**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION**

ANONYMOUS MEDIA RESEARCH HOLDINGS, LLC,	§ § §	
Plaintiff,	§ §	Case No. 1:23-cv-01143
v.	§ §	
ROKU, INC.,	§ §	Jury Trial Demanded
Defendant.	§ § § § §	

PLAINTIFF'S ORIGINAL COMPLAINT

Plaintiff Anonymous Media Research Holdings, LLC ("AMRH") files this suit against Defendant Roku, Inc. ("Roku" or "Defendant") for infringement of United States Patent Nos. 8,510,768, 10,719,848, 8,756,622, 10,719,849, 8,296,791, and 10,572,896 and alleges, with personal knowledge as to its own actions and on information and belief as to the actions of others, as follows:

THE PARTIES

1.   Plaintiff Anonymous Media Research Holdings, LLC ("AMRH") is a Delaware limited liability company that holds all rights, title, and interests in United States Patent Nos. 8,510,768, 10,719,848, 8,756,622, 10,719,849, 8,296,791, and 10,572,896 (collectively, "Asserted Patents"). AMRH has a principal place of business at 72 E 3rd St, Suite 2B, New York, NY 10003.

2.   Defendant Roku is a Delaware corporation. Roku has been registered to do business in the state of Texas since May 1, 2014 and may be served through its registered agent,

Corporation Service Company d/b/a CSC – Lawyers Incorporating Service Company, at 211 E. 7th Street, Suite 620, Austin, Texas 78701.

3.   Roku maintains regular and established places of business in this District, including its Austin Office at 9606 N. Mopac Expressway, Suite 400, Austin, Texas 78759.[1]

JURISDICTION & VENUE

4.   The Court has subject matter jurisdiction over this action pursuant to 28 U.S.C. §§ 1331 and 1338(a) because the action brought by AMRH against Roku arises under the patent laws of the United States, 35 U.S.C. § 1 *et seq*.

5.   This Court has personal jurisdiction over Roku at least because Roku conducts business in this District and throughout the state of Texas.

6.   This Court also has personal jurisdiction over Roku because Roku has committed acts of patent infringement in this District and throughout Texas, including selling, and offering for sale, products and services that infringe AMRH's Asserted Patents.

7.   This Court further has personal jurisdiction over Roku because Roku has placed infringing products and services into the stream of commerce, with the expectation they will be purchased and used by customers in Texas and in this District, such that customers in Texas and in this District have purchased and used, and continue to purchase and use, Roku's infringing products and services, which has allowed Roku to derive substantial benefits from infringing acts in Texas and in this District.

8.   Venue is proper in this District against Roku pursuant to 28 U.S.C. §§ 1391 and 1400(b) because Roku is subject to the personal jurisdiction of this Court as set forth above, has

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[1] Roku, *Welcome to Austin: Home to Live Music, BBQ, and the #1 Streaming Platform in America!*, available at https://www.weareroku.com/locations/austin (last visited Sept. 11, 2023).

committed patent infringement in this District, and maintains at least a regular and established place of business in this District at 9606 N. Mopac Expressway, Suite 400, Austin, Texas 78759.

9.   Roku has previously been party to numerous patent cases in this District, and has repeatedly availed itself of the power and benefits of this Court and forum by raising counterclaims seeking a declaratory judgment of noninfringement and invalidity.[2]

<div align="center">

FACTUAL BACKGROUND

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ACR-Based Advertising

10.   Commercial use of automatic content recognition (or "ACR") to enable targeted advertising has become an enormous business that continues to grow.

11.   By harnessing ACR technology in consumer electronics, such as Smart TVs, companies like Roku can listen to what its users listen to, and watch what its users watch. The monitoring of a user's listening and viewing activity usually involves the use of "fingerprinting" algorithms, which capture representations (or "fingerprints") of the audio or video data based on the content consumed by a user.

12.   As a result, ACR technology can obtain a comprehensive picture of a user's media consumption, including information such as what you watch, when you watch it, and how long you watch it. Advertisers can use this ACR data to better target or personalize the advertising delivered on a user-by-user or household-by-household basis.

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[2] *See, e.g.*, *AdaptFlow Techs. LLC v. Roku, Inc.*, 6-22-cv-00996 (W.D. Tex. Sept. 22, 2022), *IOENGINE, LLC v. Roku Inc.*, 6-21-cv-01296 (W.D. Tex. Dec. 14, 2021), *Diatek Licensing LLC v. Roku, Inc.*, 6-21-cv-00777 (W.D. Tex. Jul. 29, 2021), *R2 Sols. LLC v. Roku, Inc.*, 6-21-cv-00553 (W.D. Tex. Jun. 1, 2021), *American Patents LLC v. Roku, Inc.*, 6-20-cv-00742 (W.D. Tex. Aug. 14, 2020), *Aprese Sys. Texas, LLC v. Roku, Inc.*, 6-19-cv-00528 (W.D. Tex. Sept. 9, 2019), *ESW Holdings, Inc. v. Roku, Inc.*, 6-19- cv-00044 (W.D. Tex. Feb. 8, 2019), *MV3 Partners LLC v. Roku, Inc.*, 6-18-cv-00308 (W.D. Tex. Oct. 16, 2018), *Flexiworld Tech., Inc. v. Roku, Inc.*, 6-20-cv-00819 (W.D. Tex. Sept. 8, 2020), *Flexiworld Techs., Inc. v. Roku, Inc.*, 6-21-cv-00680 (W.D. Tex. Jun. 28, 2021), *Flexiworld Techs., Inc. v. Roku, Inc.*, 6-21-cv-00767 (W.D. Tex. Jul. 27, 2021), and *Flexiworld Techs., Inc. v. Roku, Inc.*, 6-21-cv-00882 (W.D. Tex. Aug. 24, 2021).

13.   Several providers of consumer electronics, such as Roku, have leveraged ACR data to build a successful business in targeted advertising. However, implementing ACR technology to scale is not straightforward. Rather, technical solutions are critical to ensure that commercially viable media measurement results are obtained from millions of monitored consumer devices.

14.   For example, as well-understood in the industry, ACR data is "dirty." The audio and visual data samples routinely lead to incorrect or missing recognitions. This would require further innovations to ensure that the ACR data accurately represent the activity on a user's device.

15.   In another example, raw ACR "fingerprint" data may only identify a unique content sample, such as State Farm's "What Ifs" commercial. Additional analytical tools are required to efficiently and effectively determine additional consumer viewership behavior such as the broadcast channel (*e.g.*, ABC or TBS) or distribution channel (*e.g.*, Linear TV or Over-the-Top / Streaming) on which the viewer is watching the commercial, or any in-play action a user performed during his or her viewing of the commercial (*e.g.*, skipping, pausing, fast-forwarding, or rewinding).

16.   Therefore, solutions are required to manage and process raw ACR data before a company like Roku can use that data at scale to enable a successful targeted advertising campaign.

Anonymous Media and Its Patented Inventions

17.   Even before the recent proliferation and fragmentation of media driven by the Internet and innovations in consumer electronics, Anonymous Media began developing potential solutions to run ACR monitoring, collect ACR data, and use that data to improve on old methods

of media measurement and develop new means of media measurement that would fit the new, emerging digital media landscape.

18.   Mr. Jonathan Steuer and Mr. Chris Otto, two founders of Anonymous Media, both have decades of experience in the media industry. Together, they developed a suite of innovative tools and techniques to process and manage raw ACR data which would generate commercially viable media measurement results based on that data.

19.   In the early 2000s, Anonymous Media began applying for patents that embodied the innovations that resulted from Mr. Steuer and Mr. Otto's work. The United States Patent and Trademark Office ("PTO") has since issued numerous patents to Anonymous Media, including the Asserted Patents, which embody the innovative solutions pioneered by Mr. Steuer and Mr. Otto to process, manage, and utilize raw ACR data.

20.   Anonymous Media developed a solution by which raw ACR data samples, including audio or video fingerprints, are compared against a reference database of content samples to generate a time-ordered sequence of content identifications, which would then be analyzed against an expected pattern reference as part of a scrubbing process in order to address missing or incorrect results. This results in the generation of clean, time-ordered sequences of media measurements. Systems and methods that specifically reflect this innovation are reflected in Asserted Patent Nos. 8,510,768 ("'768 Patent") and 10,719,848 ("'848 Patent"). *See* Exhibits 1 and 2.

21.   Anonymous Media also pioneered a technique that identifies the channel (including, for example, broadcast or distribution channel) by which a user consumed a particular item of media content using a sequential-ordered sequence of at least two content identifiers obtained from the underlying audio or video data samples collected at monitoring

devices. Systems and methods that specifically reflect this invention are reflected in Asserted Patent Nos. 8,756,622 ("'622 Patent") and 10,719,849 ("'849 Patent"). *See* Exhibits 3 and 4.

22.   Anonymous Media further devised a process to deduce actions performed by a user to alter the play of a particular item of identified media content utilizing offset time positions of the content identifications associated with the underlying ACR visual or audio data, and comparing such offset time positions of the content identification results against the time progression of the underlying ACR data samples. System(s) and method(s) that specifically reflect this invention are reflected in Asserted Patent Nos. 8,296,791 ("'791 Patent") and 10,572,896 ("'896 Patent"). *See* Exhibits 5 and 6.

Roku's Use of the Patented Technology

23.   Roku is the United States' number one TV streaming platform based on hours streamed, with the mission to be the streaming platform that connects and benefits the entire TV ecosystem around the world.[3] It has a larger active account base than all U.S. cable companies' video subscribers combined, and "9 in 10 Ad Age 200 brands have chosen Roku."[4]

24.   It is common industry knowledge that Roku primarily makes its money through advertising, and "Roku's most significant competitive advantage is its ability to collect and properly utilize [its users'] data."[5] The individualized and detailed user data collected with ACR technology is therefore a centerpiece of Roku's business. To that end, Roku acquired Nielsen Holding PLC's Advanced Video Advertising (AVA) business, including Nielsen's video automatic content recognition (ACR) and dynamic ad insertion (DAI) technologies.[6]

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[3] Roku Jobs, *Amazing Individuals. Unstoppable Team.*, available at https://www.weareroku.com/home (last visited Sept. 12, 2023); Roku, *Company*, available at https://www.roku.com/about/company (last visited Sept. 12, 2023).
[4] Roku Advertising, *TV Starts Here*, available at https://advertising.roku.com/ (last visited Sept. 12, 2023).
[5] The Motley Fool, *1 Big Reason Why Roku Wants You to Buy a Roku TV*, available at https://www.nasdaq.com/articles/1-big-reason-why-roku-wants-you-to-buy-a-roku-tv (last visited Sept. 12, 2023).
[6] Business Wire, *Roku Closes Nielsen Transaction, Including Acquisition of AVA Business*, available at https://www.businesswire.com/news/home/20210415005975/en/Roku-Closes-Nielsen-Transaction-Including-

25.   Roku has developed and used software systems, hardware systems, and network architecture that implement ACR technology to collect and analyze data from Roku TVs and other smart devices. For example, when the user enables the Roku TV's Smart TV experience, Roku uses ACR technology to "collect TV viewing information such as the programs, commercials, and channels you view, the date, time and duration of the viewing, and how you use the on-screen TV guide."[7]

> When you use a Roku TV with the Smart TV experience enabled, we use Automatic Content Recognition (**"ACR"**) technology to receive information about what you watch via the Roku TV's antenna (including live television content and ads), and via devices connected to your Roku TV (including streaming players, consoles and cable and satellite set top boxes). For example, we collect TV viewing information such as the programs, commercials, and channels you view, the date, time and duration of the viewing, and how you use the on-screen TV guide. We collect TV viewing information both when you access live TV directly through your Smart TV's interface and when you access live TV from within a Third-Party Channel. If the Smart TV experience is enabled on your Roku TV, we will use this information to personalize your TV viewing experience and ads.

26.   Moreover, Roku explained that it "use[s] [ACR data] to personalize [its users'] TV viewing experience[s] and ads,"[8] indicating that it sells, or offers for sale, products and services that use this implementation of ACR technology—including but not limited to products and services offered to third-party advertisers and content personalization features for improving the user experience on Smart consumer electronics devices.
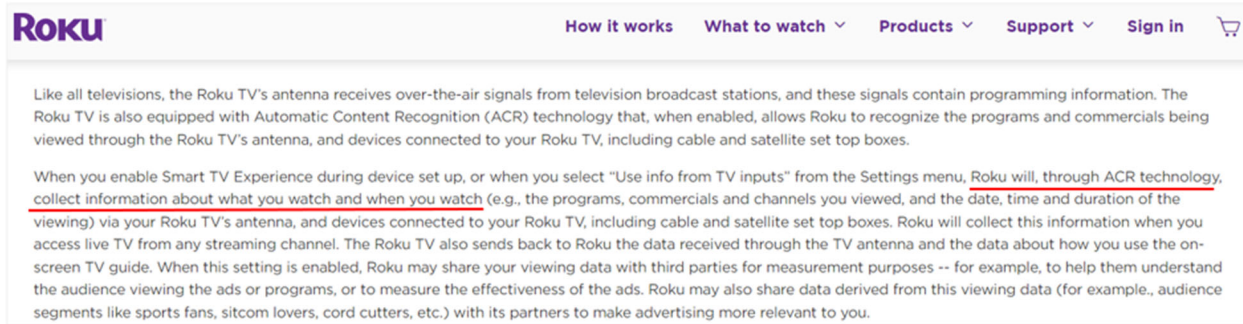
27.   Roku's public materials openly tout its use of ACR technology to track consumer behavior such as what they are watching, when they are watching it, and how long they are watching it: [9]

Acquisition-of-AVA-Business (last visited Sept. 12, 2023); *see also* Variety, *Roku to Acquire Nielsen's Addressable TV Advertising Business*, available at https://variety.com/2021/digital/news/roku-acquires-nielsen-advanced-video-advertising-1234918532/ (last visited Sept. 12, 2023).
[7] Roku, *Roku Privacy Policy*, available at https://docs.roku.com/published/userprivacypolicy/en/us (last visited Sept. 12, 2023).
[8] *Id*.
[9] Roku, *Roku ACR Service Policy*, available at https://docs.roku.com/published/acrservicepolicy/en/us (last visited Sept. 13, 2023).

Like all televisions, the Roku TV's antenna receives over-the-air signals from television broadcast stations, and these signals contain programming information. The Roku TV is also equipped with Automatic Content Recognition (ACR) technology that, when enabled, allows Roku to recognize the programs and commercials being viewed through the Roku TV's antenna, and devices connected to your Roku TV, including cable and satellite set top boxes.

When you enable Smart TV Experience during device set up, or when you select "Use info from TV inputs" from the Settings menu, Roku will, through ACR technology, collect information about what you watch and when you watch (e.g., the programs, commercials and channels you viewed, and the date, time and duration of the viewing) via your Roku TV's antenna, and devices connected to your Roku TV, including cable and satellite set top boxes. Roku will collect this information when you access live TV from any streaming channel. The Roku TV also sends back to Roku the data received through the TV antenna and the data about how you use the on-screen TV guide. When this setting is enabled, Roku may share your viewing data with third parties for measurement purposes -- for example, to help them understand the audience viewing the ads or programs, or to measure the effectiveness of the ads. Roku may also share data derived from this viewing data (for example., audience segments like sports fans, sitcom lovers, cord cutters, etc.) with its partners to make advertising more relevant to you.

28.   Roku promotes that it "has the ability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming" as well as that it will "measure ads by initial fingerprinting and matching the ad to a reference library."[10]

What They Measure

Roku has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming. They also measure local affiliates in the covered markets. In all, Roku has 270 channels under measurement. They measure ads by initial fingerprinting and matching the ad to a reference library. They either passively extract the ad from the system or it is client-provided. Roku licenses the ad reference library, as opposed to owning it.

29.   These software systems, hardware systems, network architecture, products, and services that enable Roku's ACR-based offerings are collectively referred to herein as "Accused ACR Instrumentalities." As detailed below, Roku uses the Accused ACR Instrumentalities to carry out functions described in the Asserted Patents, including but not limited to receiving representations of audio or video data over a network, querying an electronic database on known content, and taking additional action depending on the content identification results obtained. Additional actions are taken, for example, to enable more precise measurement of the content playing on smart devices.

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[10] Sequent Partners, *Automatic Content Recognition: the Future of TV Ad and Audience Data* at 23, previously available for download on https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data.

30.   By making, using, offering to sell, and/or selling the Accused ACR Instrumentalities, Roku has infringed and is infringing the Asserted Patents as described in further detail below.

31.   Anonymous Media has attempted to engage in discussions with Roku regarding Roku's unauthorized use of the patented technology at issue via at least Roku's Accused ACR Instrumentalities.

32.   In connection with those efforts, representatives of Anonymous Media prepared claim charts reflecting publicly available evidence of Roku's use of the patented inventions.

33.   Anonymous Media's representatives made those claim charts available in an electronic data room, and provided Roku representatives access to that data room, so that Roku was able to view those claim charts.

34.   Roku, however, rebuffed Anonymous Media's attempts to engage in good-faith discussions.

35.   Left with no recourse, AMRH files this suit to enforce its intellectual property rights and collect just compensation for Roku's unauthorized use of its patented inventions.

CAUSES OF ACTION

Count I: Infringement of U.S. Patent No. 8,510,768

36.   All preceding factual allegations above are incorporated as if fully set forth herein.

37.   The USPTO duly and legally issued U.S. Patent No. 8,510,768 ("'768 Patent") to Anonymous Media Research, LLC with Mr. Jonathan Steuer and Mr. Chris Otto as named inventors. Anonymous Media Research, LLC subsequently assigned all rights, titles, and interests in the '768 Patent to AMRH.

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38.   The '768 Patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code.

39.   Roku has directly infringed and continues to directly infringe the '768 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of the Accused ACR Instrumentalities to practice the claimed invention in the '768 Patent. For example, Claim 9 of the '768 Patent[11] recites:

> A computer program product in a non-transitory computer readable medium comprising instructions executable by one or more processors of one or more computers, the one or more computers being coupled to a network to receive, over the network, data for a sequence of audio data samples, the audio data samples comprising representations of audio data captured at a media monitoring device, the plurality of audio data samples being submitted over the network, the instructions comprising instructions for:
>
> > (a) using the one or more computers to query an electronic database of a plurality of audio data representations and corresponding content identifiers;
> >
> > (b) generating a raw play stream, the raw play stream comprising a sequence of content identification results corresponding to the sequence of audio data samples; wherein:
> >
> > the sequence of content identification results is obtained by querying the electronic database to attempt to determine respective likely matches between respective audio data samples in the sequence of audio data samples and respective audio data representations in the electronic database;
> >
> > a content identification result of the sequence of content identification results comprises either: (i) a content identifier associated in the electronic database with a respective audio data representation that is determined to be a respective likely match with a respective one of the audio data samples; or (ii) an indication of the absence of a respective likely match between a respective audio data sample and an audio data representation in the electronic database; and
> >
> > the raw play stream includes either: at least two different content identifiers obtained from the electronic database; or at least one content identifier obtained from the electronic database and at least one indication of the absence of a respective likely match between a respective audio data sample and an audio data representation in the electronic database;

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[11] Claim 9 is referenced herein for representative purposes. Plaintiff intends to identify additional asserted claims and reserves its right to provide greater detail and scope via its Infringement Contentions at the time required under this Court's scheduling order.

(c) scrubbing the raw play stream by analyzing sample sequence data of the raw play stream to determine whether to change a result of the sequence of content of identification results in view of a pattern of the sample sequence data of the raw play stream compared to an expected pattern of sample sequence data; and

(d) generating a clean play stream from the raw play stream by making any changes to the raw play stream that are determined to be made by the scrubbing.

The Accused ACR Instrumentalities meet the recited elements of the media measurement system set forth in Claim 9.

40.   For instance, Roku uses the Accused ACR Instrumentalities to measure viewership on Smart TVs:[12]
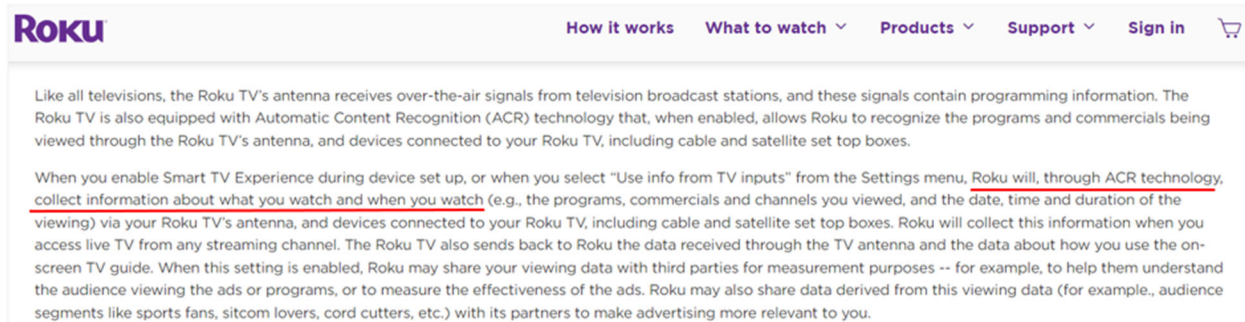
41.   Roku deploys the Accused ACR Instrumentalities to receive over a network, at one or more computers coupled to a network, data for a sequence of audio data samples that comprise representations of audio data captured at a media monitoring device.
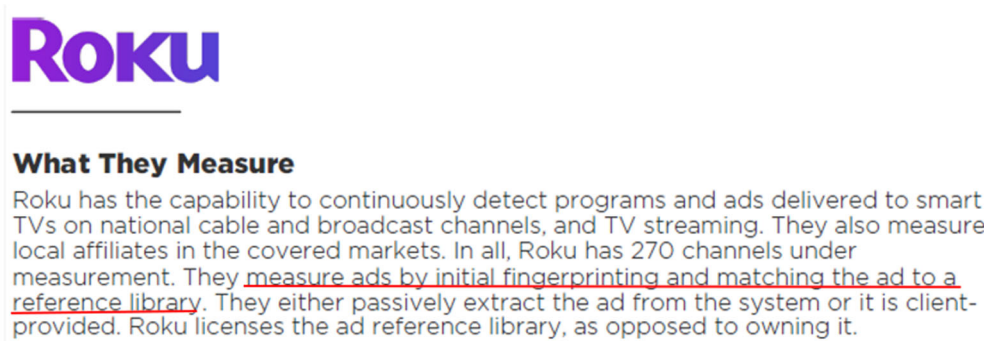
42.   Roku acquired from Nielsen its Advanced Video Advertising business, inheriting Nielsen's "capabilities in automatic content recognition (ACR) and dynamic ad insertion

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[12] Roku, *Roku ACR Service Policy*, available at https://docs.roku.com/published/acrservicepolicy/en/us (last visited Sept. 13, 2023).

(DAI)."[13] Nielsen has stated that its ACR capabilities include gathering "content data" which includes "collecting audio and video 'fingerprints'."[14]

> • **Content data:** This may include audio and visual content information. ACR works by collecting audio and video 'fingerprints' to allow us to identify commercial information about content consumed on the TV and internet or other similar network activity (e.g., program, video, advertisements, channel, video games, and similar media).

43.   Roku's Accused ACR Instrumentalities use one or more computers to query an electronic database of a plurality of audio data representations and corresponding content identifiers. Roku advertises that it "has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming" as well as that it will "measure ads by initial fingerprinting and matching the ad to a reference library."[15]

> **What They Measure**
> Roku has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming. They also measure local affiliates in the covered markets. In all, Roku has 270 channels under measurement. They measure ads by initial fingerprinting and matching the ad to a reference library. They either passively extract the ad from the system or it is client-provided. Roku licenses the ad reference library, as opposed to owning it.

44.   As part of "matching the ad to a reference library" via the Accused ACR Instrumentalities as set forth above, Roku generates a raw play stream which comprises a sequence of content identification results that corresponds to the aforementioned sequence of audio data samples.

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[13] Ad Exchanger, *Roku Acquires Video Ad Tech From Nielsen – And Nielsen Gets Insights on Roku Users*, available at https://www.adexchanger.com/digital-tv/roku-acquires-advanced-video-ad-tech-from-nielsen-and-nielsen-expands-access-to-roku-audiences/ (last visited Sept. 22, 2023). All references to Nielsen ACR technology and capabilities herein are references to Roku's implementation of that technology and capability.

[14] Nielsen, *Nielsen Advanced Video Advertising Privacy Statement* (Oct. 2020 version).

[15] Sequent Partners, *Automatic Content Recognition: the Future of TV Ad and Audience Data* at 23, previously available for download on https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data.

45.   These content identification results comprise a content identifier that is associated in the electronic database ("reference library") with a respective audio data representation that the "matching" process determines to be a respective likely match.

46.   Alternatively, said content identification results may also comprise an indication of the absence of a respectively likely match between an audio data sample and an audio data representation in that electronic database ("reference library."). For example, Nielsen stated in 2022 that reference libraries underlying ACR technology did not cover at least 23% of minutes monitored in a study of Nielsen's ACR provider partners.[16]

47.   The Accused ACR Instrumentalities scrub the raw play stream by analyzing sample sequence data of the raw play stream. Said scrubbing is accomplished by determining whether to change a result of the sequence of content of identification results in view of a pattern of the sample sequence data of the raw play stream compared to an expected pattern of sample sequence data. For example, Roku scrubs a raw play stream in view of an expected pattern of sample sequence data to solve inaccuracies or better identify content playing at a certain time.[17]

> Once the data has been collected, TV analytics companies ingest ACR data and combine it with other data sets to make it more accurate and usable.
>
> ACR data is "dirty," said Denise Colella, NBCUniversal's SVP of advanced advertising products and strategy. "You have to make sure it's been cleaned and organized and processed in the proper way. It takes a lot of time to ingest that data and learn how to use it."

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[16] Nielsen, *Big Data from Smart TVs Isn't Enough to Measure Audiences*, available at https://www.nielsen.com/insights/2022/big-data-from-smart-tvs-isnt-enough-to-measure-audiences (last visited Sept. 8, 2023).

[17] *See* Ad Exchanger, *The Marketer's Guide to ACR Tech in Smart TVs*, available at https://www.adexchanger.com/ad-exchange-news/the-marketers-guide-to-acr-tech-in-smart-tvs (last visited Sept. 8, 2023).

> Each company has a different methodology around cleansing their ACR data, and many validate it by cross-referencing it with other data sets.
>
> For example, Nielsen uses its panel as a truth set for its ACR data, said Kelly Abcarian, GM of advanced video advertising at Nielsen.

> **Who are the vendors and how much scale do they have?**
>
> Each ACR company supplied AdExchanger with information about their opted-in US footprint:
>
> **Nielsen Gracenote:** 18.9 million devices in the United States. Works with 12 TV manufacturers. In TVs since 2013. It licenses data to others on this list.
>
> **Inscape:** 11.2 million opted-in TV sets from Vizio in the United States. In TVs since 2014. Purely a data licensing business.
>
> **Samsung Ads:** 33 million opted-in Samsung TVs in the United States. Does not sell or license its data.
>
> **Roku:** More than 10 million US TVs have opted in over past two years. Over 10 manufacturers, including TCL, Hisense, Sharp and Hitachi, include the Roku OS. Does not sell or license data.

48.   The Accused ACR Instrumentalities generate a clean play stream from the raw play stream by making any changes to the raw play stream that are determined to be made by the scrubbing. For example, said clean play stream utilizes said scrubbing to ensure that viewing history data is accurate across the entire duration of monitoring a smart device. The resulting clean play stream generated by the Accused ACR Instrumentalities is used by Roku to generate advertising insights and reports that Roku monetizes through advertising products and services.[18]

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[18] Sequent Partners, *Automatic Content Recognition: the Future of TV Ad and Audience Data* at 23, previously available for download on https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data.

ROKU

What They Measure

Roku has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming. They also measure local affiliates in the covered markets. In all, Roku has 270 channels under measurement. They measure ads by initial fingerprinting and matching the ad to a reference library. They either passively extract the ad from the system or it is client-provided. Roku licenses the ad reference library, as opposed to owning it.

Roku's traditional linear TV content coverage enables it to differentiate live versus delayed viewing up to a configurable time horizon.

Roku has developed business logic to "pick winners" when fingerprints yield multiple possible matches (as often happens with ads).

Roku data is used for advertising personalization, targeting, frequency management across linear and streaming, measurement and tune-in promotion analysis.

How They Measure

While the basic ACR technology may be commoditized, the details of implementation are not and make a major difference, in Roku's opinion. For example, the ability to sustain a large number of devices, resolve multi-matches, and leverage a high-quality content catalogue are points of differentiation.

Building the ad tech stack to collect viewership associated with the right household, making sure it's an ad, assigning it to the right network are all critical, finer points.

TV streaming viewing is identified through data integrations with the streaming services. Long term, Roku believes they must first deliver a great consumer experience – using ACR to deliver benefits such as the ability to recommend content, and an opt-in feature called "More Ways to Watch" that allows viewers to stream live broadcast shows from the beginning, find full episodes they may have missed, and other consumer benefits.

Roku's ACR technology is built into televisions manufactured by Roku TV manufacturing partners. Other OEMs have different hardware or memory capabilities, but Roku OS is the same in every television, assuming minimum requirements are met by OEMs to ensure the Roku OS operates the way it should. Roku leverages its own advertising identifier that's unique to each Roku device to provide capabilities across its ad platform.

49.   Roku committed the infringing activities without license from AMRH. Roku's acts of infringement have damaged AMRH, as owner of the '768 Patent. AMRH is entitled to recover from Roku the damages it has sustained as a result of Roku's wrongful acts in an amount subject to proof at trial. The infringement of the '768 Patent by Roku has damaged and will continue to damage AMRH.

50.   Roku's infringement of AMRH's '768 Patent has been willful, and continues to be willful. In addition, or in the alternative, Roku's infringement of AMRH's '768 Patent is willful at least of the date of the service of this Complaint.

Count II: Infringement of U.S. Patent No. 8,756,622

51.   All preceding factual allegations are incorporated as if fully set forth herein.

52.   The USPTO duly and legally issued U.S. Patent No. 8,756,622 ("'622 Patent") to Anonymous Media Research, LLC with Mr. Jonathan Steuer and Mr. Chris Otto as named inventors. Anonymous Media Research, LLC subsequently assigned all rights, titles, and interests in the '622 Patent to AMRH.

53.   The '622 Patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code.

54.   Roku has directly infringed and continues to directly infringe the '622 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of the Accused ACR Instrumentalities to practice the claimed invention in the '622 Patent. For example, Claim 6 of the '622 Patent[19] recites:

> A computer program product in a non-transitory computer readable medium comprising instructions executable by one or more processors of one or more computers, the instructions comprising instructions for:
>
>> generating a play stream of content identification results corresponding to a sequence of data samples, the data samples comprising representations of audio data captured at a media monitoring device, wherein content identifiers of the play stream's content identification results are obtained by using corresponding data samples to search a computerized database of known content; and
>>
>> in response to obtaining the content identifiers, utilizing a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples, the at least two different obtained content identifiers identifying different media content items.

The Accused ACR Instrumentalities meet the recited elements of the claimed media measurement system in Claim 6.

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[19] Claim 6 is referenced herein for representative purposes. Plaintiff intends to identify additional asserted claims and reserves its right to provide greater detail and scope via its Infringement Contentions at the time required under this Court's scheduling order.

55.   For instance, Roku uses the Accused ACR Instrumentalities to measure viewership on Smart TVs:[20]
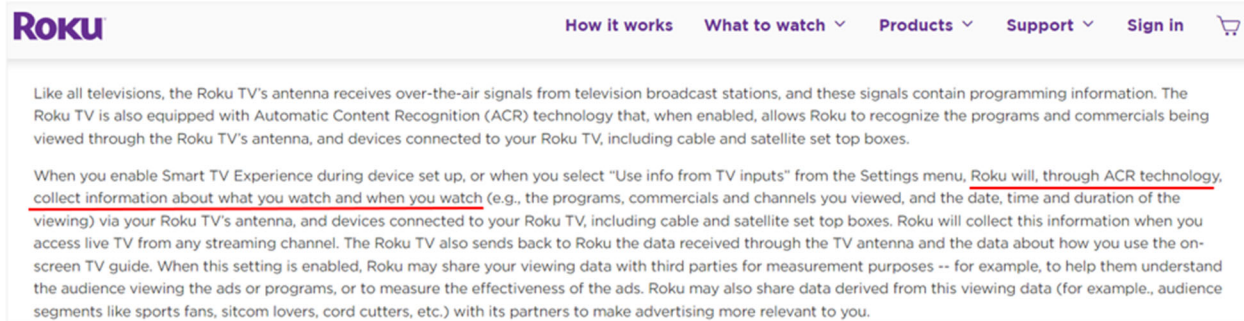
56.   Roku deploys the Accused ACR Instrumentalities to generate a play stream of content identification results that correspond to a sequence of data samples which comprise representations of audio data captured at a media monitoring device.

57.   Roku has acquired from Nielsen its Advanced Video Advertising business, inheriting Nielsen's "capabilities in automatic content recognition (ACR) and dynamic ad insertion (DAI)."[21] Nielsen has stated that its ACR capabilities include gathering "content data" which includes "collecting audio and visual 'fingerprints'."[22]

58.   Moreover, Roku's Accused ACR Instrumentalities use corresponding data samples to search a computerized database of known content in order to obtain the content identifiers of the play stream's content identification results. For example, Roku advertises that it "has the capability to continuously detect programs and ads delivered to smart TVs on national

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[20] Roku, *Roku ACR Service Policy*, available at https://docs.roku.com/published/acrservicepolicy/en/us (last visited Sept. 13, 2023).

[21] Ad Exchanger, *Roku Acquires Video Ad Tech From Nielsen – And Nielsen Gets Insights on Roku Users*, available at https://www.adexchanger.com/digital-tv/roku-acquires-advanced-video-ad-tech-from-nielsen-and-nielsen-expands-access-to-roku-audiences/ (last visited Sept. 22, 2023).

[22] Nielsen, *Nielsen Advanced Video Advertising Privacy Statement* (Oct. 2020 version).

cable and broadcast channels, and TV streaming" as well as that it will "measure ads by initial

fingerprinting and matching the ad to a reference library."[23]
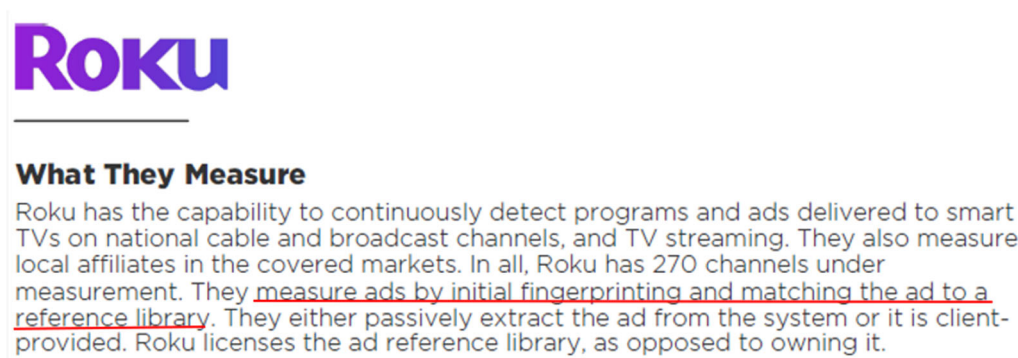
59.   In response to obtaining the content identifiers, Roku's Accused ACR

Instrumentalities utilize a sequential order of at least two different obtained content identifiers in

the play stream to identify a channel corresponding to the data samples, the at least two different

obtained content identifiers identifying different media content items.

60.   For example, Roku states that "we collect TV information such as the programs,

commercials, and channels you view."[24]

In addition, Nielsen ACR technology collects "preference data" which includes "the choices you

make, such as the particular programs, channels, videos, video games, or other media you select

or view," as well as "content data" which includes "e.g., program, video, advertisement, channel,

video games, and similar media."[25]

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[23] Sequent Partners, *Automatic Content Recognition: the Future of TV Ad and Audience Data* at 23, previously available for download on https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data.

[24] Roku, *Roku Privacy* Policy, available at https://docs.roku.com/published/userprivacypolicy/en/us (last visited Sept. 12, 2023).

[25] Nielsen, *Nielsen Advanced Video Advertising Privacy Statement* (Oct. 2020 version).

- **Behavior and preference information:** "Behavior data" refers to when or how you do things, such as how frequently you use the TV or other devices connected to it, as well as the start and end time of your television usage. "Preference data" refers to the choices you make, such as the particular programs, channels, videos, video games, or other media you select or view.

- **Content data:** This may include audio and visual content information. ACR works by collecting audio and video 'fingerprints' to allow us to identify commercial information about content consumed on the TV and internet or other similar network activity (e.g., program, video, advertisements, channel, video games, and similar media).

61.   Roku committed the infringing activities without license from AMRH. Roku's acts of infringement have damaged AMRH, as owner of the '662 Patent. AMRH is entitled to recover from Roku the damages it has sustained as a result of Roku's wrongful acts in an amount subject to proof at trial. The infringement of the '662 Patent by Roku has damaged and will continue to damage AMRH.

62.   Roku's infringement of AMRH's '622 Patent has been willful, and continues to be willful. In addition, or in the alternative, Roku's infringement of AMRH's '622 Patent is willful at least of the date of the service of this Complaint.

Count III: Infringement of U.S. Patent No. 8,296,791

63.   All preceding factual allegations are incorporated as if fully set forth herein.

64.   The USPTO duly and legally issued U.S. Patent No. 8,296,791 ("'791 Patent") to Anonymous Media Research, LLC with Mr. Jonathan Steuer and Mr. Chris Otto as named inventors. Anonymous Media Research, LLC subsequently assigned all rights, titles, and interests in the '791 Patent to AMRH.

65.   The '791 Patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code.

66. Roku has directly infringed and continues to directly infringe the '791 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of the Accused ACR Instrumentalities to practice the claimed invention in the '791 Patent. For example, Claim 9 of the '791 Patent[26] recites:

> A media measurement method comprising:
>
>> using one or more computers to generate a play stream of content identification results corresponding to a sequence of submitted data samples, the submitted data samples corresponding to audio data samples captured at a monitoring device associated with a monitored audience member; and
>>
>> using one or more computers to utilize sample sequence data and content offset data to deduce play-altering actions of the monitored audience member, the sample sequence data corresponding to a sequence of the content identification results, wherein play-altering actions include actions that alter at least one of a pace and a sequence of a media stream, the content offset data including content offsets associated with the content identification results, a content offset indicating a time position of a content identification result within identified content, wherein to utilize comprises, for a particular plurality of submitted data samples and corresponding content identification results, comparing a progression of log times associated with capture timing of each of the particular plurality of submitted data samples and a progression of content offsets of the corresponding content identification results.

The Accused ACR Instrumentalities perform the recited steps of the claimed media measurement method in Claim 9.

67. For instance, Roku uses the Accused ACR Instrumentalities to measure viewership on Smart TVs:[27]

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[26] Claim 9 is referenced herein for representative purposes. Plaintiff intends to identify additional asserted claims and reserves its right to provide greater detail and scope via its Infringement Contentions at the time required under this Court's scheduling order.

[27] Roku, *Roku ACR Service Policy*, available at https://docs.roku.com/published/acrservicepolicy/en/us (last visited Sept. 13, 2023).

> **ROKU**
>
> Like all televisions, the Roku TV's antenna receives over-the-air signals from television broadcast stations, and these signals contain programming information. The Roku TV is also equipped with Automatic Content Recognition (ACR) technology that, when enabled, allows Roku to recognize the programs and commercials being viewed through the Roku TV's antenna, and devices connected to your Roku TV, including cable and satellite set top boxes.
>
> When you enable Smart TV Experience during device set up, or when you select "Use info from TV inputs" from the Settings menu, Roku will, through ACR technology, collect information about what you watch and when you watch (e.g., the programs, commercials and channels you viewed, and the date, time and duration of the viewing) via your Roku TV's antenna, and devices connected to your Roku TV, including cable and satellite set top boxes. Roku will collect this information when you access live TV from any streaming channel. The Roku TV also sends back to Roku the data received through the TV antenna and the data about how you use the on-screen TV guide. When this setting is enabled, Roku may share your viewing data with third parties for measurement purposes -- for example, to help them understand the audience viewing the ads or programs, or to measure the effectiveness of the ads. Roku may also share data derived from this viewing data (for example., audience segments like sports fans, sitcom lovers, cord cutters, etc.) with its partners to make advertising more relevant to you.

68.   Roku's Accused ACR Instrumentalities uses one or more computers to generate a play stream of content identification results that correspond to a sequence of submitted data samples which correspond to the audio data samples that a monitoring device captures from a monitored audience member.

69.   Roku acquired from Nielsen its Advanced Video Advertising business which resulted in Roku inheriting Nielsen's "capabilities in automatic content recognition (ACR) and dynamic ad insertion (DAI)."[28] Nielsen has stated that its ACR capabilities include gathering "content data" which includes "collecting audio and video 'fingerprints'."[29]

> • **Content data:** This may include audio and visual content information. ACR works by collecting audio and video 'fingerprints' to allow us to identify commercial information about content consumed on the TV and internet or other similar network activity (e.g., program, video, advertisements, channel, video games, and similar media).

Moreover, Roku advertises that it "has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming" as well as that it will "measure ads by initial fingerprinting and matching the ad to a reference library."[30]

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[28] Ad Exchanger, *Roku Acquires Video Ad Tech From Nielsen – And Nielsen Gets Insights on Roku Users*, available at https://www.adexchanger.com/digital-tv/roku-acquires-advanced-video-ad-tech-from-nielsen-and-nielsen-expands-access-to-roku-audiences/ (last visited Sept. 22, 2023).

[29] Nielsen, *Nielsen Advanced Video Advertising Privacy Statement* (Oct. 2020 version).

[30] Sequent Partners, *Automatic Content Recognition: the Future of TV Ad and Audience Data* at 23, previously available for download on https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data.

ROKU

What They Measure

Roku has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming. They also measure local affiliates in the covered markets. In all, Roku has 270 channels under measurement. They measure ads by initial fingerprinting and matching the ad to a reference library. They either passively extract the ad from the system or it is client-provided. Roku licenses the ad reference library, as opposed to owning it.

70.   The Accused ACR Instrumentalities, utilizing sample sequence data and content offset data, use one or more computers to deduce play-altering actions that alter at least one of a pace and a sequence of a media stream.

71.   As set forth above, the sample sequence data corresponds to a sequence of content identification results from the "matching" of the "fingerprints" collected to the "reference library" via Roku's Accused ACR Instrumentalities. Moreover, the content offset data includes time positions of content identification results within the corresponding identified content. Furthermore, the Accused ACR Instrumentalities utilize content offset data and sample sequence data by comparing the log times associated with the capture timing of a plurality of submitted data samples and a progression of content offsets for the corresponding content identification results identified from that plurality of submitted data samples.

72.   For example, Roku discloses the following details regarding the Accused ACR Instrumentalities that underpin its targeted advertising product and service offerings.[31]

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[31] Sequent Partners, *Automatic Content Recognition: the Future of TV Ad and Audience Data* at 23, 24, previously available for download on https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data.

What They Measure

Roku has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming. They also measure local affiliates in the covered markets. In all, Roku has 270 channels under measurement. They measure ads by initial fingerprinting and matching the ad to a reference library. They either passively extract the ad from the system or it is client-provided. Roku licenses the ad reference library, as opposed to owning it.

Roku's traditional linear TV content coverage enables it to differentiate live versus delayed viewing up to a configurable time horizon.

Roku has developed business logic to "pick winners" when fingerprints yield multiple possible matches (as often happens with ads).

Roku data is used for advertising personalization, targeting, frequency management across linear and streaming, measurement and tune-in promotion analysis.

How They Measure

While the basic ACR technology may be commoditized, the details of implementation are not and make a major difference, in Roku's opinion. For example, the ability to sustain a large number of devices, resolve multi-matches, and leverage a high-quality content catalogue are points of differentiation.

Building the ad tech stack to collect viewership associated with the right household, making sure it's an ad, assigning it to the right network are all critical, finer points.

TV streaming viewing is identified through data integrations with the streaming services. Long term, Roku believes they must first deliver a great consumer experience – using ACR to deliver benefits such as the ability to recommend content, and an opt-in feature called "More Ways to Watch" that allows viewers to stream live broadcast shows from the beginning, find full episodes they may have missed, and other consumer benefits.

Roku's ACR technology is built into televisions manufactured by Roku TV manufacturing partners. Other OEMs have different hardware or memory capabilities, but Roku OS is the same in every television, assuming minimum requirements are met by OEMs to ensure the Roku OS operates the way it should. Roku leverages its own advertising identifier that's unique to each Roku device to provide capabilities across its ad platform.

Matching Ads to Programs

Roku fingerprints programs as well as ads so they have the flow of events and can link the ads. There may be some issues identifying content associated with an ad pod if channel changing occurred across multiple channels.

Outcome Data and Sources

Roku offers solutions that measure television tune-in, incremental reach over linear, analytics on linear audiences and more. They also partner with third-party companies for measurement. NCS, Polk, and Millward Brown are examples of their partnerships utilized in outcome tracking.

73.   Moreover, for example, Nielsen discloses the following about the "Data Collection" and "Data Use" related to its ACR technology.[32]

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[32] Nielsen, *Nielsen Advanced Video Advertising Privacy Statement* (Oct. 2020 version).

Participating Smart TV manufacturers include Nielsen's Automatic Content Recognition ("ACR") software in televisions, which can recognize certain premium or ad supported content, on-screen content and audio (but cannot recognize or collect information from your own personal content), and Nielsen's consent management software, which allows viewers to manage their information sharing and use settings. This software enables Nielsen to collect certain personal data (i.e., information that is associated with, can identify or reasonably be linked, directly or indirectly, with a particular consumer or household), information about your Smart TV (such as device ID, IP address), and your TV viewing information to offer our Services. In particular, we collect the following categories of information:

- **Identifiers**: These include unique identifiers (such as a unique device ID created by the manufacturer of the Smart TV), internet protocol (IP) addresses, or other similar online and device identifiers.
- **Television Information:** This includes information such as the television brand and model, firmware version, OS version, usage information such as on-screen programming identifiers and audio levels (0-100, mute on/off), and input Source (HDMI, Tuner, etc.).
- **Behavior and preference information:** "Behavior data" refers to when or how you do things, such as how frequently you use the TV or other devices connected to it, as well as the start and end time of your television usage. "Preference data" refers to the choices you make, such as the particular programs, channels, videos, video games, or other media you select or view.
- **Content data:** This may include audio and visual content information. ACR works by collecting audio and video 'fingerprints' to allow us to identify commercial information about content consumed on the TV and internet or other similar network activity (e.g., program, video, advertisements, channel, video games, and similar media).
- **Demographic information:** Nielsen will use your Smart TV's IP address to determine your general geographic location (i.e., your city and state). Nielsen may also obtain information from third party sources to help us understand audience demographics (such as age and gender) and preferences. Data from these other sources may be used to enhance or calibrate the data collected from our ACR software.
- **Derived or inferred data:** Inferences drawn from any of the above information to create a profile about you reflecting inferences about your preferences, characteristics, and/or behaviors (such as the number of viewers in a household and their ages, genders, and languages) may also be generated by Nielsen or a service provider acting on our behalf.

Nielsen's Audience Measurement. If you choose to participate in Nielsen's Audience Measurement, information is used to generate our market research reports and insights about television and online viewing, audience trends, and advertising effectiveness. Our research reports and insights help our clients make decisions about what types of programs to show, and when, where and how to advertise their products to consumers. We may also provide data to our clients based upon modelled data, which are projections based on demographic and behavioral characteristics (like gender, age, and TV viewing habits) that look at a sample group of people and predict what people with similar characteristics or preferences are likely to watch or buy.

We use tools and methods to make sure that there is no reasonable possibility of identifying you from the data we provide to our clients. For example, the data we collect is combined with data collected from other participants in our research to produce aggregated reports from which no individual can be uniquely identified. If our reports and insights are not aggregated, we take steps to make sure there is no reasonable possibility of re-identification.

Personalized Advertising. In order to personalize the advertisements you see when watching TV, we use the information we collect to create groups of people, called 'audience segments,' who share similar interests. If you consent to Personalized Advertising, your Smart TV will be assigned to one or more of these audience segments based on your TV viewing history and other information, and we enable our clients to provide relevant advertisements that they believe are of interest to such groups. We will not share your personal data or viewing information with our clients, but we will share the descriptions of the audience segments so that our clients can decide which audience segments they would like to have shown their advertisements. Please note that in order to participate in Personalized Advertising, Audience Measurement must also be enabled; by agreeing to Nielsen's Personalized Advertising Service, you give Nielsen permission to enable Audience Measurement.

74.   Examples of behavior information that include a monitored audience member's play-altering actions which alter at least one of a pace and a sequence of a media stream and which are deduced in a similar manner by Roku's Accused ACR Instrumentalities, include ad-skipping, time-shifting, binge-watching, channel-surfing, and fast-forwarding. For example, it is understood that ACR measurement companies such as Roku will capture "viewing behavior" such as "viewability, program/provider preferences, ad avoidance, ad consumption, time spent, channel surfing, fast-forwarding, binge-watching, completed views, etc."[33] [34]

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[33] Ad Monster, *Automated Content Recognition (ACR): The Field-Leveling Technology for T/V (Television/Video)*, available at https://www.admonsters.com/automated-content-recognition-acr-tv-televisionvideo/ (last visited Sept. 22, 2023).

In the past, ad value was determined by the "opportunity to expose" a viewer to an ad (not actual verified exposure). The contextual program rating served as surrogate for the commercial rating. ACR helps advertisers know if the ad itself was on-screen for specific viewers and for how long, and will help sellers justify higher rates for verified, completed views. Some points of valuation capturable through ACR include:

- The type of viewing platform—Connected TV, OTT, Linear TV, DVR playback, MVPDs, VOD
- Location—both fixed screen and mobile locations
- Viewer profiles—individual or household demographics and/or IP addresses, aiding cross-media measurement
- Viewing behavior—viewability, program/provider preferences, ad avoidance, ad consumption, time spent, channel surfing, fast-forwarding, binge-watching, completed views etc.

ACR is not only about helping television get more digital; it also allows digitally-delivered video to move beyond impressions and calculate reach and frequency, which has always been a necessity for television buyers.

This authentication of data, combined with second-by-second viewing measurement plus the door-opening promise of addressable TV are key reasons why historic television content and measurement giants are seriously investing in ACR:

- After acquiring Gracenote's Video Automatic Content Recognition (ACR) technology in 2017, **Nielsen** has integrated Gracenote-branded technology, unique IDs and metadata (through its own Grabix analytics platform) into an increasing number of its measurement, analytics and advanced advertising solutions according to Nielsen.
- **CBS, A&E and MediaTek** have joined with Nielsen's Gracenote in a five-market pilot, enabling the many MediaTek-powered Smart TV platforms to deliver addressable advertising capabilities in live trials.
- Ad Age recently revealed that **NBC Universal, CBS, Disney Media Networks, Discovery, AMC Networks, Turner, AT&T's Xandr, Comcast's FreeWheel and Hearst TV** have formed a consortium with Inscape, a division of **Vizio** (10 million Smart TVs) to develop open standards for ACR, DAI and addressability across all Smart TVs. It is called OAR, for Open Addressable Ready.

75.   Roku committed the infringing activities without license from AMRH. Roku's acts of infringement have damaged AMRH, as owner of the '791 Patent. AMRH is entitled to recover from Roku the damages it has sustained as a result of Roku's wrongful acts in an amount

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[34] *See also* Extreme Reach, *Automated Content Recognition: A Technology to Turbo-charge Addressable TV*, available at https://extremereach.com/blog/automated-content-recognition-a-technology-to-turbo-charge-addressable-tv (last visited Sept. 8, 2023) ("[ACR] allows content to be recognized by video, audio or watermark cues and matched back to a source database for reference and verification. This includes . . . behaviors associated with what's being watched (ad-skipping, binge-watching) . . . ."); IAB Australia, *IAB Member Q&A: Use of Data in Connected TV*, available at https://iabaustralia.com.au/resource/iab-member-qa-use-of-data-in-connected-tv (last visited Sept. 8, 2023) ("Advertisers can access key behaviours associated with TV viewership such as ad-skipping, time-shifting, streaming, and binge-watching to better understand the viewing habits, lifestyle and interests of their target audience to inform media planning and CTV activation.").

subject to proof at trial. The infringement of the '791 Patent by Roku has damaged and will continue to damage AMRH.

76.   Roku's infringement of AMRH's '791 Patent has been willful, and continues to be willful. In addition, or in the alternative, Roku's infringement of AMRH's '791 Patent is willful at least of the date of the service of this Complaint.

Count IV: Infringement of U.S. Patent No. 10,719,848

77.   All preceding factual allegations are incorporated as if fully set forth herein.

78.   The USPTO duly and legally issued U.S. Patent No. 10,719,848 ("'848 Patent") to Anonymous Media Research, LLC with Mr. Jonathan Steuer and Mr. Chris Otto as named inventors. Anonymous Media Research, LLC subsequently assigned all rights, titles, and interests in the '848 Patent to AMRH.

79.   The '848 Patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code.

80.   Roku has directly infringed and continues to directly infringe the '848 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of the Accused ACR Instrumentalities to practice the claimed invention in the '848 Patent. For example, Claim 9 of the '848 Patent[35] recites:

> A computer program product in a non-transitory computer readable medium comprising instructions executable by one or more processors of one or more computers, the one or more computers being coupled to a network to receive, over the network, data for a sequence of video data samples, the video data samples comprising representations of video data captured at a media monitoring device, the plurality of video data samples being submitted over the network, the instructions comprising instructions for:
>
>> (a) using the one or more computers to query an electronic database of a plurality of video data representations and corresponding content identifiers;

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[35] Claim 9 is referenced herein for representative purposes. Plaintiff intends to identify additional asserted claims and reserves its right to provide greater detail and scope via its Infringement Contentions at the time required under this Court's scheduling order.

(b) generating a raw play stream, the raw play stream comprising a sequence of content identification results corresponding to the sequence of video data samples; wherein:

the sequence of content identification results is obtained by querying the electronic database to attempt to determine respective likely matches between respective video data samples in the sequence of video data samples and respective video data representations in the electronic database;

a content identification result of the sequence of content identification results comprises either: (i) a content identifier associated in the electronic database with a respective video data representation that is determined to be a respective likely match with a respective one of the video data samples; or (ii) an indication of the absence of a respective likely match between a respective video data sample and a video data representation in the electronic database; and

the raw play stream includes either: at least two different content identifiers obtained from the electronic database; or at least one content identifier obtained from the electronic database and at least one indication of the absence of a respective likely match between a respective video data sample and a video data representation in the electronic database;

(c) scrubbing the raw play stream by analyzing sample sequence data of the raw play stream to determine whether to change a result of the sequence of content of identification results in view of a pattern of the sample sequence data of the raw play stream compared to an expected pattern of sample sequence data; and

(d) generating a clean play stream from the raw play stream by making any changes to the raw play stream that are determined to be made by the scrubbing.

The Accused ACR Instrumentalities meet the recited elements of the media measurement system in Claim 9.

81.   For instance, Roku uses the Accused ACR Instrumentalities to measure viewership on Smart TVs:[36]

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[36] Roku, *Roku ACR Service Policy*, available at https://docs.roku.com/published/acrservicepolicy/en/us (last visited Sept. 13, 2023).

Like all televisions, the Roku TV's antenna receives over-the-air signals from television broadcast stations, and these signals contain programming information. The Roku TV is also equipped with Automatic Content Recognition (ACR) technology that, when enabled, allows Roku to recognize the programs and commercials being viewed through the Roku TV's antenna, and devices connected to your Roku TV, including cable and satellite set top boxes.

When you enable Smart TV Experience during device set up, or when you select "Use info from TV inputs" from the Settings menu, Roku will, through ACR technology, collect information about what you watch and when you watch (e.g., the programs, commercials and channels you viewed, and the date, time and duration of the viewing) via your Roku TV's antenna, and devices connected to your Roku TV, including cable and satellite set top boxes. Roku will collect this information when you access live TV from any streaming channel. The Roku TV also sends back to Roku the data received through the TV antenna and the data about how you use the on-screen TV guide. When this setting is enabled, Roku may share your viewing data with third parties for measurement purposes -- for example, to help them understand the audience viewing the ads or programs, or to measure the effectiveness of the ads. Roku may also share data derived from this viewing data (for example., audience segments like sports fans, sitcom lovers, cord cutters, etc.) with its partners to make advertising more relevant to you.

82.   Roku deploys the Accused ACR Instrumentalities to receive over a network, at one or more computers coupled to a network, data for a sequence of video data samples that comprise representations of video data captured at a media monitoring device.

83.   Roku acquired from Nielsen its Advanced Video Advertising business, inheriting Nielsen's "capabilities in automatic content recognition (ACR) and dynamic ad insertion (DAI)."[37] Nielsen has stated that its ACR capabilities include gathering "content data" which includes "collecting audio and video 'fingerprints'."[38]

- **Content data:** This may include audio and visual content information. ACR works by collecting audio and video 'fingerprints' to allow us to identify commercial information about content consumed on the TV and internet or other similar network activity (e.g., program, video, advertisements, channel, video games, and similar media).

84.   Roku's Accused ACR Instrumentalities use one or more computers to query an electronic database of a plurality of video data representations and corresponding content identifiers. Roku promotes that its ACR "snapshots" are "scanned through a database of content and ads, which allows the exposure to be matched to what is airing."[39]

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[37] Ad Exchanger, *Roku Acquires Video Ad Tech From Nielsen – And Nielsen Gets Insights on Roku Users*, available at https://www.adexchanger.com/digital-tv/roku-acquires-advanced-video-ad-tech-from-nielsen-and-nielsen-expands-access-to-roku-audiences/ (last visited Sept. 22, 2023).

[38] Nielsen, *Nielsen Advanced Video Advertising Privacy Statement* (Oct. 2020 version).

[39] Roku Advertising, *A Guide to ACR: The Future of TV and Audience Data*, available at https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data (last visited Sept. 22, 2023).

Here's How ACR Works

Roughly twice per second, a Roku TV captures video "snapshots" in 4K resolution. These snapshots are scanned through a database of content and ads, which allows the exposure to be matched to what is airing. For example, if a streamer is watching an NFL football game and sees an ad for a hard seltzer, Roku's ACR will know that the ad has appeared on the TV being watched at that time. In this way, the content on screen is automatically recognized, as the technology's name indicates. The data then is paired with user profile data to link the account watching with the content they're watching. We should note, however, that this data becomes aggregated, removing personally identifiable information before it is received by advertisers.

In addition, Roku advertises that it "has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming" as well as that it will "measure ads by initial fingerprinting and matching the ad to a reference library."[40]

ROKU

What They Measure

Roku has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming. They also measure local affiliates in the covered markets. In all, Roku has 270 channels under measurement. They measure ads by initial fingerprinting and matching the ad to a reference library. They either passively extract the ad from the system or it is client-provided. Roku licenses the ad reference library, as opposed to owning it.

85.   As part of "matching the ad to a reference library" via the Accused ACR Instrumentalities as set forth above, Roku generates a raw play stream which comprises a sequence of content identification results that corresponds to the aforementioned sequence of video data samples.

86.   These content identification results comprise either (1) a content identifier that is associated in the electronic database ("reference library") with a respective video data representation that the "matching" process determines to be a respective likely match; or (2) alternatively, said content identification results may comprise an indication of the absence of a respectively likely match between a video data sample and a video data representation in that

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[40] Sequent Partners, *Automatic Content Recognition: the Future of TV Ad and Audience Data* at 23, previously available for download on https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data.

electronic database ("reference library."). For example, Nielsen stated in 2022 that reference libraries underlying ACR technology did not cover at least 23% of minutes monitored in a study of Nielsen's ACR provider partners.[41]

87.   The Accused ACR Instrumentalities scrub the raw play stream by analyzing sample sequence data of the raw play stream. Said scrubbing is accomplished by determining whether to change a result of the sequence of content of identification results in view of a pattern of the sample sequence data of the raw play stream compared to an expected pattern of sample sequence data. For example, Roku scrubs a raw play stream in view of an expected pattern of sample sequence data to solve inaccuracies or better identify content playing at a certain time.[42]

> Once the data has been collected, TV analytics companies ingest ACR data and combine it with other data sets to make it more accurate and usable.
>
> ACR data is "dirty," said Denise Colella, NBCUniversal's SVP of advanced advertising products and strategy. "You have to make sure it's been cleaned and organized and processed in the proper way. It takes a lot of time to ingest that data and learn how to use it."

> Each company has a different methodology around cleansing their ACR data, and many validate it by cross-referencing it with other data sets.
>
> For example, Nielsen uses its panel as a truth set for its ACR data, said Kelly Abcarian, GM of advanced video advertising at Nielsen.

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[41] Nielsen, *Big Data from Smart TVs Isn't Enough to Measure Audiences*, available at https://www.nielsen.com/insights/2022/big-data-from-smart-tvs-isnt-enough-to-measure-audiences (last visited Sept. 8, 2023).
[42] *See* Ad Exchanger, *The Marketer's Guide to ACR Tech in Smart TVs*, available at https://www.adexchanger.com/ad-exchange-news/the-marketers-guide-to-acr-tech-in-smart-tvs (last visited Sept. 8, 2023).

> **Who are the vendors and how much scale do they have?**
>
> Each ACR company supplied AdExchanger with information about their opted-in US footprint:
>
> **Nielsen Gracenote:** 18.9 million devices in the United States. Works with 12 TV manufacturers. In TVs since 2013. It licenses data to others on this list.
>
> **Inscape:** 11.2 million opted-in TV sets from Vizio in the United States. In TVs since 2014. Purely a data licensing business.
>
> **Samsung Ads:** 33 million opted-in Samsung TVs in the United States. Does not sell or license its data.
>
> **Roku:** More than 10 million US TVs have opted in over past two years. Over 10 manufacturers, including TCL, Hisense, Sharp and Hitachi, include the Roku OS. Does not sell or license data.

88.   The Accused ACR Instrumentalities generate a clean play stream from the raw play stream by making any changes to the raw play stream that are determined to be made by the scrubbing. For example, said clean play stream utilizes said scrubbing to ensure that viewing history data is accurate across the entire duration of monitoring a smart device. The resulting clean play stream generated by the Accused ACR Instrumentalities is used by Roku to generate advertising insights and reports that Roku monetizes through advertising products and services.[43]

> **ROKU**
>
> **What They Measure**
>
> Roku has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming. They also measure local affiliates in the covered markets. In all, Roku has 270 channels under measurement. They measure ads by initial fingerprinting and matching the ad to a reference library. They either passively extract the ad from the system or it is client-provided. Roku licenses the ad reference library, as opposed to owning it.
>
> Roku's traditional linear TV content coverage enables it to differentiate live versus delayed viewing up to a configurable time horizon.
>
> Roku has developed business logic to "pick winners" when fingerprints yield multiple possible matches (as often happens with ads).
>
> Roku data is used for advertising personalization, targeting, frequency management across linear and streaming, measurement and tune-in promotion analysis.

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[43] Sequent Partners, *Automatic Content Recognition: the Future of TV Ad and Audience Data* at p. 23, previously available for download on https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data.

How They Measure

While the basic ACR technology may be commoditized, the details of implementation are not and make a major difference, in Roku's opinion. For example, the ability to sustain a large number of devices, resolve multi-matches, and leverage a high-quality content catalogue are points of differentiation.

Building the ad tech stack to collect viewership associated with the right household, making sure it's an ad, assigning it to the right network are all critical, finer points.

TV streaming viewing is identified through data integrations with the streaming services. Long term, Roku believes they must first deliver a great consumer experience – using ACR to deliver benefits such as the ability to recommend content, and an opt-in feature called "More Ways to Watch" that allows viewers to stream live broadcast shows from the beginning, find full episodes they may have missed, and other consumer benefits.

Roku's ACR technology is built into televisions manufactured by Roku TV manufacturing partners. Other OEMs have different hardware or memory capabilities, but Roku OS is the same in every television, assuming minimum requirements are met by OEMs to ensure the Roku OS operates the way it should. Roku leverages its own advertising identifier that's unique to each Roku device to provide capabilities across its ad platform.

89.   Roku committed the infringing activities without license from AMRH. Roku's acts of infringement have damaged AMRH, as owner of the '848 Patent. AMRH is entitled to recover from Roku the damages it has sustained as a result of Roku's wrongful acts in an amount subject to proof at trial. The infringement of the '848 Patent by Roku has damaged and will continue to damage AMRH.

90.   Roku's infringement of AMRH's '848 Patent has been willful, and continues to be willful. In addition, or in the alternative, Roku's infringement of AMRH's '848 Patent is willful at least of the date of the service of this Complaint.

Count V: Infringement of U.S. Patent No. 10,719,849

91.   All preceding factual allegations are incorporated as if fully set forth herein.

92.   The USPTO duly and legally issued U.S. Patent No. 10,719,849 ("'849 Patent") to Anonymous Media Research, LLC with Mr. Jonathan Steuer and Mr. Chris Otto as named inventors. Anonymous Media Research, LLC subsequently assigned all rights, titles, and interests in the '849 Patent to AMRH.

93.   The '849 Patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code.

33

94.   Roku has directly infringed and continues to directly infringe the '849 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of the Accused ACR Instrumentalities to practice the claimed invention in the '849 Patent. For example, Claim 10 of the '849 Patent[44] recites:

> A computer system comprising one or more computers configured by computer code stored in the one or more computers, the computer code comprising instruction executable by one or more processors of the one or more computers, the instructions comprising instructions for:
>
>> generating a play stream of content identification results corresponding to a sequence of data samples, the data samples comprising representations of video data captured at a media monitoring device, wherein content identifiers of the play stream's content identification results are obtained by using corresponding data samples to search a computerized database of known content;
>>
>> in response to obtaining the content identifiers, utilizing a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples, the at least two different obtained content identifiers identifying different media content items; and
>>
>> using one or more computers to utilize an identified channel corresponding to the data samples to generate a media measurement report.

The Accused ACR Instrumentalities meet the recited elements of the claimed media measurement system in Claim 10.

95.   For instance, the Accused ACR Instrumentalities consist of software systems, hardware systems, network architecture, products, and services that enable Roku's ACR-based offerings. The Accused ACR Instrumentalities are a computer system comprising one or more computers configured by computer code comprising instruction that practices claim 10 of the '849 Patent, *see infra*.

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[44] Claim 10 is referenced herein for representative purposes. Plaintiff intends to identify additional asserted claims and reserves its right to provide greater detail and scope via its Infringement Contentions at the time required under this Court's scheduling order.

96.   Roku deploys the Accused ACR Instrumentalities to generate a play stream of content identification results that correspond to a sequence of data samples which comprise representations of data captured at a media monitoring device.

97.   Roku has acquired from Nielsen its Advanced Video Advertising business, inheriting Nielsen's "capabilities in automatic content recognition (ACR) and dynamic ad insertion (DAI)."[45] Nielsen has stated that its ACR capabilities include gathering "content data" which includes "collecting audio and visual 'fingerprints'."[46]

> • **Content data:** This may include audio and visual content information. ACR works by collecting audio and video 'fingerprints' to allow us to identify commercial information about content consumed on the TV and internet or other similar network activity (e.g., program, video, advertisements, channel, video games, and similar media).

98.   Moreover, Roku's Accused ACR Instrumentalities use corresponding data samples to search a computerized database of known content in order to obtain the content identifiers of the play stream's content identification results. For example, Roku promotes that its ACR "snapshots" are "scanned through a database of content and ads, which allows the exposure to be matched to what is airing."[47]

> **Here's How ACR Works**
>
> Roughly twice per second, a Roku TV captures video "snapshots" in 4K resolution. These snapshots are scanned through a database of content and ads, which allows the exposure to be matched to what is airing. For example, if a streamer is watching an NFL football game and sees an ad for a hard seltzer, Roku's ACR will know that the ad has appeared on the TV being watched at that time. In this way, the content on screen is automatically recognized, as the technology's name indicates. The data then is paired with user profile data to link the account watching with the content they're watching. We should note, however, that this data becomes aggregated, removing personally identifiable information before it is received by advertisers.

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[45] Ad Exchanger, *Roku Acquires Video Ad Tech From Nielsen – And Nielsen Gets Insights on Roku Users*, available at https://www.adexchanger.com/digital-tv/roku-acquires-advanced-video-ad-tech-from-nielsen-and-nielsen-expands-access-to-roku-audiences/ (last visited Sept. 22, 2023).
[46] Nielsen, *Nielsen Advanced Video Advertising Privacy Statement* (Oct. 2020 version).
[47] Roku Advertising, *A Guide to ACR: The Future of TV and Audience Data*, available at https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data (last visited Sept. 22, 2023).

Moreover, Roku advertises that it "has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming" as well as that it will "measure ads by initial fingerprinting and matching the ad to a reference library."[48]

What They Measure

Roku has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming. They also measure local affiliates in the covered markets. In all, Roku has 270 channels under measurement. They measure ads by initial fingerprinting and matching the ad to a reference library. They either passively extract the ad from the system or it is client-provided. Roku licenses the ad reference library, as opposed to owning it.

99.   In response to obtaining the content identifiers, Roku's Accused ACR Instrumentalities utilize a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples, the at least two different obtained content identifiers identifying different media content items.

100.   For example, Roku states that "we collect TV information such as the programs, commercials, and channels you view."[49]

When you use a Roku TV with the Smart TV experience enabled, we use Automatic Content Recognition ("**ACR**") technology to receive information about what you watch via the Roku TV's antenna (including live television content and ads), and via devices connected to your Roku TV (including streaming players, consoles and cable and satellite set top boxes). For example, we collect TV viewing information such as the programs, commercials, and channels you view, the date, time and duration of the viewing, and how you use the on-screen TV guide. We collect TV viewing information both when you access live TV directly through your Smart TV's interface and when you access live TV from within a Third-Party Channel. If the Smart TV experience is enabled on your Roku TV, we will use this information to personalize your TV viewing experience and ads.

101.   In addition, Nielsen ACR technology collects "preference data" which includes "the choices you make, such as the particular programs, channels, videos, video games, or other

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[48] Sequent Partners, *Automatic Content Recognition: the Future of TV Ad and Audience Data* at 23, previously available for download on https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data.

[49] Roku, *Roku Privacy Policy*, available at https://docs.roku.com/published/userprivacypolicy/en/us (last visited Sept. 12, 2023).

media you select or view," as well as "content data" which includes "e.g., program, video, advertisement, channel, video games, and similar media."[50]

- **Behavior and preference information:** "Behavior data" refers to when or how you do things, such as how frequently you use the TV or other devices connected to it, as well as the start and end time of your television usage. "Preference data" refers to the choices you make, such as the particular programs, channels, videos, video games, or other media you select or view.

- **Content data:** This may include audio and visual content information. ACR works by collecting audio and video 'fingerprints' to allow us to identify commercial information about content consumed on the TV and internet or other similar network activity (e.g., program, video, advertisements, channel, video games, and similar media).

102.   The Accused ACR Instrumentalities utilize the identified channel corresponding to the data samples to generate media measurement reports, including reports that contain advertising insights that Roku monetizes, including through its advertising products and services.

103.   Roku committed the infringing activities without license from AMRH. Roku's acts of infringement have damaged AMRH, as owner of the '849 Patent. AMRH is entitled to recover from Roku the damages it has sustained as a result of Roku's wrongful acts in an amount subject to proof at trial. The infringement of the '849 Patent by Roku has damaged and will continue to damage AMRH.

104.   Roku's infringement of AMRH's '849 Patent has been willful, and continues to be willful. In addition, or in the alternative, Roku's infringement of AMRH's '849 Patent is willful at least of the date of the service of this Complaint.

Count VI: Infringement of U.S. Patent No. 10,572,896

105.   All preceding factual allegations are incorporated as if fully set forth herein.

106.   The USPTO duly and legally issued U.S. Patent No. 10,572,896 ("'896 Patent") to Anonymous Media Research, LLC with Mr. Jonathan Steuer and Mr. Chris Otto as named

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[50] Nielsen, *Nielsen Advanced Video Advertising Privacy Statement* (Oct. 2020 version).

inventors. Anonymous Media Research, LLC subsequently assigned all rights, titles, and interests in the '896 Patent to AMRH.

107.   The '896 Patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code.

108.   Roku has directly infringed and continues to directly infringe the '896 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of the Accused ACR Instrumentalities to practice the claimed invention in the '896 Patent. For example, Claim 1 of the '896 Patent[51] recites:

A media measurement method comprising:

> using one or more computers to generate a play stream of content identification results corresponding to a sequence of submitted data samples, the submitted data samples corresponding to video data samples captured at a monitoring device associated with a monitored audience member;

> using one or more computers to utilize sample sequence data and content offset data to deduce play-altering actions of the monitored audience member, the sample sequence data corresponding to a sequence of the content identification results, the content offset data including content offsets associated with the content identification results, a content offset indicating a time position of a content identification result within identified content, wherein to utilize comprises, for a particular plurality of submitted data samples and corresponding content identification results, comparing a progression of log times associated with capture timing of each of the particular plurality of submitted data samples and a progression of content offsets of the corresponding content identification results; and

> using one or more computers to utilize deduced play altering actions of the monitored audience member to generate a media measurement report.

The Accused ACR Instrumentalities perform the recited steps of the claimed media measurement method in Claim 1.

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[51] Claim 1 is referenced herein for representative purposes. Plaintiff intends to identify additional asserted claims and reserves its right to provide greater detail and scope via its Infringement Contentions at the time required under this Court's scheduling order.

109.   For instance, Roku uses the Accused ACR Instrumentalities to measure viewership on Smart TVs:[52]
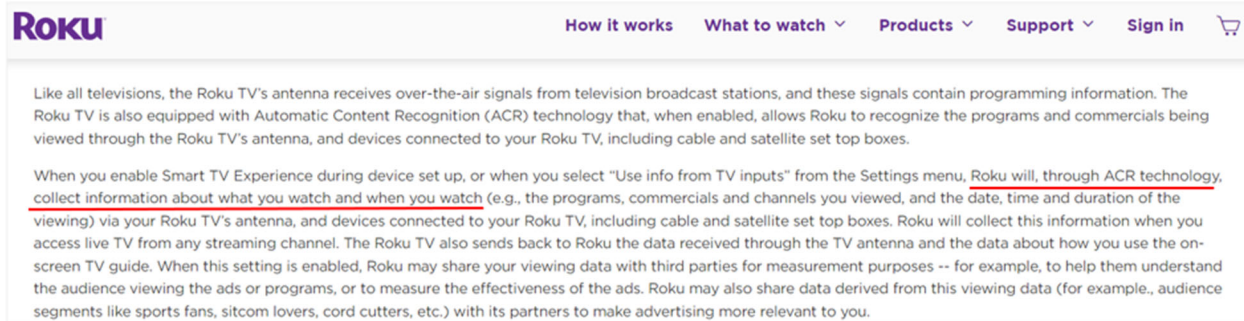
110.   Roku's Accused ACR Instrumentalities uses one or more computers to generate a play stream of content identification results that correspond to a sequence of submitted data samples which correspond to the video data samples that a monitoring device captures from a monitored audience member.

111.   Roku acquired from Nielsen its Advanced Video Advertising business which resulted in Roku inheriting Nielsen's "capabilities in automatic content recognition (ACR) and dynamic ad insertion (DAI)."[53] Nielsen has stated that its ACR capabilities include gathering "content data" which includes "collecting audio and video 'fingerprints'."[54]

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[52] Roku, *Roku ACR Service Policy*, available at https://docs.roku.com/published/acrservicepolicy/en/us (last visited Sept. 13, 2023).

[53] Ad Exchanger, *Roku Acquires Video Ad Tech From Nielsen – And Nielsen Gets Insights on Roku Users*, available at https://www.adexchanger.com/digital-tv/roku-acquires-advanced-video-ad-tech-from-nielsen-and-nielsen-expands-access-to-roku-audiences/ (last visited Sept. 22, 2023).

[54] Nielsen, *Nielsen Advanced Video Advertising Privacy Statement* (Oct. 2020 version).

Moreover, Roku promotes that its ACR "snapshots" are "scanned through a database of content and ads, which allows the exposure to be matched to what is airing."[55]

> **Here's How ACR Works**
>
> Roughly twice per second, a Roku TV captures video "snapshots" in 4K resolution. These snapshots are scanned through a database of content and ads, which allows the exposure to be matched to what is airing. For example, if a streamer is watching an NFL football game and sees an ad for a hard seltzer, Roku's ACR will know that the ad has appeared on the TV being watched at that time. In this way, the content on screen is automatically recognized, as the technology's name indicates. The data then is paired with user profile data to link the account watching with the content they're watching. We should note, however, that this data becomes aggregated, removing personally identifiable information before it is received by advertisers.

In addition, Roku advertises that it "has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming" as well as that it will "measure ads by initial fingerprinting and matching the ad to a reference library."[56]

> **ROKU**
>
> **What They Measure**
>
> Roku has the capability to continuously detect programs and ads delivered to smart TVs on national cable and broadcast channels, and TV streaming. They also measure local affiliates in the covered markets. In all, Roku has 270 channels under measurement. They measure ads by initial fingerprinting and matching the ad to a reference library. They either passively extract the ad from the system or it is client-provided. Roku licenses the ad reference library, as opposed to owning it.

112.   The Accused ACR Instrumentalities, utilizing sample sequence data and content offset data, use one or more computers to deduce play-altering actions that alter at least one of a pace and a sequence of a media stream.

113.   As set forth above, the sample sequence data corresponds to a sequence of content identification results from the "matching" of the "snapshots" or "fingerprints" collected to the "reference library" via Roku's Accused ACR Instrumentalities. Moreover, the content offset data

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[55] Roku Advertising, *A Guide to ACR: The Future of TV and Audience Data*, available at https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data (last visited Sept. 22, 2023).

[56] Sequent Partners, *Automatic Content Recognition: the Future of TV Ad and Audience Data* at 23, previously available for download on https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data.

includes time positions of content identification results within the corresponding identified content. Furthermore, the Accused ACR Instrumentalities utilize content offset data and sample sequence data by comparing the log times associated with the capture timing of a plurality of submitted data samples and a progression of content offsets for the corresponding content identification results identified from that plurality of submitted data samples.

114.   For example, Roku discloses the following details regarding the Accused ACR Instrumentalities that underpin its targeted advertising product and service offerings.[57]

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[57] Sequent Partners, *Automatic Content Recognition: the Future of TV Ad and Audience Data* at ~~pp.~~ 23, 24, previously available for download on https://advertising.roku.com/resources/blog/insights-analysis/acr-the-future-of-tv-and-audience-data.

Matching Ads to Programs

Roku fingerprints programs as well as ads so they have the flow of events and can link the ads. There may be some issues identifying content associated with an ad pod if channel changing occurred across multiple channels.

Outcome Data and Sources

Roku offers solutions that measure television tune-in, incremental reach over linear, analytics on linear audiences and more. They also partner with third-party companies for measurement. NCS, Polk, and Millward Brown are examples of their partnerships utilized in outcome tracking.

115.   Moreover, for example, Nielsen discloses the following about the "Data Collection" and "Data Use" related to its ACR technology.[58]

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[58] Nielsen, *Nielsen Advanced Video Advertising Privacy Statement* (Oct. 2020 version).

Participating Smart TV manufacturers include Nielsen's Automatic Content Recognition ("ACR") software in televisions, which can recognize certain premium or ad supported content, on-screen content and audio (but cannot recognize or collect information from your own personal content), and Nielsen's consent management software, which allows viewers to manage their information sharing and use settings. This software enables Nielsen to collect certain personal data (i.e., information that is associated with, can identify or reasonably be linked, directly or indirectly, with a particular consumer or household), information about your Smart TV (such as device ID, IP address), and your TV viewing information to offer our Services. In particular, we collect the following categories of information:

- **Identifiers**: These include unique identifiers (such as a unique device ID created by the manufacturer of the Smart TV), internet protocol (IP) addresses, or other similar online and device identifiers.
- **Television Information:** This includes information such as the television brand and model, firmware version, OS version, usage information such as on-screen programming identifiers and audio levels (0-100, mute on/off), and input Source (HDMI, Tuner, etc.).
- **Behavior and preference information:** "Behavior data" refers to when or how you do things, such as how frequently you use the TV or other devices connected to it, as well as the start and end time of your television usage. "Preference data" refers to the choices you make, such as the particular programs, channels, videos, video games, or other media you select or view.
- **Content data:** This may include audio and visual content information. ACR works by collecting audio and video 'fingerprints' to allow us to identify commercial information about content consumed on the TV and internet or other similar network activity (e.g., program, video, advertisements, channel, video games, and similar media).
- **Demographic information:** Nielsen will use your Smart TV's IP address to determine your general geographic location (i.e., your city and state). Nielsen may also obtain information from third party sources to help us understand audience demographics (such as age and gender) and preferences. Data from these other sources may be used to enhance or calibrate the data collected from our ACR software.
- **Derived or inferred data:** Inferences drawn from any of the above information to create a profile about you reflecting inferences about your preferences, characteristics, and/or behaviors (such as the number of viewers in a household and their ages, genders, and languages) may also be generated by Nielsen or a service provider acting on our behalf.

Nielsen's Audience Measurement. If you choose to participate in Nielsen's Audience Measurement, information is used to generate our market research reports and insights about television and online viewing, audience trends, and advertising effectiveness. Our research reports and insights help our clients make decisions about what types of programs to show, and when, where and how to advertise their products to consumers. We may also provide data to our clients based upon modelled data, which are projections based on demographic and behavioral characteristics (like gender, age, and TV viewing habits) that look at a sample group of people and predict what people with similar characteristics or preferences are likely to watch or buy.

We use tools and methods to make sure that there is no reasonable possibility of identifying you from the data we provide to our clients. For example, the data we collect is combined with data collected from other participants in our research to produce aggregated reports from which no individual can be uniquely identified. If our reports and insights are not aggregated, we take steps to make sure there is no reasonable possibility of re-identification.

Personalized Advertising. In order to personalize the advertisements you see when watching TV, we use the information we collect to create groups of people, called 'audience segments,' who share similar interests. If you consent to Personalized Advertising, your Smart TV will be assigned to one or more of these audience segments based on your TV viewing history and other information, and we enable our clients to provide relevant advertisements that they believe are of interest to such groups. We will not share your personal data or viewing information with our clients, but we will share the descriptions of the audience segments so that our clients can decide which audience segments they would like to have shown their advertisements. Please note that in order to participate in Personalized Advertising, Audience Measurement must also be enabled; by agreeing to Nielsen's Personalized Advertising Service, you give Nielsen permission to enable Audience Measurement.

116.   Examples of behavior information that include a monitored audience member's play-altering actions which alter at least one of a pace and a sequence of a media stream and which are deduced in a similar manner by Roku's Accused ACR Instrumentalities, include ad-skipping, time-shifting, channel-surfing, and fast-forwarding. For example, it is understood that ACR measurement companies such as Roku will capture "viewing behavior" such as

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"viewability, program/provider preferences, ad avoidance, ad consumption, time spent, channel surfing, fast-forwarding, binge-watching, completed views, etc."[59] [60]

In the past, ad value was determined by the "opportunity to expose" a viewer to an ad (not actual verified exposure). The contextual program rating served as surrogate for the commercial rating. ACR helps advertisers know if the ad itself was on-screen for specific viewers and for how long, and will help sellers justify higher rates for verified, completed views. Some points of valuation capturable through ACR include:

- The type of viewing platform—Connected TV, OTT, Linear TV, DVR playback, MVPDs, VOD
- Location—both fixed screen and mobile locations
- Viewer profiles—individual or household demographics and/or IP addresses, aiding cross-media measurement
- Viewing behavior—viewability, program/provider preferences, ad avoidance, ad consumption, time spent, channel surfing, fast-forwarding, binge-watching, completed views etc.

ACR is not only about helping television get more digital; it also allows digitally-delivered video to move beyond impressions and calculate reach and frequency, which has always been a necessity for television buyers.

This authentication of data, combined with second-by-second viewing measurement plus the door-opening promise of addressable T/V are key reasons why historic television content and measurement giants are seriously investing in ACR:

- After acquiring Gracenote's Video Automatic Content Recognition (ACR) technology in 2017, **Nielsen** has integrated Gracenote-branded technology, unique IDs and metadata (through its own Grabix analytics platform) into an increasing number of its measurement, analytics and advanced advertising solutions according to Nielsen.
- **CBS, A&E and MediaTek** have joined with Nielsen's Gracenote in a five-market pilot, enabling the many MediaTek-powered Smart TV platforms to deliver addressable advertising capabilities in live trials.
- Ad Age recently revealed that **NBC Universal, CBS, Disney Media Networks, Discovery, AMC Networks, Turner, AT&T's Xandr, Comcast's FreeWheel and Hearst TV** have formed a consortium with Inscape, a division of **Vizio** (10 million Smart TVs) to develop open standards for ACR, DAI and addressability across all Smart TVs. It is called OAR, for Open Addressable Ready.

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[59] Ad Monster, *Automated Content Recognition (ACR): The Field-Leveling Technology for T/V (Television/Video)*, available at https://www.admonsters.com/automated-content-recognition-acr-tv-televisionvideo/ (last visited Sept. 22, 2023).

[60] *See also* Extreme Reach, *Automated Content Recognition: A Technology to Turbo-charge Addressable TV*, available at https://extremereach.com/blog/automated-content-recognition-a-technology-to-turbo-charge-addressable-tv (last visited Sept. 8, 2023) ("[ACR] allows content to be recognized by video, audio or watermark cues and matched back to a source database for reference and verification. This includes . . . behaviors associated with what's being watched (ad-skipping, binge-watching) . . . .") ; IAB Australia, *IAB Member Q&A: Use of Data in Connected TV*, available at https://iabaustralia.com.au/resource/iab-member-qa-use-of-data-in-connected-tv (last visited Sept. 8, 2023) ("Advertisers can access key behaviours associated with TV viewership such as ad-skipping, time-shifting, streaming, and binge-watching to better understand the viewing habits, lifestyle and interests of their target audience to inform media planning and CTV activation.").

117.   The Accused ACR Instrumentalities utilize the deduced play altering actions to generate media measurement reports, including reports containing advertising insights that Roku monetizes, including through its advertising products and services.

118.   Roku committed the infringing activities without license from AMRH. Roku's acts of infringement have damaged AMRH, as owner of the '896 Patent. AMRH is entitled to recover from Roku the damages it has sustained as a result of Roku's wrongful acts in an amount subject to proof at trial. The infringement of the '896 Patent by Roku has damaged and will continue to damage AMRH.

119.   Roku's infringement of AMRH's '896 Patent has been willful, and continues to be willful. In addition, or in the alternative, Roku's infringement of AMRH's '896 Patent is willful at least of the date of the service of this Complaint.

JURY DEMAND

120.   AMRH hereby demands a trial by jury on all issues.

PRAYER

Wherefore, AMRH prays for entry of judgment as follows:

121.   A judgment in favor of AMRH that Roku has infringed and is infringing, either literally and/or under the doctrine of equivalents, the Asserted Patents;

122.   A judgment in favor of AMRH that Roku's infringement has been and continues to be willful; in the alternative, a judgment in favor of AMRH that Roku's infringement is willful and continues to be willful as of the date of this Complaint;

123.   An award of damages in favor of AMRH adequate to compensate AMRH for Roku's infringement of the Asserted Patents which shall in no event be less than a reasonable royalty, together with interest and cost as fixed by the court pursuant to 35 U.S.C. § 284;

124.   An award of enhanced damages in favor of AMRH against Roku for up to three times the award of actual damages for Roku's willful infringement of the Asserted Patents pursuant to 35 U.S.C. § 284;

125.   A permanent injunction in favor of AMRH against Roku enjoining Roku, its officers, agents, employees, and others acting in privity, from further infringement of the Asserted Patents;

126.   An award of an ongoing royalty for Roku's post-judgment infringement in the event a permanent injunction is not granted;

127.   An award of attorneys' fees pursuant to 35 U.S.C. § 285 or as otherwise permitted by law in an amount deemed just and appropriate by the Court;

128.   An award of costs and expenses as deemed appropriate by the Court; and

129.   Any other legal or equitable relief to which AMRH is justly entitled.

Dated: September 22, 2023

Respectfully submitted,

/s/ Weining Bai

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