UNITED STATES COPYRIGHT OFFICE

Long Comment Regarding a Proposed Exemption Under 17 U.S.C. § 1201

I. ITEM A -- COMMENTER INFORMATION

Petitioner Institute of Scrap Recycling, Inc. ("ISRI") submits this comment in response to the Copyright Office's Notice of Proposed Rule Making[1] ("2020 NPRM") in support of Proposed Class 10 and respectfully asks the Librarian of Congress to exempt this class of works from 17 U.S.C. § 1201(a)(1)'s prohibition on the circumvention of access control technologies for the period 2021-2014.

Petitioner ISRI[2] is a Washington, DC-based trade association representing more than 1,300 companies—ranging from small, family-owned businesses to large, multi-national corporations—operating at more than 4,000 facilities in the United States and 40 countries worldwide. ISRI members are manufacturers and processors, brokers, and industrial consumers of scrap commodities, including ferrous and nonferrous metals, paper, electronics, rubber, plastics, glass, and textiles.

The U.S. electronics recycling industry has shown tremendous growth over the past 10 years. This maturing segment of the scrap recycling industry provides an overall economic contribution of approximately $109 billion, including exports of $ 20 billion in 2018, to the U.S. economy, and employs more than 45,000 direct, full time employees (up from 45,000 in 2016).[3] In 2019, the U.S. electronics recycling industry processed more than 5 million tons of used and end-of-life electronics equipment.[4] More than 70 percent of the collected equipment is manufactured into specification grade commodities—including scrap steel, aluminum, copper, lead, circuit boards, plastics, and glass. These valuable commodities are then sold to basic materials manufacturers in the United States and globally as raw material feedstock for new products, such as steel, copper, aluminum, plastic, and glass.

Electronics recyclers also repair, refurbish, and resell (recyclers) functioning electronics equipment as used products into domestic and international markets. Recyclers also provide a number of logistical services, like collection, storage, and transportation, as well as scrubbing hard drives of sensitive personal and commercial data. While only 20-30% of the overall volume of devices received by recyclers is sent for reuse, repair, and remanufacturing, the majority of

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[1] Exemptions to Permit Circumvention of Access Controls on Copyrighted Works, 85 Fed. Reg. 65,293 (Oct. 15, 2020) (to be codified at 37 C.F.R. pt. 201).
[2] *See* https://www.isri.org/ (last visited Dec. 13, 2020).
[3] *See 2019 Recycling Industry Yearbook*, ISRI, http://www.scrap2.org/yearbook/4/ (last visited Dec. 13, 2020).
[4] *Id*., *Electronics*, ISRI, http://www.scrap2.org/yearbook/42/ (last visited Dec. 13, 2020).

revenue stems from such use. According to a U.S. International Trade Commission report,[5] in 2011, the total domestic market was valued at $19.2 billion with reused technological devices, such as wireless cellphones and tablets, accounting for $14.9 billion.

The industry is driven not only by devices originally purchased by individuals, but also by equipment collected from businesses and commercial interests, comprising up to 75 percent of the market on a volume basis. The electronics recycling industry is poised to meet the anticipated increased demand for more used products and specification grade commodities.

ISRI advocates on behalf of its members on a variety of important issues directly and indirectly impacting the recycling industry in Washington, DC, state capitals across the U.S., and internationally.

Petitioner may be contacted through the above-identified counsel.

[5] Used Electronics Products: An Examination of U.S. Exports, Inv. No. 332-528, USITC Pub. 4,379 (February 2013) (Final), at 2-3, https://www.usitc.gov/publications/332/pub4379.pdf (last visited Dec. 13, 2020).

II. ITEM B. PROPOSED CLASS ADDRESSED

Proposed Class 10: Computer Programs—Unlocking

III. ITEM C. OVERVIEW OF PROPOSED EXEMPTIONS

Petitioner seeks expansions of the current exemption to the DMCA's prohibition against circumvention of technological measures that control access to computer programs that enable wireless devices to connect to wireless communications networks—a process commonly referred to as "unlocking." The current exemption permits circumvention for a narrow subset of all wireless devices: lawfully acquired wireless telephone handsets, tablets, mobile connectivity devices, and wearable wireless devices.[6] ISRI proposed that exemption in the 2017 Seventh Triennial Rulemaking.[7] ISRI now seeks to expand the exemption to all wireless devices or, if such a broad extension is not allowed, at a minimum to lawfully acquired laptop computers, including Chromebooks, in addition to the current categories of wireless telephone handsets, tablets, mobile connectivity devices and wearable wireless devices.

In the current 2020 rulemaking, ISRI sought renewal of the exemption for unlocking lawfully acquired wireless telephone handsets, tablets, mobile connectivity devices and wearable wireless devices. In its 2020 NPRM, the Copyright Office indicated its determination that there was continuing need and justification for the previous exemption, that there was no opposition to renewal, and that the it intends to recommend readoption of the exemption in its current form.[8] In two separate Petitions for New Exemptions submitted on September 8, 2020, ISRI requested the expansion of the renewed unlocking exemption to cover (1) laptop computers (including Chromebooks) with 4G LTE or 5G or other cellular connection capabilities, and (2) any wireless devices equipped with 4G LTE or 5G or other cellular connection capabilities, without limitation to the current four categories, including, but not limited to Smart TVs, Internet of Things devices, extended reality ("XR") headsets, desktop computers, and drones. In the 2020 NPRM, the Copyright Office grouped both of these requested exemptions into a single class, Class 10. ISRI believes the broader exemption for all 4G LTE, 5G, or other wireless enabled devices is necessary and justified and requests that it be granted. For purposes of this comment, however, Petitioner will separate its arguments into two separate sections, addressing, in the alternative (1) the need and justifications for an expansion of the current exemption to include lawfully acquired laptop computers, including Chromebooks, and (2) the need and justifications for an expansion of the current exemption to include any wireless devices equipped with 4G LTE or 5G or other cellular connection capabilities.

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[6] *See* Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, Final Rule, 83 Fed. Reg. 54,010 (Oct. 26, 2018) (hereinafter 2018 Final Rule), at 54,020.
[7] Comments on Behalf of Petitioner Institute of Scrap Recycling Industries, Inc., Proposed Class 5: Computer Programs -- Unlocking, Docket No. 2017-10 (hereinafter "ISRI 2017 Comments").
[8] *See* 2020 NPRM at 54,013.

IV. ITEM D. TECHNOLOGICAL PROTECTION MEASURE AND METHODS OF CIRCUMVENTION

In the case of both exemptions sought here, the copyrighted work sought to be accessed, "computer programs, in the form of firmware or software, that enable wireless mobile devices to connect to a wireless telecommunications network," is, like other computer programs, a "literary work" under 17 U.S.C. § 102.

A. The TPMs and Methods of Circumvention, and the Non-Infringing Uses and Statutory Factors that Justify the Exemption for the Current Four Categories of Devices, Apply Equally to the Unlocking of Laptops and Other Devices

The same pro-consumer and procompetitive benefits that justify allowing unlocking of the enumerated categories of devices, and that warranted the 2015 and 2018 exemptions and the 2020 renewal recommendation, also justify unlocking of laptop computers and all cellular-enabled devices. Unlocking of laptops or other devices for use on another carrier's network, in the same way as unlocking handsets, tablets, connectivity devices, and wearables, (i) involves identical or very similar TPM and methods of circumvention; (ii) involves identical noninfringing uses, and (iii) does not infringe the copyright in any copyrightable work at all. Most importantly, just as with the currently listed devices, permitting users to switch carriers for their laptop computers or other devices does not, as the NTIA, Register, and Librarian have previously recognized, implicate any copyright interests. Because these justifications are identical or virtually identical, ISRI will not repeat a full explanation of those factors here but instead incorporates by reference the detailed arguments in its 2015 comments regarding tablet computers,[9] as well as the conclusions of the 2015 Final Rule[10] and the 2015 Register's Recommendation.[11]

V. EXTENSION OF THE EXISTING UNLOCKING EXEMPTION TO COVER LAWFULLY ACQUIRED LAPTOP COMPUTERS (INCLUDING CHROMEBOOKS)

[Alternative] Proposed Class: *Computer programs that enable the following types of lawfully acquired wireless devices to connect to a wireless telecommunications network, when circumvention is undertaken solely in order to connect to a wireless telecommunications network and such connection is authorized by the operator of such network: (i) Wireless telephone handsets (i.e., cellphones); (ii) Laptop computers (including Chromebooks); (iii) All-purpose tablet computers; (iv) Portable mobile connectivity devices, such as mobile hotspots, removable wireless broadband modems, and similar devices; and (v) Wearable wireless devices designed to be worn on the body, such as smartwatches or fitness devices.*

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[9] Comments on Behalf of Petitioner Institute of Scrap Recycling Industries, Inc., Docket No. 2014-07 (hereinafter "ISRI 2015 Comments")

[10] *See* Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, Final Rule, 80 Fed. Reg. 65,944 (Oct. 28, 2015) (hereinafter 2015 Final Rule), at 65950-52.

[11] Section 1201 Rulemaking: Sixth Triennial Proceeding to Determine Exemptions to the Prohibition on Circumvention -- Recommendation of the Register of Copyrights (October 2015) ("2015 Register Recommendation"), at 147-53, 159-64, 167-70.

A. Overview of Proposed Exemption

ISRI's 2017 exemption request sought an expansion of the unlocking exemption from only used devices in the enumerated categories to all lawfully acquired such devices, new or used. The scope of that request (a narrower alternative to the request for an expansion to all wireless devices, not just those in the specific categories), was based on the then current industry conditions and business practices that ISRI members were encountering. Since that time, however, those conditions and practices have changed. ISRI members now report that they are beginning to obtain and need to recycle and/or resell (as explained in the Adverse Impact section below) wireless-enabled laptop computers, including Chromebooks, a type of laptop that utilizes Google's Chrome OS operating system.[12] Thus, ISRI now seeks to expand the existing exemption to permit similar unlocking of laptops and Chromebooks for the purpose of connecting to the wireless carrier of the owner's choice, by adding laptops as a new category of device to the existing exemption.

B. Item E. Adverse Impact of Excluding Laptops from the Unlocking Exemption

At the time of ISRI's 2017 comment, ISRI members were not yet acquiring laptop computers with cellular or other wireless capability that would enable them to connect to a wireless communications network. That has changed over the past three years. Increasingly, laptop computers, including Chromebooks (hereinafter "laptops") are available in the market with 4G LTE, 5G, or other cellular connection capabilities. ISRI members have now begun to obtain and need to recycle and/or resell laptops with such wireless connectivity, but have found that some of those devices are locked to a particular wireless carrier in the same manner as are wireless handsets, tablets, and other devices covered by the current exemption. As with other devices, the value of laptops that are locked to a particular wireless carrier are lower than that of unlocked devices. For example, ISRI members report that an unlocked Chromebook device is often worth at least 6% to 8% more than a locked Chromebook.

When recyclers are unable to engage in noninfringing unlocking of laptops (similar to the currently covered devices), consumers are denied the ability to use their devices on the network of their choice and denied the full benefit of choosing or selling used devices and the full value of that purchase or sale, and competition between new and used devices and between networks is reduced.

1. Laptops are Increasingly Cellular Enabled

For the last two to three years, momentum has been building slowly but steadily toward the inclusion of wireless capability, primarily in the form of 4G LTE connectivity, in laptops. The number of laptop models with such capacity, and the number of computer makers offering them, has continued to grow.[13] A number of these wireless-capable laptops are built around a new Qualcomm "Always On, Always Connected" processor that Qualcomm labels the "Snapdragon

[12] *See* https://www.google.com/chromebook/ (last visited Dec. 13, 2020).
[13] *See, e.g.*, https://www.windowscentral.com/best-windows-10-lte-laptops (last visited Dec. 13, 2020).

compute platform."[14] A few examples of the current or recent models of LTE-capable laptops include the HP Elite Dragonfly,[15] the Lenovo ThinkPad X1 Carbon Gen 8,[16] several models of Microsoft's Surface,[17] the Dell Latitude 7410,[18] and the Asus NovaGo.[19]

During this same time period, Chromebooks—laptops running the Chrome OS rather than Windows—have become a growing portion of the U.S. laptop market. And, like other laptops, Chromebooks also are now becoming available with LTE connectivity. As early as 2014, HP offered its Chromebook 11 with connectivity to Verizon LTE.[20] More recently, the Samsung Chromebook Plus features "Verizon 4G LTE data connectivity" as a built-in feature.[21] Acer offers its Chromebook Spin 513 with LTE[22] using the Qualcomm Snapdragon platform.[23] And lesser-known laptop makers focused on specialized markets like education are including LTE in some of their models, such as the Sector 5 Chromebook LTE.[24]

As the number of laptop makers and models with 4G LTE grows, the first of what likely will be a significant number and variety of laptops connecting to the latest generation of cellular networks, 5G,[25] are also beginning to appear. In mid-2019, laptop maker Lenovo and wireless chip maker Qualcomm announced the first consumer 5G laptop.[26] That laptop uses the Qualcomm "Snapdragon 8cx 5G computer platform," a purpose-built processor for laptops and personal computers that offers 5G capability. The Qualcomm-Lenovo announcement highlighted the central role that 5G cellular connectivity will have in laptops and other personal computers going forward: "This collaboration . . . ushers in a new generation of Always On, Always Connected PCs that are designed to deliver the benefits of the unifying connectivity fabric made possible by 5G."[27]

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[14] https://www.qualcomm.com/products/mobile-computing/mobile-pcs (last visited Dec. 13, 2020).
[15] https://www.techradar.com/reviews/hp-elite-dragonfly (last visited Dec. 13, 2020) (laptop review, noting that LTE integration "has become a feature that we're having trouble imagining life without.").
[16] https://www.lenovo.com/us/en/laptops/thinkpad/thinkpad-x1/X1-Carbon-Gen-8-/p/20U9CTO1WWENUS1 (last visited Dec. 13, 2020).
[17] *See, e.g.*, https://www.microsoft.com/en-us/p/surface-pro-x/8qg3bmrhnwhk?activetab=pivot%3aoverviewtab (Surface Pro X with "blazing-fast LTE connectivity"); https://www.microsoft.com/en-us/p/surface-go-2/8pt3s2vjmdr6?activetab=pivot%3aoverviewtab (ultraportable Surface Go 2 with LTE) (last visited Dec. 13, 2020).
[18] https://www.dell.com/en-us/work/shop/cty/pdp/spd/latitude-14-7410-2-in-1-laptop?gacd=9646510-1029-5761040-266791111-0&dgc=st&ds_rl=1282789&gclid=CjwKCAiAt9z-BRBCEiwA_bWv-NOtDuKGOeZg_-CZ6HyUYmtIfOuSAJwX9tu1fxAUPRVVFb5pUpgrrxoCzPsQAvD_BwE&gclsrc=aw.ds (last visited Dec. 13, 2020).
[19] https://www.asus.com/us/2-in-1-PCs/ASUS-NovaGo-TP370QL/ (last visited Dec. 13, 2020).
[20] https://www.pcmag.com/reviews/hp-chromebook-11-verizon-lte (last visited Dec. 13, 2020).
[21] https://www.samsung.com/us/business/products/computing/chrome-devices/chromebook-plus/chromebook-plus-12-2-4g-lte-intel-celeron-xe525qbb-k01us/ (last visited Dec. 13, 2020).
[22] https://www.acer.com/ac/en/US/content/series/acerchromebookspin513 (last visited Dec. 13, 2020).
[23] https://www.qualcomm.com/products/mobile-computing/chromebooks?cmpid=fofyus203885&gclid=CjwKCAiAt9z-BRBCEiwA_bWv-JhAEhb0wXVbUrxFCla5pGOlQ9eIHtYTJZRzB99knVQ24G0rF4WZMBoCiGMQAvD_BwE (last visited Dec. 13, 2020).
[24] https://chromeunboxed.com/exclusive-first-look-at-the-sector-5-lte-chromebook-e4/ (last visited Dec. 13, 2020).
[25] https://www.laptopmag.com/articles/what-is-5g (last visited Dec. 13, 2020).
[26] https://www.qualcomm.com/news/onq/2019/05/27/qualcomm-and-lenovo-unveil-worlds-first-5g-pc-powered-snapdragon (last visited Dec. 13, 2020).
[27] *Id*.

That laptop is now available to consumers as the Lenovo Flex 5G convertible, which offers the ability to connect to both 4G LTE and 5G.[28] Dell also has a new laptop model featuring 5G connectivity, the Latitude 9510.[29] Within the next year many more models from a number of PC makers are likely to be on the market. A recent PCWorld analysis notes that "a few more 5G laptops will soon arrive from the likes of Dell, HP, and Samsung, and CES [the January, 2021 Consumer Electronics Show] will surely bring a parade of options."[30] Apple is also rumored to be developing a 5G version of its laptops, though there does not yet appear to be any official confirmation of that report.[31]

2. Some Cellular-Enabled Laptops Are Carrier Locked

ISRI member report that they are already beginning to encounter some LTE enabled laptops, particularly Chromebooks, that are locked to a particular carrier. ISRI members' ability to resell or recycle those devices to make the best use of them requires that they be able to unlock any carrier locks that may be in place in order to allow those laptops to be used on any wireless carrier, in the same manner as is currently permitted for the four existing categories of devices.

There are additional indications of carrier locking of laptops beyond ISRI-member reports. For example, early last year, Microsoft and several partners announced a new set of lower-priced Windows laptops for education called "Always Connected PCs," designed to better compete with Chromebooks in the education market. The announcement indicated that these laptops will be coupled with 4G LTE service from T-Mobile.[32] Samsung advertises its Chromebook Plus as featuring "Verizon 4G LTE data connectivity" as a built-in feature,[33] Verizon itself acknowledges that Chromebooks and other devices that come with Verizon connectivity are locked for at least 60 days after purchase, even where paid for in full or paid off in advance of any installment period.[34] On the 5G side, the new Lenovo Flex 5G laptop is reported to work exclusively with Verizon: "The Flex 5G supports either eSIM or a physical nanoSIM card, and while the X55 modem is technically compatible with all carriers, the laptop is currently exclusive to Verizon's network."[35]

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[28] https://www.pcmag.com/reviews/lenovo-flex-5g (last visited Dec. 13, 2020).
[29] https://i.dell.com/sites/csdocuments/Product_Docs/en/latitude-9510-5g-infographic.pdf (last visited Dec. 13, 2020).
[30] https://www.pcworld.com/article/3584529/should-you-buy-a-5g-laptop-right-now.html (last visited Dec. 13, 2020).
[31] See https://appleinsider.com/articles/19/08/02/apple-predicted-to-launch-a-5g-macbook-pro-in-2020 (last visited Dec. 13, 2020).
[32] https://www.pcworld.com/article/3514552/windows-pcs-push-back-against-chromebooks-in-schools-with-lte-gemini-lake-refresh-chips.html (last visited Dec. 13, 2020).
[33] https://www.samsung.com/us/business/products/computing/chrome-devices/chromebook-plus/chromebook-plus-12-2-4g-lte-intel-celeron-xe525qbb-k01us/ (last visited Dec. 13, 2020).
[34] https://www.verizon.com/support/device-locking-faqs/?adobe_mc=MCMID%3D14307194005061265670008304208851792416%7CMCORGID%3D843F02BE53271A1A0A490D4C%2540AdobeOrg%7CTS%3D1607988784&mboxSession=25150e6b37f04d5980aac6cd86490156 (last visited Dec. 13, 2020).
[35] https://www.pcmag.com/reviews/lenovo-flex-5g (last visited Dec. 13, 2020); *see also* https://www.tomshardware.com/reviews/lenovo-flex-5g (In the US, "Verizon's 5G network is used exclusively" for the Flex 5G) (last visited Dec. 13, 2020).

While the degree to which this rapidly emerging generation of 4G LTE and 5G laptops will continue to be locked to particular carriers is not completely clear, it is likely that many of the same business and economic considerations that led cell phones and tablets to be locked to one carrier will impact cellular-connected laptops as well. Moreover, concerns about future carrier-locking activity are justified in part by recent industry practices. In 2019, the U.S. Department of Justice Antitrust Division concluded an investigation of the GSM Association ("GSMA"), a trade association representing major mobile network operators worldwide.[36] Carriers are rapidly shifting to embedded SIMs ("eSIMs") in mobile devices, including laptops, rather than traditional removable SIM cards.[37] The new eSIMs, which are hard-wired into devices, permit consumers to switch mobile service remotely, over the internet, rather than physically obtaining and swapping a carrier's SIM card, making it easier to compare and switch wireless carriers. GSMA was working to develop a standard for Remote SIM Provisioning ("RSP"), the specification that would govern how eSIMs download and manage consumers' carrier choices. The DOJ investigation found that the GSMA used an "unbalanced standard-setting process" to develop RSP standards that included "self-dealing provisions designed to enhance or maintain the incumbent operators' competitive position by entrenching network locking practices and otherwise deterring potentially disruptive competition" and that were "designed to blunt the competitive impact of a new technology—eSIM—that should facilitate easier consumer switching among operators."[38] Although the Antitrust Division ultimately concluded, based on changes GSMA made in its standards process in light of the investigation, that it did not, at that point (November 2019), intend to bring an enforcement action, it cautioned GSMA that it would be monitoring the new process and that it would "take a close look" at any resulting specifications that affect user's ability to switch carriers.[39]

ISRI believes that there is currently sufficient evidence that the steadily increasing numbers of laptops with cellular connectivity will include a meaningful number that are locked to a particular carrier and that, without this proposed exemption, recyclers and consumers will be adversely impacted in making noninfringing uses.

VI. EXTENSION OF EXISTING UNLOCKING EXEMPTION TO COVER ALL WIRELESS DEVICES

[Alternative] Proposed Class: *Computer programs that enable lawfully acquired wireless devices to connect to a wireless telecommunications network, when circumvention is undertaken solely in order to connect to a wireless telecommunications network and such connection is authorized by the operator of such network*.

A. Overview of the Proposed Exemption

[36] See DOJ Antitrust Division Business Review Letter, Nov. 27, 2019, https://www.justice.gov/atr/page/file/1221321/download (last visited Dec. 13, 2020).
[37] *See* https://www.pcmag.com/reviews/lenovo-flex-5g (last visited Dec. 13, 2020).
[38] *Id*. at 4.
[39] *Id*. at 11-12.

The broader expansion ISRI seeks under Proposed Class 10 is to allow the unlocking of any wireless devices equipped with 4G LTE, 5G, or other cellular connection capabilities that connect to a wireless telecommunications network, without limitation to the current four categories. Such devices include but are not limited to Smart TVs, Internet of Things devices, extended reality ("XR") headsets, desktop computers, and drones. ISRI sought a similar expansion for all connected devices in its 2017 request. However, the Register concluded that, at that time, the ISRI's concerns about adverse impacts from locking of such devices were still too speculative.[40]

To the extent that the magnitude of this adverse impact is not yet certain, ISRI urges the Copyright Office to opt to provide protection now to ensure that, where locking does take place, recyclers and consumers will not be harmed. There is no harm to any devices that are not locked from granting the exemption for those that are.

B. Item E. Adverse Impact of Excluding Other Cellular Enabled Devices From the Unlocking Exemption

As the range of wireless devices available in the market and in use continues to grow beyond laptops and the categories of devices covered by the current exemption, so will the adverse effects stemming from owners' – whether they be consumers or recyclers -- inability to choose the mobile wireless communications provider for the device that they own and use or seek to recycle/resell. For commercial and industrial products in particular, the ability of recyclers to unlock those devices and resell them for use on any carrier will be critical to the efficient and economical reuse and redistribution of these devices. These impacts are beginning to be felt now, but there is no reason that they will be different in scope or character from the impact of being unable to choose the wireless carrier for wireless phones, tablets, mobile connectivity devices, or wearables that are locked to one carrier. In each case, the single characteristic of the device at issue is the choice of carrier to which it connects. Being denied that choice by the lack of a circumvention exemption harms resellers, consumers and businesses.

SmartTVs: Electronics manufacturers have begun to produce and sell so-called "Smart TVs," televisions that include internet connectivity.[41] The internet connectivity allows users to utilize a variety of apps, to stream video from a huge variety of internet sources, to control internet-enable household devices, and more.[42] As 5G networks spread and begin to become widespread in the next year and more,[43] manufacturers are beginning to add 5G capability to Smart TVs. 5G-enabled Smart TVs will allow all the features and performance of standard Smart TVs over 5G networks.[44] Samsung, Sharp, and Huawei have all announced that they are developing Smart TVs with 5G capability.[45]

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[40] *See* 2015 Register Recommendation at 155-162.
[41] *See* https://www.tomsguide.com/us/smart-tv-faq,review-2111.html (last visited Dec. 13, 2020).
[42] *Id*.
[43] *See, e.g.*, https://www.t-mobile.com/coverage/4g-lte-5g-networks?coverageMap=verizon (last visited Dec. 13, 2020).
[44] https://5g.co.uk/guides/5g-tv/ (last visited Dec. 13, 2020).
[45] https://www.digitaltrends.com/home-theater/samsung-first-8k-5g-tv/; https://www.digitalphablet.com/huawei-launch-honor-smart-tv-5g/ (last visited Dec. 13, 2020).

Drones: Cellular 4G LTE networks are currently used to control and receive information and video from drones.[46] Widespread 5G networks will also allow a new generation of 5G-enabled drones. Verizon reportedly has been working on drone connectivity since October, 2016, and acquired Skyward, a company focused on drone operational software and systems.[47] 5G promises to increase the ability of drones to transmit high-definition footage in real time, to use artificial intelligent to perform complex tasks in real time, and enable precise tracking and control of drone fleets while in operation.[48]

Extended reality (augmented reality and virtual reality): The availability of 5G networks will enable previously impossible detached, mobile extended reality applications.[49] Qualcomm and a number of global wireless carriers are backing an initiative to bring 5G-enabled VR and AR headsets to market in the near future.[50]

Internet of Things: As ISRI detailed in its 2017 exemption request, the Internet of Things (IoT)—a huge category of connected devices of all types, sizes and applications—is increasingly relying on devices that connect via wireless telecommunications networks in the same manner as mobile phones, tablets, and similar cellular-type devices.

All of these new types of cellular-connected devices will eventually find their way into the hands of recyclers. As ISRI described in 2017, all of these products and categories are excluded by the current, category specific unlocking exemption. Yet it remains as important for consumers, businesses, and other owners of these devices be able to choose the wireless carrier with which they connect their device as it is for the owners of wireless phones or tablets to be able to do so. Allowing user-owners, or recyclers or resellers of such devices, to unlock software locks for the purpose of connecting these various devices to another carrier's network is procompetitive and pro-consumer in the same way as is allowing unlocking of the devices enumerated in the current exemption. Although there are still few concrete examples, some of these devices will be sold locked to specific carrier's networks. And as the range of these wireless devices available in the market and in use continues to grow, so will the adverse effects stemming from owners'—whether they be consumers or recyclers—inability to choose the mobile wireless communications provider for the device that they own and use or seek to recycle/resell.

Without an expansion of the current exemption to cover these devices, recycler owners are substantially adversely affected in their ability to make the noninfringing uses of the devices and the software they contain that they are able to make of similar devices covered by the current exemption. They are unable to engage in noninfringing unlocking for the benefit of consumers

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[46] *See* https://www.ericsson.com/en/news/2019/10/defibrilators-delivered-via-lte-enabled-drones-in-canada (last visited Dec. 13, 2020).
[47] https://www.businessinsider.com/verizon-highlights-5g-drone-opportunity-2019-12 (last visited Dec. 13, 2020).
[48] *Id*.
[49] https://www.counterpointresearch.com/future-xtended-reality-arvrmr/; https://www.ericsson.com/en/blog/2020/4/how-5g-and-edge-computing-can-enhance-virtual-reality (last visited Dec. 13, 2020).
[50] https://www.mobileworldlive.com/devices/news-devices/global-operators-push-5g-extended-reality (last visited Dec. 13, 2020).

who are buying or selling used devices; consumers are denied the ability to acquire devices from resellers and use them on the network of their choice; and competition between new and formerly owned devices and between networks is reduced. These adverse impacts are the same as or very similar to those recognized as legitimate in the existing exemption for other wireless devices.

VII. CONCLUSION

Petitioner's members and other recyclers provide important public and economic benefits by efficiently buying, refurbishing, reselling, and recycling devices that they lawfully acquired individually from consumers and in bulk from organizations. Granting the unlocking exemption proposed here is essential and is warranted by current laptop and other device market conditions. The exemption will promote competition in the laptop and cellular-enabled device and carrier marketplaces, increase the choices available to consumers, and enable recyclers to again efficiently and economically enable those choices, all without negatively impacting legitimate copyright interests.

VIII. DOCUMENTARY EVIDENCE

None