patent by using the Comcast Set-Top Box Products and Comcast Services.

81. Comcast has, since at least the filing of the December 5, 2016 Complaint (Dkt. 1), known or been willfully blind to the fact that such acts by its customers of using the Comcast Set-Top Box Products and Comcast Services directly infringe the '188 Patent.

82. Comcast's knowledge of the '188 Patent, which covers the Comcast Set-Top Box Products and Comcast Services, made it known to Comcast that its customers' use of the Comcast Set-Top Box Products and Comcast Services would directly infringe the '188 Patent, or, at the very least, rendered Comcast willfully blind to the fact that such use of the Comcast Set-Top Box Products and Comcast Services would directly infringe the '188 Patent.

83. Having known or been willfully blind to the fact that its customers' use of the Comcast Set-Top Box Products and Comcast Services would directly infringe the '188 Patent, Comcast, upon information and belief, actively encouraged and continues to actively encourage its customers to directly infringe the '188 Patent by using, selling, leasing, offering to sell/lease, or importing the Comcast Set-Top Box Products and Comcast Services and, by, for example, marketing the Comcast Set-Top Box Products and Comcast Services to customers; working with its customers to implement and install the Comcast Set-Top Box Products and Comcast Services and components thereof; fully supporting and managing its customers' continued use of the Comcast Set-Top Box Products and Comcast Services; and providing technical assistance to customers during its continued use of the Comcast Set-Top Box Products and Comcast Services. *See, e.g.,* www.xfinity.com/Comcast.

84. Comcast induces its users to infringe one or more claims of the '188 Patent at least by encouraging them to use Comcast Set-Top Box Products and Comcast Services, which, alone or in combination with other Comcast devices or the users' devices, add an additional encryption layer to data incoming to the system-on-chip in a manner that practices all steps of at least Claim 9 of the '188 Patent. For example, Comcast advertises its Xfinity service on its website www.xfinity.com and encourages its users to configure and operate the set-top boxes in an infringing manner. In response, Comcast's users acquire, configure and operate the Comcast Set-Top Box Products and Comcast Services such that all steps of at least Claims 9 of the '188 Patent are practiced.

85. Thus, Comcast has specifically intended to induce, and has induced, its customers to infringe one or more claims of the '188 Patent, and Comcast has known of or been willfully blind to such infringement. Comcast has advised, encouraged, and/or aided its customers

to engage in direct infringement, including through its encouragement, advice, and assistance to customers to use the infringing Comcast Set-Top Box Products and Comcast Services.

86. Based on, among other things, the foregoing facts, Comcast has induced, and continues to induce, infringement under 35 U.S.C. § 271(b) of one or more claims of the '188 Patent.

87. Further, Comcast sells to its customers Comcast Set-Top Box Products and Comcast Services that are especially made and adapted—and specifically intended by Comcast—to be used as components and material parts of the method covered by the '188 Patent. For example, Comcast leases set-top boxes to customers, which customers use to access and implement the infringing Comcast Set-Top Box Products and Comcast Services, and without which customers would be unable to use the infringing Comcast Set-Top Box Products and Comcast Services.

88. Upon information and belief, Comcast also knew that Comcast Set-Top Box Products infringed the '188 Patent through publicly available data sheets describing the functioning of the Broadcom system-on-chips that are included in Comcast Set-Top Box Products or through information received from Broadcom.

89. The addition of an encryption layer to data incoming to the system-on-chip functionality in Comcast Set-Top Box Products and Comcast Services is especially made and adapted to infringe the '188 Patent. Upon information and belief, such feature is not a staple article or commodity of commerce, and, because it is designed to work only with the Comcast Set-Top Box Products and Comcast Services in a manner that infringes the '188 Patent, it does not have a substantial non-infringing use. At least since the filing of the December 5, 2016 Complaint (Dkt. 1), based on the foregoing facts, Comcast has known or been willfully blind to the fact that such

feature is especially made and adapted for—and is in fact used in—Comcast Set-Top Box Products and Comcast Services that are covered by the '188 Patent.

90. Based on, among other things, the foregoing facts, Comcast has contributorily infringed, and continues to contributorily infringe, one or more claims of the '188 Patent under 35 U.S.C. § 271(c).

91. Comcast's acts of direct and indirect infringement have caused, and continue to cause, damage to NagraVision, and NagraVision is entitled to recover from Defendants the damages sustained as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of NagraVision's exclusive rights under the '188 Patent has damaged and will continue to damage NagraVision, causing irreparable harm, for which there is no adequate remedy at law, with the balance of hardships between NagraVision and Defendants, and the public interest, warranting an injunction.

COUNT IV: INFRINGEMENT OF U.S. PATENT NO. RE40,334

92. On May 20, 2008, United States Patent No. RE40,334 ("the '334 Patent"), which is entitled "Method and Apparatus for Encrypted Data Stream Transmission," was lawfully issued by the USPTO. A true and correct copy of the '334 Patent is attached as Exhibit D. The '334 Patent is a reissue of United States Patent No. 6,286,103.

93. Pursuant to 35 U.S.C. § 282, the '334 Patent is presumed valid.

94. When issued, the '334 Patent was assigned to Nagra Thomson Licensing, and Nagra Thomson Licensing was the sole owner of the patent. Through an assignment dated March 15, 2000, the inventors of the '334 Patent, Michel Maillard, Christian Benardeau, and Jean-Luc Dauvois, assigned their interest in the invention to Canal+ Societe Anonyme. Through an assignment dated September 27, 2001, Canal+ Societe Anonyme assigned its interest in the

invention to Canal+ Technologies. Through an assignment dated June 21, 2004, Canal+ Technologies assigned its interest in the invention to Nagra Thomson Licensing. Through an assignment dated June 16, 2011, Nagra Thomson Licensing assigned its interest in the invention to Nagra France. As of the filing of this First Amended Complaint, Nagra France retains the exclusive right to enforce the '334 Patent.

95. The '334 Patent is generally directed to transmission and reception of scrambled data. For example, the '334 Patent discloses, among other things, a method that includes transmitting a scrambled data stream to a decoder, sending the scrambled data stream to a portable security module inserted in the decoder, descrambling the scrambled data stream, encrypting a descrambled data stream, sending the encrypted data stream to the decoder, decrypting the encrypted data stream, and using the decrypted data stream. *See* Ex. D (the '334 Patent) at Abstract. In prior art techniques for scrambled transmissions, an encrypted control word is passed from the decoder to the portable security module for decryption before being passed in a decrypted form to the control unit in the decoder for descrambling of the transmission. *Id.* at 2:4–7. A weakness in these techniques is that it is relatively easy to determine the connections between the portable security module and the decoder and to thereafter record the control word information passing along these connections. *Id.* at 2:9–12. By proposing a solution in which data is descrambled by a portable security module before being passed back to the decoder in an encrypted form, the invention of the '334 Patent overcomes the problems with the prior art techniques. *Id.* at 2:13–17.

96. Upon information and belief, Comcast manufactures and/or imports Comcast Set-Top Box Products with CableCARDs and Comcast CableCARD Products into the United States, and sells or leases them to customers together or separately as part of Comcast Services. Comcast has infringed and continues to infringe one or more claims of the '334 Patent.

The infringing acts include, but are not limited to, the manufacture, use, test, sale, lease, importation, and/or offer for sale/lease in or within the United States of Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services in a manner that practices all steps of at least Claim 1 of the '334 Patent. By manufacturing, using, testing, selling, leasing, importing, and/or offering to sell/lease Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services, and operating them such that all steps of at least Claim 1 of the '334 Patent are performed, Comcast has in the past infringed, and continues to infringe, the '334 Patent, including under 35 U.S.C. § 271(a), either literally or under the doctrine of equivalents. Upon information and belief, Comcast distributes Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services in Texas, including within this district, and uses them in a manner consistent with at least Claim 1 of the '334 Patent and/or induces its customers to do so. Based on these activities, Comcast has committed the tort of patent infringement in this district, and this action arises at least in part from such infringement.

97. Upon information and belief, users (e.g., Comcast customers and/or employees) of Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products,¹ and Comcast Services infringe at least Claim 1 of the '334 Patent in the exemplary manner described below:

A. Comcast Set-Top Box Products with CableCARDS provide a method of transmission and reception of a scrambled data stream. For example, Comcast transmits a scrambled data stream to Comcast Set-Top Box Products with CableCARDS to prevent

¹ To the extent that Comcast provides consumers with ARRIS CableCARDS, the use of such products would infringe at least Claim 1 of the '334 Patent for the reasons described below.

unauthorized viewers from using its pay-TV services. Only subscribers of Comcast Services can view encrypted channels.

What is Digital Encryption of a Channel?

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Digital encryption technology “scrambles” content provided from programmers to prevent unauthorized viewers from watching pay television services.

To protect their copyrighted content, programmers such as Disney, Viacom and NBC Universal turn to digital encryption technology, which “scrambles” the TV signal. Only the households that subscribe to encrypted channels can display the programming.

We’re required by these programmers to protect their content from unauthorized viewers. Instead of attaching physical blocks to your cable line, we chose, like many other cable and satellite providers, to use digital encryption.

To view encrypted channels, you’ll need a digital device such as a Digital Transport Adapter (DTA), digital cable box or [CableCARD](#). You can get one by calling us at **1-800-XFINITY**.

See *What is Digital Encryption of a Channel?*, <https://customer.xfinity.com/help-and-support/cable-tv/what-is-digital-encryption/> (last visited Mar. 29, 2017).

B. Comcast Set-Top Box Products with CableCARDS include a CableCARD, which allows the viewing and recording of scrambled content. For example, Pace’s XG1V3 (PX013ANM) set-top box branded for Comcast Xfinity includes a Multi-Stream CableCARD (“M-CARD”) manufactured by ARRIS.



C. Comcast also provides customers with Comcast CableCARD Products, which can be inserted into devices that are not branded for Comcast Xfinity, including but not limited to TiVo and Ceton InfiniTV products, so that such devices can receive and use scrambled content from Comcast. *See, e.g.,* Pair or Activate Your CableCARD - Self-Installation Setup, <https://www.xfinity.com/support/cable-tv/pair-activate-cablecard/> (last visited Feb. 24, 2017).

Device manufacturers, such as TiVo and Ceton, manufacture devices for retail that can use a CableCARD to access XFINITY TV service. If you purchased a CableCARD-compatible cable TV box from a reseller, it can also be used to access XFINITY TV services (see [Customer-Owned Cable TV Boxes](#) for further information). If you elect to use such customer-owned devices instead of a Comcast-supplied TV box or digital adapter, you must obtain a CableCARD from Comcast.

Note: If you use a CableCARD from Comcast, you are eligible for the customer-owned equipment credit from Comcast. If you use a customer-owned device for XFINITY TV on additional outlets you will be charged a Digital Additional Outlet fee. This same fee applies to customers using our leased TV boxes.

CableCARD Frequently Asked Questions

What is a CableCARD?

A CableCARD is a one-way device roughly the size of a credit card that can be used with a compatible device to access XFINITY TV services without leasing a Comcast TV box or digital adapter. Comcast supports CableCARD-compatible devices such as TiVo, Ceton or Siliondust equipment; and CableCARD-ready televisions. If you subscribe to XFINITY TV service, you have the option of purchasing a CableCARD-compatible device from a retailer or you can lease a Comcast TV box or digital adapter.

See What is a CableCARD?, <https://customer.xfinity.com/help-and-support/cable-tv/about-cablecards> (last visited Apr. 1, 2017).

If you plan to purchase cable services that we scramble or encrypt, such as premium, pay-per-view or digital services, you should make sure that any set-top converter, or navigation device or digital-cable-ready television (which can receive digital cable services using a device that we must provide called a CableCARD in place of a converter) that you purchase from a retail outlet is compatible with our system. *Due to device*

See Important Information For Video Customers, <http://www.xfinity.com/corporate/customers/policies/videonotice.html> (last visited Dec. 2, 2016).

**CUSTOMER OWNED
VIDEO EQUIPMENT POLICY¹**

Comcast offers a variety of video service packages. Many of these packages include equipment. However, you are not required to use Comcast supplied equipment with your video services. Instead, you may choose to use *qualifying equipment* that you own.

Using your own qualifying equipment may result in your receiving an equipment credit or being charged reduced rates if we are informed of your use of that equipment. The amount of any such discount will be determined by Comcast in its sole discretion. If you wish to use your own qualifying equipment in lieu of Comcast supplied equipment, you should contact Comcast at 1-800-Xfinity.

“Qualifying equipment” must meet the following requirements:

- (i) it must have been both tested and approved for its intended use by CableLabs®;
- (ii) it must be technically compatible with Comcast’s cable systems and approved for use by Comcast; and
- (iii) it must not be capable of the unauthorized receipt of any services from Comcast.
- (iv) CableCARD compatible devices must have one or more Comcast provided CableCARDS activated.

See Customer Owned Video Equipment Policy,
http://cdn.comcast.com/~Media/Files/EquipmentPolicy/CUSTOMER_OWNED_EQUIPMENT_POLICY_revised_6_13_11.pdf (last visited Dec. 2, 2016).

D. Upon information and belief, Comcast CableCARD Products comply with relevant specifications issued by Cable Television Laboratories, Inc. (“CableLabs”). CableLabs is a non-profit organization founded by members of the cable industry, including Comcast. CableLabs develops, among other things, specifications for secure delivery of high speed data, video, and voice services.

E. Comcast transmits a scrambled data stream to Comcast Set-Top Box Products with CableCARDS. *See, e.g.,* CableCARD Specification at p. 37.

F. The scrambled data stream is subsequently sent to the CableCARD. *See, e.g.,* CableCARD Specification at p. 37.

G. The CableCARD inside of the Comcast Set-Top Box Products with CableCARDS descrambles the scrambled data stream.

In digital cable systems the system operator protects selected content against unauthorized access with a conditional access scrambling system. A properly authorized CableCARD security module (Card) removes the conditional access scrambling and, based on the Copy Control Information (CCI) from the Headend, may rescrumble the content before delivering it to consumer receivers and set-top terminals (Hosts) across the Card-Host Interface defined in OpenCable CableCARD 2.0 Interface Specification [CCIF].

See CableCARD™ Copy Protection 2.0 Specification (“Copy Protection Specification”), <https://community.cablelabs.com/wiki/plugins/servlet/cablelabs/alfresco/download?id=b3c6b0a9-7511-4c09-b75b-53023809a06f>, p. 1 (last visited Mar. 29, 2017).

Copy-protected content will arrive at the Host in a data stream scrambled by the CA System. The selected stream passes from the Host to the Card while still protected by CA-scrambling.

After the Host is authenticated, the Card may CA-descramble zero CCI-D content.

When fully bound to an authenticated and validated Host, the Card may also CA-descramble non-zero CCI-D content. The Card may CP-encrypt content to protect it on return to the Host across the Card-Host interface.

See Copy Protection Specification at p. 13.

Similarly, Comcast CableCARD Products used with non-Comcast devices descramble the scrambled data stream.

H. The CableCARD inside the Comcast Set-Top Box Products with CableCARDs encrypts a descrambled data stream. Copy protection, which includes encryption of the descrambled data stream, is required for high-valued content with a non-zero Encryption Mode Indicator (“EMI”). Upon information and belief, Comcast’s scrambled data streams include content with a non-zero EMI.

Copy protection is required for protection of high-valued content, content marker with a non-zero EMI, across the CHI. Section 8, [CCCP], as well as [SCTE41], identify this functionality and the expected behavior.

See CableCARD Specification at p. 33.

Copy protection SHALL be provided for content marked with a non-zero EMI delivered in MPEG transport streams flowing from the Card to the Host when the Card is required to remove conditional access scrambling from the received MPEG transport stream(s). Such protection, including scrambling of content from Card to Host and authenticated delivery of messages through the CPU interface for permitted use of content marked with a non-zero EMI, is defined in OpenCable CableCARD Copy Protection 2.0 Specification [CCCP].

See CableCARD Specification at p. 105.

9.1.1 EMI - Digital Copy Control Bits

Bits 0 and 1 of the CCI byte are the EMI bits. The Host SHALL use the EMI bits contained in the CCI to control copy permissions for digital outputs as defined in Table 9.1-2 and supply the EMI bits to any Host digital output ports for control of copies made from those outputs. The EMI bits are defined in Table 9.1-2.

Table 9.1-2 - EMI Values and Copy Permissions

EMI Value	Digital Copy Permission
00b	Copying not restricted
01b	No further copying is permitted
10b	One generation copy is permitted
11b	Copying is prohibited

See Copy Protection Specification at p. 33.

Similarly, the Comcast CableCARD Products encrypt a descrambled data stream.

I. The CableCARD sends the encrypted data stream to the Comcast Set-Top Box Products with CableCARDS. *See, e.g.*, CableCARD Specification at p. 37. Similarly, the Comcast CableCARD Products send the encrypted data stream to the non-Comcast device.

J. The encrypted data stream is subsequently decrypted. *See, e.g.*, Copy Protection Specification at p. 25.

K. The decrypted data stream is subsequently used, for example, by being output for viewing by Comcast customers.

98. Comcast has thus infringed, and continues to infringe, one or more claims of the '334 Patent by making, using, testing, selling, leasing, importing, and/or offering for sale/lease the Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services, and operating them such that all steps of at least Claim 1 of the '334 Patent are performed, including within this district. Moreover, Comcast fully implements, manages, and supports the infringing method of using the Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services by its customers.

99. Comcast's customers have been and are now infringing, including under 35 U.S.C. § 271(a), one or more claims of the '334 Patent by using the Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services.

100. Comcast has, since at least the filing of this First Amended Complaint, known or been willfully blind to the fact that such acts by its customers of using Comcast Set-Top Box Products with CableCARDS and Comcast Services directly infringe the '334 Patent.

101. Comcast's knowledge of the '334 Patent, which covers operating the Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services in their intended manner and such that all steps of at least Claim 1 of the '334 Patent are performed, made it known to Comcast that its customers' use of the Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services would directly infringe the '334 Patent, or, at the very least, rendered Comcast willfully blind to such infringement.

102. Having known or been willfully blind to the fact that its customers' use of Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services in their intended manner and such that all steps of at least Claim 1 of the '334 Patent are performed would directly infringe the '334 Patent, Comcast, upon information and belief, actively encouraged and continues to actively encourage its customers to directly infringe the '334 Patent by using, selling, leasing, offering to sell/lease, or importing the said Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services, and, by, for example, marketing the Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services to customers; working with its customers to implement and install the Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, Comcast

Services, and components thereof; fully supporting and managing its customers' continued use of the Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services; and providing technical assistance to customers during their continued use of the Comcast Set-Top Box Products with CableCARDS, Comcast CableCARD Products, and Comcast Services. *See, e.g.*, <https://www.xfinity.com/support/cable-tv/pair-activate-cablecard/>.

103. Comcast induces its users to infringe one or more claims of the '334 Patent at least by encouraging them to use Comcast Set-Top Box Products with CableCARDS or Comcast CableCARD Products, which, alone or in combination with other Comcast devices or the users' devices, implement copy protection functionality in a manner that practices all steps of at least Claim 1 of the '334 Patent. For example, Comcast advertises its CableCARDS on its website www.xfinity.com, promotes the CableCARDS (*see, e.g.*, <https://customer.xfinity.com/help-and-support/cable-tv/about-cablecards>; <https://customer.xfinity.com/help-and-support/cable-tv/how-to-get-a-cablecard>), and encourages its users to configure and operate the set-top boxes and/or CableCARDS in an infringing manner (*see, e.g.*, <https://customer.xfinity.com/help-and-support/cable-tv/pair-activate-cablecard>). In response, Comcast's users acquire, configure, and operate Comcast Set-Top Box Products with CableCARDS and Comcast CableCARD Products such that all steps of at least Claim 1 of the '334 Patent are practiced. Comcast has been aware of the '334 Patent since at least the filing of this First Amended Complaint.

104. Thus, Comcast has specifically intended to induce, and has induced, its customers to infringe one or more claims of the '334 Patent, and Comcast has known of or been willfully blind to such infringement. Comcast has advised, encouraged, and/or aided its customers to engage in direct infringement, including through its encouragement, advice, and assistance to

customers to use the infringing Comcast Set-Top Box Products with CableCARDs, Comcast CableCARD Products, and Comcast Services.

105. Based on, among other things, the foregoing facts, Comcast has induced, and continues to induce, infringement under 35 U.S.C. § 271(b) of one or more claims of the '334 Patent.

106. Further, Comcast sells or leases to its customers Comcast Set-Top Box Products with CableCARDs and Comcast CableCARD Products that are especially made and adapted—and specifically intended by Comcast—to be used as components and material parts of the methods covered by the '334 Patent. For example, Comcast leases set-top boxes and CableCARDs to customers, which customers configure and use in a manner such that all steps of at least Claim 1 of the '334 Patent are performed, and without which customers would be unable to use and avail themselves of the Comcast Set-Top Box Products with CableCARDs, Comcast CableCARD Products, and Comcast Services in their intended manner.

107. Upon information and belief, Comcast also knew, at least since the filing of this First Amended Complaint, that Comcast Set-Top Box Products with CableCARDs and other devices into which Comcast CableCARD Products are inserted implement CableCARDs in a manner that practice all steps of at least Claim 1 of the '334 Patent, as evidenced, for example, by pertinent CableLabs specification documents that Comcast had access to.

108. Comcast Set-Top Box Products with CableCARDs that provide the copy protection functionality are especially made and adapted to infringe at least Claim 1 of the '334 Patent. Upon information and belief, such set-top boxes are not a staple article or commodity of commerce suitable for substantial noninfringing use. The Comcast Set-Top Box Products with CableCARDs are designed to work only with the Comcast Services in a manner that is covered by

the '334 Patent. At least since the filing of this First Amended Complaint, based on the foregoing facts, Comcast has known or been willfully blind to the fact that the Comcast Set-Top Box Products with CableCARDs are especially made and adapted for—and are in fact used in—Comcast Services in a manner that is covered by the '334 Patent.

109. Similarly, Comcast CableCARD Products are especially made and adapted to infringe at least Claim 1 of the '334 Patent. Upon information and belief, the CableCARDs are not a staple article or commodity of commerce suitable for substantial noninfringing use. The Comcast CableCARD Products are designed to work only with the Comcast Services in a manner that is covered by the '334 Patent. At least since the filing of this First Amended Complaint, based on the foregoing facts, Comcast has known or been willfully blind to the fact that the Comcast CableCARD Products are especially made and adapted for—and are in fact used in—Comcast Services in a manner that is covered by the '334 Patent.

110. Based on, among other things, the foregoing facts, Comcast has contributorily infringed, and continues to contributorily infringe, one or more claims of the '334 Patent under 35 U.S.C. § 271(c).

111. Defendants' acts of direct and indirect infringement have caused, and continue to cause, damage to Nagra France, and Nagra France is entitled to recover from Defendants the damages sustained as a result of Defendants' wrongful acts in an amount subject to proof at trial.

COUNT V: INFRINGEMENT OF U.S. PATENT NO. 7,251,825

112. On July 31, 2007, United States Patent No. 7,251,825 ("the '825 Patent"), which is entitled "Method to Use a Virtual Private Network Using a Public Network," was lawfully issued by the USPTO. A true and correct copy of the '825 Patent is attached as Exhibit E.

113. Pursuant to 35 U.S.C. § 282, the '825 Patent is presumed valid.

114. When issued, the '825 Patent was assigned to Nagravision and Nagravision was the sole owner of the '825 Patent. As of the filing of this First Amended Complaint, Nagravision retains the exclusive right to enforce the '825 Patent.

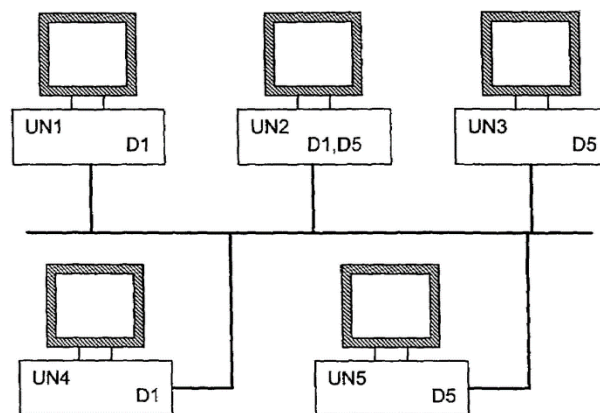
115. The '825 Patent is generally directed to creating and using a virtual private network connected to a public network. For example, the '825 Patent discloses a method for exchanging data between several computers or multimedia units through a public network while guaranteeing at the same time the confidentiality of these data through the creation and use of a virtual private network ("VPN"). The '825 Patent explains that "[i]n this way an unsolved problem remains which consists of linking several computers or multimedia units through a public network at the same time guaranteeing the confidentiality of that data." *See* Ex. E (the '825 Patent) at 1:30-33. "This aim is reached by a method for creating and using a virtual private network (VPN) having a plurality of units connected to a public network, each unit having a security device which includes a unique number UA." *Id.* at 1:37-41.

116. Upon information and belief, Comcast manufactures and/or imports Comcast Set-Top Box Products, including gateway and peripheral set-top boxes, into the United States, and sells or leases them to customers separately or as part of Comcast Services. Comcast has infringed and continues to infringe one or more claims of the '825 Patent. The infringing acts include, but are not limited to, the manufacture, use, test, sale, lease, importation, and/or offer for sale/lease in or within the United States of Comcast Set-Top Box Products and Comcast Services that implement a method to use a VPN having a plurality of units connected to a public network in a manner that practices all steps of at least Claim 1 of the '825 Patent. By manufacturing, using, testing, selling, leasing, importing, and/or offering to sell/lease Comcast Set-Top Box Products

and Comcast Services, and operating them such that all steps of at least Claim 1 of the '825 Patent are performed, Comcast has in the past infringed, and continues to infringe, the '825 Patent, including under 35 U.S.C. § 271(a), either literally or under the doctrine of equivalents. Upon information and belief, Comcast distributes its Comcast Set-Top Box Products and Services in Texas, including within this district, and uses them in a manner consistent with at least Claim 1 of the '825 Patent and/or induces its customers to do so. Based on these activities, Comcast has committed the tort of patent infringement in this district, and this action arises at least in part from such infringement.

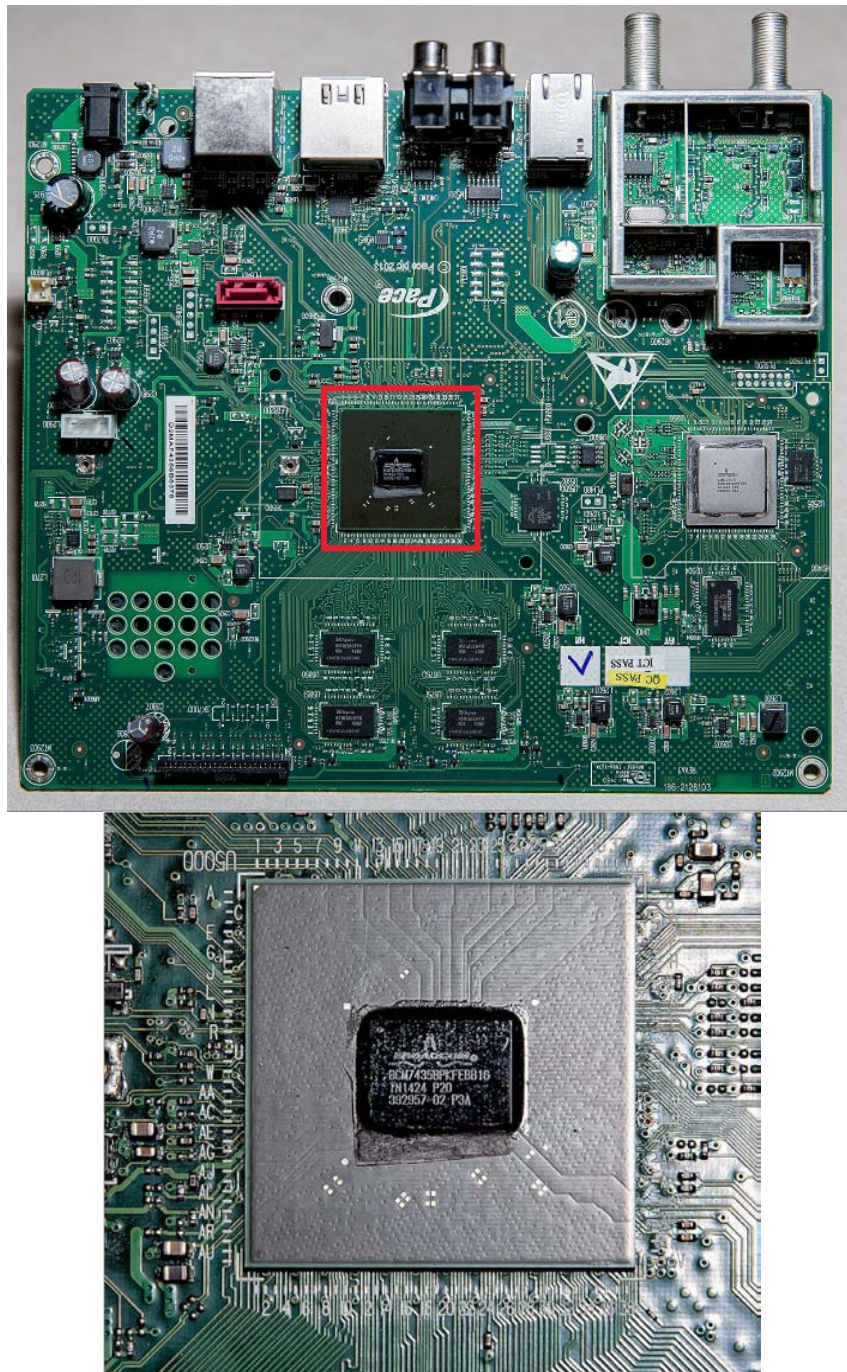
117. Upon information and belief, users (e.g., Comcast customers and/or employees) of Comcast Set-Top Box Products and Comcast Services infringe at least Claim 1 of the '825 Patent in the exemplary manner described below:

A. Upon information and belief, Comcast Set-Top Box Products and Comcast Services allow users to create and manage a MoCA network, which is a virtual private network. Different set-top boxes within close proximity (e.g., within the same house) use the MoCA network to communicate.



See Ex. E (the '825 Patent), Fig. 1.

B. Comcast Set-Top Box Products incorporate chips, e.g., Broadcom 7400 series chips or equivalent SOCs, that support MoCA.



Broadcom's BCM7435 is a Set-top Box (STB) platform that enables operators to securely deliver premium broadcast content converged with Web-based content and services to multiple screens in the connected home.

Broadcom's BCM7435 with transcoding shows video broadcast content streaming simultaneously to multiple devices, while concurrently supporting secure Web applications. This enables operators to offer new, Web-based services while protecting high-value broadcast content.

As a result, pay-TV users can access more apps, social networking and an overall Web-based TV experiences.

Features

- 7000 DMIPS dual-core/quad-thread applications processor supporting SMP (multicore) and AMP (multioperating system) platforms
- Four real-time high-definition transcoding streams for expanded CE device support
- CPU core Web domain security
- Extreme performance for more advanced 3D user interfaces and gaming applications
- Power-management capability for new energy efficiency requirements
- MoCA 2.0 support

Applications

- Set-Top Boxes
- IPTV

See BCM 7435, <https://www.broadcom.com/products/broadband/set-top-box/bcm7435#overview> (last visited Mar. 21, 2017).

C. Comcast Set-Top Box Products and Comcast Services support the use of a gateway device, e.g., an XG1 model set-top box, and at least one peripheral device, (e.g., Xi3 or RNG150N model set-top boxes) within a home or business.

X1 Entertainment Operating system currently is supported by three devices: XG1, RNG150, and Xi3.

XG1

Device used to support DVR services; known as the Hub in AnyRoom scenario. Two models: Pace and Arris (HDMI output only).



RNG150

Device used to support HD only services; known as a Terminal in AnyRoom scenario. Two models: Pace and Samsung.



Additional info on RNG150

- Cannot pause live TV on the RNG150
- Pandora, Facebook, My Account and Tips & Tricks apps are not available on the RNG150N.
- Reboots may take longer on the Pace RNG150N device
- Requires XR8 Aim Anywhere Adapter for RF Pairing

SD Mode for XG1 or RNG150

- X1 Applications are not available
- L-View patterns are not available in SD; this includes mini-guide, Sports app, etc.
- Quick Search is not available

Xi3

Device used to pair with XG1 in a home; known as a terminal in AnyRoom scenario. Xi3 is a MoCA and IP only device. Xi3s do not have a QAM tuner, they leverage tuners from the XG1. One Model: Pace.



Additional Info on Xi3

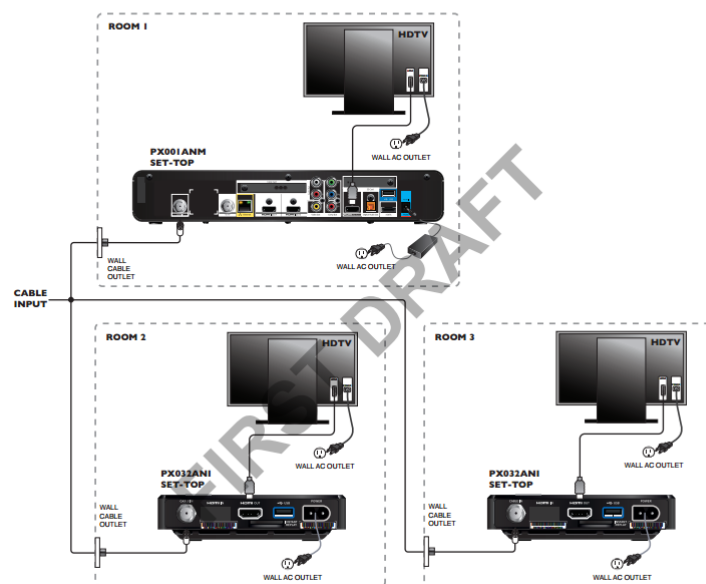
- HDMI output only
- Maximum of (3) Xi3s per XG1
- Xi3s require MoCA network for ALL communication
- Relies upon the XG1 (gateway) for:
 - Tuning Linear TV Channels
 - Entitlements
 - Recordings (does not take up tuner)
 - Access to Guide
 - Access to On-Demand shows/movies (does not take up tuner)
- Has a 30-minute time-shift buffer for pause/fast-forward/reverse (pending firmware release)

See X1 Installation Guide, <http://textlab.io/doc/463330/x1-installation-guide> (last visited February 14, 2017).

CONNECTING THE EQUIPMENT (cont.)

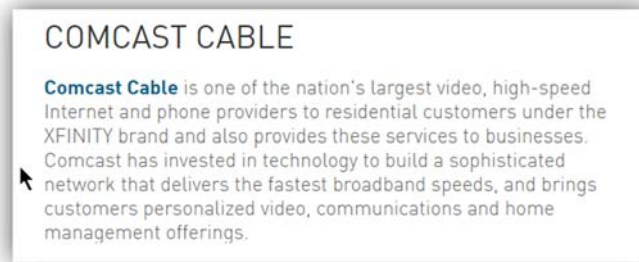
Setup - HDTV (HDMI connection)

This setup uses an HDMI connector to connect to the HDTV. This displays the highest quality picture on your HDTV and also means there will be no picture degradation on any copy-protected programs (provided the link remains secure – see page 7).



See User Guide: Pace Xi3-P, <https://fccid.io/pdf.php?id=2150838> (last visited Feb. 14, 2017) (watermark in original).

D. Comcast Set-Top Box Products receive services through a network that is connected to many homes.



See Company Overview, <http://corporate.comcast.com/news-information/company-overview>.

E. Comcast Set-Top Box Products include a security device. For example, Comcast Set-Top Box Products include MoCA-enabled chips, e.g., Broadcom 7400 series chips. For example, Pace's XG1V3 (PX013ANM) and Xi3 devices use the Broadcom BCM7435 chipset to support MoCA 2.0 functionality. The MoCA MAC layer includes encryption.

Broadcom's BCM7435 is a Set-top Box (STB) platform that enables operators to securely deliver premium broadcast content converged with Web-based content and services to multiple screens in the connected home.

Broadcom's BCM7435 with transcoding shows video broadcast content streaming simultaneously to multiple devices, while concurrently supporting secure Web applications. This enables operators to offer new, Web-based services while protecting high-value broadcast content.

As a result, pay-TV users can access more apps, social networking and an overall Web-based TV experiences.

Features

- 7000 DMIPS dual-core/quad-thread applications processor supporting SMP (multicore) and AMP (multioperating system) platforms
- Four real-time high-definition transcoding streams for expanded CE device support
- CPU core Web domain security
- Extreme performance for more advanced 3D user interfaces and gaming applications
- Power-management capability for new energy efficiency requirements
- MoCA 2.0 support

Applications

- Set-Top Boxes
- IPTV

See BCM 7435, <https://www.broadcom.com/products/broadband/set-top-box/bcm7435#overview> (last visited Feb. 14, 2017).

Practically, these security means can present themselves in several forms. To assure high security in the mechanism of encryption/decryption, specialized microprocessors which contain encryption engine and data such as the security keys are used.

See Ex. E (the '825 Patent), Col. 2:6-10.

F. For example, United States Patent Application Publication No. 2014/0169558, which provides a general overview of the MoCA 2.0 standard, explains in ¶ 7 that “[i]n a MoCA 2.0 network ... the well-known Advanced Encryption Standard (AES) cipher is used to encrypt messages with encryption keys.” It is further explained that “[i]n accordance with MoCA 2.0, a MoCA 2.0 [Network Coordinator] is used to admit new MoCA 2.0 nodes.” US Patent Application Publication No. 2014/0169558 at ¶ 8.

G. Comcast Set-Top Box Products contain a security device (MoCA-enabled chip) that includes a unique number. Each MoCA-enabled chip includes a MAC Address (unique number UA) that uniquely identifies it.



See User Guide Pace Xi3-P, <https://fccid.io/pdf.php?id=2150838> (last visited Feb. 14, 2017).

H. The VPN created between the Comcast Set-Top Box Products includes a first unit generating a right associated to the unique number. For example, the first unit may be an XG1 model gateway acting as a MoCA Network Coordinator (“NC”). See US Patent Application Publication No. 2014/0169558. The VPN created between the Comcast Set-Top Box Products

include a second unit. The second unit may be an RNG or Xi3 model acting as MoCA New Node (“NN”). *See* US Patent Application Publication No. 2014/0169558.

I. Network messages in MoCA networks are encrypted with a key known as the APMK (Privacy Management Key). Each peripheral device receives this key from the gateway device after being admitted to the network. This key is a right Dn. *See* US Patent Application Publication No. 2014/0169558 at ¶ 8. After admittance, the peripheral device sends the gateway device a request for Dynamic Keys. The gateway device responds by sending the ATEK (Traffic Encryption Key) and APMK to that peripheral device via a unicast message addressed to that peripheral device’s MAC address.

TABLE 1

Encryption Keys

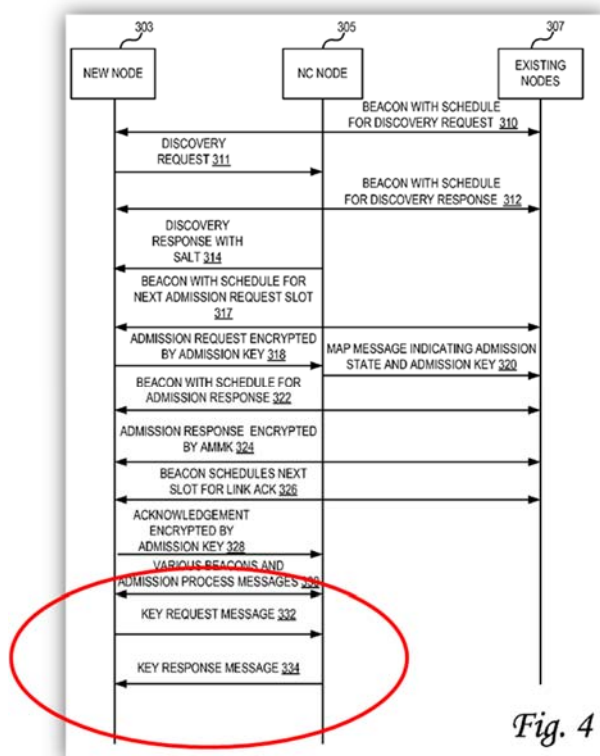
Key Type	Key	Usage
Static Keys	AES MAC Management Key (“AMMK”)	Encryption of MAC Control except for Link Privacy Messages.
	Initial AES Privacy Management Key (“APMKInitial”)	Encryption of Link Privacy messages when the current APMK being used by the rest of the network is not available (e.g., prior to admission).
Dynamic Keys	AES Privacy Management Key (“APMK”)	Encryption of Link Privacy messages when the current APMK being used by the rest of the network is available.
	AES Traffic Encryption Key (“ATEK”)	Encryption of MAC Data Transmissions

US Patent Application Publication No. 2014/0169558 at Table 1.

J. The Dynamic Keys (APMK, ATEK) are periodically updated. These are sent in messages from the gateway set-top device and encrypted by the APMK (right Dn). The APMK must be present in a peripheral device for it to receive updated keys. The message is unicast from the gateway set-top device to a peripheral device.

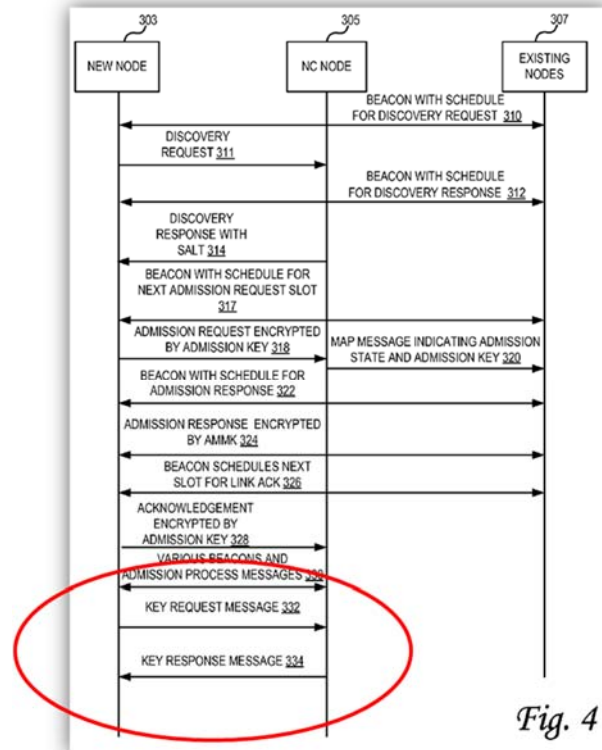
“From time to time, the NC 305 sends updated keys to the network nodes 303, 307 using the APMK. In this manner, keys are updated

to provide an extra measure of security to the network.” US Patent Application Publication No. 2014/0169558 at ¶ 59.



US Patent Application Publication No. 2014/0169558 at Fig. 4.

K. The APMK generated by the gateway set-top device (first unit) is associated with the MAC address. In MoCA, privacy messages are sent unicast (point to point). The APMK is dynamically generated for each individual peripheral device and is sent to that device using a peripheral device’s MAC address, thus, associating the right with a peripheral device.



US Patent Application Publication No. 2014/0169558 at Fig. 4.

L. US Patent Application Publication No. 2009/0010263A1 describes the packet configuration of packets sent by MoCA networks. The frame identifies both the source and destination of the packet.

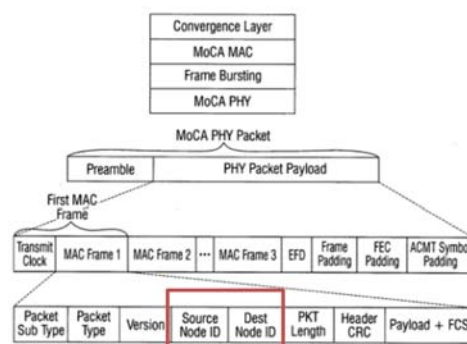


FIG. 6

US Patent Application Publication No. 2009/0010263A1 at Fig. 6.

M. US Patent Application Publication No. 2010/0238932A1 describes packet aggregation in MoCA networks. Figure 9 shows that the packets are unicast to a specific peripheral device (second unit).

Field	Length	Usage
FRAME SUBTYPE	4 bits	If FRAME_TYPE = MAP 0x0 = Asynchronous MAP If FRAME_TYPE = Reservation Request 0x0 = Asynchronous If FRAME_TYPE = Control 0x0 = Type III Probe Report 0x1 = Admission Request 0x2 = Admission response 0x3 = Key distribution 0x4 = Dynamic Key distribution 0x5 = Type III Probe Report Request 0x6 = Link Acknowledgement 0x7 = Type II Probe Report 0x8 = Periodic Link Packet 0x9 = Power Control 0xA = Power Control Response 0xB = Power Control Acknowledgement 0xC = Power Control Update 0xD = Topology update 0xE = Unicast MAC Address Notification 0xF = reserved If FRAME_TYPE = Ethernet transmission 0x0 = ETHERNET_PACKET 0x1 = Ethernet Aggregate If FRAME_TYPE = MPEG or DSS Field is Reserved If FRAME_TYPE = Terminal allocation 0x0 = Terminal allocation If FRAME_TYPE = Beacon 0x0 = Beacon
FRAME_TYPE	4 bits	Indicates the type of transmission for which the time is being allocated. Only following values are allowed 0x0 = MAP 0x1 = Reservation request 0x2 = Control 0x3 = Ethernet transmission 0x5 = MPEG transmission 0x6 = DSS transmission 0xA = Terminal allocation (TAU) 0xC = Beacon

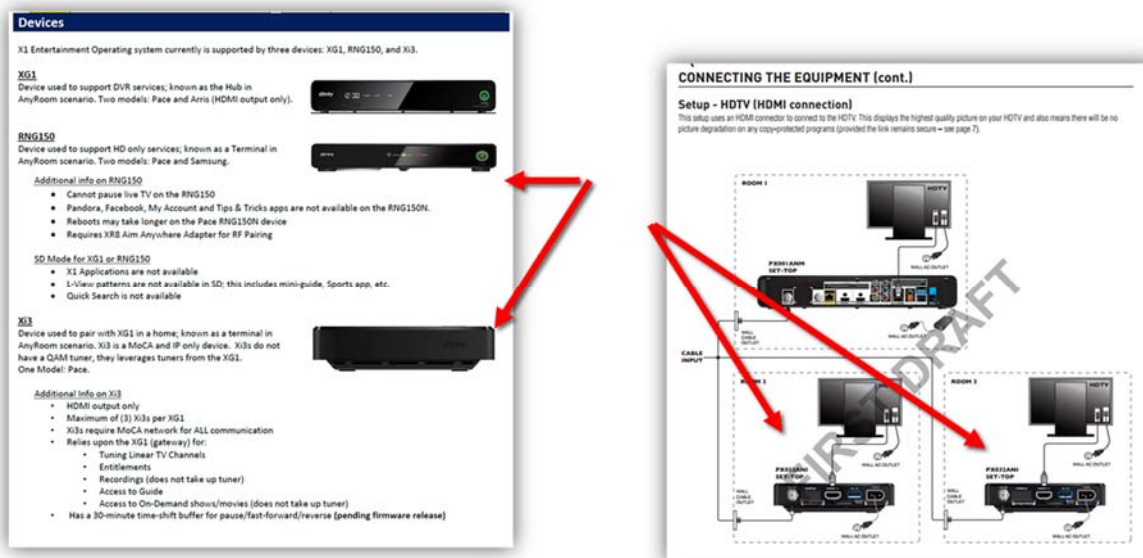
FIG. 9

US Patent Application Publication No. 2010/0238932A1 at Fig. 9.

transmissions. Because the MoCA network is not a broadcast network and packets are unicast between MoCA nodes, MoCA nodes cannot act as learning bridges by snooping traffic. Instead each MoCA node monitors the SA of packets entering the MoCA network through it and distributes that information to all the other nodes via notification messages. The notification messages inform other nodes that any messages destined to that address should be forwarded to the notifying node.

See MoCA 2.0, http://www.eetimes.com/document.asp?doc_id=1278926 (last visited Mar. 21, 2017).

N. The MoCA virtual private network includes at least one peripheral device with a MoCA-enabled chip that receives the APMK from the gateway set-top device.



See X1 Installation Guide, <http://textlab.io/doc/463330/x1-installation-guide> (last visited February 14, 2017); see User Guide: Pace Xi3-P, <https://fccid.io/pdf.php?id=2150838> (last visited Feb. 14, 2017) (watermark in original).

O. Comcast Set-Top Box Products encrypt the data sent by the unit Un and a description of the right Dn necessary for the decryption of the data, by an encryption data key KS. For example, Comcast Set-Top Box Products encrypt the data sent by the gateway set-top device and packet “type” fields in the MoCA MAC Frame (description of the right necessary for the decryption of the data) using an ATEK (encryption data key). Data is any packet of data (e.g., video or internet traffic) sent from a MoCA-enabled gateway set-top device to a peripheral device. MoCA frames include bits to indicate the type of a packet. Since MoCA packets are encrypted by different keys, the packet bits also describe what keys are required to decrypt them. US Patent Application Publication No. 2009/0010263A1 describes the packet configuration of packets sent by MoCA networks.

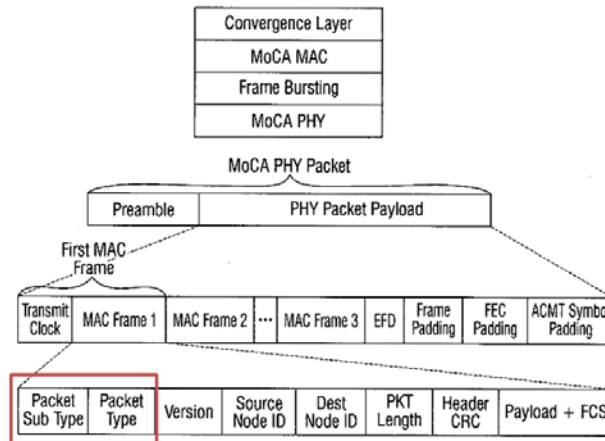


FIG. 6

US Patent Application Publication No. 2009/0010263A1 at Fig. 6.

P. This indication of packet type is a description of the right necessary for the decryption of the data. The data and the description of the right are encrypted by an(ATEK).

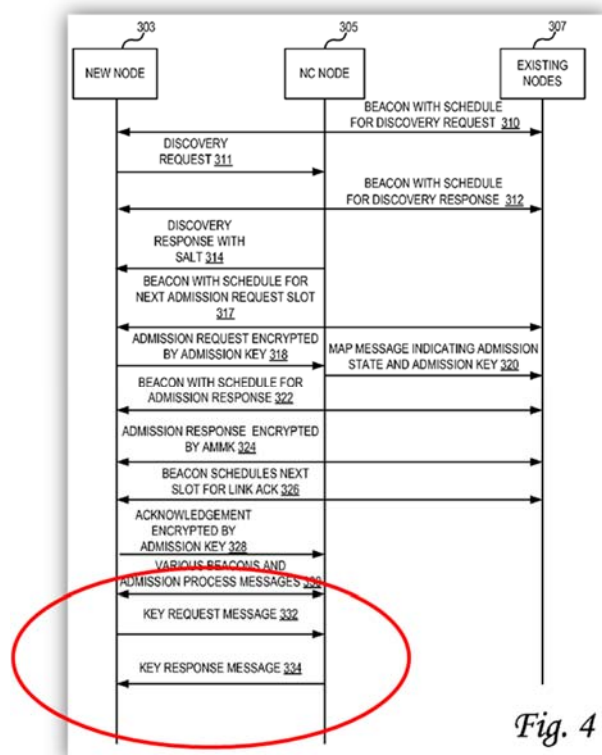
TABLE 1

Encryption Keys

Key Type	Key	Usage
Static Keys	AES MAC	Encryption of MAC Control except for Link Privacy Messages.
	Management Key ("AMMK")	
	Initial AES Privacy Management Key ("APMKInitial")	Encryption of Link Privacy messages when the current APMK being used by the rest of the network is not available (e.g., prior to admission).
Dynamic Keys	AES Privacy Management Key ("APMK")	Encryption of Link Privacy messages when the current APMK being used by the rest of the network is available.
	AES Traffic Encryption Key ("ATEK")	Encryption of MAC Data Transmissions

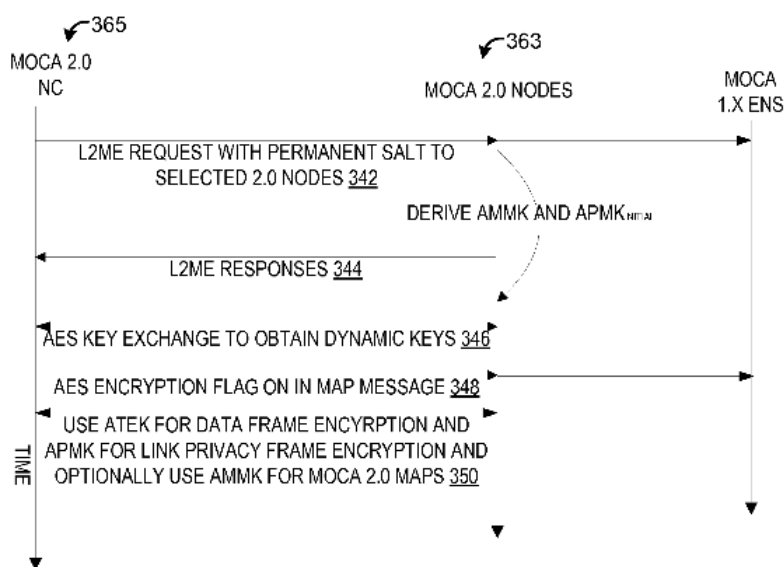
US Patent Application Publication No. 2014/0169558 at Table 1.

Q. Comcast Set-Top Box Products create a message (control data block) that includes an ATEK and packet type fields in a MoCA MAC frame. *See* US Patent Application Publication No. 2009/0010263A1 at ¶8 ("The 'link privacy' messages include a message used to request a set of dynamic keys and a response message used to send the dynamic keys to a requesting node."). The Dynamic Keys (ATEK/APMK) are sent from the gateway set-top device to a peripheral device and encrypted by the APMK.



US Patent Application Publication No. 2014/0169558 at Fig. 4.

R. A peripheral device in the VPN receives the encrypted data and the link privacy message.



US Patent Application Publication No. 2014/0169558 at Fig. 7.

S. To decrypt the encrypted data, a peripheral device receives the link privacy message that contains the ATEK used to encrypt the data from the gateway set-top device.

T. The MoCA-enabled chip in a peripheral device is presented with the encrypted link privacy message to verify whether the APMK is present. If the APMK is present, then the ATEK is used to decrypt the encrypted data. To establish the ATEK as valid, the peripheral device decrypts and recovers the key from the link privacy message. If the APMK is not present in a peripheral device, the encrypted data cannot be decrypted and a new key is requested.

118. Comcast has thus infringed, and continues to infringe, one or more claims of the '825 Patent by making, using, testing, selling, leasing, importing, and/or offering for sale/lease the Comcast Set-Top Box Products and Comcast Services, and operating them such that all steps of at least Claim 1 of the '825 Patent are performed, including within this district. Moreover, Comcast fully implements, manages, and supports the infringing method of using the Comcast Set-Top Box Products and Comcast Services by its customers.

119. Comcast's customers have been and are now infringing, including under 35 U.S.C. § 271(a), one or more claims of the '825 Patent by using the Comcast Set-Top Box Products and Comcast Services.

120. Comcast has, since at least the filing of this First Amended Complaint, known or been willfully blind to the fact that such acts by its customers of using Comcast Set-Top Box Products and Comcast Services directly infringe the '825 Patent.

121. Comcast's knowledge of the '825 Patent, which covers operating the Comcast Set-Top Box Products and Comcast Services in their intended manner and such that all steps of at least Claim 1 of the '825 Patent are performed, made it known to Comcast that its

customers' use of the Comcast Set-Top Box Products and Comcast Services would directly infringe the '825 Patent, or, at the very least, rendered Comcast willfully blind to such infringement.

122. Having known or been willfully blind to the fact that its customers' use of Comcast Set-Top Box Products and Comcast Services in their intended manner and such that all steps of at least Claim 1 of the '825 Patent are performed would directly infringe the '825 Patent, Comcast, upon information and belief, actively encouraged and continues to actively encourage its customers to directly infringe the '825 Patent by using, selling, leasing, offering to sell/lease, or importing the said Comcast Set-Top Box Products and Comcast Services, and, by, for example, marketing the Comcast Set-Top Box Products and Comcast Services to customers; working with its customers to implement and install the Comcast Set-Top Box Products and Comcast Services and components thereof; fully supporting and managing its customers' continued use of the Comcast Set-Top Box Products and Comcast Services; and providing technical assistance to customers during their continued use of the Comcast Set-Top Box Products and Comcast Services. *See, e.g.,* www.xfinity.com/Comcast .

123. Comcast induces its users to infringe one or more claims of the '825 Patent at least by encouraging them to use Comcast Set-Top Box Products, which, alone or in combination with other Comcast devices or the users' devices, implement MoCA networks in a manner that practices all steps of at least Claim 1 of the '825 Patent. For example, Comcast advertises its Comcast Set-Top Box Products on its website www.xfinity.com, promotes its Comcast Set-Top Box Products on its website <https://www.xfinity.com/support/cable-tv/x1-hub-vs-companion-box/>, and encourages its users to configure and operate its Comcast Set-Top Box Products in an infringing manner (*see, e.g.,* <https://www.xfinity.com/support/cable-tv/reboot->

anyroom-dvr/). In response, Comcast's users acquire, configure and operate its Comcast Set-Top Box Products, such that all steps of at least Claim 1 of the '825 Patent are practiced. Comcast has been aware of the '825 Patent since at least the filing of this First Amended Complaint.

124. Thus, Comcast has specifically intended to induce, and has induced, its customers to infringe one or more claims of the '825 Patent, and Comcast has known of or been willfully blind to such infringement. Comcast has advised, encouraged, and/or aided its customers to engage in direct infringement, including through its encouragement, advice, and assistance to customers to use the infringing Comcast Set-Top Box Products and Comcast Services.

125. Based on, among other things, the foregoing facts, Comcast has induced, and continues to induce, infringement under 35 U.S.C. § 271(b) of one or more claims of the '825 Patent.

126. Further, Comcast sells or leases to its customers Comcast Set-Top Box Products and Comcast Services that are especially made and adapted—and specifically intended by Comcast—to be used as components and material parts of the methods covered by the '825 Patent. For example, Comcast leases set-top boxes to customers, which customers configure and use in a manner that all steps of at least Claim 1 of the '825 Patent are performed, and without which customers would be unable to use and avail themselves of the Comcast Set-Top Box Products and Comcast Services in their intended manner.

127. Upon information and belief, Comcast also knew, at least since the filing of this First Amended Complaint, that Comcast Set-Top Box Products implement a VPN in a manner that practice all steps of at least Claim 1 of the '825 Patent through relevant Broadcom SOC, and equivalent SOC, datasheets, and MoCA specification information that, upon information and belief, Comcast had access to.

128. The MoCA-enabled devices in Comcast Set-Top Box Products and Comcast Services are especially made and adapted to infringe at least Claim 1 of the '825 Patent. Upon information and belief, X1 Xfinity MoCA-enabled devices are not staple articles or commodities of commerce, and, because the functionality is designed to work only with the Comcast Set-Top Box Products and Comcast Services in a manner that is covered by the '825 Patent, it does not have a substantial non-infringing use. At least since the filing of this First Amended Complaint, based on the foregoing facts, Comcast has known or been willfully blind to the fact that such functionality is especially made and adapted for—and is in fact used in—Comcast Set-Top Box Products and Comcast Services in a manner that is covered by the '825 Patent.

129. Based on, among other things, the foregoing facts, Comcast has contributorily infringed, and continues to contributorily infringe, one or more claims of the '825 Patent under 35 U.S.C. § 271(c).

130. Defendants' acts of direct and indirect infringement have caused, and continue to cause, damage to NagraVision, and NagraVision is entitled to recover from Defendants the damages sustained as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of NagraVision's exclusive rights under the '825 Patent has damaged and will continue to damage NagraVision, causing irreparable harm, for which there is no adequate remedy at law, with the balance of hardships between NagraVision and Defendants, and the public interest, warranting an injunction.

DEMAND FOR JURY TRIAL

131. Plaintiffs demand a jury trial on all claims and issues, as provided by Rule 38(a) of the Federal Rules of Civil Procedure.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray for a judgment in their favor and against Defendants, and respectfully request the following relief:

A. A judgment that Defendants have infringed one or more of the claims of the '720 Patent, literally and/or under the doctrine of equivalents;

B. A judgment that Defendants account for and pay Nagravision all damages caused by the infringement of the '720 Patent, which by federal statute can be no less than a reasonable royalty;

C. An order that Nagravision is entitled to pre-judgment and post-judgment interest on the damages caused by reason of Defendants' infringement of the '720 Patent;

D. An order permanently enjoining Defendants and their officers, agents, employees, and those acting in privity with them, from further infringement of the '720 Patent;

E. A judgment that Defendants have infringed one or more of the claims of the '740 Patent, literally and/or under the doctrine of equivalents;

F. A judgment that Defendants account for and pay Nagravision all damages caused by the infringement of the '740 Patent, which by federal statute can be no less than a reasonable royalty;

G. An order that Nagravision is entitled to pre-judgment and post-judgment interest on the damages caused by reason of Defendants' infringement of the '740 Patent;

H. An order permanently enjoining Defendants and their officers, agents, employees, and those acting in privity with them, from further infringement of the '740 Patent;

I. A judgment that Defendants have infringed one or more of the claims of the '188 Patent, literally and/or under the doctrine of equivalents;

J. A judgment that Defendants account for and pay Nagravision all damages caused by the infringement of the '188 Patent, which by federal statute can be no less than a reasonable royalty;

K. An order that Nagravision is entitled to pre-judgment and post-judgment interest on the damages caused by reason of Defendants' infringement of the '188 Patent;

L. An order permanently enjoining Defendants and their officers, agents, employees, and those acting in privity with them, from further infringement of the '188 Patent.

M. A judgment that Defendants have infringed one or more of the claims of the '334 Patent, literally and/or under the doctrine of equivalents;

N. A judgment that Defendants account for and pay Nagra France all damages caused by the infringement of the '334 Patent, which by federal statute can be no less than a reasonable royalty;

O. An order that Nagra France is entitled to pre-judgment and post-judgment interest on the damages caused by reason of Defendants' infringement of the '334 Patent;

P. A judgment that Defendants have infringed one or more of the claims of the '825 Patent, literally and/or under the doctrine of equivalents;

Q. A judgment that Defendants account for and pay Nagravision all damages caused by the infringement of the '825 Patent, which by federal statute can be no less than a reasonable royalty;

R. An order that Nagravision is entitled to pre-judgment and post-judgment interest on the damages caused by reason of Defendants' infringement of the '825 Patent;

S. An order permanently enjoining Defendants and their officers, agents, employees, and those acting in privity with them, from further infringement of the '825 Patent.

- T. An order that this action be considered an exceptional case under 35 U.S.C. § 285;
- U. An order that Plaintiffs be granted their reasonable attorneys' fees in this action;
- V. An order that all costs and expenses be awarded to Plaintiffs; and
- W. An order that Plaintiffs be granted such other and further relief that the Court deems to be just and equitable.

Dated: April 24, 2017

Respectfully submitted,

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and Nagra France SAS*

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing document was filed electronically in compliance with Local Rule CV-5(a). Therefore, this document was served on all counsel who are deemed to have consented to electronic service on this the 24th day of April, 2017.

/s/ Andrea Fair
Andrea Fair