

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent of: Kuo et al.  
U.S. Patent No.: 9,774,916 Attorney Docket No. 52472-0007IP1  
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Filing Date: January 7, 2015  
Title: INFORMATION CONCENTRATING CENTER CAPABLE  
OF MAKING P2P CONNECTIONS WITH REMOTE  
CLIENT DEVICES

**DECLARATION OF VLAD KARDASHOV**

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I, Vlad Kardashov of Toronto, Ontario, declare that:

## **I. INTRODUCTION**

1. My name is Vlad Kardashov, and I have been retained by counsel for Petitioners Reolink Innovation Inc. and Shenzhen Reolink Technology Co., Ltd. (“Reolink” or “Petitioners”) as an expert witness to provide assistance regarding U.S. Patent No. 9,774,916 (“the ’916 Patent”). Specifically, I have been asked to consider the validity of claims 1-10 and 16 of the ’916 Patent (the “Challenged Claims”).

2. I am being compensated for my time at my standard consulting rate. I am also being reimbursed for expenses that I incur during the course of this work. My compensation is not contingent upon the results of my study, the substance of my opinions, or the outcome of any proceeding involving the Challenged Claims. I have no financial interest in the outcome of this matter or on related litigation involving the ’916 Patent.

3. My analysis here is based on my years of education, research and experience, as well as my investigation and study of relevant materials, including those cited herein. I may rely upon these materials, my knowledge and experience, and/or additional materials to further explain and corroborate my analysis, and to respond to critiques of my analysis raised by the Patent Owner or the Patent Trial and Appeal Board (“Board”).

4. My analysis of the materials produced in this proceeding is ongoing and I will continue to review any new material as it is provided. This declaration represents only those opinions that I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

## **II. BACKGROUND AND QUALIFICATIONS**

5. I am over the age of 18 and am competent to provide this testimony. I have personal knowledge, or have developed knowledge of the technologies addressed in this declaration based upon my education, training, experience, and my review of the '916 Patent, its file history, and the related prior art. I am well qualified to serve as a technical expert in this matter based upon my qualifications, discussed in detail below. I also have personal knowledge of the products described in the Lorex Manual (EX1007) and Lorex Video (EX1012) and of facts that confirm the Lorex Manual and Lorex Video were published before the earliest effective filing date of the '916 Patent (January 7, 2014).

6. I am an expert in the field of computer networks and cloud-based technologies. I have developed products in this field for over 20 years. I have summarized in this section my educational background, work experience, and other relevant qualifications. Attached hereto as Appendix A, is a true and correct copy of my curriculum vitae ("CV") that further describes my background and experiences.

7. In 2002, I earned my Bachelor of Science degree in Electrical Engineering and from The Singalovsky College in Tel Aviv, Israel. Upon earning my degree, I entered industry as an electrical and systems engineer. Over my career, I advanced to senior executive roles in research and development as Director, Vice President, and President. I am currently serving as the President of a cloud technology company.

8. From 2001 to 2005, I worked at Pelephone, one of the largest mobile service providers in Israel. My work at Pelephone included roles as a system validation engineer and engineering manager. In these roles, I developed and improved technologies involving mobile networks and device connectivity using these networks. Following my time at Pelephone, I worked as a senior executive in research and development at two additional technology companies from 2009 to 2012 where I developed products to improve the user experience in mobile networks.

9. From 2012 to 2016, I was employed as the Director of Engineering & Product Development at Lorex Technology, Inc. (acquired by FLIR Systems, Inc. in 2012), which produced a variety of networked video recording and streaming systems, including the Lorex LH150 ECO4 Series of DVR, which was capable of streaming live or recorded video signals from one or more video cameras connected to the DVR to a remote device (e.g., a smartphone, tablet, or PC) over the Internet via a P2P connection. My work at Lorex Technology included managing the product

design of the Lorex DVRs, IP cameras, and related networked products, managing the team that was responsible for cloud-based services—including Lorex’s network servers involved in establishing direct P2P connectivity between DVRs and client devices. I also managed development of the Lorex ECO Stratus mobile app and corresponding PC/Mac desktop apps that allowed our customer’s personal devices to receive and play video streams from LH150 ECO4 Series DVRs over a P2P connection. Based on my responsibilities as a Project Lead and IP Products Line Manager, I had personal knowledge of, and was highly familiar with, the Lorex LH150 ECO4 Series DVRs, the Lorex ECO Stratus app/service, Lorex’s network server system, and all of the instructions/user manuals/literature/how-to videos that were published by Lorex Technology during 2012 and later.

10. From 2016 to 2020, I served as Vice President (Engineering) at FLIR Systems, Inc., serving in FLIR’s security division (again, FLIR Systems had previously acquired Lorex Technology). During that time, I continued to manage Lorex Technology (engineering and product development) and also FLIR Security research and design. In 2018, FLIR Systems, Inc. sold Lorex Technology to Dahua Technology, and my role stayed with FLIR Systems, Inc. at that time. I managed Lorex’s technology during this transition.

11. I am currently the President of iENSO, a technology company that develops and manufactures cloud-connected imaging systems. As the President of

iENSO, I oversee the development of our products which include embedded cameras for smart appliances, security cameras, and imaging systems for autonomous vehicles and drones. I also oversee development of iENSO's cloud platform which supports many of our imaging products and allows users to store data, perform data analysis, and manage connected devices.

### **III. LEVEL OF ORDINARY SKILL IN THE ART**

12. In rendering the opinions set forth in this declaration, I was asked to consider the patent claims and the prior art through the eyes of a person of ordinary skill in the art as of the effective filing date of the '916 Patent ("POSITA"), which I have concluded is January 7, 2014 for the reasons that I address in detail below (§VI.B). I understand that the factors considered in determining the ordinary level of skill in a field of art include the level of education and experience of persons working in the field; the types of problems encountered in the field; the teachings of the prior art; and the sophistication of the technology at the time of the alleged invention. I understand that a POSITA is not a specific real individual, but rather is a hypothetical individual having the qualities reflected by the factors above. I understand that a POSITA also would have knowledge from the teachings of the prior art, including the art cited below.

13. Taking these factors into consideration, on or before January 7, 2014, a POSITA relating to the technology of the '916 Patent would have had a Bachelor's

degree in electrical engineering and two years of work experience with network and communication technologies.

14. By January 7, 2014, my education and work experience was at least that of a POSITA. I am qualified to provide opinions concerning what a POSITA would have known and understood at that time, and my analysis and conclusions herein are from the perspective of a POSITA as of that date.

#### **IV. MATERIALS CONSIDERED AND RELIED UPON**

15. In forming my opinions and reaching the conclusions described in this declaration, I have relied on the documents and materials cited herein as well as those identified in this declaration, including the '916 Patent, the prosecution history of the '916 Patent, and prior art references cited herein. These materials comprise patents, related documents, and printed publications. Each of these materials is a type of document that experts in my field would have reasonably relied upon when forming their opinions. I have also relied on my education, training, research, knowledge, and personal and professional experience in the relevant technologies and systems that were already in use prior to, and within the timeframe of the earliest effective filing date of the '916 Patent (January 7, 2014).

16. Accordingly, as part of my independent analysis of the '916 Patent, I have analyzed the following publications and materials:

| <b><u>Exhibit</u></b> | <b><u>Description</u></b>                                                                                                                                                                                                                                                                                                             |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EX1001                | U.S. Patent No. 9,774,916 to Kuo et al. (“the ’916 Patent”)                                                                                                                                                                                                                                                                           |
| EX1002                | Prosecution History of the ’916 Patent (“the Prosecution History”)                                                                                                                                                                                                                                                                    |
| EX1004                | Prosecution History of U.S. Application Serial No. 13/293,506 (“the ’506 application”)                                                                                                                                                                                                                                                |
| EX1005                | Prosecution History of U.S. Application Serial No. 13/950,282 (“the ’282 application”)                                                                                                                                                                                                                                                |
| EX1006                | File History of U.S. Provisional Application Serial No. 61/924,240 (“the provisional application”)                                                                                                                                                                                                                                    |
| EX1007                | Lorex LH150 ECO4 Series Instruction Manual English Version 1.0 (2013), <i>available at</i> <a href="https://www.lorextechnology.com/downloads/security-dvr/LH150-Series/LH150_SERIES_MANUAL_EN_R1_web.pdf">https://www.lorextechnology.com/downloads/security-dvr/LH150-Series/LH150_SERIES_MANUAL_EN_R1_web.pdf</a> (“Lorex Manual”) |
| EX1008                | U.S. Publication No. 2011/0082941 (“Kim941”)                                                                                                                                                                                                                                                                                          |
| EX1009                | U.S. Publication No. 2014/0218517 (“Kim517”)                                                                                                                                                                                                                                                                                          |
| EX1010                | Doherty et al., <i>Wireless Home Networking Simplified</i> (2007) (“Doherty”)                                                                                                                                                                                                                                                         |
| EX1011                | U.S. Publication No. US2012/0198040 (“Kuo”)                                                                                                                                                                                                                                                                                           |
| EX1012                | Lorex Technology Inc., “How to set up remote access for DVR using - Lorex Stratus Connectivity” (June 18, 2013), <i>available at</i> <a href="https://www.youtube.com/watch?v=fMPRi9WFuTM">https://www.youtube.com/watch?v=fMPRi9WFuTM</a> (“Lorex Video”)                                                                            |
| EX1013                | U.S. Publication No. 2012/0113265 (“Galvin”)                                                                                                                                                                                                                                                                                          |
| EX1016                | U.S. Publication No. 2007/0300261 (“Barton”)                                                                                                                                                                                                                                                                                          |
| EX1017                | U.S. Publication No. 2007/0097860 (“Rys”)                                                                                                                                                                                                                                                                                             |

| <b><u>Exhibit</u></b> | <b><u>Description</u></b>                                                                                                                                                                                                                                                                                                  |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EX1019                | Lorex LNR300 netHD Series Instruction Manual English Version 1.0 (2013), <i>available at</i> <a href="https://www.lorextechnology.com/downloads/security-nvr/LNR300-Series/LNR300_SERIES_MANUAL_EN_R1_web.pdf">https://www.lorextechnology.com/downloads/security-nvr/LNR300-Series/LNR300_SERIES_MANUAL_EN_R1_web.pdf</a> |
| EX1020                | Ford et al., Peer-to-Peer Communication Across Network Address Translators, 2005 USENIX Annual Technical Conference, pp. 179-192 (“Ford”)                                                                                                                                                                                  |

17. Although this declaration refers to selected portions of the cited references, it should be understood that these are examples, and I recognize that a POSITA would have viewed the references cited herein in their entirety and in combination with other references cited herein or cited within the references themselves.

## **V. LEGAL STANDARDS**

18. I am not a lawyer and do not provide any legal opinions, but I have been advised that certain legal standards are to be applied by technical experts in forming opinions regarding meaning and validity of patent claims I have applied the legal standards described below, which were provided to me by counsel for the Petitioners.

19. It is my understanding that assessing the validity of a U.S. patent based on a prior art analysis involves two steps. First, one construes the terms of the patent claims to understand what meaning one of ordinary skill in the art would have given the terms. Second, after the claim terms have been construed, one then assesses

validity by comparing the patent claim properly construed to the “prior art.” I understand that the teaching of the prior art is viewed through the eyes of a POSITA as of the effective filing date of the ’916 Patent. My analysis as to what constitutes a POSITA is set forth above (§III).

**A. Legal Standards for Prior Art**

20. I understand that a patent or other publication must first qualify as prior art before it can be used to invalidate a patent claim. Counsel for Petitioners have informed me that Kim941 (EX1008), Kim517 (EX1009), Kuo (EX1011), and Galvin (EX1013) all qualify as prior art to the ’916 Patent. I have also assessed that Lorex Manual (EX1007) and Lorex Video (EX1012) were both publicly accessible and disseminated to the public before the earliest effective filing date (January 7, 2014) of the ’916 Patent, and therefore qualify as prior art printed publications to the ’916 Patent. *See below*, §§ VII.A, VII.E.

**B. Legal Standard for Priority Date**

21. I understand that the “priority date” or “earliest effective filing date” of a patent claim is the date on which the patent was filed, or the date on which an earlier-filed U.S., foreign, or international patent application was filed if the patentee claims the benefit of priority to that earlier-filed application and that earlier-filed application provides enabling disclosure of the patent’s claimed subject matter. I have reviewed ’916 Patent and each of several earlier-filed applications to which the

patentee claims priority. For the reasons that I explain in further detail below (§VI.B), it is my firm opinion that the Challenged Claims of the '916 Patent are entitled to an effective filing date no earlier than January 7, 2014.

### **C. Legal Standard for Obviousness**

22. My understanding is that a patent claim is invalid as obvious only if the subject matter of the claimed invention “as a whole” would have been obvious to a POSITA as of the earliest effective filing date of that patent claim. To determine the differences between a prior art reference (or a proposed combination of prior art references) and the claims, the question of obviousness is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious.

23. It is my understanding that there is no single way to define the line between true inventiveness on one hand—which is patentable—and the application of common sense and ordinary skill to solve a problem on the other hand—which is not patentable. For instance, factors such as market forces or other design incentives may be the source of what produced a change, rather than true inventiveness.

24. I understand that, when assessing obviousness, one may consider whether the change was merely the predictable result of using prior art elements according to their known functions, or whether it was the result of true inventiveness. And, one may consider whether there is some teaching or suggestion in the prior art

to make the modification or combination of elements recited in the claim at issue. Also, one may consider whether the innovation applies a known technique that had been used to improve a similar device or method in a similar way and whether the claimed invention would have been obvious to try. In determining whether the claimed invention would have been obvious to try, the claim must be directed to a relatively small number of possible approaches to the problem for which a POSITA would have reasonably expected success implementing before the earliest effective filing date.

25. I understand that obviousness is assessed through the eyes of a POSITA as of the earliest effective filing date and that one should not consider what is known today or what is learned from the teaching of the patent.

26. I understand that an obviousness determination entails consideration of the scope and content of the prior art; the difference or differences, if any, between the claim of the patent and the prior art; the level of ordinary skill in the art at the time the claimed invention was made; and, if available, objective indicia of non-obviousness, also known as “secondary considerations.”

27. I understand that the secondary considerations can include: commercial success of a product due to the merits of the claimed invention; a long felt need for the solution provided by the claimed invention; unsuccessful attempts by others to find the solution provided by the claimed invention; copying of the claimed

invention by others; unexpected and superior results from the claimed invention; acceptance by others of the claimed invention as shown by praise from others in the field or from the licensing of the claimed invention; teaching away from the conventional wisdom in the art at the time of the invention; independent invention of the claimed invention by others before or at about the same time as the named inventor thought of it; and other evidence tending to show obviousness. I understand that, to establish a secondary consideration, the evidence must demonstrate a nexus between that secondary consideration and the claimed invention.

## **VI. OVERVIEW OF THE '916 PATENT**

### **A. Subject Matter Overview**

28. The '916 Patent is titled "Information Concentrating Center Capable of Making P2P Connections with Remote Client Devices." The '916 Patent generally describes techniques for establishing a point-to-point (P2P) connection over the Internet between an information concentrating center such as a set top box) and a client device such as a mobile phone. EX1001, 1:37-54, 12:52. Point-to-point connections like those described in the '916 Patent commonly include or are referred to "peer-to-peer" connections, also abbreviated as "P2P" connections. *See, e.g.*, EX1020, 1 ("peer-to-peer (P2P) communication")

29. According to the specification, the information concentrating center is assigned a unique identification (UID) that it registers with a "linking server." The

linking servers is configured to facilitate the establishment of a P2P connection between the information concentrating center and the client device. EX1001, 1:63-67, 13:53-14:57, FIG. 19. The client, which is not registered in the linking server, sends a request to the linking server that contains the UID for the information concentrating center, thereby prompting the linking server to send “hole punching” messages to both the client and the identified information concentrating center to establish the P2P connection. EX1001, 2:1-11; *see also* 14:51-57 (“there are many ways to establish P2P connection ... through the Internet, and [the] present invention is not limited to the ways of establishing the P2P connections”).

30. By way of example, the topology of an example network that includes a remote client device 1706, a set top box 1730, and a linking server 1750 where the above-described P2P connection can be established is shown in FIG. 19:

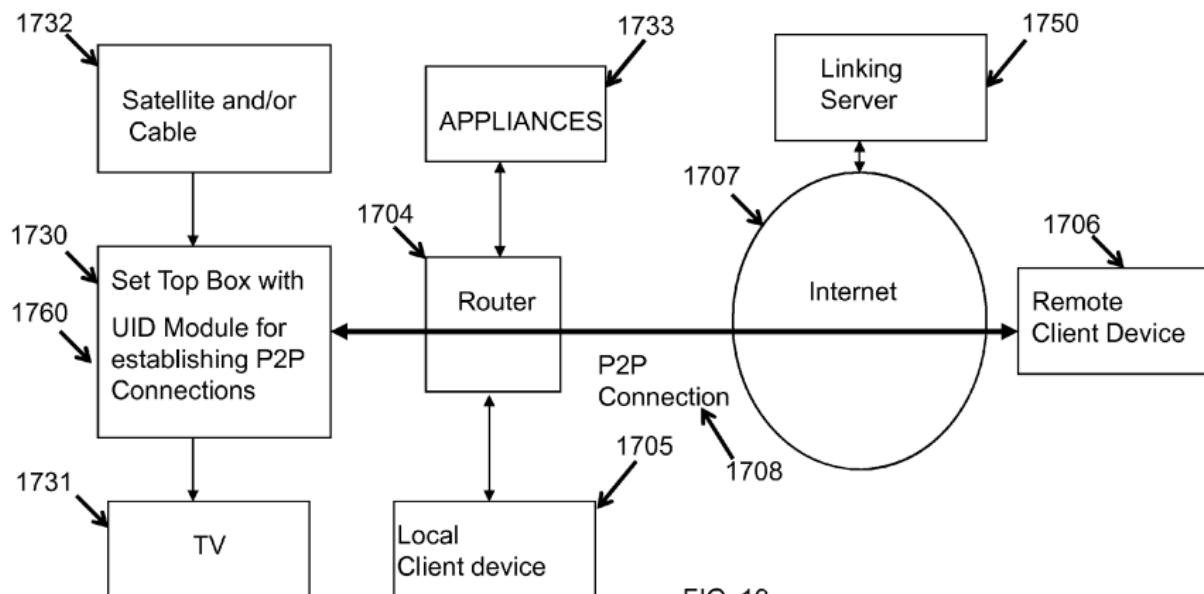


FIG. 19

EX1001, FIG. 19.

31. Conventional techniques for establishing P2P connections were often complex and involved protocols ranging from dynamic domain name system (DDNS) to port mapping and universal plug and play (UPnP), according to the specification. EX1001, 12:19-30. The '916 Patent purported to simplify this process through use of a "linking server" that would mediate communications between the information concentrating center and the remote client device while the P2P connection is established. EX1001, 12:47-62.

32. In view of my expertise in the field of computer networking and the documents I have reviewed in preparation of this declaration, I can confirm that the use of a "linking server" to establish P2P connections was not new before the earliest effective filing date of the '916 Patent (January 7, 2014). Linking servers, connection servers, and similar kinds of network devices were commonly used in computer networking to establish P2P connections between devices over the Internet. For example, as described in further detail below, Kim941 (EX1008) and Kuo (EX1011) both describe linking servers that facilitated the establishment of P2P connections between peer devices well before the earliest effective filing date of the '916 Patent.

**B. File History and Effective Filing Date of the '916 Patent**

33. As part of my preparation of this declaration, I reviewed the file history of the '916 Patent (EX1002). I understand that the '916 Patent was filed January 7,

2015, and claims priority to a provisional application (EX1006) filed January 7, 2014. *See* EX1001, 1:8-14. Additionally, the '916 Patent claims to be a “continuation-in-part” of two utility applications: (1) U.S. Serial No. 13/950,282 (EX1005) filed July 25, 2013, and (2) U.S. Serial No. 13/293,506 (EX1004) filed November 10, 2011.

34. I have carefully reviewed the content and file histories of the provisional application and each of the two earlier-filed continuation-in-part parent applications. Based on my review, it is clear that the Challenged Claims recite multiple limitations that were disclosed no earlier than the January 7, 2014 filing of the provisional application. The earliest effective filing date of the Challenged Claims can be no earlier than January 7, 2014.

35. The first several limitations of independent claim 1 of the '916 Patent highlight how the Challenged Claims include subject matter that was first introduced in the January 7, 2014 provisional and that was never described in the earlier-filed CIP applications in the alleged priority chain. These limitations recite the following language:

[1pre] An electronic device for concentrating  
information, comprising:

[1a] at least one first interface for receiving information  
from at least one information source;

[1b] a second interface coupling to the Internet, for establishing a connection with a remote client device through the Internet;

[1c] a third interface for connecting to a television for viewing said information

36. Neither the '282 application nor the '506 application describe an “electronic device for concentrating information” that includes all three of the “interfaces” recited in Elements [1a]-[1c]. Indeed, there is no mention at all of such an electronic device that includes any interface for connecting to a television for viewing information received from an information source through at least one other interface in either the '282 or the '506 applications. To the contrary, the provisional application filed on January 7, 2014 provides the first disclosure of an electronic device for concentrating information that has all three specific types of interfaces claimed in Elements [1a]-[1c]. The provisional application describes these features with respect to FIGS. 1-3, for example. FIGS. 1-3 of the provisional (and the related textual description of these figures) were later integrated as FIGS. 17-19 of the application that issued as the '916 Patent. *Compare* EX1001, FIGS. 17-19 *with* EX1006, FIGS. 1-3; *see also* EX1001, 12:63-13:41, 13:53-14:9.

37. FIG. 3 of the provisional illustrates one example of a networked system containing a set top box—i.e., an “electronic device for concentrating

information”—having three interfaces consistent with the features recited in claim 1, for example:

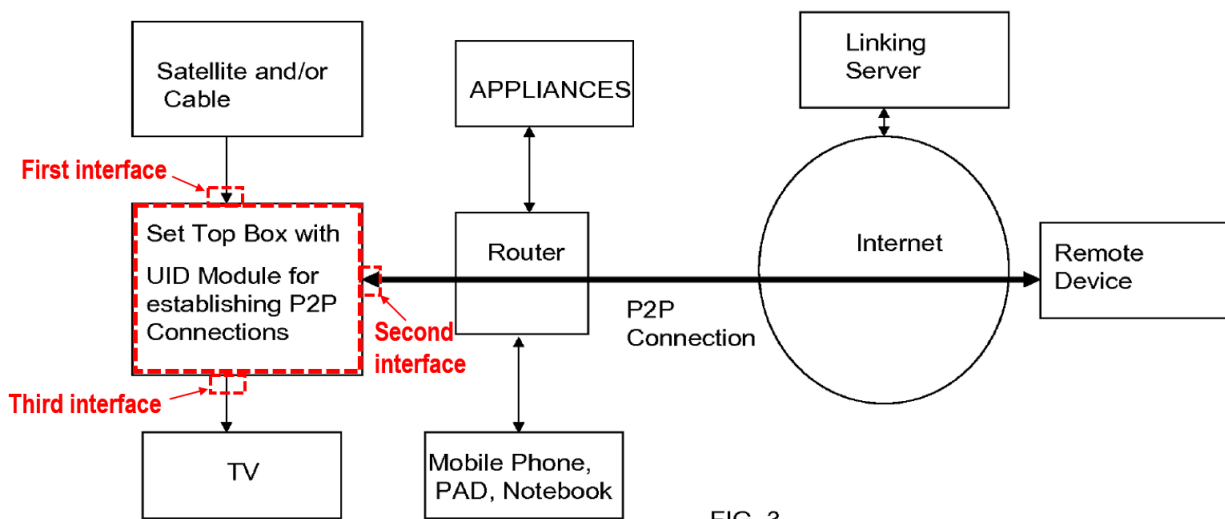


FIG. 3

EX1006, FIG. 3 (annotated)

See also EX1006, pp. 3-6, FIGS. 1-2.

As shown in FIG. 3, the set-top box is communicatively coupled to (1) a satellite and/or cable source (i.e., an information source), (2) a router that connects the set-top box to a remote device over the Internet, and (3) a television on which video from the satellite and/or cable source can be viewed. EX1006, pp. 5-6, FIG. 3. Accepting this representation, it is clear that the set-top box shown in FIG. 19 includes “at least one first interface for receiving information from at least one information source” (e.g., the satellite and/or cable source), “a second interface coupling to the Internet, for establishing a connection with a remote client device through the Internet” (e.g., the connection to the Internet via the router), and (3) “a

third interface for connecting to a television for viewing said information,” as recited in claim 1.

38. To the extent that the earlier-filed continuation-in-part parent applications describe Internet-connected devices, they lack disclosure of an electronic device for concentrating information that includes the particular combination of interfaces recited in Elements [1a]-[1c]. Indeed, I have thoroughly reviewed both the '282 and '506 applications and could find no disclosure in either application that would even arguably support these limitations from independent claim 1 of the '916 Patent. Neither the '282 application nor the '506 application contains any figure that resembles FIGS. 1-3 of the provisional application or FIGS. 17-19 of the '916 Patent. Likewise, neither the '282 application nor the '506 application describes a set-top box or other information concentrating center that includes any interfaces for connecting to a television for viewing information received from an information source on at least one other port. Based on my review, I identified no use of the terms “television” or “TV” in the specifications of the '506 or '282 applications at all.

39. My independent analysis is further supported by the Patent Owner's own representations to the Examiner during prosecution of the '916 Patent. During prosecution, the Patent Owner specifically pointed to FIG. 19 (i.e., provisional FIG. 3) for support of several limitations recited in claim 1. EX1002, 85, 211, 215, 216.

Specifically, the Patent Owner told the Examiner that the claimed at least one first interface and second interface “can be found supportive in Fig. 19, wherein the set top box has an *interface for receiving information from satellite* or cable and another *interface coupling to the Internet*.” EX1002, 216. The Patent Owner also explained that the claimed third interface “can be found supportive in FIG. 19.” EX1002, 85. FIG. 19 was first introduced in the provisional application, and neither the Patent Owner nor the Examiner identified any disclosure present from the earlier-filed continuation-in-part parent applications as providing support for Elements [1a]-[1c].

40. During prosecution, I understand that the Patent Owner responded to rejections set forth in at least four Office actions. The Patent Owner’s arguments and remarks in these responses contained some notable admissions. For example, as noted above regarding the “interface[s]” of Elements [1a]-[1c], Patent Owner conceded that “it is well know[n] that each device must have an interface to couple to another device, hence an ‘interface’ is inherent in each device for coupling to another device to a skilled person in the art.” EX1002, 215. As to the claimed “unique identification (UID),” Patent Owner argued that “the unique identification (UID) is NOT a network address, such as an IP address” but rather is “used for identifying a network address such as an IP address.” *Id.*, 217. Patent Owner also contested the Examiner’s mapping of a prior art mobile phone to the claimed “information concentrating center,” asserting that “a skilled person in the art

WOULD NOT think of the wireless device/MOBILE PHONE as an information concentrating center such as a set top box in the first place.” *Id.*, 87.

41. The Examiner issued a notice of allowance on June 27, 2017. EX1002, 7-17. The Examiner’s notice of allowance included an Examiner’s amendment in which the term “information concentrating center” was replaced in the claims with the term “electronic device for concentrating information.” *Id.* The Examiner’s amendment also added Element [1h] to independent claim 1, which requires that “the remote client device does not have a unique identification (UID) to register in the at least one linking server for associating connecting information of the remote client device when the remote client device contacts the at least one linking server for establishing the P2P connection.” *Id.*

42. I do not agree with the Examiner’s decision to allow the application. Based on my review, the prior art combinations described in this declaration (Grounds 1A-2B) would have rendered obvious each of claims 1-10 and 16 of the ’916 Patent.

### **C. Interpretation of the ’916 Patent Claims at Issue**

43. For purposes of my analysis in this IPR proceeding, I understand that the terms that appear in the claims of the ’916 Patent should be interpreted according to their ordinary and customary meaning under the *Phillips* standard. In determining the ordinary and customary meaning, I understand that the words of a claim are first

given their plain meaning that those words would have had to a POSITA at the time of the alleged invention. I also understand that the structure of the claims, the specification and file history also may be used to better construe a claim insofar as the plain meaning of the claims cannot be understood. Moreover, I understand that even treatises and dictionaries may be used, albeit under limited circumstances, to determine the meaning attributed by a POSITA to a claim term at the time of filing. I have followed this approach in interpreting terms of the Challenged Claims herein.

44. I also understand that the words of the claims should be interpreted as they would have been interpreted by a POSITA as of the effective filing date of the Challenged Claims (not today). For purposes of my analysis here, I have interpreted the terms of the Challenged Claims from the perspective of a POSITA as of the January 7, 2014 priority date of the '916 Patent.

## **VII. OVERVIEW OF THE CITED REFERENCES**

### **A. Lorex Technology Publications**

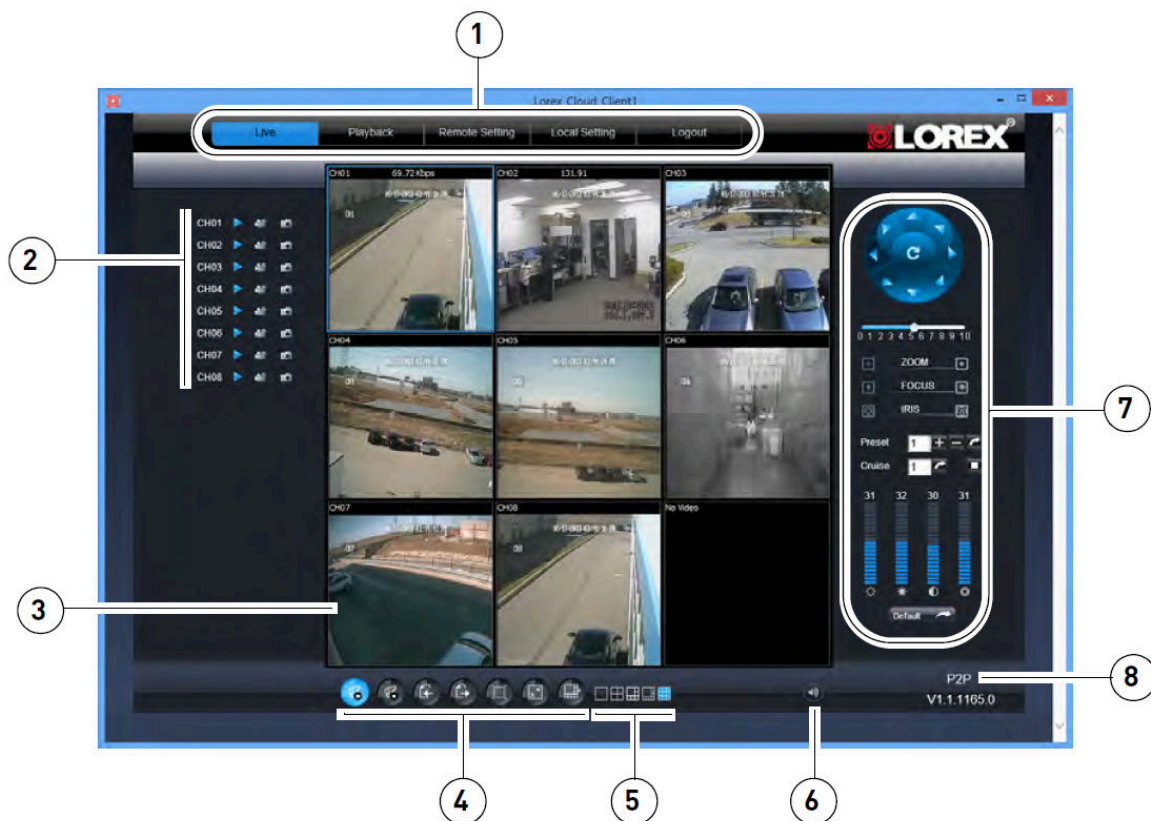
#### **1. Lorex Manual (EX1007)**

45. Lorex Manual is a detailed consumer product manual that explains technical features of the Lorex LH150 ECO4 Series Digital Video Recorder (DVR) and the Lorex Stratus client application and cloud-based services.

46. Lorex Manual describes steps for establishing a point-to-point (P2P) connection between the DVR and a remote client device, such as a smartphone,

tablet, or PC/MAC. EX1007, 57-62,<sup>1</sup> 84-117. The P2P connection allows a user to stream video and remotely access additional information from the DVR.

47. The following screenshot, for example, shows live video feeds from eight cameras streamed from the DVR to a remote PC over a “P2P” connection:

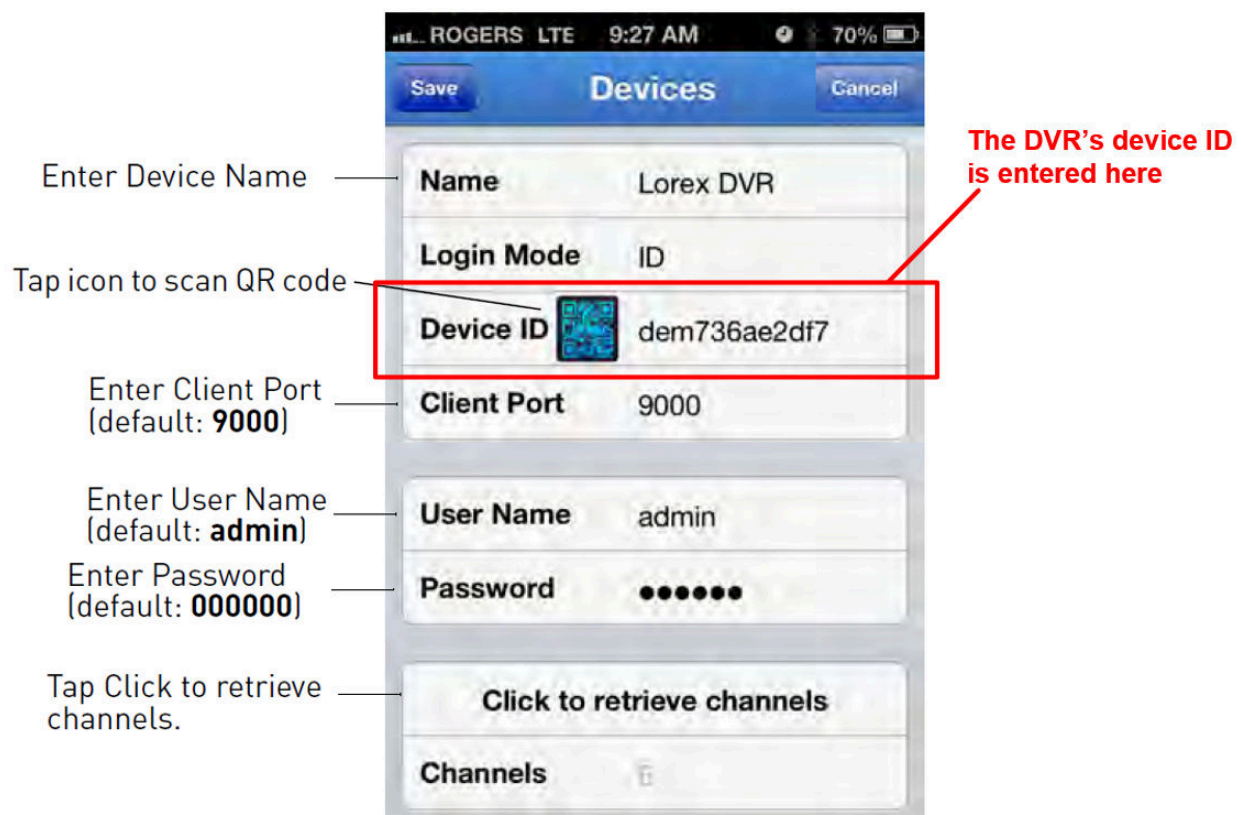


EX1007, 61

48. Lorex Manual explains that the Lorex LH150 ECO4 Series DVR is provided with a “device ID” that serves as “a unique code that allows your system to handshake with the Lorex servers for connection over the Internet.” EX1007, 58.

<sup>1</sup> Citations to Lorex Manual (EX1007) refer to the Manual’s native page numbers.

The user's smartphone, tablet, or PC uses the device ID to initiate a process for establishing a direct P2P connection with the DVR. EX1007, 61-62; *see also* 10, 84. By submitting the device ID and additional login information through a user interface at the smartphone, tablet or PC (like that shown below), the smartphone, tablet, or PC can remotely log into the DVR to stream live or recorded video:



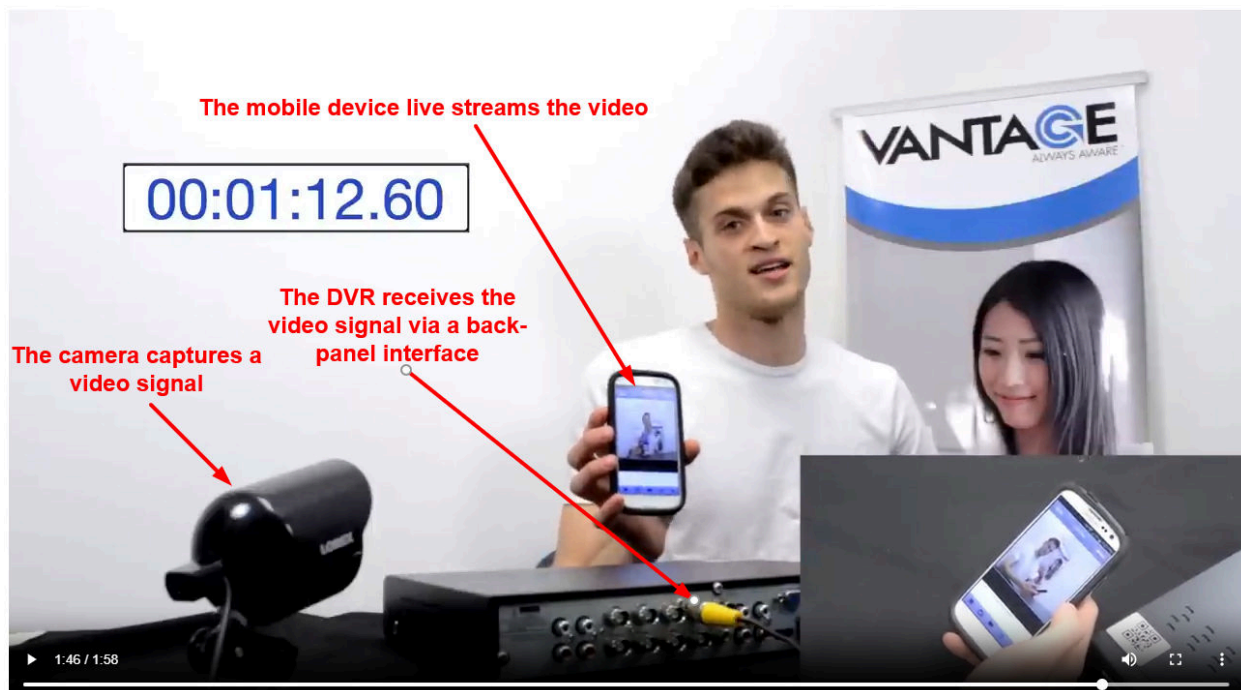
EX1007, 85 (annotated).

49. Lorex Manual explains that the method of connection using the device ID and Lorex's "Stratus" service is the "primary connectivity option" since it does not require extensive network (re-)configuration. EX1007, 10, 74. For instance, although dynamic domain name system (DDNS) is available as an alternate

connectivity method, Lorex Manual explains that DDNS involves more complex port forwarding, registration, and network configuration procedures that are not required by the primary connectivity option. EX1007, 10, 84.

## 2. Lorex Video (EX1012)

50. Lorex Video is a YouTube video from Lorex Technology Inc. that demonstrates the simple steps involved in connecting a smartphone to Lorex's ECO4 Series DVR using the Lorex Stratus connectivity app like that described in the Lorex Manual. Once established, the connection allows the smartphone to receive a live video stream of a video signal from a camera connected to the DVR:



EX1012, 1:46 (annotated).

51. Lorex Video demonstrates how the smartphone can be used to initiate a process of establishing a connection with the DVR by entering the DVR's "device ID" into a field of a user interface displayed on the phone. EX1012, 1:03-1:58. For example, the device ID can be obtained by scanning a QR code affixed to the DVR to autofill the user interface field. EX1012, 0:56-1:03.



EX1012, 1:02 (annotated).

52. Lorex Video describes several advantages of the Lorex Stratus service, including that complexities associated with port forwarding and router configuration are eliminated. EX1012, 0:15-0:28. Since the mobile device can initiate a connection using a device ID prominently displayed on a face of the DVR, the mobile device can readily establish the connection without extra manual configuration steps involving the mobile device. EX1012, 1:03-1:58.

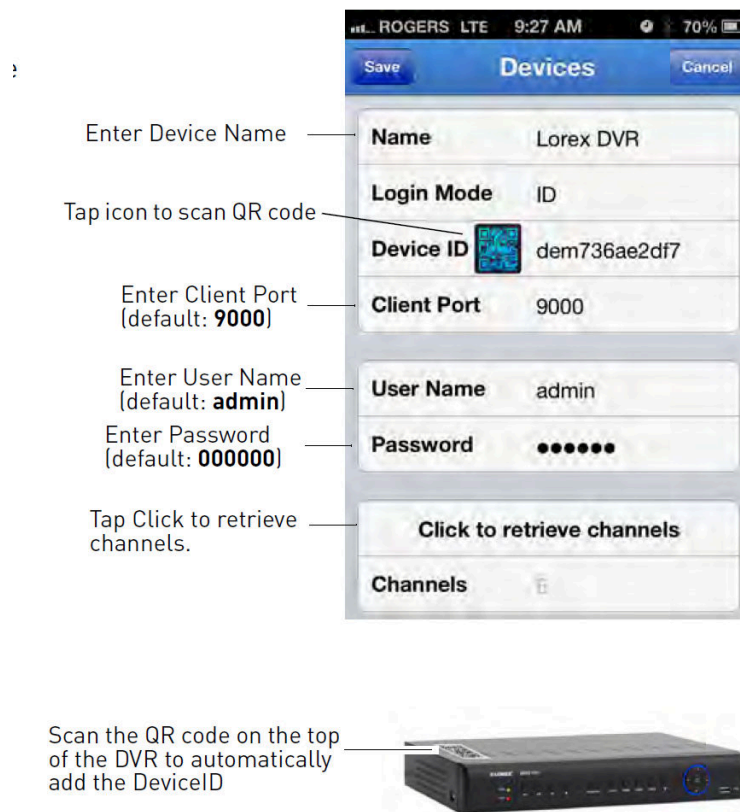
### **3. Public Accessibility and Dissemination of Lorex Manual and Lorex Video**

53. As noted above (§ II), I was employed at Lorex Technology, Inc. from March 2012 to 2016 as the Director of Engineering & Product Development. In this role, I gained personal knowledge of and became highly familiar with, the Lorex LH150 ECO4 Series DVR, the Lorex Stratus app and related connectivity solutions, the Lorex network server system, and all of the instructions/user guides/literature/how-to videos related to these products that were published by Lorex during 2012 and later. All of these materials were publicly disseminated with the intention of sharing with as many customers and potential customers as feasible. Among the publications of which I have personal knowledge are Lorex Manual (EX1007) and Lorex Video (EX1012).

54. I particularly recall the Lorex LH150 ECO4 Series DVR, the Lorex Stratus connectivity services, Lorex Manual, and Lorex Video for several reasons. First, I managed the group responsible for video recording products at Lorex. We submitted Lorex LH150 ECO4 Series DVR and other Lorex products for the Consumer Electronics Show (CES) innovation awards in 2013.

55. Second, the Lorex LH150 ECO4 Series DVR and Lorex Stratus connectivity services provided a rapid and improved process for achieving a direct point-to-point connection between a user's smartphone (having the Lorex Stratus app) and the Lorex LH150 ECO4 Series DVR. As demonstrated in Lorex Manual

(EX1007), the rapid and improved DVR onboarding and connection to network process was achieved simply by using the Lorex Stratus app (on the user's smartphone) to capture a QR code printed on a label affixed to the DVR:



EX1007, 85

56. Third, myself and other leaders at Lorex Technology in 2013 strongly believed that the LH150 ECO4 Series DVR (and the Lorex Stratus app) would be a hit with consumers, so we intentionally sought to publish the “how to” Lorex Video (EX1012) with a “stopwatch” graphic to highlight the simplistic and rapid nature of establishing a point-to-point connection between the DVR and the user's smartphone. *See* EX1012, 0:28-0:30 (“I’m going to time it, right here”). In our view at the time,

it was a success, as it garnered thousands of views on YouTube in 2013, which we believed led to many sales of the product in that year. The LH150 ECO4 Series DVR sold successfully through leading retail channels e.g. Costco, Amazon.com, BestBuy and many more.

57. Regarding the Lorex Manual, I have personally reviewed a PDF copy of this exhibit (EX1007) and downloaded it from the Lorex Technology website ([https://www.lorextechnology.com/downloads/security-dvr/LH150-Series/LH150\\_SERIES\\_MANUAL\\_EN\\_R1\\_web.pdf](https://www.lorextechnology.com/downloads/security-dvr/LH150-Series/LH150_SERIES_MANUAL_EN_R1_web.pdf)). EX1007 is the same document that I reviewed and approved for publication in 2013 while I was an executive at Lorex. Based on my review, EX1007 is a true and correct copy of the Lorex Manual that was published in 2013. Again, I am familiar with the Lorex Manual for the reasons detailed above and from my personal experience reviewing and approving it for publication in 2013. I note that the Lorex Manual includes the copyright date “© 2013” on its cover page:

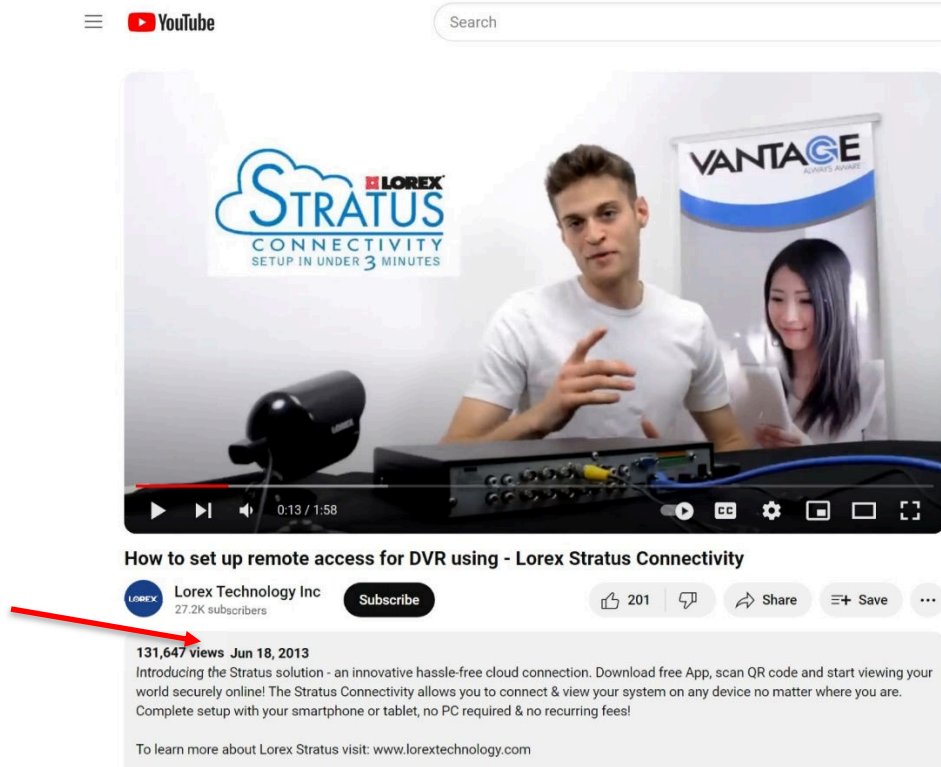


*See* EX1007, 1.

58. It was Lorex Technology’s ordinary and customary business practice to list the year the document was actually published and publicly distributed to members of the public—the year 2013 in this example shown above. Additionally,

based upon my personal knowledge and my estimation in accordance with Lorex Technology's product sales, Lorex Manual (EX1007) was publicly distributed to thousands of people in the U.S. and Canada during 2013—including the customers that purchased the Lorex LH150 ECO4 Series DVR and the members of the public that downloaded copies of the Lorex Manual (EX1007) freely from the Lorex Technology's web site.

59. Regarding Lorex Video entitled "How to set up remote access for DVR using - Lorex Stratus Connectivity" (EX1012), I have personally downloaded and viewed it from the publicly available YouTube link (<https://www.youtube.com/watch?v=fMPRi9WFuTM>). EX1012 is a true and correct copy of Lorex Video. Again, I am familiar with Lorex Video for the reasons detailed above and as a result of my personal experience reviewing and approving it for publication in 2013. I note that this Lorex Video accurately indicates it was published in 2013, as indicated by the following screenshot from the YouTube page located at the link provided above:



60. Based upon my personal knowledge detailed above, I recall that Lorex Video (EX1012) was indeed uploaded to YouTube in June 2013 and was actively and intentionally shared by Lorex’s support and sales teams to members of the public throughout the latter half of 2013 and beyond. Additionally, I recall that this Lorex Video (EX1012) was publicly accessible in 2013 using typical search strings in YouTube such as searches for “Lorex Technology” (ordinary customers of the Lorex products seeking these “how to” videos) or for “DVR + remote access + smartphone.” Indeed, as the screenshot above shows, the YouTube page for Lorex Video (EX1012) accurately identifies the creator of the video as Lorex Technology Inc., captures the subject matter of the video in its title “How to set up remote access for DVR using - Lorex Stratus Connectivity,” and further provides a short description of the video:

“Introducing the Stratus solution – an innovative hassle-free cloud connection. Download free App, scan QR code and start viewing your world securely online! The Stratus Connectivity allows you to connect & view your system on any device no matter where you are. Complete setup with your smartphone or tablet, no PC required & no recurring fees!” The descriptive content in these fields ensured that ordinary users interested in Lorex products specifically or remote video streaming solutions generally could locate the video through YouTube’s well-known search capabilities. Finally, based upon my access and my role at Lorex Technology during this time, I have personal knowledge that Lorex Video (EX1012) was publicly disseminated during 2013 to thousands of people and indeed received thousands of “views” on YouTube before the earliest effective filing date of the ’916 Patent (January 7, 2014).

**B. Kim941 (EX1008)**

61. Kim941 describes techniques for establishing P2P connections. EX1007, 61-62; EX1008, [0018]-[0020]. In Kim941, peer nodes P1 and P2 register with a remote server 100 by providing the server 100 with their respective unique IDs and address information (e.g., virtual address, network address, NAT address). EX1008, ¶[0055]. The server maintains a database of registered peer nodes in which the unique ID for each peer node is mapped to corresponding address information for that node. EX1008, ¶[0055]. Paragraphs [0054]-[0056] and [00075] below

describe how peer nodes can register a unique ID with a server and how the server can maintain a list of registered peer nodes that maps unique IDs to address information:

**[0054]** FIG. 2 is a flowchart illustrating a method of allocating a virtual address of a peer node in a server according to an exemplary embodiment of the present invention. FIG. 2 illustrates only one peer node P1.

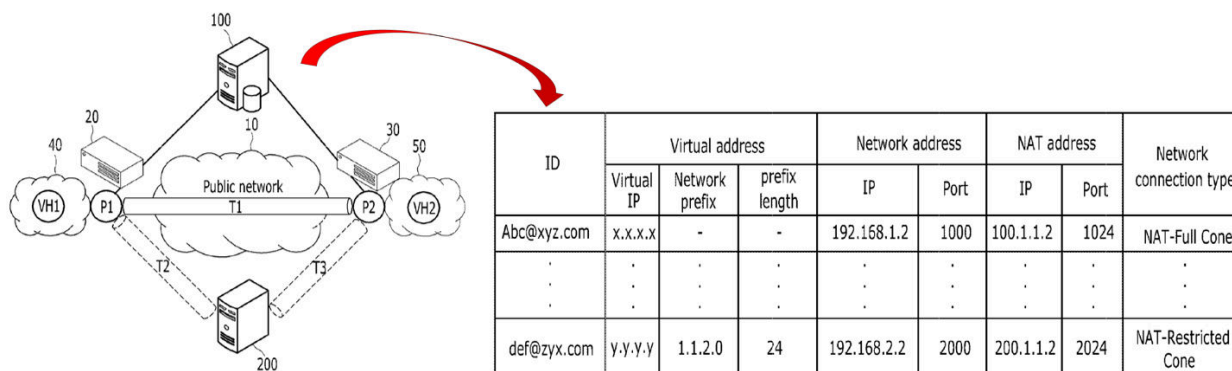
**[0055]** Referring to FIG. 2, in order to register information such as an ID and a password to the server 100, the peer node P1 transmits a registration request message including an ID and a password to the server 100 (S210).

**[0056]** The server 100 registers information such as an ID and a password of the peer node P1 (S220). Here, the ID is an identifier that can distinguish the peer node P1 in the server 100 and is formed with a string.

...

**[0075]** A virtual address, a network address, a NAT address, and a network connection type on an ID basis of the peer node P1 are stored in the storage unit 120. For example, as shown in FIG. 5, by mapping to an ID (abc(@)xyz.com, def@xyz.com) of a peer node, a virtual address, a network address, a NAT address, and a network connection type can be stored.

Kim941, [0054]-[0056], [0075].



EX1008, FIGS. 1 and 5 (annotated), [0075].

62. Once registered, peer nodes maintain a connection to server 100 or re-connect to server 100 at a later time to make themselves available for P2P connections. EX1008, [0078]-[0079], FIG. 6 (“S602”, “S604”); *see also id.*, FIG. 2 (“S210”), [0055]-[0060]; EX1001, ¶62. To initiate a direct connection with the second peer P2, the first peer P1 transmits a “tunnel query request” message to the server (which includes an ID of P2). EX1008, [0081] FIG. 6; EX1001, ¶62. In response to the “tunnel query request” message, the server 100 replies to P1 with a “tunnel query response” message (which includes a registered network address of P2) and additionally sends a “tunnel query notification” message to P2 (which includes a network address of P1) through the server 100’s existing connection with P2. EX1008, [0079]-[0084]. Peers P1 and P2 then use each other’s network addresses as received from server 100 to “punch[] a TCP or UDP hole” through each other’s respective firewalls or NATs (represented by elements 20 and 30 in FIG. 1), thereby establishing a peer-to-peer connection for “[d]irect communication between P1 and P2.” EX1008, [0083]-[0084], FIG. 6, *see also id.*, [0084], [0013].

### **C. Kim517 (EX1009)**

63. Kim517 describes “a home network system, and particularly, [a] home monitoring method and apparatus using electrical appliances and cameras.” EX1009, [0003]. Kim517 discloses that “[a] home network system refers to a system that

connects home devices installed in a house through a wired or wireless network so as to control the home devices.” EX1009, [0005]. Kim517 also discloses that “[a]n advanced home network system integrates home devices through a Home Gateway (HGW or H-GW) and connects the home devices to an external common data network, for example, an Internet Protocol (IP) network (that is, the Internet), so as to provide more various Internet-based services.” *Id.* This means that in addition to managing security cameras, Kim517’s home gateway device can manage smart appliances and other kinds of home devices.

64. FIG. 5 (reproduced below) depicts an example home network implemented in accordance with Kim517’s techniques, including a home gateway 510 wired or wirelessly connected to home devices 512a, 512b, 514, and 516. *Id.*, [0018], [0038]-[0047], [0056], [0059]-[0068]; *see also id.*, FIGS. 1-4 (and associated text). A user can use his or her mobile terminal 532 to remotely control the home devices 512a, 512b, 514 over the Internet 520 and through the home gateway 510:

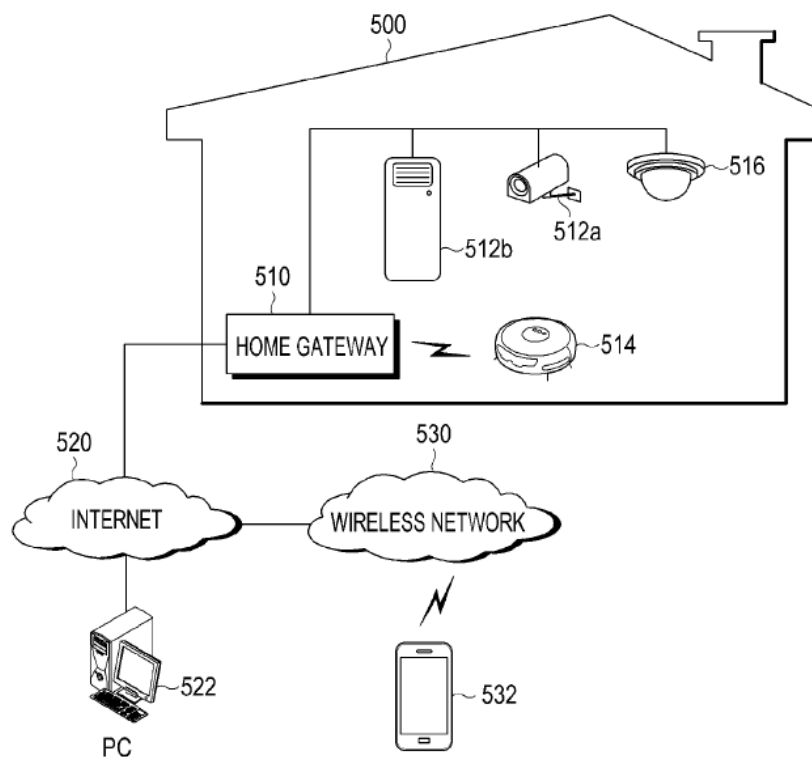


FIG.5

EX1009, FIG. 5.

*See also id.*, [0039]-[0040], [0067]-[0068], [0162]-[0169], FIGS. 18, 19A-19B.

#### **D. Kuo (EX1011)**

65. Kuo is a publication of an earlier-filed patent application by a subset of co-inventors named on the '916 Patent. *Compare* EX1001 *with* EX1011. The '916 Patent specification expressly refers to Kuo (U.S. Application Serial No. 13/293,506) multiple times for additional detail on aspects of the subject matter described and claimed in the '916 Patent. EX1011, 14:18-22 (“Please note that all the descriptions, in U.S. patent application Ser. No[.] 13/293,506 ... can be integrated in whole or in

part with the information concentrating center for establishing a P2P connection with a remote client device[] ...”)., 13:42-52, 14:10-16. Indeed, FIGS. 1-11 of Kuo are identical to those same figures in the '916 Patent.

66. Like the '916 Patent and Lorex Manual, Kuo describes techniques for establishing P2P connections between devices by hole punching. EX1007, 10; EX1011, ¶[0029]. In Kuo, a “remote device”<sup>2</sup> registers its unique serial number with a “linking server.” EX1011, ¶[0055]. For example, Kuo discloses that “[t]he remote devices A, B and C (31, 32 and 33) respectively have their unique IDs.” EX1011, ¶[0026]. Each remote devices is assigned to a respective linking server, sometimes based on a service provuider corresponding to the remote device, a location of the remote device, or a product corresponding to the remote device. EX1011, ¶[0027]. Kuo’s remote devices register their unique serial numbers with assigned linking servers. EX1011, ¶¶[0028], [0032]. Kuo explains that each linking server maintains a list of serial numbers corresponding to respective remote devices registered within that linking server, as shown below in Table 1:

---

<sup>2</sup> Remote devices include “security apparatuses” and “home electric appliances.” EX1011, [0039].

TABLE 1

| the mapping relationship between the remote devices and the linking server groups |                          |                                  |                     |
|-----------------------------------------------------------------------------------|--------------------------|----------------------------------|---------------------|
|                                                                                   | Codes of Linking Servers | Serial Numbers of Remote Devices | Notes               |
| Service Provider A                                                                | Ser 01                   | D01, D02, D03, D04, D05          | Ser 01: Shanghai    |
|                                                                                   | Ser 02                   |                                  | Ser 02: Tokyo       |
|                                                                                   | Ser 03                   |                                  | Ser 03: Los Angeles |
|                                                                                   | Ser 04                   | D06, D07, D08, D09               | Ser 04: New York    |
|                                                                                   | Ser 05                   |                                  | Ser 05: Berlin      |
| Service Provider B                                                                | Ser 11                   | D11, D12, D13,                   | Ser 11: Paris       |
|                                                                                   | Ser 12                   | D14                              | Ser 12: Cairo       |

EX1011, ¶[0033], TABLE 1 (annotated).

67. Kuo discloses that in Table 1, “the server list of the administration server stores the linking servers Ser 01-Ser 05 managed by Service Provider A and the linking servers Ser 11-Ser 12 managed by Service Provider B.” EX1011, ¶[0034]. As shown in table 1, “[r]emote devices D01-D05 are assigned to register in the linking servers Ser 01-Ser 03,” with remote devices D01-D03 assigned to Ser01 and remote devices D04 and 05 assigned to Ser 02. EX1011, ¶[0034], TABLE 1. Kuo explains that “D01-D05 are respectively the serial numbers of remote devices” and that “each remote device has a unique serial number, whereby the administration server or the linking server can verify or recognize the remote device.” EX1011,

¶[0034]. Accordingly, Kuo describes a system where a device can contact a linking server to register a unique device ID (i.e., serial number).

68. Kuo explains that a “proximal device”<sup>3</sup> can request a connection with a remote device registered in the linking server. EX1011, ¶[0038]. The proximal device can include an application programming interface (API) that allows a user to select a particular remote device for connecting to. EX1011, ¶[0038]. Based on this user selection, the proximal device locates a linking server where the remote device is registered and requests a connection with the remote device. EX1011, ¶[0038]. In response to receiving a connection request, Kuo’s linking server performs hole punching to establish a P2P connection between the remote device and the proximal device. EX1011, ¶[0038]. Kuo’s procedure for using a linking server to connect a remote device and a proximal device is described below in paragraph [0038], for example:

[0038] Refer to FIG. 11 showing a flowchart of the process that the user uses a proximal device to ask for connecting with a remote device. The user uses API of a proximal device to select a specified remote device. Then, the proximal device requests the administration sever to find out the specified remote device via API (Step S21). The administration server responds to the proximal device with the address of a linking server that the remote device registers (Step S22). Thus, the proximal device learns the linking server whereby it can connects with the specified remote device. Next, the proximal device asks the linking

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<sup>3</sup> Proximal devices include “mobile phones” and “computers.” EX1008, ¶[0039].

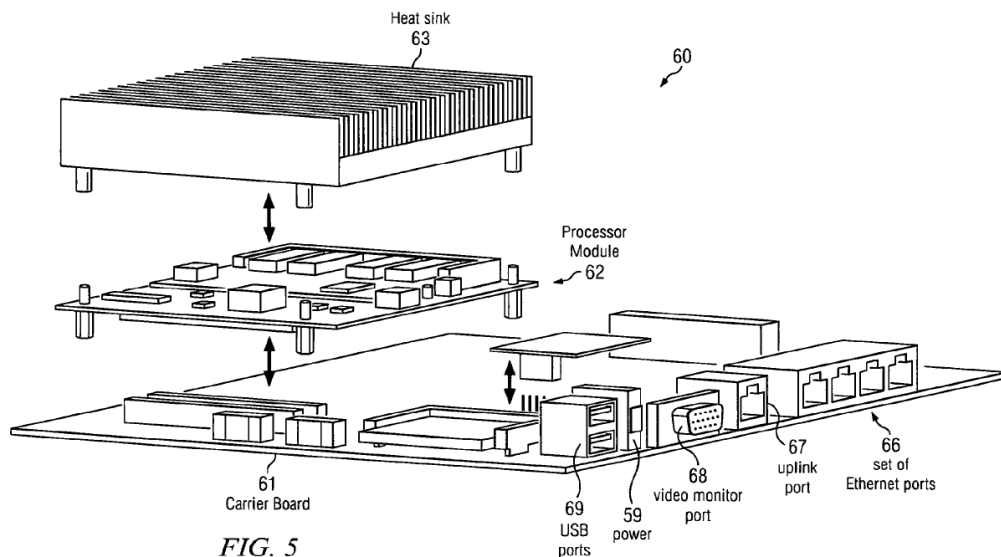
server to establish a link between the proximal device and the remote device (Step S23). The linking server takes priority to perform a hole punching process on the proximal device and the remote device (Step S24). If the hole punching process is successful, the proximal device and the remote device undertake point-to-point transmission (Step S25). If the hole punching process fails, the linking server forwards data packets between the proximal device and the remote device (Step S26).

69. Kuo expressly discloses that the remote devices are registered in the linking server, but proximal devices need not be registered because they simply use an API to identify a linking server or address for the particular remote device to which the proximal device requests to connect. EX1011, ¶¶[0010]-[0012] (“As long as a proximal device has API supported by the administration server, the user can request the administration server to find out the linking address.”), [0029]-[0039], FIGS. 3, 10-11. After reviewing Kuo, it would have been clear to a POSITA that Kuo’s remote devices register with the linking servers so that proximal devices can locate the remote devices based on their unique serial numbers *without needing to register*. Since a proximal device can simply look up a registered remote device to find its respective linking servers, the non-registered proximal devices can initiate connection this way without themselves registering with the linking servers.

**E. Galvin (EX1013)**

70. The Galvin reference has a teaching that is similar to Lorex Video. For example, Galvin discloses a video recorder that receives video streams from security cameras. EX1013, [0057]. Galvin’s video recorder has ports for connecting to

security cameras and at least one port for connecting to a video display monitor (e.g., television). EX1013, [0067] (“The various connections of network video recorder 1 are...a video monitor port 68 for connecting a video display... and a set of Ethernet ports 66...An IP camera 34, for example, is connected to network video recorder 1 by PoE cable 64 plugged into one of the set of Ethernet ports.”), FIGS. 4-5. Galvin teaches that the video recorder can output video from at least one of the security cameras for display by the video display monitor. EX1013, [0108].



EX1013, FIG. 5

## VIII. GROUND 1A: LOREX MANUAL IN COMBINATION WITH KIM941 RENDERS CLAIMS 1-8, 10, AND 16 OBVIOUS

### A. Overview of the Combination and Reasons to Combine

71. Based upon my knowledge and experience in the field and my review of Lorex Manual and Kim941, it is clear that a POSITA would have been motivated

to apply Kim941's suggested use of a network server for device registration and hole-punching for establishing P2P connections in the system described in Lorex Manual. For example, to the extent Lorex Manual does not expressly describe details as to how the DVR contacts the Stratus servers to register its device ID and later establish a P2P connection, these operations would have been obvious when considering the teachings of Kim 941.

72. As described above (§VII.B), Kim941 expressly describes a peer node that contacts a linking server 100 to register a unique ID with the server. EX1008, [0055] ("in order to register information such as an ID and a password to the server 100, the peer node P1 transmits a registration request message including an ID and a password to the server 100."), [0056]-[0060], FIG. 2. This allows the server 100 to facilitate hole punching and the establishment of a P2P connection between the peer node and another peer node based on the unique ID. EX1008, [0081]; *see also id.*, [0078]-[0089], FIG. 6. In the combination, Lorex Manual's DVR would predictably contact the Stratus servers to register its embedded "device ID" consistent with Kim941's teachings. A remote client device (e.g., the user's smartphone, tablet, or PC) would then be capable of identifying the DVR as the target of a requested P2P connection by specifying the unique ID of the DVR that has been registered with the server. EX1008, [0078]-[0089], FIG. 6.

73. Based on my review, multiple reasons would have prompted a POSITA to implement Lorex Manual in accordance with Kim941's suggested device registration and hole-punching techniques.

74. As a first reason, a POSITA would have understood that implementing Lorex Manual's system to include a conventional "network server" that facilitates hole-punching (as suggested by Kim941) would provide an improved and advantageous approach for establishing a P2P connection between the DVR and remote client device, especially where the DVR is located behind a firewall and/or network address translator (NAT) that would otherwise prevent the remote client device from initiating a P2P connection with the DVR (e.g., due to common security policies of firewalls/NATs that block unsolicited inbound communications from devices outside of the DVR's local network). *See, e.g.*, EX1020 ("Network Address Translation (NAT) causes well-known difficulties for peer-to-peer (P2P) communication, since the peers involved may not be reachable at any globally valid IP address."). By registering and maintaining a connection with the network server, the network server can apply predictable hole-punching techniques like those described with respect to FIG. 6 of Kim941 to safely notify the DVR of the remote client device's request for a direct connection and to provide each of the DVR and the remote client device with the other's network address information as needed to establish a P2P connection. Indeed, Kim941 expressly suggests using the hole-

punching server for the “advantages of allowing to perform direct communication between Peer-to-Peer (P2P) ... in an IP network in which a firewall or a NAT exists,” which Kim941 describes as beneficially “simplifying a processing procedure.” EX1008, [0018]-[0019], [0121].

75. As a second reason, a POSITA would have been motivated to implement Lorex Manual in a predictable manner that employs Kim941’s suggested use of a network server and hole punching for connecting the remote client device (e.g., the user’s smartphone, tablet, or PC) to Lorex Manual’s DVR because Kim941’s network server can conveniently work with an “existing application” like Lorex Manual’s “ECO Stratus” app to advantageously “construct[] a direct communication environment for ... a video camera.” EX1008, [0123] (“very effective for constructing a service environment such as ... P2P”).

76. As a third reason, a POSITA would have been prompted to implement Lorex Manual’s system to include a “network server” that uses hole-punching (as suggested by Kim941) to predictably form a “direct communication environment of an IP level” between Lorex Manual’s DVR and the user’s remote client device—and particularly in a manner that renders it “unnecessary for each application service to form a special session,” thereby improving “flexibility” in “operating each service.” EX1008, [0122].

77. As a fourth reason, a POSITA would have understood that implementing Lorex Manual's system to include a network server that uses hole-punching while also using registered "connection type" information from a peer (as suggested by Kim941) would beneficially allow the server to confirm whether a direct tunnel can be formed between the IP camera and user's/terminal device. EX1008, [0078]-[0083], [0094]-[0099], [0014]-[0018], FIGS. 6, 8. Notably, the application of Kim941's techniques are consistent with and would have furthered Lorex Manual's goal of establishing a P2P connection between a DVR and a remote client device. EX1008, 62. In the combination, Kim941's network server and hole-punching techniques would improve Lorex Manual's system by ensuring that the DVR and remote client device could establish a P2P connection in wide range of circumstances such as where the DVR and remote client device are located behind firewalls/NATs and/or where the DVR and remote client devices require either the same or different connection types. EX1008, [0006]-[0007], [0014].

78. Based upon my knowledge and experience in this field and my review of the relatively straightforward and predictable structures in Lorex Manual and Kim941, it is clear that a POSITA would have possessed the requisite level of skill to implement this combination given the overlapping technologies of Lorex Manual and Kim941—and certainly would have had a reasonable expectation of success in achieving this combination in the manner described above. Both references are

directed to technology for establishing P2P connections among networked devices (e.g., peer devices). As I have explained throughout this declaration, the state of the art for such networked devices and their interconnectivity was relatively advanced by the earliest effective filing date of the '916 Patent.

**B. Independent Claim 1**

79. Independent claim 1 of the '916 Patent recites:

1. An electronic device for concentrating information, comprising:

- at least one first interface for receiving information from at least one information source;
- a second interface coupling to the Internet, for establishing a connection with a remote client device through the Internet;
- a third interface for connecting to a television for viewing said information; and
- a unique identification (UID) embedded in the electronic device for concentrating information, wherein the electronic device for concentrating information contacts at least one linking server through the Internet to register said embedded unique identification (UID) into the at least one linking server for identifying network addressing information of the electronic device for concentrating information so as to enable the remote client device to establish a P2P connection with the electronic device for concentrating information for viewing said information received by the electronic device for concentrating information;

wherein the remote client device contacts the at least one linking server through the Internet according to said unique identification (UID) of the electronic device for concentrating information for establishing a P2P connection between the remote client device and the electronic device for concentrating information via the Internet, wherein at least one portion of the information received by the electronic device for concentrating information is delivered to the remote client device on the P2P connection, wherein the remote client device does not have a unique identification (UID) to register in the at least one linking server for associating connecting information of the remote client device when the remote client device contacts the at least one linking server for establishing the P2P connection.

80. As I explain in more detail below through my element-by-element analysis, Lorex Manual in view of Kim941 renders claim 1 obvious.

***[1pre] An electronic device for concentrating information, comprising:***

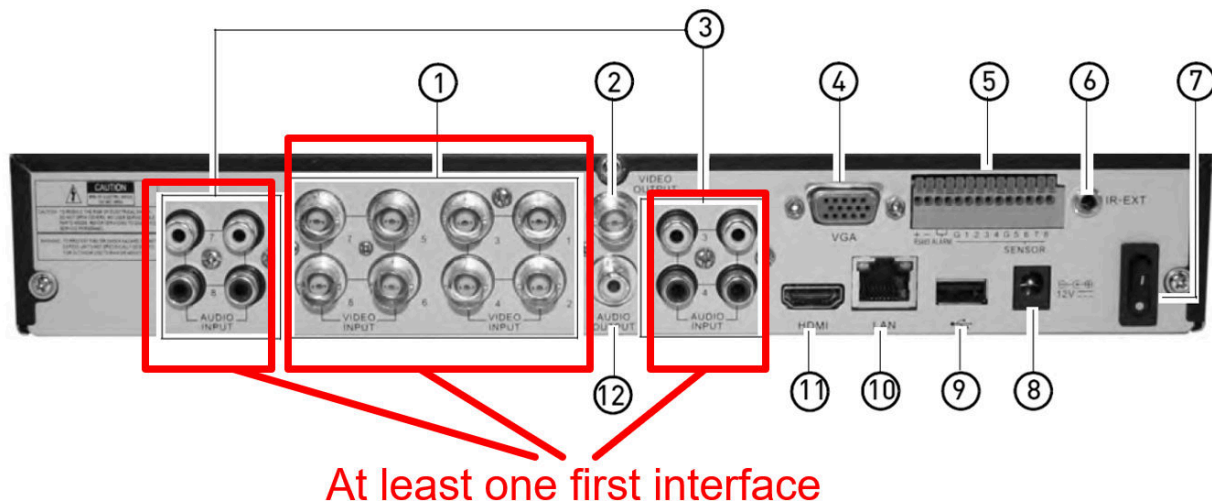
81. The Lorex Manual-Kim941 combination provides the recited “electronic device for concentrating information.” Lorex Manual discloses, for example, an *electronic device* (e.g., a DVR) that *concentrates information* (e.g., video streams) from one or more cameras of a security system. EX1007, 5. In addition, Lorex Manual describes both an 8-channel DVR having eight video input ports and a 16-channel DVR having sixteen video inputs ports for receiving respective video streams from up to eight or sixteen connected cameras, respectively. EX1007, 5-6.

82. Therefore, the Lorex Manual-Kim941 combinations provides Element [1pre].

***[1a] at least one first interface for receiving information from at least one information source;***

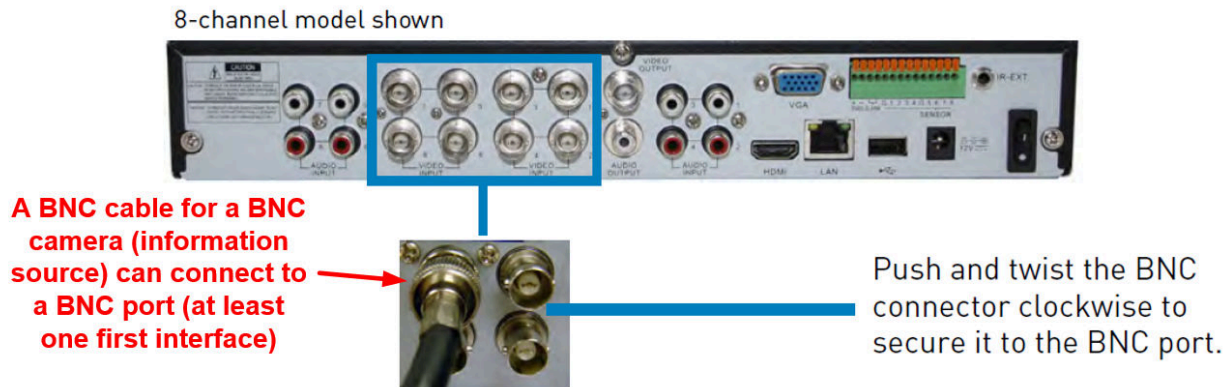
83. The Lorex Manual-Kim941 combination provides Element [1a]. As I have noted above (*see* [1pre]), the DVR described in Lorex Manual includes video input ports (*at least one first interface*) configured to connect to up to eight or sixteen video cameras as information sources for video data (*at least one information source*). EX1007, 5 (“1 Video Input; Connect up to 8 BNC cameras”; “3 Audio Input: Connect up to 8 RCA audio-enabled cameras”), 6. The DVR also includes audio input ports for receiving audio signals from audio-enabled cameras, as another example of the claimed “*at least one first interface*.” EX1007, 5-6. The

video and audio input ports of Lorex Manual's 8-channel DVR are shown below in an annotated figure from Lorex Manual:



EX1007, 5 (annotated).

84. To the extent that Lorex Manual does not show the video input ports and the audio input ports being connected to information sources such as cameras and microphones, I believe that it would have been obvious to a POSITA that Lorex Manual's "Video Input" and "Audio Input" each represent at least one interface for receiving information from at least one information source. One reason for this is because Lorex Manual describes the "Video Input" as being configured to connect up to 8 Bayonet Neill-Concelman (BNC) cameras. A "BNC camera" is a camera that uses a well-known kind of interface referred to as a "BNC connector." BNC connectors are coaxial cables that can connect to a BNC interface such as the video inputs of Lorex Manual's DVR. Lorex Manual shows how a BNC connector for a BNC camera can connect to one of video interfaces on the DVR:

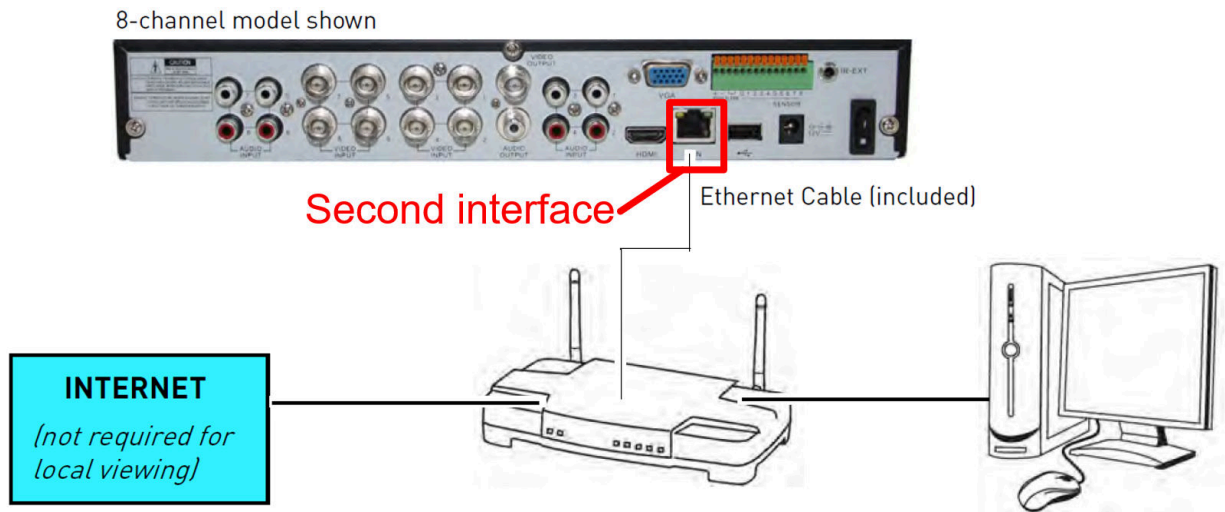


EX1007, 7 (annotated).

85. Therefore, the Lorex Manual-Kim941 combination provides Element [1a].

*[1b] a second interface coupling to the Internet, for establishing a connection with a remote client device through the Internet;*

86. The Lorex Manual-Kim941 combination provides Element [1b]. Lorex Manual teaches that the DVR includes a local area network (LAN) port (*a second interface*) that receives one end of an ethernet cable for connecting the DVR to an Internet router. EX1007, 5-6, 7 (“Connect an ethernet cable...to the LAN port...Connect the other end of the ethernet cable to a router on your network.”). In addition, Lorex Manual teaches that the router connected via the ethernet cable to the LAN port of the DVR connects to the Internet. EX1007, 58. A network topology of the DVR connected to the Internet and a remote client device (e.g., a smartphone, tablet, or PC) via the router is shown below in an annotated figure from Lorex Manual:



EX1007, 5 (annotated).

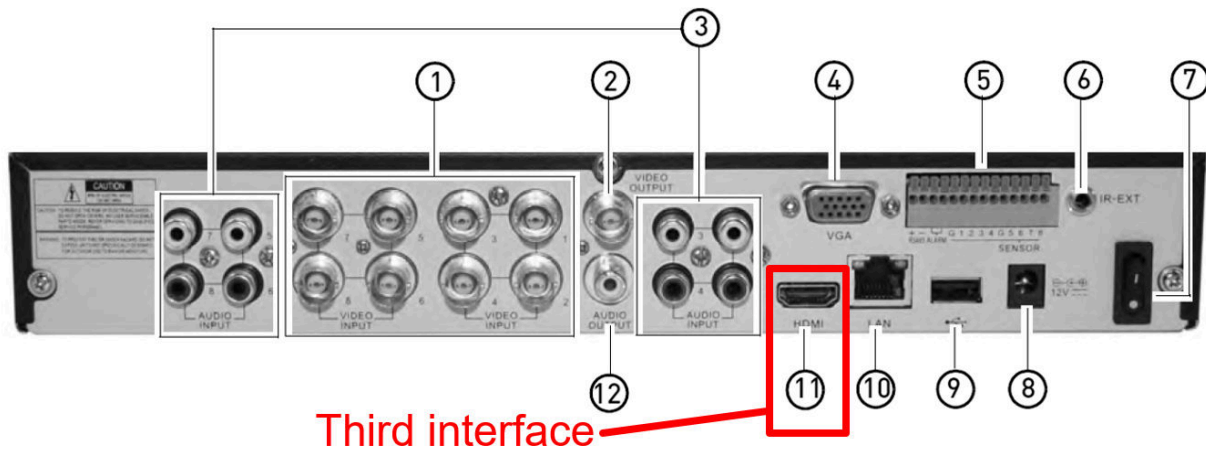
87. According to Lorex Manual, a *remote client device* (e.g., a smartphone, tablet, or PC) can connect to the DVR over the Internet to remotely stream video from the cameras connected to the DVR or from video recorded or otherwise stored on the DVR. EX1007, 84 (“You can remotely view camera streams from your DVR on compatible mobile phones and tablets.”). Lorex Manual explains that this remote connection is achieved by an Ethernet cable connecting the LAN port (*second interface*) of the DVR to an Internet router. EX1007, 84.

88. Lorex Manual thus discloses a *second interface* (e.g., the LAN port) coupling to the *Internet* for establishing a *connection* with a *remote client device* (e.g., a smartphone, tablet, or PC) through the *Internet*. EX1007, 5, 7, 58, 84.

89. Therefore, the Lorex Manual-Kim941 combination provides Element [1b].

***[1c] a third interface for connecting to a television for viewing said information; and***

90. The Lorex Manual-Kim941 combination would have rendered obvious Element [1c]. Lorex Manual teaches that the DVR includes a high-definition multimedia interface (HDMI) port for connecting to a ***television*** for viewing ***information*** that is concentrated by the DVR. EX1007, 5, 8. Specifically, Lorex Manual discloses that an HDMI cable can connect the HDMI port of the DVR to a ***television***. EX1007, 5, 8 (“Connect the included HDMI cable from the HDMI port to the TV or monitor.”). The third interface of Lorex Manual’s DVR is illustrated below.



EX1007, 5 (annotated).

91. In addition, Lorex Manual discloses that the ***television*** connected to the ***third interface*** (i.e., HDMI port) of the DVR can display ***information*** (i.e., video data) concentrated by the DVR. EX1007, 15. For example, Lorex Manual describes a remote control that can control an interface displayed by the television to play back

video recordings. EX1007, 15 (“Press 0 three times to show the mouse cursor on the BNC monitor or the monitor connected with HDMI... In Playback Mode, press to play video.”). Consequently, Lorex Manual discloses that the DVR includes a ***third interface*** (i.e., HDMI port) for connecting to a ***television*** for viewing ***information*** (i.e., video) concentrated by the DVR. EX1007, 5, 8, 15.

92. Therefore, the Lorex Manual-Kim941 combination provides Element [1c].

***[1d] a unique identification (UID) embedded in the electronic device for concentrating information,***

93. The Lorex Manual-Kim941 combination provides Element [1d]. The ***electronic device*** (e.g., DVR) of Lorex Manual includes a “device ID.” EX1007, 58-60, 85, 93. Lorex Manual explains that this device ID is a “unique code” that represents a ***unique identification (UID)*** of the DVR. EX1007, 58. In addition to describing the DVR’s device ID as a “unique code,” the examples of device IDs shown in Lorex Manual are 12-character strings of letters and numbers (e.g., “dem736ae2df7,” “dem78dde6d86,” and “dem98c475b90”). EX1007, 58, 59, 85. Other than the first three characters “dem” which are the same for every device ID, these device IDs appear to include randomly generated strings of characters. *Id.* Using randomized strings of characters is consistent with known techniques for assigning “unique” device identifiers.

94. The device ID of the DVR is physically *embedded* in the DVR by a label attached to a housing of the DVR. EX1007, 58. This label contains the device ID printed in standard characters and encoded in a quick-response (QR) code. EX1007, 85. For example, Lorex Manual describes two options for obtaining the DVR’s device ID to enter into a user interface field of a mobile application. EX1007, 85. The first option is to “[s]can the QR code on the top of the DVR to automatically add the device ID.” *Id.* The second option is to “manually enter the Device ID printed on the label” on the top of the DVR. *Id.* This means that the device ID of the DVR is physically *embedded* on a label on the top surface of the DVR in two ways – encoded in a QR code and printed for manual entry.

95. In addition to being physically *embedded* on the housing of the DVR, the device ID is digitally *embedded* in the DVR that allows other devices to connect with the DVR over the Internet using the device ID. EX1007, 58. Kim941 likewise discloses that a peer node can include an ID that is digitally *embedded* in the peer node. EX1008, [0056]. Kim941 explains that this ID is unique and “distinguishes” the peer node. EX1008, [0056]. Further, in the predictable Lorex Manual-Kim941 combination, the device ID is embedded in the peer node to permit the peer node to register with a conventional hole-punching server using the device ID.

96. Therefore, the Lorex Manual-Kim941 combination provides Element [1d].

***[1e] wherein the electronic device for concentrating information contacts at least one linking server through the Internet to register said embedded unique identification (UID) into the at least one linking server for identifying network addressing information of the electronic device for concentrating information so as to enable the remote client device to establish a P2P connection with the electronic device for concentrating information for viewing said information received by the electronic device for concentrating information;***

97. The teachings of Lorex Manual in view of Kim941 would have rendered Element [1e] obvious. To start, Lorex Manual describes a cloud connectivity service – referred to as “Lorex Stratus Connectivity” – that allows a ***remote client device*** (e.g., a computer, tablet, or mobile device) to connect to the DVR over the Internet. EX1007, 10. This cloud connectivity service creates a connection between the ***remote client device*** and the DVR through a “secure handshake” between the ***remote client device*** and Lorex’s Stratus servers. EX1007, 10. These Stratus servers represent ***at least one linking server*** that are separate from the DVR and the ***remote client device*** and can facilitate an Internet connection (e.g., a “link”) between the DVR and the ***remote client device***. EX1007, 10.

98. Lorex Manual expressly discloses that the connection between the ***remote client device*** and the DVR can be a peer-to-peer (P2P) connection. EX1007, 62. When a P2P connection is established, the ***remote client device*** can display information (e.g., video) streaming directly from the DVR to the ***remote client***

*device*. EX1007, 62. Lorex Manual distinguishes this direct P2P connection from a relay (RLY) connection in which the *remote client device* receives information from the DVR through the Lorex servers and indicates that the relay connection is “only used when a direct connection cannot be made between the DVR and the computer. EX1007, 62, 87-90.

99. Lorex Manual explains that the *remote client device* (e.g., a computer, tablet, or mobile device) uses the *unique identification (UID)* (e.g., device ID) of the DVR to perform a secure handshake with the Stratus servers to establish a connection with the DVR over the Internet. EX1007, 10, 57. Lorex Manual’s *remote client device* performs this secure handshake with the Stratus servers using a message that includes the device ID of the DVR. EX1007, 59, 85, 93.

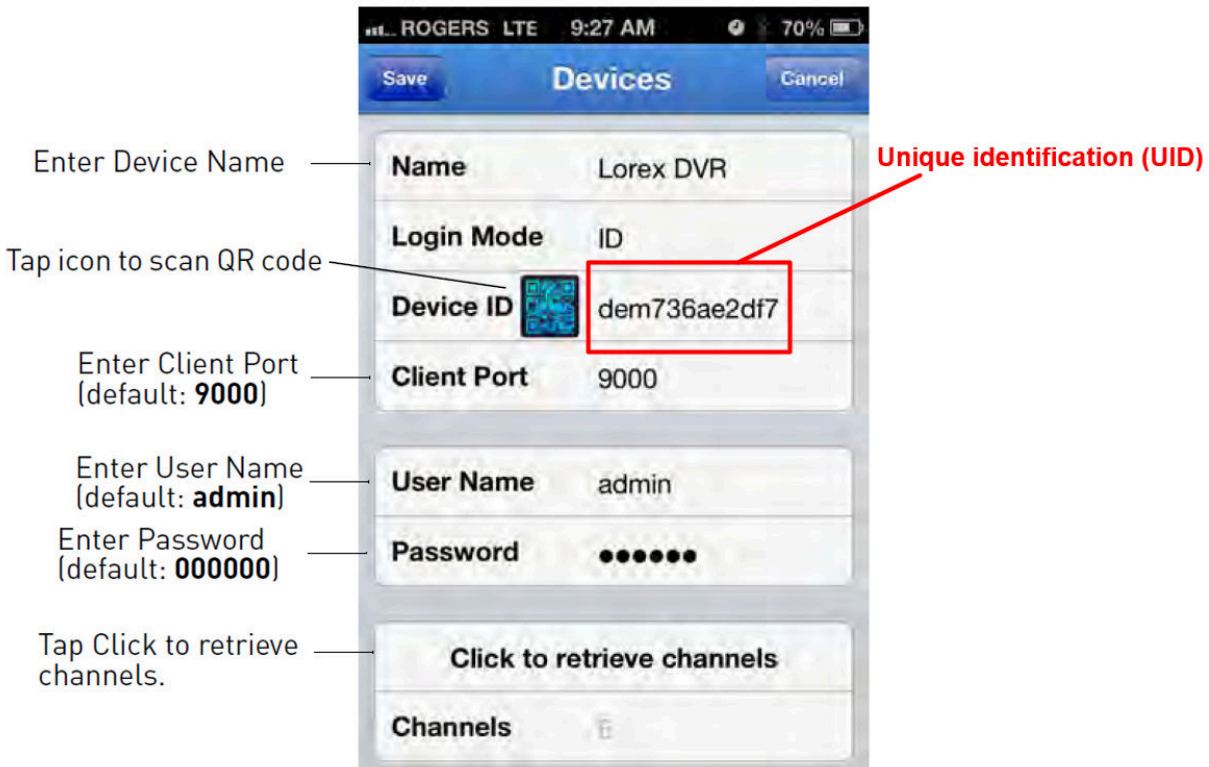
100. To the extent Lorex Manual does not expressly disclose that the DVR contacts the Stratus servers to register the device ID, these operations would have been predictably provided by the Lorex Manual-Kim941 combination. Kim941, for example, expressly describes a peer node that contacts a linking server 100 to register a unique ID with the server. EX1008, [0055] (“in order to register information such as an ID and a password to the server 100, the peer node P1 transmits a registration request message including an ID and a password to the server 100.”), [0056]-[0060], FIG. 2. This allows server 100 to facilitate hole punching and the establishment of a P2P connection between the peer node and

another peer node based on the unique ID. EX1008, [0081]; *see also id.*, [0078]-[0089], FIG. 6. In the combination, Lorex Manual's DVR would predictably contact the Stratus servers (*at least one linking server*) to register its embedded "device ID" consistent with Kim941's teachings.

101. Therefore, the Lorex Manual-Kim941 combination provides Element [1e].

*[1f] wherein the remote client device contacts the at least one linking server through the Internet according to said unique identification (UID) of the electronic device for concentrating information for establishing a P2P connection between the remote client device and the electronic device for concentrating information via the Internet,*

102. The teachings of Lorex Manual in view of Kim941 would have rendered Element [1f] obvious. Lorex Manual discloses that a *remote client device* (e.g., smartphone, tablet, or PC) can use the *unique identification* (e.g., the "device ID") of the DVR to identify a particular DVR as the target for a P2P connection. EX1007, 58-59, 61-62, 85. An example login page from an iPhone in the Lorex Manual is illustrated below, which includes the device ID of the DVR obtained by scanning a QR code on the DVR using the iPhone's built-in camera:



EX1007, 59 (annotated).

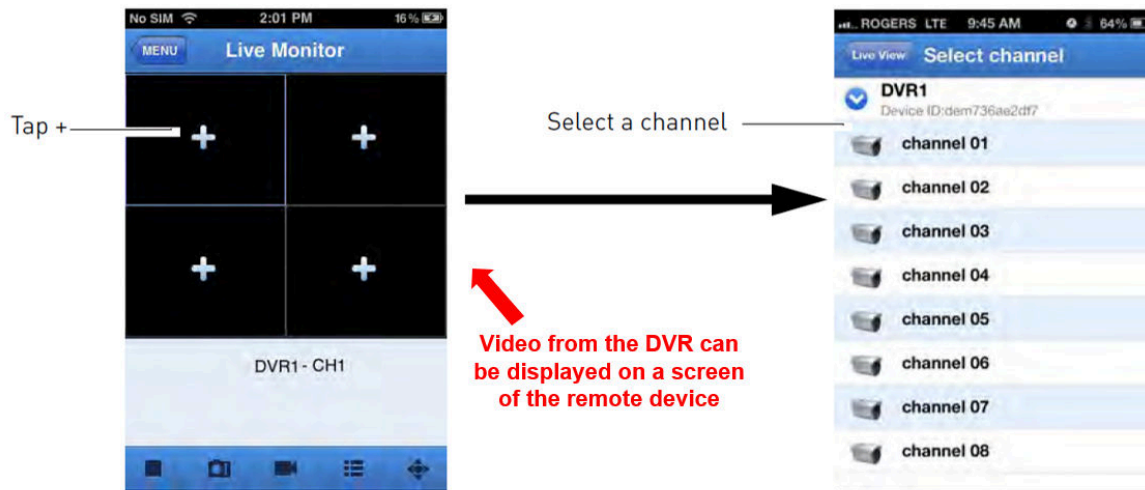
103. Kim941 further describes conventional techniques for a remote client device to contact at least one linking server through the Internet according to a unique identification of another device to establish a P2P connection between the remote client device and the other device via the Internet. For example, Kim941 discloses that “in order to perform direct communication with the peer node P2, the peer node P1 performs a process of setting a tunnel with the peer node P2.” EX1008, [0080]. “In order to set a tunnel for performing direct communication with the peer node P2, the peer node P1 transmits a tunnel query request message to the server 100 (S606)” that “includes an ID of the peer node P2.” *Id.*, [0081]; *see also id.*,

[0082]-[0089], FIG. 6. It would have been obvious to apply Kim941's suggested techniques for establishing a P2P connection to the system described by Lorex Manual. In the Lorex Manual-Kim-971 combination, the remote client device (e.g., smartphone, tablet, or PC) would predictably contact the Lorex Servers (e.g., ***at least one linking server***) to initiate a P2P connection with the DVR by sending a tunnel query request message that includes the DVR's unique device ID consistent with the teachings of Kim941.

104. Therefore, the Lorex Manual-Kim941 combination provides Element [1f].

***[1g] wherein at least one portion of the information received by the electronic device for concentrating information is delivered to the remote client device on the P2P connection,***

105. The Lorex Manual-Kim941 combination provides Element [1g]. Lorex Manual expressly teaches that the ***remote client device*** (e.g., smartphone, tablet, or PC) receives ***information*** (e.g., video streams) from the ***electronic device for concentrating information*** (e.g., DVR). EX1007, 84 ("You can remotely view camera streams from your DVR on compatible mobile phones and tablets."), 86-87. For example, Lorex Manual shows how a user of the remote client device can navigate a user interface of a mobile device to view live video from each of eight video channels:



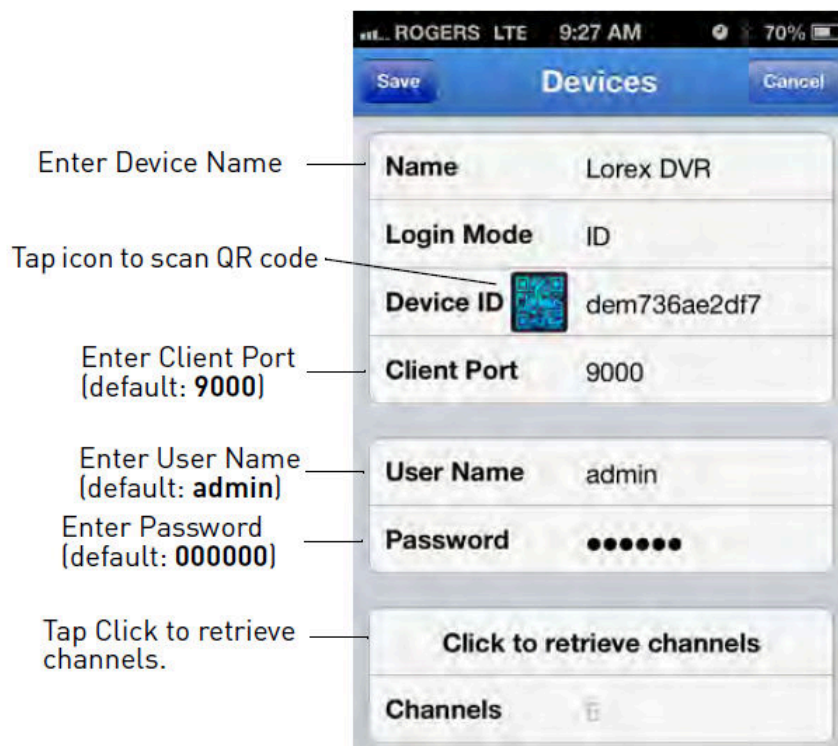
EX1007, 86-87 (annotated).

106. As described above in connection with Element [1a], these eight video channels represent the different video inputs to the eight input ports on the DVR. EX1007, 5, 86-87. The remote client device receives this data from the DVR over the P2P connection established between the remote client device and the DVR. EX1007, 10, 61-62. Consequently, Lorex Manual discloses that at least a portion of the video data received by the DVR is delivered to the remote client device via a P2P connection.

107. Therefore, the Lorex Manual-Kim941 combination provides Element [1g].

***[1h] wherein the remote client device does not have a unique identification (UID) to register in the at least one linking server for associating connecting information of the remote client device when the remote client device contacts the at least one linking server for establishing the P2P connection.***

108. The teachings of Lorex Manual in view of Kim941 would have rendered Element [1h] obvious. For example, Lorex Manual teaches that a remote client device can use the DVR's device ID and other information corresponding to the DVR to perform a secure handshake with Lorex servers and establish a P2P connection with the DVR. EX1007, 84-85. Lorex Manual shows a user interface screen containing information used to perform the secure handshake:



EX1007, 85

109. According to the Lorex Manual, the mobile device initiates a request to connect with the DVR by entering the device ID of the DVR, the client port of the DVR, and a username and password associated with the DVR. EX1007, 85.

110. To the extent that Lorex Manual does not expressly disclose that the mobile device does not have a UID to register with the Lorex servers when the remote client device contacts the servers to connect, such conventional features would have been obvious to a POSITA when considering the teachings of Kim941. Kim941 teaches that peer nodes (e.g., P1 and P2) ***pre-register*** their IDs with a server before one of the peer nodes contacts the server for establishing a P2P connection. EX1008, [0055] (“in order to register information such as an ID and a password to the server 100, the peer node P1 transmits a registration request message including an ID and a password to the server.”), [0056]-[0060], FIG. 2.

111. Later, when one of the peers (e.g., P1) contacts the server 100 to establish a P2P connection with another peer (e.g., P2),<sup>4</sup> the first peer ***does not*** have a unique ID to register in the server 100. As an initial matter, a POSITA would have understood and it would have been obvious that there is no need for the first peer to register with the server merely to request a P2P connection with the second peer since the server need only look-up registered information (e.g., the ID and network

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<sup>4</sup> Note that Element [1h] recites an intended use of the remote client device (not any structure of the claimed “electronic device” in the preamble) *at this later time frame*—“when the remote client device contacts the at least one linking server for establishing the P2P connection.”

address(es)) of the second peer—not the first peer—to perform hole-punching and follow the process shown in FIG. 6. *Id.* Moreover, Kim941 expressly contemplates peers can *pre-register* with the server such that the first peer does not provide its unique ID for registration again when it *later* contacts the server 100 to establish the P2P connection. EX1008, [0079]-[0087], FIG. 6; *see* FIGS. 5 (showing peers pre-registered with server 100) and 7. Indeed, Kim941 expressly discloses that the first peer’s “tunnel query request message” includes the unique ID of the second peer rather than that of the first peer to identify the second peer as the device to which the first peer requests to connect. EX1008, [0081], FIG. 6.

112. For the reasons that I discussed above in connection with Element [1e], it would have been obvious to apply Kim941’s procedures for registration and establishing a P2P connection to the system described in Lorex Manual. In this combination, Lorex’s remote client device would predictably not include its own device ID for registration when contacting the Lorex Stratus servers to establish a P2P connection with the DVR.

113. Therefore, the Lorex Manual-Kim941 combination provides Element [1h].

### **C. Claim 2**

114. Claim 2 of the ’916 Patent recites:

|                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. The electronic device for concentrating information according to claim 1, wherein the electronic device for concentrating information is a set top box. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|

115. Lorex Manual describes a DVR, which constitutes an “*electronic device for concentrating information*” for the reasons addressed above with respect to Element [1pre]. A POSITA also would have known that a DVR like that described in the Lorex Manual is a type of “set top box” that can sit atop a television or other viewing device, for example. Indeed, the evidence here confirms that DVRs were a conventional category of set top boxes by the relatively late Critical Date of the ’916 Patent (January 7, 2014).

116. For example, one patent application published before January 7, 2014 discloses that “[b]ecause DVRs are usually box-like in shape, and are often found sitting on top of the television sets to which they are connected, DVRs typically are included in the broad category of devices now called ‘set-top boxes.’” EX1016, [0003]. Barton also discloses that a DVR “can be any set-top box that is capable of receiving broadcast program content.” EX1016, [0003]. Another patent application discloses that set top boxes can perform capabilities often associated with DVRs. EX1017, [0049] (“set top box[] ... capabilities can include digital video recorder (DVR) capabilities”). Other devices that are similar to DVRs—including network video recorders (NVRs)—receive video data and communicate with remote client devices. One such NVR is described in a product manual that I reviewed and

approved in 2013. *See* EX1019. These disclosures are consistent with my understanding that the term “set top box” can refer to several kinds of digital media devices including DVRs, NVRs, and cable boxes.

117. Therefore, Lorex Manual discloses the additional feature recited in claim 2 and the teachings of Lorex Manual in view of Kim941 would have rendered claim 2 obvious in its entirety.

**D. Claim 3**

118. Claim 3 of the '916 Patent recites:

|                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. The electronic device for concentrating information according to claim 1, wherein the remote client device is a portable electronic device. |
|------------------------------------------------------------------------------------------------------------------------------------------------|

119. Lorex Manual discloses that the *remote client device* can be a *portable electronic* device such as a smartphone or tablet computer. EX1007, 10, 84 (“Mobile Apps: Accessing your DVR Using a Mobile Device”). For example, Lorex Manual discloses that “[y]ou can remotely view camera streams from your DVR on compatible mobile phones and tablets. This system features connectivity using the exclusive Lorex Stratus solution, which allows for easy access using a mobile device without requiring network configuration or a computer to complete the setup.” *Id.* Lorex Manual shows how a user can view security camera footage on a screen of a *portable electronic device* such as a smartphone or tablet computer:



EX1007, 87 (annotated).

120. Therefore, Lorex Manual discloses the additional feature recited in claim 3 and the teachings of Lorex Manual in view of Kim941 would have rendered claim 3 obvious in its entirety.

#### E. Claim 4

121. Claim 4 of the '916 Patent recites:

4. The electronic device for concentrating information according to claim 1, wherein the remote client device is a mobile phone.

122. Lorex Manual discloses that the *remote client device* can be a *mobile phone*. Lorex Manual cites “Instant Mobile Viewing on compatible Smart Phones” as one connectivity feature of the DVR. EX1007, vii. Furthermore, Lorex Manual

discloses that (“[y]ou can remotely view camera streams from your DVR on compatible mobile phones ...”). EX1007, 10, 84 Lorex Manual also discloses techniques for using the Lorex ECO Stratus application to connect to the DVR on an “iPhone” and an “Android smartphone,” which are two universally well-known kinds of mobile phone. EX1007, 10, 84, 92.

123. Therefore, Lorex Manual discloses the additional feature recited in claim 4 and the teachings of Lorex Manual in view of Kim941 would have rendered claim 4 obvious in its entirety.

**F. Claim 5**

124. Claim 5 of the '916 Patent recites:

|                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>5.</b> The electronic device for concentrating information according to claim <b>1</b>, wherein the remote client device is not registered in the at least one linking server while the P2P connection is being established.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

125. The teachings of Lorex Manual and Kim941 provide the additional feature recited in claim 5 for at least the reasons that I explained above in connection with Element [1h].

**G. Claim 6**

126. Claim 6 of the '916 Patent recites:

|                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>6.</b> The electronic device for concentrating information according to claim <b>5</b>, wherein the at least one linking server transmits hole-punching messages to the electronic device for concentrating information and the remote client device to establish the P2P connection.</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

127. Kim941 describes a linking server (e.g., server 100) that transmits hole-punching messages to the peer nodes—which predictably include the DVR (*electronic device*) and phone, tablet, or PC (*remote client device*) in the Lorex Manual-Kim941 combination—to establish the P2P connection. EX1008, [0082]-[0083], FIG. 6.

128. Therefore, Kim941 discloses the additional feature recited in claim 6 and the teachings of Lorex Manual in view of Kim941 would have rendered claim 6 obvious in its entirety.

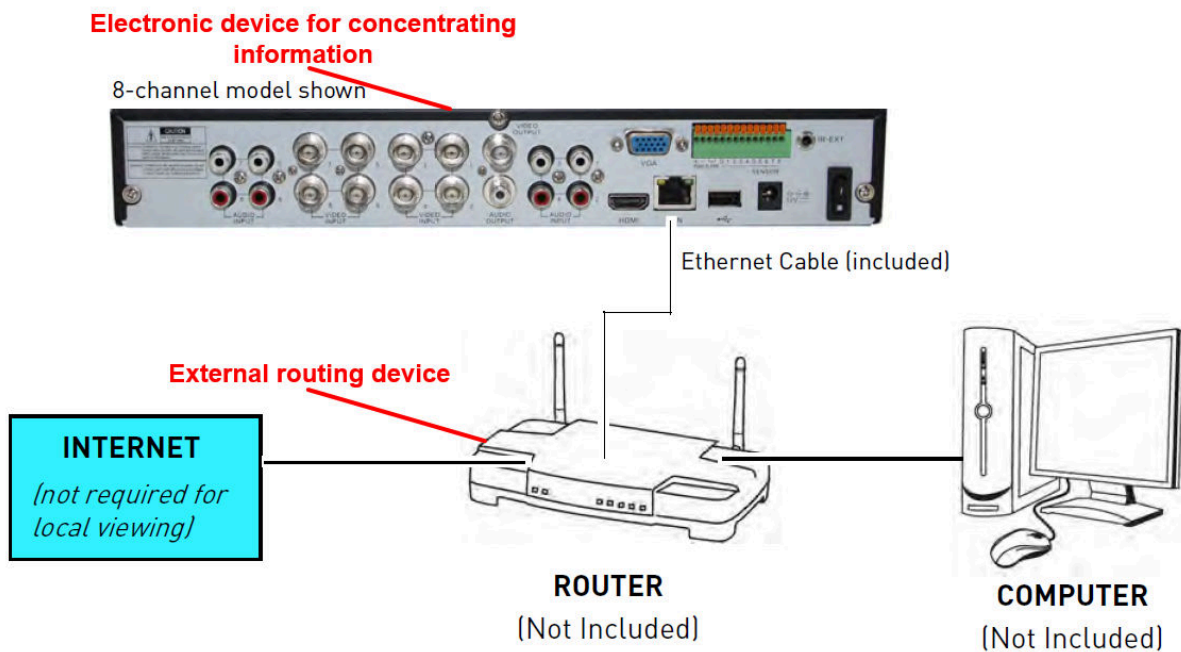
#### **H. Claim 7**

129. Claim 7 of the '916 Patent recites:

7. The electronic device for concentrating information according to claim 1, wherein the second interface couples to the Internet through an external routing device or an internal routing device.

130. Lorex Manual discloses that the DVR (*electronic device for concentrating information*) connects to an *external routing device* via an ethernet cable connected to the LAN port (*second interface*) of the DVR. EX1007, 5, “Connect a CAT 5 RJ45 Ethernet cable for local and remote connectivity), 7 (“Connect an ethernet cable (included) to the LAN port on the rear panel of the DVR. Connect the other end of the ethernet cable to a router on your network.”), 57, 84. This is consistent with my understanding that external routing devices are well-known devices that serve as the gateway from a LAN to the wider Internet.

131. Lorex Manual also discloses that connecting the DVR to a router represents “step 1 of 3” of “connecting to your DVR over the Internet.” EX1007, 57-58. To perform this step, Lorex Manual instructs the user to “[c]onnect an Ethernet cable (included) to the LAN port on the rear panel of the DVR. Connect the other end of the Ethernet cable to an empty LAN port (usually numbered 1-4) on your router.” EX1007, 58. Lorex Manual shows a diagram of the DVR’s LAN port connected to a router, the router connected to the Internet:



EX1007, 58 (annotated).

132. Therefore, Lorex Manual discloses the additional feature recited in claim 7 and the teachings of Lorex Manual in view of Kim941 would have rendered claim 7 obvious in its entirety.

## I. Claim 8

133. Claim 8 of the '916 Patent recites:

8. The electronic device for concentrating information according to claim 7, wherein the routing device is an IP router.

134. Claim 8 merely adds an intended use of the “routing device” but does not further define the claimed “electronic device for concentrating information.” The additional features recited in claim 8 are therefore not entitled to patentable weight. Nonetheless, even if it were, it would have been obvious based on Lorex Manual in view of Kim941. For example, Lorex Manual discloses that the DVR connects to the Internet via a “router,” as discussed above in connection with Claim 7. EX1007, 57-58. Lorex Manual expressly shows that the router connects to the Internet, which is a network that uses IP protocols. EX1007, 58. Lorex Manual further describes that the remote client device connects to the DVR can connect to the Internet using the DVR’s IP address<sup>5</sup> – while the DVR is connected to the Internet via the router. EX1007, 120. In this context, a POSITA would have understood Lorex Manual to mean that the “router” is an IP router as claimed.

---

<sup>5</sup> An IP address is “not required” to connect to the DVR. EX1007, 119. However, the fact that remote devices are able to connect to the DVR using an IP address in at least some examples means that the router connecting the DVR to the Internet is an “IP router.”

135. The '916 Patent does not offer a definition of the term “IP router.” This means that in view of the specification of the '916 Patent, a POSITA would understand the term “IP router” to include any router capable of handling network traffic according to IP protocols. As discussed above, Lorex Manual’s router falls into this category because the router can handle network traffic according to the IP address of the DVR, which means that the router can operate according to IP protocols.

136. Therefore, Lorex Manual discloses the additional feature recited in claim 8 and the teachings of Lorex Manual in view of Kim941 would have rendered claim 8 obvious in its entirety.

**J. Claim 10**

137. Claim 10 of the '916 Patent recites:

|                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>10.</b> The electronic device for concentrating information according to claim 7, wherein the routing device has a wireless access point for connecting to a portable electronic device so as to deliver the information to the portable electronic device.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

138. Claim 10 merely adds an intended use of the “routing device” but does not further define the claimed “electronic device for concentrating information.” The additional features recited in claim 10 are therefore not entitled to patentable weight. Nonetheless, even if it were, it would have been obvious based on Lorex Manual in view of Kim941. For example, Lorex Manual discloses that the DVR can

connect to the Internet and a local area network (LAN) through a router. EX1007, 58, 119-122. The router depicted in Lorex Manual includes a pair of antennas, which a POSITA would have understood to mean that the router has a wireless access point. EX1007, 58 and 112 (depicting router with antennas).

139. Lorex Manual also teaches that the user can connect a client device such as a PC or MAC to the DVR in a LAN, through the router, to deliver information from the DVR (e.g., live or recorded video streams) to the client. EX1007, 119 (“You can connect to your DVR through Internet Explorer through the local area network (LAN).”), 120-122. By the late timeframe of the ’916 Patent (Jan. 7, 2014), a POSITA would have known that a conventional class of PC was a notebook or laptop computer (*portable electronic device*). At a minimum, it would have been obvious to use a notebook or laptop PC for connecting to the DVR as described in Lorex Manual because notebook/laptop computers were a popular PC at the time and because they offered the convenience of mobility and a small form factor to users.

140. Therefore, Lorex Manual discloses the additional feature recited in claim 10 and the teachings of Lorex Manual in view of Kim941 would have rendered claim 10 obvious in its entirety.

#### **K. Claim 16**

141. Claim 16 of the ’916 Patent recites:

|                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>16.</b> The electronic device for concentrating information according to claim 1, wherein the information is formatted by the electronic device for concentrating information in a way suitable for viewing by the remote client device.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

142. As described above in connection with Element [1g], Lorex Manual discloses how the *remote client device* (e.g., smartphone, tablet, or PC) can display video data from the *electronic device for concentrating information* (e.g., DVR), and the remote client device can receive this video data directly from the DVR over a P2P connection. EX1007, 10, 84-87. Lorex Manual discloses that a screen of the remote client device displays the video from the DVR in a way that is suitable for viewing at the remote client device. For example, Lorex Manual discloses that the DVR provides “960H (960x480) recording resolution, D1/2C1F/CIF supported,” “H.264 video compression,” and “Real time recording 30fps per channel.” EX1007, viii; *see also* 42 (“You can configure the recording quality, recording resolution and video frame rate for each channel.”). Lorex Manual’s DVR thus formats the video with an appropriate resolution, compression, recording quality, and frame rate suitable for streaming and viewing by the remote client device.

143. Therefore, Lorex Manual discloses the additional feature recited in claim 16 and the teachings of Lorex Manual in view of Kim941 would have rendered claim 16 obvious in its entirety.

**IX. GROUND 1B: LOREX MANUAL IN COMBINATION WITH KIM941 AND KIM517 RENDERS CLAIM 9 OBVIOUS**

**A. Overview of the Combination and Reasons to Combine**

144. Lorex Manual describes how a user can remotely control pan-tilt-zoom (PTZ) cameras connected to a DVR through an interface of a remote client device (e.g., the smartphone, tablet, or PC). EX1007, 66, 77-78, 88-89, 96, 106-108. According to Lorex Manual, PTZ cameras must be physically connected to the DVR through an RS485 port on the rear of the DVR. *Id.*, 106. Based on my review, Lorex Manual does not describe PTZ cameras or other controllable appliances connected to the DVR through a wireless connection, and relatedly, does not expressly disclose a remote client device configured to control through the DVR an appliance that is wirelessly connected to the DVR. These features were nonetheless well known before the '916 Patent as demonstrated by Kim517.

145. Based upon my knowledge and experience in the field and my review of Lorex Manual and Kim917, it is clear that a POSITA would have been motivated to apply Kim517's suggestion for remotely controlling a PTZ camera or other appliance wirelessly connected to a home gateway such as Lorex Manual's DVR before the earliest effective filing date of the '916 Patent (January. 7, 2014). Multiple reasons would have prompted the combination.

146. As a first reason, a POSITA would have implemented Lorex Manual's DVR according to Kim517's suggestion for wirelessly connecting to remotely controllable appliances (e.g., PTZ cameras) to expand the capabilities of the DVR

and to increase the number and types of devices to which the DVR could connect. A POSITA would have appreciated that the additional capabilities would have expanded the market for the DVR to users who would desire to use the DVR with wireless appliances, and would have increased user satisfaction among users who prefer wireless rather than or in addition to wired appliances.

147. As a second reason, a POSITA would have implemented Lorex Manual's DVR according to Kim517's suggestion for wirelessly connecting to remotely controllable appliances (e.g., PTZ cameras) to simplify the ability to connect certain cameras and other appliances to the DVR without the need to deal with routing wires between the DVR and the appliances.

148. As a third reason, a POSITA would have implemented Lorex Manual's DVR according to Kim517's suggestion for wirelessly connecting to remotely controllable appliances (e.g., PTZ cameras) to allow the DVR to connect to such appliances over longer distances that would be impractical or difficult to connect by wire.

149. As a fourth reason, a POSITA would have implemented Lorex Manual's DVR according to Kim517's suggestion for wirelessly connecting to controllable appliances (e.g., PTZ cameras) to advantageously permit a user to issue commands to and control the appliances through a remote client device, thereby

increasing the usefulness of the appliances to the user even when the user is not at home (or other premises of the DVR and the connected appliances).

Based upon my knowledge and experience in this field and my review of the relatively straightforward and predictable structures in Lorex Manual and Kim917, it is clear that a POSITA would have possessed the requisite level of skill to implement this combination given the overlapping technologies of Lorex Manual and Kim917. A POSITA would have reasonably expected success in achieving this combination in the manner described above. Both references describe similar systems for connecting home devices or appliances (e.g., cameras) to an information concentrating device (e.g., a DVR or home gateway) and controlling the devices through a remote device. Indeed, both the Lorex Manual's DVR and Kim517's home gateway are implemented set-top boxes with similar functionality; EX1009, [00410] ("set-top box"). The state of the art for such networked devices and their interconnectivity was relatively advanced by the earliest effective filing date of the '916 Patent.

**B. Claim 9**

150. Claim 9 of the '916 Patent recites:

|                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>9. The electronic device for concentrating information according to claim 7, wherein the electronic device for concentrating information is connected to an appliance through the routing device and the remote client device controls the appliance through the electronic device for concentrating information.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

151. Lorex Manual describes techniques for remotely controlling pan-tilt-zoom (PTZ) cameras connected to a DVR through an interface of a remote client device (e.g., smartphone, tablet, or PC). EX1007, 66, 77-78, 88-89, 96, 106-108. Further, for the reasons described in detail above, a POSITA would have found it obvious to implement Lorex Manual's DVR according to Kim517's suggestion enable the DVR to wirelessly connect to remotely controllable home devices or appliances (e.g., PTZ cameras). The DVR in the resulting combination would have predictably provided the additional features recited in claim 9.

152. Kim517 discloses a home gateway that, like Lorex Manual's DVR, provides an electronic device for concentrating information. EX1009, [0005], [0039]-[0040], FIGS. 1-2, 5. In the combination, Lorex Manual's DVR would predictably include the capability of Kim517's home gateway to communicate with a home device (*appliance*) through a wireless connection. *Id.*, [0040] ("home devices 110 may be capable of performing communication with the home gateway 110 according to a ... wireless communication scheme"), [0045], [0047], FIG. 3. For example, Kim517 teaches that the home device (*appliance*) includes a communication module that allows it to communicate with the home gateway over a wireless LAN. *Id.*, [0073], FIG. 6. Kim517 also teaches that communication over a wireless LAN involves communication with a wireless access point, which is conventionally included in a router like that disclosed in Lorex Manual. EX1009,

[0056]; EX1007, 58 (depicting a router with a pair of antennas indicative of wireless communication capability); *see also id.*, EX1009, [0047], FIG. 3. The combination would predictably involve Lorex Manual's DVR connecting to an appliance (e.g., a PTZ camera) through the router.

153. Consistent with Kim517's teachings, the remote client device (e.g., smartphone, tablet, or PC) in the predictable Lorex Manual-Kim941-Kim517 combination would also control the appliance (e.g., PTZ camera) through the DVR. EX1007, 66, 77-78, 88-89, 96, 106-108; EX1009, [0067]-[0068] ("the user transmits, to the home gateway 510, a control command for controlling a movement of a mobile camera ... through the personal computer 522 or the mobile terminal 532, and the home gateway 510 transfers the control command to a corresponding home device 514"), [0121], [0040]-[0042], FIGS. 5, 18, 19A-19B.

154. Therefore, the teachings of Lorex Manual in view of Kim941 and Kim517 would have rendered claim 9 obvious in its entirety.

## **X. GROUND 1C: LOREX MANUAL IN COMBINATION WITH KUO RENDERS CLAIMS 1-8, 10, AND 16 OBVIOUS**

### **A. Overview of the Combination and Reasons to Combine**

155. Based on my review, a POSITA would have found it obvious to combine Lorex Manual and Kuo such that Lorex Manual's DVR would contact a linking server through the Internet to register its unique Device ID consistent with Kuo's suggested techniques. Although Lorex Manual describes a cloud service—

i.e., “Lorex Stratus”—that facilitates the establishment of a P2P connection between a DVR and a remote client device (e.g., a smartphone, tablet, or PC), Lorex Manual does not, however, describe many details as to how the P2P connection is established after the client device requests to login to the service and connect to the DVR. EX1007, 10, 57-60, 62. Kuo nonetheless describes a conventional solution that would have been obvious to apply to Lorex Manual to achieve its goals of establishing a P2P connection between the DVR and remote client device. Multiple reasons would have prompted a POSITA to implement Lorex Manual in accordance with Kuo’s suggestions for establishing a P2P connection using device registration, identification, and hole-punching techniques before the alleged invention of the ’916 Patent.

156. As a first reason, a POSITA would have understood that implementing Lorex Manual’s system to include a linking server that registers a device ID (e.g., the unique “Device ID” or serial number of Lorex’s DVR) based on Kuo’s suggestions would predictably provide a simple and secure way for the user’s remote client device (e.g., smartphone, tablet, or PC) to connect with the DVR. Kuo explains that the linking server enhanced security over conventional P2P connection techniques because device ID or serial number registration obviates a need to share IP addresses for the remote device. EX1011, ¶¶[0007], [0039] (“the remote device and the linking server needn’t directly disclose the IPs and domain names thereof”).

157. As a second reason, a POSITA would have been prompted to apply Kuo's hole-punching techniques to Lorex Manual because hole-punching was a well-known and popular solution for establishing P2P connections between devices, even in situations where the endpoints are located behind firewalls or network address translators (NATs) that would otherwise block direct communication between the endpoints.

158. As a third reason, a POSITA would have implemented Lorex Manual's system in accordance with Kuo's techniques for establishing P2P connections to provide a simple method for the remote client device (referred to as the "proximal device" in Kuo) to locate an appropriate linking server where the DVR (corresponding to the "remote device in Kuo) is registered and from which a hole-punching process can be initiated to form the P2P connection. EX1011, ¶¶[0010]-[0012] ("As long as a proximal device has API supported by the administration server, the user can request the administration server to find out the linking address."), [0029]-[0039], FIGS. 3, 10-11.

159. Based upon my knowledge and experience in this field and my review of the relatively straightforward and predictable structures in Lorex Manual and Kuo, it is clear that a POSITA would have possessed the requisite level of skill to implement this combination given the overlapping technologies of Lorex Manual and Kuo. A POSITA would have had a reasonable expectation of success in

achieving this combination in the manner described above, especially considering that both references describe similar networked systems for establishing P2P connections. As I have explained throughout this declaration, the state of the art for such networked devices and their interconnectivity was relatively advanced by the earliest effective filing date of the '916 Patent.

**B. Independent Claim 1**

160. Independent claim 1 of the '916 Patent recites:

1. An electronic device for concentrating information, comprising:

- at least one first interface for receiving information from at least one information source;
- a second interface coupling to the Internet, for establishing a connection with a remote client device through the Internet;
- a third interface for connecting to a television for viewing said information; and
- a unique identification (UID) embedded in the electronic device for concentrating information, wherein the electronic device for concentrating information contacts at least one linking server through the Internet to register said embedded unique identification (UID) into the at least one linking server for identifying network addressing information of the electronic device for concentrating information so as to enable the remote client device to establish a P2P connection with the electronic device for concentrating information for viewing said information received by the electronic device for concentrating information;

wherein the remote client device contacts the at least one linking server through the Internet according to said unique identification (UID) of the electronic device for concentrating information for establishing a P2P connection between the remote client device and the electronic device for concentrating information via the Internet, wherein at least one portion of the information received by the electronic device for concentrating information is delivered to the remote client device on the P2P connection, wherein the remote client device does not have a unique identification (UID) to register in the at least one linking server for associating connecting information of the remote client device when the remote client device contacts the at least one linking server for establishing the P2P connection.

161. As I explain in more detail below through my element-by-element analysis, Lorex Manual in combination with Kuo renders claim 1 obvious.

***Elements [1pre]-[1d]***

162. Lorex Manual discloses and renders obvious Elements [1pre]-[1d] for at least the same reasons that I addressed above in connection with Ground 1A at Elements [1pre]-[1d]. For purposes of Ground 1C, Lorex Manual alone discloses Element [1d] and any references in Ground 1A relating to Kim941 for Element [1d] are unnecessary and do not apply in this Ground 1C.

***[1e] wherein the electronic device for concentrating information contacts at least one linking server through the Internet to register said embedded unique identification (UID) into the at least one linking server for identifying network addressing information of the electronic device for concentrating information so as to enable the remote client device to establish a P2P connection with the electronic device for concentrating information for viewing said information received by the electronic device for concentrating information;***

163. As I described above in connection with ground 1A (Element[1e]), Lorex Manual discloses a ***remote client device*** (e.g., a computer, tablet, or mobile device) that uses a ***unique identification (UID)*** (e.g., device ID) of a DVR (***electronic device for concentrating information***) to perform a secure handshake with Lorex Stratus servers and establish a connection with the DVR over the Internet. EX1007, 10, 57, 59, 85, 93. To the extent Lorex Manual does not expressly disclose that the DVR contacts the at least one linking server to register the device ID, such features would have been obvious and provided in the Lorex Manual-Kuo combination.

164. Kuo, for example, discloses a “remote device” (analogous to the DVR in Lorex Manual or the electronic device for concentrating information in the ’916 Patent) that contacts a linking server through the Internet to register a ***unique identification (UID)*** (e.g., a serial number) into the linking server for identifying network addressing information of the device. EX1011, [0037], FIG. 10. For example, Kuo discloses that “the remote device connects with the linking server provided by the administration server” and “[t]he remote device sends a piece of device-registering information to the linking server” such that “the linking server learns the IP and information necessary for communicating with the remote device.” EX1011, [0037]. Furthermore, Kuo describes one embodiment in which the device-registering information that the remote device registers with the linking server is a “unique serial number” that allows the linking server to “verify or recognize the remote device.” EX1011, [0034], FIG. 10. Consequently, the remote device registers both ***addressing information*** (i.e., the IP and information necessary for communicating) and a ***unique identifier (UID)*** (i.e., a unique serial number) with the linking server.

165. Kuo’s technique for registering a unique serial number remote device in a linking server enables a proximal device (analogous to the mobile phone in Lorex Manual and remote client device in the ’916 Patent) to establish a P2P connection with the remote device by contacting the linking server. EX1011, [0038].

For example, Kuo discloses that “[t]he user uses API of a proximal device to select a specified remote device...Thus, the proximal device learns the linking server whereby it can connects with the specified remote device” and that “the proximal device asks the linking server to establish a link between the proximal device and the remote device.” EX1011, [0038]. Since Kuo’s proximal device can locate a linking server corresponding to a proximal device based on a user selection of the remote device on an API, this indicates that the remote device contacts the linking server through the internet to register its unique serial number so that the proximal device is able to distinguish the remote device from other remote devices in seeking to connect with the remote device specifically. Put another way, Kuo’s proximal device selects a specific remote device in order to connect to that specific remote device which means that the linking server must have a way to distinguish the selected remote device form other remote devices to initiate the connection with the proximal device. The registered unique serial numbers allow the linking servers to identify the remote device, which means that the remote device contacting the linking server with its unique serial number enables the proximal device to establish a P2P connection with the remote device by contacting the linking server.

166. Kuo discloses that in response to receiving a request from a proximal device to connect with a remote device, “the linking server takes priority to perform a hole punching process on the proximal device and the remote device” in order to

establish a P2P connection. EX1011, [0038]. Hole punching is a technique for establishing a P2P connection that involves sending messages to devices on either end of the P2P connection. It is well-known in the computer networking industry that to send these hole punching messages, the linking server must know the network address of these devices.

167. Therefore, the Lorex Manual-Kuo combination provides Element [1e].

***[1f] wherein the remote client device contacts the at least one linking server through the Internet according to said unique identification (UID) of the electronic device for concentrating information for establishing a P2P connection between the remote client device and the electronic device for concentrating information via the Internet,***

168. As described above in connection with the analysis of Element [1f] in Ground 1A, Lorex Manual discloses a ***remote client device*** (e.g., a computer, tablet, or mobile device) that uses a ***unique identification (UID)*** (e.g., device ID) of a DVR (***electronic device for concentrating information***) to perform a secure handshake with Lorex Stratus servers and establish a connection with the DVR over the Internet. EX1007, 10, 57, 59, 85, 93;

169. To the extent Lorex Manual does not expressly disclose details of the client device's contact with a linking server as claimed in [1f], these features would have been obvious in view of Kuo. For instance, Kuo discloses a "proximal device" (analogous to the remote client device such as a phone or PC in Lorex Manual and the '916 Patent) that contacts a linking server to establish a P2P connection with a

“remote device” (analogous to the DVR in Lorex Manual or the electronic device for concentrating information in the ’916 Patent). EX1011, [0038] (“the proximal device asks the linking server to establish a link between the proximal device and the remote device”) & FIG. 11, [0037], [0039], FIG. 10; *see also id.*, [0007]-[0012], [0024]-[0027], FIGS. 1-3. The proximal device uses an identifier for the targeted remote device, which can be a serial number as described in Kuo or a Device ID as described in Lorex Manual. EX1011, [0034], [0037]-[0039], Table 1; EX1007, 58-60, 85. For the reasons I expressly articulated above in connection with Element [1e], a POSITA would have found it obvious to combine Lorex Manual and Kuo such that Lorex Manual’s remote client device (e.g., smartphone, tablet, or PC) would contact a linking server through the Internet according to the Device ID of the DVR to establish a P2P connection with the DVR.

170. Therefore, the Lorex Manual-Kuo combination provides Element [1e].

***[1g] wherein at least one portion of the information received by the electronic device for concentrating information is delivered to the remote client device on the P2P connection,***

171. Lorex Manual expressly teaches that at least a portion of the video data received by the DVR is delivered to the remote client device on the P2P connection for the same reasons described above in connection with Ground 1A (Element [1g]). EX1007, 5, 84-87.

172. Therefore, the Lorex Manual-Kuo combination provides Element [1g].

***[1h] wherein the remote client device does not have a unique identification (UID) to register in the at least one linking server for associating connecting information of the remote client device when the remote client device contacts the at least one linking server for establishing the P2P connection.***

173. As discussed above in connection with Element [1f], Kuo discloses a “proximal device” (analogous to the remote client device such as a phone or PC in Lorex Manual and the ’916 Patent) that contacts a linking server to establish a P2P connection with a “remote device” (analogous to the DVR in Lorex Manual or the electronic device for concentrating information in the ’916 Patent). EX1011, [0038]-[0039], FIG. 11. In Kuo, the proximal device does not have a unique identification to register in the linking server when it contacts the linking server for establishing the P2P connection. In fact, the proximal device is not registered in the linking server when the P2P connection is established at all.

174. That the proximal device is not registered in the linking server when contacting the linking server to establish the P2P connection or when the P2P connection is established when have been evident to a POSITA reviewing Kuo, at least because Kuo’s linking servers are configured to maintain registration information for the remote devices (not the proximal devices) and because Kuo defines an API that allows a proximal device to contact a linking server to connect with a remote device based merely on information about the linking server that the proximal device obtains from an administration server. EX1011, [0008] (“the remote

device registering the information thereof in the linking server”), [0009]-[0012], [0032]-[0034], [0037]-[0039], FIGS. 10-11. Kuo is clear that “the proximal device can merely use the administration server to find out a linking server that a specified remote device registers, neither needing a fixed IP nor remembering the IP addresses or domain names of the linking servers. *As long as proximal device has API supported by the administration server, the user can request the administration server to find out the linking address.*” *Id.*, [0012], [0039] (“The remaining procedures, such as interactions with the administration server and the linking server, are all automatically executed by API. Therefore, the present invention can greatly reduce complexity of operation.”). Kuo’s API thus obviates any need for the proximal device to register with the linking server. *Id.* Noticeably, Kuo’s approach is identically described in the ’916 Patent and the specification of the ’916 Patent expressly refers to Kuo (U.S. Serial No. 13/293,506) as providing the registration and connection procedures implemented by the disclosed devices. *Cf.* EX1001, 8:54-9:15, 13:42-52, 14:10-23.

175. For the reasons expressly articulated above in connection with Element [1e], a POSITA would have found it obvious to combine Lorex Manual and Kuo such that Lorex Manual’s remote client device (e.g., smartphone, tablet, or PC) would not have had and would not register a unique ID for associating connecting

information of the remote client device when contacting the linking server for establishing the P2P connection or while the P2P connection is being established.

176. Therefore, the Lorex Manual-Kuo combination provides Element [1h].

**C. Claim 2**

177. Claim 2 of the '916 Patent recites:

|                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. The electronic device for concentrating information according to claim 1, wherein the electronic device for concentrating information is a set top box. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|

178. The teachings of Lorex Manual and Kuo provide the additional feature recited in this dependent claim for at least the reasons addressed above in connection with Ground 1A (claim 2).

**D. Claim 3**

179. Claim 3 of the '916 Patent recites:

|                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. The electronic device for concentrating information according to claim 1, wherein the remote client device is a portable electronic device. |
|------------------------------------------------------------------------------------------------------------------------------------------------|

180. The teachings of Lorex Manual and Kuo provide the additional feature recited in this dependent claim for at least the reasons addressed above in connection with Ground 1A (claim 3).

**E. Claim 4**

181. Claim 4 of the '916 Patent recites:

**4.** The electronic device for concentrating information according to claim **1**, wherein the remote client device is a mobile phone.

182. The teachings of Lorex Manual and Kuo provide the additional feature recited in this dependent claim for at least the reasons addressed above in connection with Ground 1A (claim 4).

**F. Claim 5**

183. Claim 5 of the '916 Patent recites:

**5.** The electronic device for concentrating information according to claim **1**, wherein the remote client device is not registered in the at least one linking server while the P2P connection is being established.

184. The teachings of Lorex Manual and Kuo provide the additional feature recited in this dependent claim for at least the reasons addressed above in connection with Element [1h] (Ground 1C).

**G. Claim 6**

185. Claim 6 of the '916 Patent recites:

**6.** The electronic device for concentrating information according to claim **5**, wherein the at least one linking server transmits hole-punching messages to the electronic device for concentrating information and the remote client device to establish the P2P connection.

186. Kuo discloses, and the Lorex Manual-Kuo combination provides, that the linking server transmits hole-punching messages to establish a P2P connection to both endpoints of the connection, which would include the remote client device

(e.g., smartphone, tablet, or PC) and the DVR of Lorex Manual in the combination described above. EX1011, [0029] (“The linking server group A (20)...sends hole-punching information 960 and hole-punching information 961 to the proximal device 4 and the remote device A (31) so as to establish a point-to-point link 97 between the proximal device 4 and the specified remote device A (31).”), [0038], FIG. 11.

#### **H. Claim 7**

187. Claim 7 of the '916 Patent recites:

|                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>7.</b> The electronic device for concentrating information according to claim <b>1</b>, wherein the second interface couples to the Internet through an external routing device or an internal routing device.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

188. The teachings of Lorex Manual and Kuo provide the additional feature recited in this dependent claim for at least the reasons addressed above in connection with Ground 1A (claim 7).

#### **I. Claim 8**

189. Claim 8 of the '916 Patent recites:

|                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>8.</b> The electronic device for concentrating information according to claim <b>7</b>, wherein the routing device is an IP router.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------|

190. The teachings of Lorex Manual and Kuo provide the additional feature recited in this dependent claim for at least the reasons addressed above in connection with Ground 1A (claim 8).

**J. Claim 10**

191. Claim 10 of the '916 Patent recites:

|                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>10.</b> The electronic device for concentrating information according to claim 7, wherein the routing device has a wireless access point for connecting to a portable electronic device so as to deliver the information to the portable electronic device.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

192. The teachings of Lorex Manual and Kuo provide the additional feature recited in this dependent claim for at least the reasons addressed above in connection with Ground 1A (claim 10).

**K. Claim 16**

193. Claim 16 of the '916 Patent recites:

|                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>16.</b> The electronic device for concentrating information according to claim 1, wherein the information is formatted by the electronic device for concentrating information in a way suitable for viewing by the remote client device.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

194. The teachings of Lorex Manual and Kuo provide the additional feature recited in this dependent claim for at least the reasons addressed above in connection with Ground 1A (claim 16).

**XI. GROUND 1D: LOREX MANUAL IN COMBINATION WITH KUO AND KIM517 RENDERS CLAIM 9 OBVIOUS**

**A. Claim 9**

195. Claim 9 of the '916 Patent recites:

|                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>9. The electronic device for concentrating information according to claim 7, wherein the electronic device for concentrating information is connected to an appliance through the routing device and the remote client device controls the appliance through the electronic device for concentrating information.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

196. A POSITA would have found it obvious and would have been motivated to further modify the Lorex Manual-Kuo combination in view of Kim 517 for substantially the same reasons discussed above in Ground 1B. The combined teachings of Lorex Manual, Kuo, and Kim517 would have provided Claim 9 for at least the reasons described above in connection with Ground 1B (claim 9).

## **XII. GROUND 2A: LOREX VIDEO IN COMBINATION WITH GALVIN AND KUO RENDERS CLAIMS 1-8, 10, AND 16 OBVIOUS**

### **A. Overview of the Combination and Reasons to Combine**

#### *Combining Lorex Video with Kuo*

197. Based on my review, POSITA would have found it obvious to combine Lorex Video and Kuo to provide a linking server like that described in Kuo in Lorex Video's system. The DVR in Lorex Video would then contact the linking server through the Internet to register its unique Device ID consistent with Kuo's suggested techniques. There are multiple rationales that would have prompted a POSITA to implement this combination, including implementing Lorex Video in accordance with Kuo's suggestions for establishing a P2P connection using device registration,

identification, and hole-punching techniques before the earliest effective filing date of the '916 Patent (January 7, 2014).

198. As a first reason, a POSITA would have understood that implementing Lorex Video's system to include a linking server that registers a device ID (e.g., a unique "Device ID" or serial number of Lorex's DVR) based on Kuo's suggestions would predictably provide a simple and secure way for the mobile device to connect with the DVR. Kuo explains that the linking server enhanced security over conventional P2P connection techniques because device ID or serial number registration obviates a need to share IP addresses for the remote device. EX1011, ¶¶[0007], [0039] ("the remote device and the linking server needn't directly disclose the IPs and domain names thereof").

199. As a second reason, a POSITA would have been prompted to apply Kuo's hole-punching techniques to Lorex Video because hole-punching was a well-known and popular solution for establishing P2P connections between devices, even in situations where the endpoints are located behind firewalls or network address translators (NATs) that would otherwise block direct communication between the endpoints.

200. As a third reason, a POSITA would have implemented Lorex Video's system in accordance with Kuo's techniques for establishing P2P connections to provide a simple method for the remote client device (referred to as the "proximal

device” in Kuo) to locate an appropriate linking server where the DVR (corresponding to the “remote device in Kuo) is registered and from which a hole-punching process can be initiated to form the P2P connection. EX1011, ¶¶[0010]-[0012] (“As long as a proximal device has API supported by the administration server, the user can request the administration server to find out the linking address.”), [0029]-[0039], FIGS. 3, 10-11.

201. Based upon my knowledge and experience in this field and my review of the relatively straightforward and predictable structures in Lorex Video and Kuo, it is clear that a POSITA would have possessed the requisite level of skill to implement this combination given the overlapping technologies of Lorex Video and Kuo—and certainly would have had a reasonable expectation of success in achieving this combination in the manner described above. Both Lorex Video’s and Kuo’s systems involve establishing connections between network endpoints. Considering the predictable electrical/network and software components involved in the combination and the relatively advanced state of the art at the time, a POSITA would have reasonably expected success applying Kuo’s teachings to Lorex Video as described above.

*Combining Lorex Video further with Galvin*

202. Based on my review, Lorex Video describes the DVR as including a back panel with ports that can connect to a router and a camera, but Lorex Video

does not describe a port for connecting the DVR to a television. EX1012, 0:33-0:40. Galvin nonetheless describes a conventional solution that would have been obvious to apply to Lorex Video's DVR to supply this television connection port. EX1013, [0057], [0067], FIGS. 4-5. A POSITA would have been prompted to implement Lorex Video to include a display output port in accordance with Galvin's suggestion to enable connection of the DVR to a television or other screen through which a user would be able to view video from one or more cameras connected to the DVR. A POSITA also would have sought to include a display output port on Lorex Video's DVR to allow a user to view and interact with DVR configuration/menu screens locally even without a mobile device, which would have been convenient to many users. Further, Lorex Video and Galvin both describe security systems involving security camera footage. Considering the predictable electrical/network and software components involved in the combination and the relatively advanced state of the art at the time, it is clear that a POSITA would have reasonably expected success achieving the Lorex Video-Galvin-Kuo combination before the earliest effective filing date of the '916 Patent (January 7, 2014).

## **B. Independent Claim 1**

203. Independent claim 1 of the '916 Patent recites:

1. An electronic device for concentrating information, comprising:

- at least one first interface for receiving information from at least one information source;
- a second interface coupling to the Internet, for establishing a connection with a remote client device through the Internet;
- a third interface for connecting to a television for viewing said information; and
- a unique identification (UID) embedded in the electronic device for concentrating information, wherein the electronic device for concentrating information contacts at least one linking server through the Internet to register said embedded unique identification (UID) into the at least one linking server for identifying network addressing information of the electronic device for concentrating information so as to enable the remote client device to establish a P2P connection with the electronic device for concentrating information for viewing said information received by the electronic device for concentrating information;

wherein the remote client device contacts the at least one linking server through the Internet according to said unique identification (UID) of the electronic device for concentrating information for establishing a P2P connection between the remote client device and the electronic device for concentrating information via the Internet, wherein at least one portion of the information received by the electronic device for concentrating information is delivered to the remote client device on the P2P connection, wherein the remote client device does not have a unique identification (UID) to register in the at least one linking server for associating connecting information of the remote client device when the remote client device contacts the at least one linking server for establishing the P2P connection.

204. As I explain in more detail below through my element-by-element analysis, Lorex Video in combination with Galvin and Kuo renders claim 1 obvious.

***[1pre] An electronic device for concentrating information, comprising:***

205. The Lorex Video-Galvin-Kuo combination provides the recited “electronic device for concentrating information.” Lorex Video discloses an *electronic device* (i.e., a DVR) that *concentrates information* (i.e., video data) from security cameras connected to the DVR. EX1012, 0:01-0:38. For example, the presenter of Lorex Video states “I have my ECO4 Stratus DVR” as he points directly at the DVR. EX1012, 0:31-0:33. Shortly thereafter, the presenter points at a power cable connected to the DVR and proclaims “It’s powered.” EX1012, 0:31-0:34. This means that Lorex Video’s DVR represents an *electronic device* that receives electrical power.



EX1012, 0:32 (annotated).

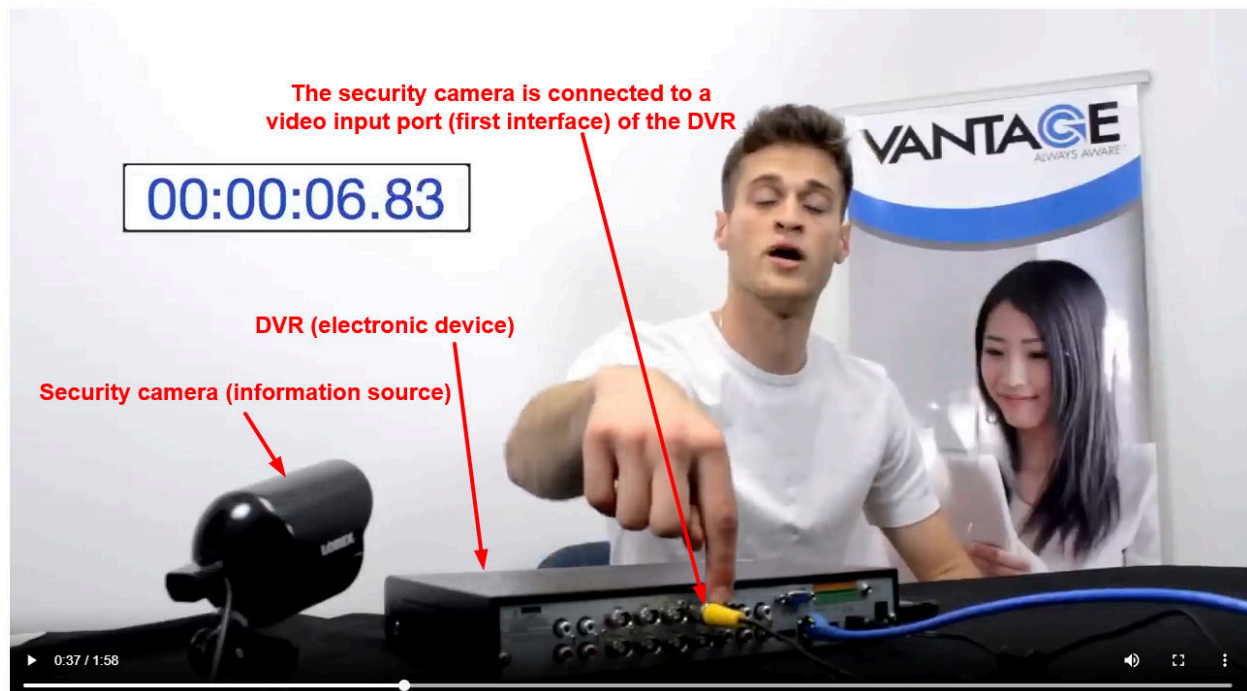
206. As I describe in further detail below in connection with Element [1a], a security camera can be connected to an input port on the back panel of the DVR so

that the DVR receives a video signal from the security camera. EX1012, 0:01-0:38. This video signal represents information that is concentrated by the DVR, which makes the DVR an *electronic device for concentrating information*.

207. Therefore, the Lorex Video-Galvin-Kuo combination provides Element [1pre].

***[1a] at least one first interface for receiving information from at least one information source;;***

208. The Lorex Video-Galvin-Kuo combination provides Element [1a]. As previously discussed (*see* [1pre]), Lorex Video's DVR includes video input ports that can connect to security cameras to receive video signals from the security cameras. EX1012, 0:01-0:38. The video input port of Lorex Video's DVR and a security camera connected to the video input port are shown below:



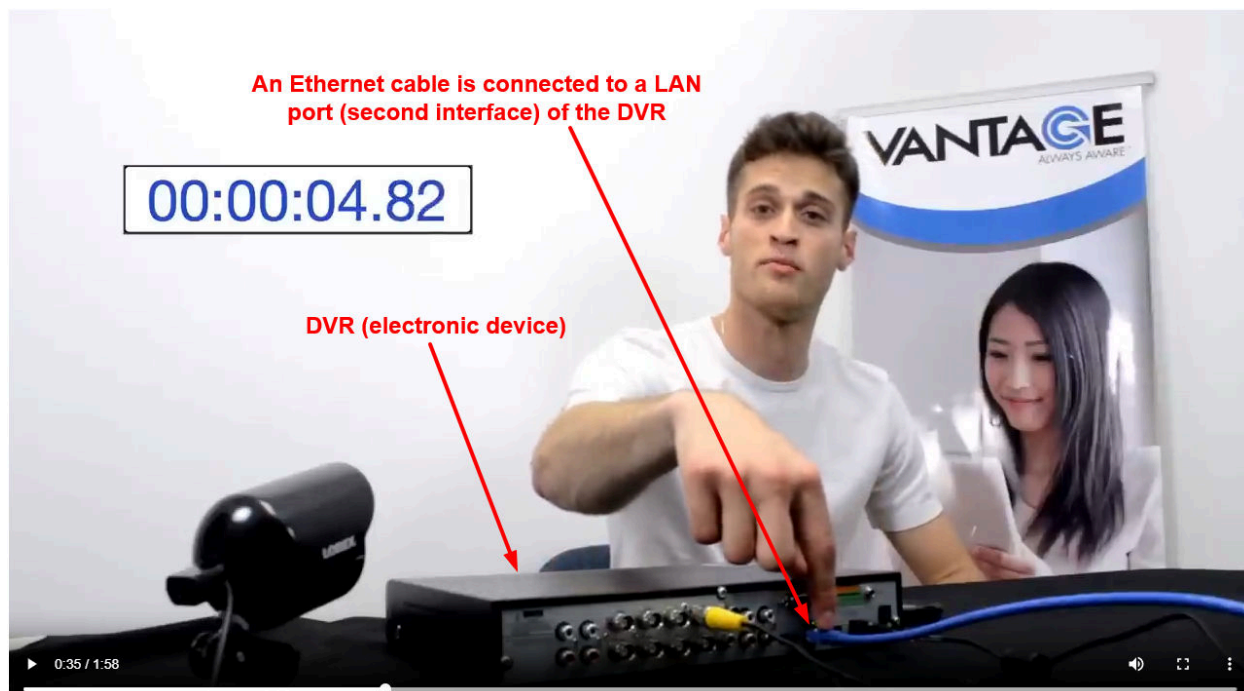
EX1012, 0:37 (annotated).

209. The security camera provides an *information source* that generates *information* including a video signal. In Lorex Video, the presenter points directly at a video input port of the DVR and proclaims that “I have one camera set up.” EX1012, 0:36-0:39. One security camera is visible as the presenter points at the video input port, which is visibly connected to a cable that extends off screen. EX1012, 0:37. Furthermore, as the presenter points at the video input port, there is a cable visibly extending off screen from the back of the camera. *Id.* Consequently, Lorex Video’s DVR includes *at least one first interface* for receiving *information* from *at least one information source*.

210. Therefore, the Lorex Video-Galvin-Kuo combination provides Element [1a].

***[1b] a second interface coupling to the Internet, for establishing a connection with a remote client device through the Internet;***

211. The Lorex Video-Galvin-Kuo combination provides Element [1b]. For example, Lorex Video explains that the DVR includes a local area network (LAN) port for connecting the DVR to a router using an Ethernet cable. EX1012, 0:01-0:38. The Ethernet port of Lorex Video’s DVR is illustrated below with an Ethernet cable connected to the Ethernet port, the Ethernet cable extending off-screen:



EX1012, 0:35 (annotated).

212. While pointing at the LAN port of the DVR, the presenter of Lorex Video proclaims that the DVR “is connected to my router using an Ethernet [cable].” EX1012, 0:35-0:39. Ethernet is a family of computer networking technologies and standards that was well-known for providing Internet connections in LANs and wide area networks (WANs). EX1010, 27, 92. Additionally, “routers” are network devices that were well-known for relaying network traffic over the Internet. EX1010, 91 (“The wireless router provides a number of functions, including... Providing a gateway to your broadband Internet connection so that several computers can share it.”).

213. Considering that Lorex Video expressly discloses that the DVR is connected to a router using an Ethernet cable, a POSITA would have understood

Lorex Video as teaching that the DVR is coupled to the Internet via a port that connects to the Ethernet cable. As described above, Lorex Video describes a connection method by which a remote client device (i.e., mobile device) can connect to the DVR over the Internet to receive video data from the DVR. EX1012, 0:35-0:39. Consequently, a connection can be established between the DVR and a mobile device via the *second interface* (i.e., LAN port) of the DVR, which connects the DVR to the Internet via a router and an Ethernet cable.

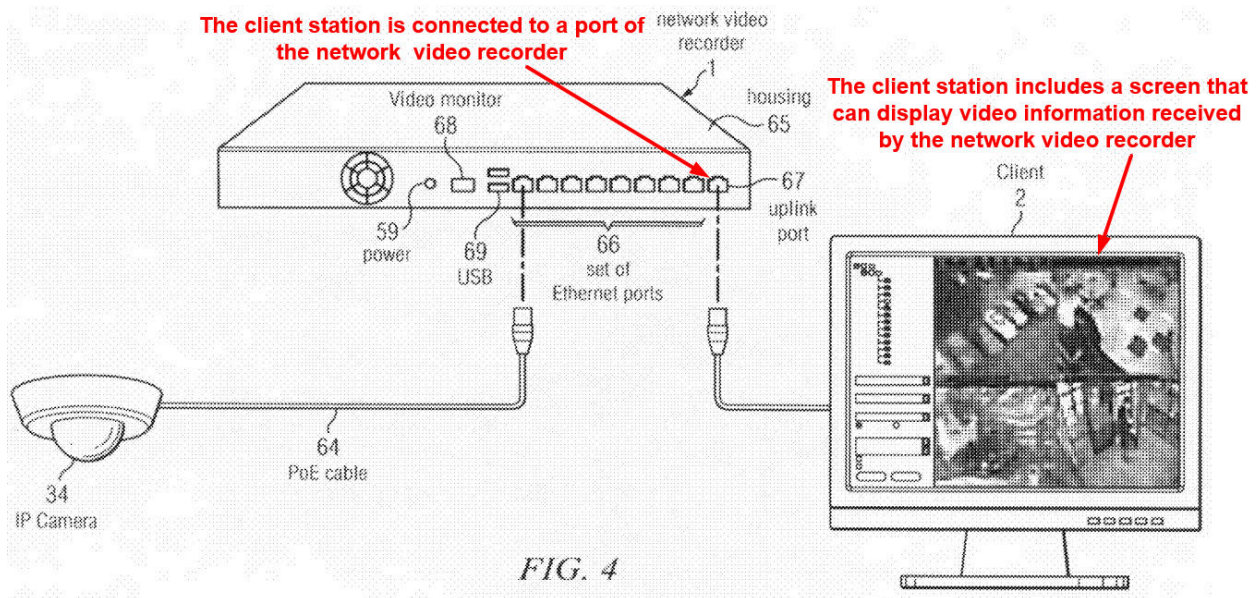
214. Therefore, the Lorex Video-Galvin-Kuo combination provides Element [1b].

***[1c] a third interface for connecting to a television for viewing said information; and***

215. The Lorex Video-Galvin-Kuo combination would have rendered obvious Element [1c]. In Lorex Video, a DVR is presented with a wide selection of ports located on a back panel of the DVR including the *first interface* (i.e., video input port) and the *second interface* (i.e., LAN port) discussed above. EX1012, 0:01-0:39. To the extent that the presenter of Lorex Video does not expressly identify a *third interface* for connecting to a *television*, such interfaces were well-known interfaces on DVRs and related technology.

216. For example, Galvin discloses a system including a network video recorder that, much like the Lorex Video's DVR, can receive video data from security cameras. EX1013, [0057]; Galvin discloses that the video recorder includes

a set of ports – with at least one of these ports being connected to a camera and at least one of these ports being connected to an IP client station that includes a television screen for viewing video data. EX1013, [0067]. FIG. 4 of Galvin illustrates the network video recorder connected to the camera and connected to the IP client station:



EX1013, [0067], FIG. 4 (annotated).

217. As illustrated above, Galvin's IP client station includes a television screen that can display video data received by the network video recorder, which is connected to the IP client station via an interface (i.e., uplink port 67). EX1013, [0067], FIG. 4. It been obvious for a POSITA to implement Lorex Video's DVR in accordance with Galvin's suggestions such that the DVR would include an interface for connecting to a device including a screen that can display information (i.e., video) received by the DVR. Consequently, the Lorex Video-Galvin-Kuo combination

discloses an *electronic device* (i.e., DVR) that includes a *third interface* for connecting to a television for viewing video data collected by cameras.

218. Therefore, the Lorex Video-Galvin-Kuo combination provides Element [1c].

***[1d] a unique identification (UID) embedded in the electronic device for concentrating information,***

219. The Lorex Video-Galvin-Kuo combination provides Element [1d]. Based on my review, Lorex Video describes a method for entering the “device ID” of a DVR into a user interface of a mobile device to establish a connection between the mobile device and the DVR. EX1012, 0:38-1:58. In describing how to enter the DVR’s device ID into a field on the mobile device, the presenter of Lorex Video states that “I’ll open the app, go to device manager, press add...under device ID...I get to scan this QR code on the top of the DVR...and it will populate all of the fields.” EX1012, 0:46-1:03. This device ID represents a *unique identification (UID)* of the DVR and allows the mobile device to connect specifically to the DVR to receive video collected by cameras that supply the video to the DVR.



EX1012, 1:02 (annotated).

220. In reviewing the video, I noticed that the QR code containing the DVR's device ID is affixed to the upper panel of the DVR and is therefore physically "***embedded***" on the DVR. EX1012, 1:02. To achieve the connection between the mobile device and the DVR described in Lorex Video, the device ID would also be digitally ***embedded*** in the DVR. This is because the DVR must have access to its own device ID in order to allow a server to connect the DVR to other devices, including the mobile device in Lorex Video.

221. Therefore, the Lorex Video-Galvin-Kuo combination provides Element [1d].

***[1e] wherein the electronic device for concentrating information contacts at least one linking server through the Internet to register said embedded unique identification (UID)***

*into the at least one linking server for identifying network addressing information of the electronic device for concentrating information so as to enable the remote client device to establish a P2P connection with the electronic device for concentrating information for viewing said information received by the electronic device for concentrating information;*

222. The Lorex Video-Galvin-Kuo combination provides Element [1e]. As I noted above in connection with element [1d], Lorex Video discloses a *remote client device* (e.g., a mobile device) that uses a *unique identification (UID)* (e.g., device ID) of a DVR (*electronic device for concentrating information*) to establish a connection with the DVR over the Internet. EX1012, 0:38-1:58. To the extent Lorex Video does not expressly disclose that the DVR contacts the at least one linking server to register the device ID, such features would have been obvious and provided in the Lorex Video-Galvin-Kuo combination.

223. Kuo, for example, discloses a “remote device” (analogous to the DVR in Lorex Video or the electronic device for concentrating information in the ’916 Patent) that contacts a linking server through the Internet to register a *unique identification (UID)* (e.g., a serial number) into the linking server for identifying network addressing information of the device. EX1011, [0037], FIG. 10. For example, Kuo discloses that “the remote device connects with the linking server provided by the administration server” and “[t]he remote device sends a piece of device-registering information to the linking server” such that “the linking server

learns the IP and information necessary for communicating with the remote device.” EX1011, [0037]. Furthermore, Kuo describes one embodiment in which the device-registering information that the remote device registers with the linking server is a “unique serial number” that allows the linking server to “verify or recognize the remote device.” EX1011, [0034], FIG. 10. Consequently, the remote device registers both *addressing information* (i.e., the IP and information necessary for communicating) and a *unique identifier (UID)* (i.e., a unique serial number) with the linking server.

224. Kuo’s technique for registering a unique serial number remote device in a linking server enables a proximal device (analogous to the mobile phone in Lorex Video and remote client device in the ’916 Patent) to establish a P2P connection with the remote device by contacting the linking server. EX1011, [0038]. For example, Kuo discloses that “[t]he user uses API of a proximal device to select a specified remote device...Thus, the proximal device learns the linking server whereby it can connects with the specified remote device” and that “the proximal device asks the linking server to establish a link between the proximal device and the remote device.” EX1011, [0038]. Since Kuo’s proximal device can locate a linking server corresponding to a proximal device based on a user selection of the remote device on an API, this indicates that the remote device contacts the linking server through the internet to register its unique serial number so that the proximal

device is able to distinguish the remote device from other remote devices in seeking to connect with the remote device specifically. Put another way, Kuo's proximal device selects a specific remote device in order to connect to that specific remote device which means that the linking server must have a way to distinguish the selected remote device from other remote devices to initiate the connection with the proximal device. The registered unique serial numbers allow the linking servers to identify the remote device, which means that the remote device contacting the linking server with its unique serial number enables the proximal device to establish a P2P connection with the remote device by contacting the linking server.

225. Kuo discloses that in response to receiving a request from a proximal device to connect with a remote device, "the linking server takes priority to perform a hole punching process on the proximal device and the remote device" in order to establish a P2P connection. EX1011, [0038]. Hole punching is a technique for establishing a P2P connection that involves sending messages to devices on either end of the P2P connection. It is well-known in the computer networking industry that to send these hole punching messages, the linking server must know the network address of these devices.

226. Therefore, the Lorex Video-Galvin-Kuo combination would have rendered obvious Element [13].

***[1f] wherein the remote client device contacts the at least one linking server through the Internet according to said unique***

***identification (UID) of the electronic device for concentrating information for establishing a P2P connection between the remote client device and the electronic device for concentrating information via the Internet,***

227. The Lorex Video-Galvin-Kuo combination would have rendered obvious Element [1f]. Lorex Video shows that the ***remote client device*** (e.g., a mobile device) uses the ***unique identification (UID)*** (e.g., device ID) of a DVR (***electronic device for concentrating information***) to establish a connection with the DVR over the Internet. EX1012, 0:38-1:58. As I explained above in connection with Element [1d], the DVR's device ID can be entered into an information field on a user interface of an application running on the mobile device. EX1012, 0:59-1:05. Once the DVR's device ID is entered, the mobile device can submit the device ID to establish a connection with the DVR. EX1012, 0:59-1:36.

228. To the extent Lorex Video does not expressly disclose details of the client device's contact with a linking server as claimed in [1f], these features would have been obvious in view of Kuo. For instance, Kuo discloses a "proximal device" (analogous to the remote client device such as a mobile phone in Lorex Video and the '916 Patent) that contacts a linking server to establish a P2P connection with a "remote device" (analogous to the DVR in Lorex Video or the electronic device for concentrating information in the '916 Patent). EX1011, [0038] ("the proximal device asks the linking server to establish a link between the proximal device and the remote device") & FIG. 11, [0037], [0039], FIG. 10; *see also id.*, [0007]-[0012], [0024]-

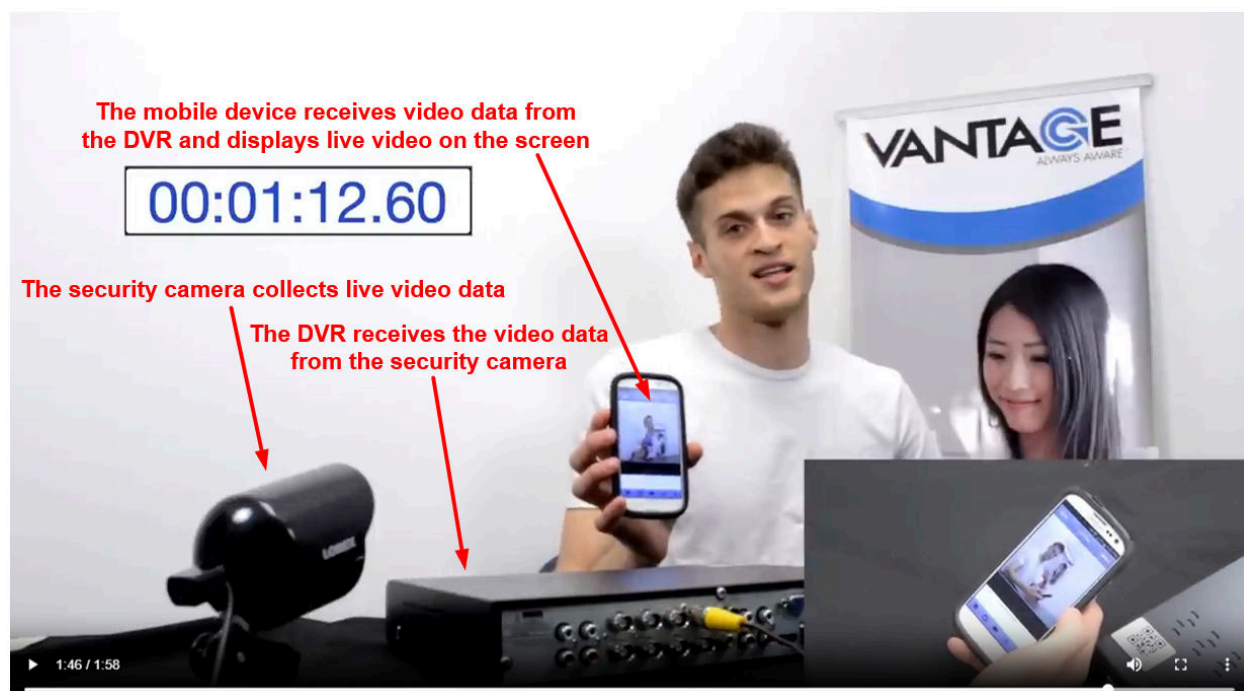
[0027], FIGS. 1-3. The proximal device uses an identifier for the targeted remote device, which can be a serial number as described in Kuo or a Device ID as described in Lorex Video. EX1011, [0034], [0037]-[0039], Table 1; EX1007, 58-60, 85. For the reasons expressly articulated above in connection with element [1e], a POSITA would have found it obvious to combine Lorex Video and Kuo such that Lorex Video's *remote client device* (e.g., mobile phone) would contact a linking server through the Internet according to the Device ID of the DVR to establish a P2P connection with the DVR.

229. Therefore, the Lorex Video-Galvin-Kuo combination provides Element [1f].

***[1g] wherein at least one portion of the information received by the electronic device for concentrating information is delivered to the remote client device on the P2P connection,***

230. The Lorex Video-Galvin-Kuo combination provides Element [1g]. As I explained above in connection with Element [1a], the DVR receives *information* (e.g., a video signal) from an *information source* (e.g., a security camera) connected to an *interface* on a back panel of the DVR. EX1012, 0:36-0:39. When the *remote client device* (e.g., a mobile device) of Lorex Video establishes a connection with the DVR by entering the DVR's device ID, the mobile device can receive *information* including video data collected by the DVR and display this video data

on a screen. EX1012, 0:38-1:58. As illustrated below, Lorex Video’s mobile device displays live video from the camera that is connected to the DVR. EX1012, 1:46.



EX1012, 1:46 (annotated).

231. Since Lorex Video’s mobile device displays video data collected by a camera connected to the rear panel of the DVR, at least a portion of the video information received by the DVR is delivered to the mobile device over the connection. EX1012, 0:55-1:58.

232. As described above, Lorex Video shows that a mobile device can connect to a DVR and receive information from the DVR simply by entering the DVR’s device ID and other information corresponding to the DVR, but Lorex Video does not expressly refer to this link as a “P2P connection.” EX1012, 0:55-1:58. However, Kuo discloses a similar method for using a proximal device to contact a

linking server to establish a connection with a remote device, the linking server establishing the connection using hole punching to enable “point-to-point transmission” – well known characteristics of P2P connections. EX1011, [0024], [0038]. Kuo discloses that the proximal device can be a mobile phone and the remote device can be a surveillance camera, so it would be obvious for a POSITA to implement the connection method of Lorex Video with the P2P connection method of Kuo so that Lorex Video’s mobile device receives video data from the DVR over a **P2P connection**. EX1011, [0039];

233. Therefore, the Lorex Video-Galvin-Kuo combination provides Element [1g].

***[1h] wherein the remote client device does not have a unique identification (UID) to register in the at least one linking server for associating connecting information of the remote client device when the remote client device contacts the at least one linking server for establishing the P2P connection.***

234. As discussed above in connection with Element [1f], Kuo discloses a “proximal device” (analogous to the remote client device such as a mobile phone in Lorex Video and the ’916 Patent) that contacts a linking server to establish a P2P connection with a “remote device” (analogous to the DVR in Lorex Video or the electronic device for concentrating information in the ’916 Patent). EX1011, [0038]-[0039], FIG. 11. In Kuo, the proximal device does not have a unique identification to register in the linking server when it contacts the linking server for establishing

the P2P connection. In fact, the proximal device is not registered in the linking server when the P2P connection is established at all. *Id.*

235. That the proximal device is not registered in the linking server when contacting the linking server to establish the P2P connection or when the P2P connection is established when have been evident to a POSITA reviewing Kuo, at least because Kuo's linking servers are configured to maintain registration information for the remote devices (not the proximal devices) and because Kuo defines an API that allows a proximal device to contact a linking server to connect with a remote device based merely on information about the linking server that the proximal device obtains from an administration server. EX1011, [0008] ("the remote device registering the information thereof in the linking server"), [0009]-[0012], [0032]-[0034], [0037]-[0039], FIGS. 10-11. Kuo is clear that "the proximal device can merely use the administration server to find out a linking server that a specified remote device registers, neither needing a fixed IP nor remembering the IP addresses or domain names of the linking servers. *As long as proximal device has API supported by the administration server, the user can request the administration server to find out the linking address.*" *Id.*, [0012], [0039] ("The remaining procedures, such as interactions with the administration server and the linking server, are all automatically executed by API. Therefore, the present invention can greatly reduce complexity of operation."). Kuo's API thus obviates any need for the

proximal device to register with the linking server. *Id.* Noticeably, Kuo's approach is identically described in the '916 Patent and the specification of the '916 Patent expressly refers to Kuo (U.S. Serial No. 13/293,506) as providing the registration and connection procedures implemented by the disclosed devices. *Cf.* EX1001, 8:54-9:15, 13:42-52, 14:10-23.

236. For the reasons expressly articulated above in connection with element [1e], a POSITA would have found it obvious to combine Lorex Video and Kuo such that Lorex Video's remote client device (e.g., smartphone, tablet, or PC) would not have had and would not register a unique ID for associating connecting information of the remote client device when contacting the linking server for establishing the P2P connection or while the P2P connection is being established.

237. Therefore, the Lorex Video-Galvin-Kuo combination provides Element [1h].

### **C. Claim 2**

238. Claim 2 of the '916 Patent recites:

|                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. The electronic device for concentrating information according to claim 1, wherein the electronic device for concentrating information is a set top box. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|

239. For at least the reasons I discussed above in connection with Ground 1A (claim 2), Lorex Video depicts a DVR in the form of a set top box.; EX1012; 0:01-0:38; EX1016, [0003] EX1017, [0049].

240. Therefore, Lorex Video discloses the additional feature recited in claim 2.

**D. Claim 3**

241. Claim 3 of the '916 Patent recites:

3. The electronic device for concentrating information according to claim 1, wherein the remote client device is a portable electronic device.

242. Lorex Video discloses the *remote client device* as an Android smartphone, which is a *portable electronic device*. EX1012, 0:45-1:42 (“Use my Android phone...automatically we have live streaming right to my phone”).



EX1012, 1:46 (annotated).

243. Therefore, Lorex Video discloses the additional feature recited in claim 3.

**E. Claim 4**

244. Claim 4 of the '916 Patent recites:

|                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>4.</b> The electronic device for concentrating information according to claim 1, wherein the remote client device is a mobile phone.</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------|

245. Lorex Video discloses the *remote client device* as an Android smartphone, which is a *mobile phone*. EX1012, 0:45-1:42 (“Use my Android phone...automatically we have live streaming right to my phone”); EX1012, 0:45-1:42.

246. Therefore, Lorex Video discloses the additional feature recited in claim 4.

**F. Claim 5**

247. Claim 5 of the '916 Patent recites:

|                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>5.</b> The electronic device for concentrating information according to claim 1, wherein the remote client device is not registered in the at least one linking server while the P2P connection is being established.</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

248. The Lorex Video-Galvin-Kuo combination provides the additional element of claim 5 for at least the reasons discussed above in connection with Element [1h].

249. Therefore, Lorex Video discloses the additional feature recited in claim 5.

**G. Claim 6**

250. Claim 6 of the '916 Patent recites:

|                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>6. The electronic device for concentrating information according to claim 5, wherein the at least one linking server transmits hole-punching messages to the electronic device for concentrating information and the remote client device to establish the P2P connection.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

251. Kuo discloses, and the Lorex Video-Galvin-Kuo combination provides, that the linking server transmits hole-punching messages to establish a P2P connection to both endpoints of the connection, which would include the mobile device and the DVR of Lorex Video in the combination described above. EX1011, [0029] (“The linking server group A (20)...sends hole-punching information 960 and hole-punching information 961 to the proximal device 4 and the remote device A (31) so as to establish a point-to-point link 97 between the proximal device 4 and the specified remote device A (31).”), [0038], FIG. 11.

252. Therefore, Lorex Video discloses the additional feature recited in claim 5.

**H. Claim 7**

253. Claim 7 of the '916 Patent recites:

|                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>7. The electronic device for concentrating information according to claim 1, wherein the second interface couples to the Internet through an external routing device or an internal routing device.</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

254. For the reasons addressed above with respect to Element [1b], Lorex Video discloses that the second interface couples to the Internet through an external routing device; EX1012, 0:35-0:39 (the DVR “is connected to my router using an Ethernet [cable]”).

255. Therefore, Lorex Manual discloses the additional feature recited in claim 7.

#### **I. Claim 8**

256. Claim 8 of the '916 Patent recites:

|                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------|
| <p>8. The electronic device for concentrating information according to claim 7, wherein the routing device is an IP router.</p> |
|---------------------------------------------------------------------------------------------------------------------------------|

257. Claim 8 merely adds an intended use of the “routing device” but does not further define the claimed “electronic device for concentrating information.” The additional features recited in claim 8 are therefore not entitled to patentable weight. Nonetheless, even if it were, it would have been obvious to a POSITA to implement Lorex Video’s router as an IP router given the ubiquitous use of IP routers before the alleged invention and to achieve known benefits of IP routers (e.g., to connect the DVR to the Internet or other IP networks). EX1012, 0:35-0:39 (the DVR “is connected to my router using an Ethernet [cable]”); EX1010, 91 (“The wireless

router provides a number of functions, including... Providing a gateway to your broadband Internet connection so that several computers can share it.”)..

**J. Claim 10**

258. Claim 10 of the '916 Patent recites:

|                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>10.</b> The electronic device for concentrating information according to claim 7, wherein the routing device has a wireless access point for connecting to a portable electronic device so as to deliver the information to the portable electronic device.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

259. Claim 10 merely adds an intended use of the “routing device” but does not further define the claimed “electronic device for concentrating information.” The additional features recited in claim 10 are therefore not entitled to patentable weight. Lorex Video’s DVR nonetheless would have been capable of connecting to such a “routing device” as claimed since the additional features in claim 10 would not have interfered with the functions of the DVR. EX1012, 0:35-0:39 (the DVR “is connected to my router using an Ethernet [cable]”).

**K. Claim 16**

260. Claim 16 of the '916 Patent recites:

|                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>16.</b> The electronic device for concentrating information according to claim 1, wherein the information is formatted by the electronic device for concentrating information in a way suitable for viewing by the remote client device.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

261. As described above in connection with Element [1g], Lorex Video’s mobile device can display video data from a DVR and the mobile device receives

this video data directly from the DVR over a P2P connection. EX1012, 0:38-1:58. Lorex Video confirms that the video streamed from the DVR is formatted so that the video is suitable for viewing. EX1012, 1:46. This is evident at least because video from Lorex Video's DVR is displayed on the screen of the mobile device, indicating that the DVR has streamed the video in a format that allows the mobile device to display the video on the screen.

262. Therefore, Lorex Video discloses the additional feature recited in claim 16.

### **XIII. GROUND 2B: LOREX VIDEO IN COMBINATION WITH GALVIN, KUO, AND KIM517 RENDERS CLAIM 9 OBVIOUS**

#### **A. Overview of the Combination and Reasons to Combine**

263. Based upon my knowledge and experience in the field and my review of the prior art, it is clear that a POSITA would have found it obvious and would have been motivated to further modify the Lorex Video-Galvin-Kuo combination based on Kim517's suggestion for remotely controlling a PTZ camera or other appliance wirelessly connected to a home gateway like Lorex Video's DVR for substantially the same reasons as those discussed above in connection with Ground 1B (claim 9).

#### **B. Claim 9**

264. Claim 9 of the '916 Patent recites:

|                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>9. The electronic device for concentrating information according to claim 7, wherein the electronic device for concentrating information is connected to an appliance through the routing device and the remote client device controls the appliance through the electronic device for concentrating information.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

265. The Lorex Video-Galvin-Kuo-Kim517 combination would have rendered claim 9 obvious for at least the reasons described above in connection with the analysis of claim 9 in Ground 1B.

#### **XIV. ADDITIONAL REMARKS**

266. I currently hold the opinions expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

267. I hereby declare that all statements made are of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this proceeding.

Dated: July 19, 2024

By: *Vlad Kardashov*  
Vlad Kardashov, BS.C  
Toronto, Ontario

# **APPENDIX A**

## Contact

vlad@kardashov.com

www.linkedin.com/in/vkard  
(LinkedIn)

## Top Skills

P&L Results

Setting Strategic Direction

Business Strategy

## Languages

Hebrew (Native or Bilingual)

English (Native or Bilingual)

## Honors-Awards

CES 2013 Innovation Award

CES 2014 Innovation Award

DIGITAL TRENDS - FLIR FX BEST  
OF CES 2014

## Patents

POWERED SECURITY CAMERA  
TOOL-FREE INSTALLATION

MODULAR CAMERA MONITORING  
SYSTEMS AND METHODS

PROXIMITY-BASED CAMERA  
CONFIGURATION

SYSTEMS AND METHODS FOR  
VIDEO SYNOPSES

SYSTEMS AND METHODS FOR  
DYNAMIC DATA MANAGEMENT

# Vlad Kardashov #

President at iENSO

Toronto, Ontario, Canada

## Summary

Experienced executive professional with extensive experience leading Product Development and R&D organizations in the fast-paced high-tech industry.

## Experience

iENSO

3 years 9 months

President

October 2023 - Present (9 months)

Toronto, Ontario, Canada

Vice President Of Engineering

October 2020 - October 2023 (3 years 1 month)

Greater Toronto Area, Canada

FLIR Systems

8 years

Vice President, Engineering. Security Division.

2016 - October 2020 (4 years)

Toronto, Canada Area

Director, Engineering & Product Development

2012 - 2016 (4 years)

Toronto, Canada Area

- Managing IP & Networking Innovative Products Design & Development
- Cloud Technologies and Cloud-based services
- Edge & Cloud-based video analytics
- Embedded systems group
- Mobile systems and apps dev
- Leading R&D groups in multiple locations in North America and Europe
- Managing the FLIR IP products line and related services starting from the inception stage to the final deployment
- Managing FLIR Cloud Platform Group

Flextronics Innovative Development, Strategic Products Group  
Director, System Integration and Test  
2011 - 2012 (1 year)  
Toronto, Canada Area

Strategic Products Engineering Division

Emblaze Mobile  
6 years

VP Technology  
July 2009 - July 2011 (2 years 1 month)  
Israel

ELSE Ltd. is a design house for cutting-edge mobile technology. Founded in 2001 and headquartered in Israel, ELSE Ltd. develops next generation innovative mobile solutions with an emphasis on user experience as the differentiating factor of its product.

Director, HW & System Validation  
2005 - July 2009 (4 years)  
Israel

Pelephone  
4 years

Manager, Engineering and Network Compliance  
2003 - July 2005 (2 years)  
Israel

Pelephone is an Israeli-based largest cellular carrier

[www.pelephone.co.il](http://www.pelephone.co.il)

System Validation Engineer, Team Lead since 2002  
2001 - 2003 (2 years)  
Israel

---

## Education

Babson College  
Executive Leadership and Innovation Program

The Singalovsky College, Tel Aviv  
BS.C, Electrical Engineering, RF