

Before the  
Federal Communications Commission  
Washington, DC 20554

State of Competition in  
the Communications Marketplace

GN Docket No. 22-203

**COMMENTS OF PUBLIC KNOWLEDGE, OPEN TECHNOLOGY INSTITUTE, AND  
CONSUMER REPORTS**

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The Commission tracks the controversial practice of phone locking less thoroughly than it once did, even as the practice comes under increasing scrutiny around the world, and as market and technological changes affect the wireless competitive landscape. Commenters therefore request that the FCC report on this issue in more detail in its Communications Marketplace Report. In addition, commenters urge the Commission to continue the sort of balanced spectrum policy it has pioneered in recent years, promoting competition by expanding spectrum access for a diverse range of users on an unlicensed, licensed and license by rule basis.

### **I. Phone Locking Costs Consumers Money and Is a Barrier to Competition**

A locked phone is one that is restricted to just one carrier, not because of technical incompatibility, but from a software lock.<sup>1</sup>

The practice of locking phones, like early termination fees, was once justified on the basis of device subsidies.<sup>2</sup> The justification for locking was to prevent a user from signing up for service, getting a phone up front, and then canceling, keeping the phone, and causing the carrier to lose money on that customer. While this scenario may never have been particularly prevalent, it proved useful to incumbents to slow down churn to other carriers, and to incentivize users to buy new phones instead of reusing older ones.

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<sup>1</sup> This is distinct from, for example, Apple’s Activation Lock, which prevents iPhones associated with an Apple account from being used with another account until the previous user has authorized it—which many users forget to do, causing difficulties in secondary markets. See Joseph Cox, *The Underground Company That Hacks iPhones for Ordinary Consumers*, MOTHERBOARD (March 31, 2022), <https://www.vice.com/en/article/jgmygb/checkm8-info-remove-icloud-activation-lock>. It is also distinct from “jailbreaking,” which allows phone users to bypass the technical locks on their phones that limit what software they can run.

<sup>2</sup> Of course, device subsidies were not really subsidies: Wireless carriers are not in the business of losing money on customers, and “subsidies” merely hide the cost of the device in the monthly service cost. The only subsidy was paid by users with lower-cost phones, who paid the same monthly bill as users with higher-end models.

Even carriers eventually realized that this was a flawed system that reduced consumer choice and began moving away from the subsidy model.<sup>3</sup> Nevertheless the practice of locking users into contracts and using software locks to artificially prevent a phone from working with a competing service provider with which it is otherwise compatible continues in the US marketplace, even as countries like Canada and the United Kingdom ban the practice entirely.<sup>4</sup>

***A. The Market and Technology Have Changed Since the FCC Last Thoroughly Examined This Issue***

As discussed below, the Commission reports on this issue less comprehensively than it once did. But changes to the marketplace in recent years have increased the need for data about practices such as phone locking that may inhibit competition. Additionally, enough time has passed since the wireless industry committed to unlock phones under certain circumstances that the effects of these policies should be apparent.<sup>5</sup>

**1. The Wireless Market is Less Competitive Today**

The US currently has three major national wireless carriers: AT&T, Verizon, and T-Mobile. Phone locking, if it is occurring, would be yet another indication (along with lockstep price increases) that this oligopolistic market needs more competitors. But in addition to reducing churn between major carriers, phone locking also hampers the emergence of new smaller competitors of all kinds, such as cable companies and MVNOS. This is one reason why some other countries have found it best to simply prohibit the practice. As the UK regulator

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<sup>3</sup> Phil Goldstein, *AT&T's Stephenson: Device subsidy model is 'fundamentally changing'*, Fierce Wireless (March 6, 2014), <https://www.fiercewireless.com/wireless/at-t-s-stephenson-device-subsidy-model-fundamentally-changing>.

<sup>4</sup> See Sim lock laws by country, Chimera, <https://chimeratool.com/ar/docs/sim-lock-laws-by-country>; Ofcom, Mobile companies now banned from selling locked handsets (December 17, 2021), <https://www.ofcom.org.uk/news-centre/2021/mobile-companies-now-banned-from-selling-locked-handsets..>

<sup>5</sup> CTIA Letter on Carrier Unlocking Voluntary Agreement, FCC Statements, <https://www.fcc.gov/document/ctia-letter-carrier-unlocking-voluntary-agreement-fcc-statements>.

Ofcom found, “more than a third of people who decided against switching said having to get a handset unlocked put them off changing provider.”<sup>6</sup>

Most used phones in the secondary market will have been initially used on one of the three major carriers, since they represent nearly the entire wireless marketplace, with close to 99 percent market share split between them.<sup>7</sup> Smaller carriers may not have contracts with large handset manufacturers like Apple and Samsung, or the ability to operate financing plans, meaning that their users may be faced with buying phones completely upfront, choosing a phone that might not be their first preference, or simply switching to one of the major carriers. As the Commission has noted, “Smaller service providers have asserted that exclusive agreements between handset manufacturers and the larger service providers put them at a competitive disadvantage because they are sometimes unable to obtain the newest handsets.”<sup>8</sup>

Phone locking also disproportionately harms low-income individuals who may be the most motivated to shoulder the inconvenience of switching plans to save money. Families with multiple phones that become unlocked at different times must also add this to the list of obstacles to compare mobile carrier prices and switch plans. The widespread availability of handsets in the secondary market creates affordable options that may be especially appealing to the customers of new or low-cost entrants. In a time of increased inflation, shipping delays, and supply constraints such as chip shortages, the wide availability of handsets that are accessible, affordable, and do not need to be shipped halfway across the world is of obvious benefit. With more unlocked

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<sup>6</sup> Ofcom, Mobile companies now banned from selling locked handsets (December 17, 2021), <https://www.ofcom.org.uk/news-centre/2021/mobile-companies-now-banned-from-selling-locked-handsets>.

<sup>7</sup> Wireless subscriptions market share by carrier in the U.S, from 1st quarter 2011 to 1st quarter 2022, <https://www.statista.com/statistics/199359/market-share-of-wireless-carriers-in-the-us-by-subscriptions/>

<sup>8</sup> 20th Mobile Report para 64.

phones in the market, consumers will not just save money on handsets, but from increased competition between carriers.

## 2. Technological Changes Such as the Increased Adoption of eSIMs Can Either Enhance or Inhibit Competition

The wireless industry has long used physical SIM cards to store subscriber information and allow a phone to connect to a particular network. When users get a new phone, in theory, they can simply place the SIM card from their old phones into their new ones to get them connected. Or, when traveling internationally, users can temporarily swap out their US SIM cards for a foreign one to avoid roaming charges.

While simple in practice, physical SIM cards have drawbacks. SIM cards come in different sizes, and the card from one phone may not work in another without an adapter, or at all. SIM cards are small, and can be hard to remove and install, and are easy to lose or damage. The problems are magnified with each phone: companies managing large fleets of corporate phones, for instance, may find physical SIM cards difficult to work with.

Embedded SIMs, or eSIMs, are intended to solve these problems. With eSIMs, for instance, a company could more easily move its phones from one carrier to another. Customers do not need to keep track of or wait for physical SIM cards, and they are not as easy to misplace. eSIMs are built into the phones themselves, and can be reprogrammed with new carrier information remotely.

One drawback of eSIMs is that they are not yet as widely supported as physical SIM cards. And, while eSIMs may be more convenient for some use cases, for others, physical SIMs may be more convenient. But the specific details of how eSIMs are implemented can have major effects on competition. Technologies developed by major carriers, for major carriers, tend to serve the interests of major carriers – often at the expense of the public interest. In 2019,

following a business review request letter from GSMA Association,<sup>9</sup> the Department of Justice (DOJ) expressed “concerns” to GSMA that its eSIM standards-setting process “could be considered an agreement among competitors to limit options available in the market in such a way as to benefit the incumbent operator.”<sup>10</sup> It elaborated that the DOJ:

has significant concerns that GSMA and its operator members used an unbalanced standard-setting process, with procedures that stacked the deck in their favor, to promulgate an RSP Specification with self-dealing provisions designed to enhance or maintain the incumbent operators’ competitive position by entrenching network locking practices and otherwise deterring potentially disruptive competition. The resulting rule is especially concerning because it appears designed to blunt the competitive impact of a new technology—eSIM—that should facilitate easier consumer switching among operators.

This example serves to show how the competitive potential of a technology cannot be assessed in a vacuum. Many technologies have the potential to enhance competition, but not all live up to that promise. The details matter, because however promising a technology is, licensing issues, restrictions, the standards-setting process, and other things, can mean that it enhances the market power of incumbents. Determining exactly how this can happen can be complex, time-consuming, and requires expertise across a wide variety of domains. The DOJ, for instance, investigated allegations of collusion in GSMA for nearly two years.

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<sup>9</sup> Letter from GSMA to DOJ, July 25, 2019, <https://www.justice.gov/atr/page/file/1221331/download>.

<sup>10</sup> Letter from DOJ to GSMA, November 27, 2019, <https://www.justice.gov/atr/page/file/1221321/download>.

### 3. Phone Locking Creates More e-Waste Than Ever Before

Globally, nearly 1.5 billion smartphones are sold each year.<sup>11</sup> These complex devices contain dangerous batteries and dozens of different kinds of materials.<sup>12</sup> They are challenging to recycle, and many phones simply end up in landfills. While there are many ways the mobile phone and wireless industries can change their practices to avoid wasting finite natural resources, policies that enabled more phones to stay in service longer would reduce e-waste.

This problem is more acute now than before, and not just because smartphone sales continue to increase. As smartphones become more complex, they become more expensive, and people keep them in service longer. In the past, older phones may have seemed too slow, incompatible with the latest software, or incompatible with the latest network upgrades. Today, smartphones are used for longer, and if they are unlocked, can be used for longer still. The prevalence of phone locking means that many perfectly usable phones are instead being recycled (which is an energy-intensive process; reuse and refurbishment are much greener) or, even worse, sitting in landfills.

***B. The Commission Should Analyze Whether Current Phone Unlocking Practices Serve the Public Interest and Add More Detail on This Issue to Its Communications Marketplace Report***

Section 401 of the RAY BAUM'S Act of 2018 directed the FCC to consolidate some of its competition reports into a single biennial Communications Marketplace Report.<sup>13</sup> Prior to this

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<sup>11</sup> Press Release, Gartner Says Global Smartphone Sales Grew 6% in 2021 (March 2, 2022), <https://www.gartner.com/en/newsroom/press-releases/2022-03-01-4q21-smartphone-market-share>

<sup>12</sup> American Chemical Society, Smartphones: Smart Chemistry, <https://www.acs.org/content/acs/en/education/resources/highschool/chemmatters/past-issues/archive-2014-2015/smartphones.html>.

<sup>13</sup> Ray Baum's Act of 2018, Pub. L. No. 115-141, 132 Stat. 348 (2018).



the Commission issued annual Mobile Wireless Competition Reports.<sup>14</sup> However, the Communications Marketplace Report tracks handset-related aspects of competition much less thoroughly than the Mobile Competition Reports did. For example, the 16th and 17th Annual Competition reports analyzed the issue of phone unlocking,<sup>15</sup> and even the 20th Annual Competition report, though it dropped discussion of phone unlocking, provided more discussion of handsets. RAY BAUM's Act does not require that the FCC stop collecting and reporting this information. As noted above, the decline in the number of national carriers from four to three, the emergence of nascent competition from a variety of fledgling cable and other MVNO mobile carriers, and the substantial increase in the cost, capability and useful life of mobile handsets all suggest that phone locking is far *more* relevant to marketplace competition today than years ago.

The Commission should track in more detail the effect handsets have on the communications marketplace, beginning with the 2022 report. Among other things, it should determine:

- Whether eSIM has enhanced or degraded wireless competition, particularly whether it is an obstacle to users who would otherwise switch to smaller carriers;
- Whether the practice of phone locking drives users to buy new phones rather than bringing their old phones to new networks, or buying used phones on secondary markets, thus costing consumers money and creating excessive e-waste;
- How many locked versus unlocked, and new versus used, phones are in use on all US wireless networks;

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<sup>14</sup> FCC, Mobile Wireless Competition Reports, <https://www.fcc.gov/reports-research/reports/mobile-wireless-competition-reports>

<sup>15</sup> 16th Mobile Competition Report at par 350 *et seq.*; 17th Mobile Competition Report at par 123 *et seq.*

- Whether major carriers continue to have better access to premium, high-demand smartphones, and the effects this may have on competition;
- Whether the wireless industry’s 2013 phone unlocking commitments<sup>16</sup> have been sufficient to mitigate the consumer harms caused by phone locking to begin with.

Identifying structural barriers to competition is the first step to eliminating them. Reporting on these and other things will not just better illuminate the state of the communications marketplace but could be useful in other policy areas. For example, this data could inform environmental, e-waste, and right-to-repair policies.

## **II. A Balanced Spectrum Policy with Expanded Access to Unlicensed and Shared Bands is Necessary to Promote Competition in the Wireless Market**

As the world goes wireless, the demand for wireless connectivity and spectrum continues to increase rapidly. It is vitally important that the Commission continue the sort of balanced spectrum policy it has pioneered in recent years by making large new contiguous blocks of spectrum available for the widest possible range of users on an unlicensed, licensed and license by rule basis. Trends in consumer use, in emerging competition in mobile by Wi-Fi-first MVNO entrants, in growing competition among fixed wireless service providers, and in direct spectrum access for very local and purpose-built broadband and IoT networks by a growing variety of enterprises, critical infrastructure, schools, libraries and other local public institutions, all reinforce the reality that the world’s most robust, competitive and valuable 5G wireless ecosystem will be built on abundant and diverse spectrum access.

Wi-Fi is the workhorse of the internet and the fuel for competition in adjacent markets for consumer devices, applications and online services. Both enterprise and low-cost, off-the-shelf

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<sup>16</sup> CTIA, Consumer Code for Wireless Service, <https://www.ctia.org/the-wireless-industry/industry-commitments/consumer-code-for-wireless-service>.

routers and devices easily and affordably leverage shared, unlicensed spectrum to enable high-capacity connectivity in homes, at work, at school, in libraries, restaurants, retailers, and virtually every public place. The vast majority of data consumed on smartphones and other mobile devices flows over Wi-Fi networks, never touching mobile carrier spectrum or infrastructure.<sup>17</sup> Accordingly, the share of data traffic offloaded via Wi-Fi is expected to increase sharply as mobile technology upgrades from 4G to 5G, since high-bandwidth applications are used primarily at home, at work and at other indoor locations.<sup>18</sup> As the new Wi-Fi 6E standard evolves into the even more advanced capabilities of Wi-Fi 7, far more contiguous unlicensed spectrum will be needed to distribute a gigabit or more of bandwidth to all the users and devices in our nation's homes, offices, schools and other venues.<sup>19</sup>

In this respect, PK, OTI, and CR strongly agree with NCTA that it is essential for competition and to “unleash additional consumer benefits” that the Commission rapidly complete its 6 GHz Further Notice proceeding and allow increased Wi-Fi power levels for low-power indoor (“LPI”) Wi-Fi.<sup>20</sup> The authorization of Very Low Power (VLP) devices and higher power for indoor-only use are crucial not only for consumers, but also for U.S. leadership in next generation Wi-Fi and the innovative applications it will support. Europe and many other

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<sup>17</sup> See Cisco, “*Cisco Annual Internet Report (2018-2023)*,” White Paper (Mar. 9, 2020) available <https://www.cisco.com/c/en/us/solutions/collateral/executive-perspectives/annual-internet-report/white-paper-c11-741490.html>.

<sup>18</sup> *Ibid.* Another study by Analysis Mason projected that the worldwide share of IP access network traffic carried over Wi-Fi will grow from 53% in 2019 to 66% in 2025. Rupert Wood, *Wireless Traffic Forecasts: 5G Will Make Little Difference to Long-term Trends*, Analysys Mason (Aug. 2020), available at [https://www.analysismason.com/contentassets/47aecb5ae5f04394861be61d278f4c8a/analysys\\_mason\\_wireless\\_traffic\\_comment\\_aug2020\\_rdnt0.pdf](https://www.analysismason.com/contentassets/47aecb5ae5f04394861be61d278f4c8a/analysys_mason_wireless_traffic_comment_aug2020_rdnt0.pdf).

<sup>19</sup> See, e.g., Joint Comments of Broadcom, Inc. and Facebook Inc., ET Docket 19-138, at 4 (filed June 2, 2021); Notice of Inquiry Comments of Intel Corporation, Docket No. 21-353, at 3 (filed Nov. 1, 2021).

<sup>20</sup> Comments of NCTA, GN Docket No. 22-203, at 16.

advanced nations have now followed the FCC’s lead on 6 GHz, including by authorizing both LPI and VLP at workable power levels, but unless the Commission follows suit the U.S. will fall behind.<sup>21</sup> The pending 12 GHz proceeding represents another important opportunity for the Commission to consider the extent to which a low-power, indoor-only underlay for unlicensed use (similar if not the same rules as govern LPI in 6 GHz) can be accommodated regardless of the degree of coexistence possible between incumbent satellite and future two-way terrestrial broadband providers.<sup>22</sup>

Opening more unused spectrum capacity for unlicensed use and coordinated sharing is particularly important for bridging the digital divide and promoting competition in rural, Tribal and other underserved communities. We agree with the Wireless Internet Service Providers Association (WISPA) that a combination of outdoor access to additional unlicensed and shared spectrum (e.g., in the 5.9 GHz band and in vacant portions of the 4.9 GHz band currently used by public safety in a handful of cities) are important opportunities to enable WISPs and other local ISPs to deploy high-speed fixed networks as well as 5G-ready networks that can compete on quality and price with the offerings of larger providers.<sup>23</sup>

In recent years the FCC has made historic progress by adopting innovative approaches to unlock underutilized spectrum for shared use that have put the U.S. on a path to the world’s most robust 5G wireless ecosystem. In addition to the 5.9 and 6 GHz proceedings, a leading example is the Citizens Broadband Radio Service (CBRS), which after just two years of operation has

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<sup>21</sup> See Wi-Fi Alliance, Ex Parte Letter and Presentation, Unlicensed Use of the 6 GHz Band, ET Docket No. 18-295 (July 25, 2022) (showing a comparison of LPI and VLP power levels adopted in various nations).

<sup>22</sup> See Comments of the Public Interest Organizations, *Expanding Flexible Use of the 12.2-12.7 GHz Band*, WT Docket 20-443 (May 7, 2021), at 14-27.

<sup>23</sup> Comments of WISPA, GN Docket No. 22-203, at 21-23.

proven to be a boon to direct spectrum access for a wide variety of local and national users while also completely protecting the U.S. Navy from harmful interference. As NCTA noted, cable operators use this spectrum to compete with incumbent mobile service providers “and to extend and complement existing fixed services through additional coverage and capacity” in the increasingly competitive fixed wireless market.<sup>24</sup> In addition, a wide range of companies in a diverse range of other industries acquired PALs – and/or leveraged the General Authorized Access portion of the band – including the use of vacant PAL spectrum on a “use it or share it” basis – to deploy private LTE and customized IoT networks.<sup>25</sup>

In addition to the many enterprises that acquired local spectrum access in the auction for CBRS Priority Access Licenses in 2020, in response to the pandemic remote learning crisis and ongoing “homework gap,” an increasing number of school districts are partnering with WISPs or network integrators to deploy networks that rely on the GAA portion of CBRS to connect students without adequate broadband at home directly to the school’s network.<sup>26</sup> The school districts in Fresno (California), Fort Worth (Texas) and Boulder (Colorado) are all far along in leveraging CBRS spectrum to extend connectivity to the majority of their low-income student households in need.

Most importantly for competition, as well as innovation, the CBRS framework can be tailored to additional occupied but underutilized bands to unlock low-cost capacity. While there are many underutilized bands that could best serve the public interest if the Commission adopted a version of the CBRS sharing framework to expand local access (e.g., 4.9 GHz, 7 GHz), we

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<sup>24</sup> Comments of NCTA at 17.

<sup>25</sup> See, e.g., OnGo Alliance, <https://ongoalliance.org/>; Wireless Innovation Forum, <https://cbrs.wirelessinnovation.org/>.

<sup>26</sup> See Michael Calabrese and Amir Nasr, *The Online Learning Equity Gap*, Report, Open Technology Institute (Nov. 2020), at 31-38.

believe that the most immediate and important opportunity to promote competition through dynamic spectrum sharing is in the lower 3 GHz band (3.1–3.45 GHz). According to NTIA spectrum use studies, the sub-bands below 3450 MHz are more congested and less amenable to clearing.<sup>27</sup> This view is reflected in the recommendations of a 2019 report by DoD’s Defense Innovation Board, which concluded that in a reasonable time frame, dynamic sharing would be far more feasible and acceptable from the military’s perspective.<sup>28</sup> As PK and OTI have previously advocated, extending the three-tier CBRS framework to the lower 3 GHz band would best promote innovation and competition by making that spectrum available locally to thousands of individual enterprises and other operators.<sup>29</sup>

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<sup>27</sup> U.S. Dept. of Commerce, *Feasibility of Commercial Wireless Services Sharing with Federal Operations in the 3100-3550 MHz Band*, at 11 (July 2020) (“the lower portion of the band is more congested and includes additional systems that have not been analyzed”), available at source.

<sup>28</sup> Defense Innovation Board, *The 5G Ecosystem: Risks and Opportunities for DoD*, Recommendation #1, at 28 (April 2019), available at source (“DoD stands to significantly benefit if it shares some of its sub-6 GHz spectrum.”). *See also* Milo Medin and Gilman Louie, “Clearing the Air on 5G,” *Texas National Security Review* (March 13, 2020), available at source.

<sup>29</sup> *See* Comments of OTI and PK, *Facilitating Shared Use in the 3100-3550 MHz Band*, WT Docket No. 19-348 (Nov. 20, 2020); Reply Comments of OTI, *Facilitating Shared Use in the 3.1-3.55 GHz Band*, WT Docket No. 19-348 (March 23, 2020).

## Conclusion

Phone locking harms competition, frustrates users, and creates e-waste. The Commission should resume its practice of reporting on this issue more thoroughly to better inform its policies. The Commission should also continue the sort of balanced spectrum policy it has pioneered in recent years, which promotes competition by making large new contiguous blocks of spectrum available for a diverse range of users on an unlicensed, licensed and license by rule basis.

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