

In Defense of 5G: National Security and Patent Rights Under the Public Interest Factors

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Section 337 of the Tariff Act of 1930 authorizes the International Trade Commission (ITC) to stop—or “exclude”—patent-infringing imports. Exclusion orders protect the country against unfair trade practices and help enforce U.S. patent rights. But before issuing an order, the ITC is required by Section 337 to consider the order’s harm to the public health and welfare, its effect on competitive conditions, the availability of substitutes, and the harm to consumers. Because it rarely finds that these “public interest factors” outweigh the benefits of patent enforcement, the ITC has mostly granted exclusion orders despite growing concerns related to the public’s reliance on imported mobile technology.

5G—the next generation of mobile technology—promises to connect our homes, cars, and hospitals to digital networks across the country. With great promise comes great risk. The growing threat of hacking from foreign adversaries like China and Russia, coupled with the concentrated nature of 5G innovation, raises urgent cybersecurity concerns. From 2017 to 2019, two ITC administrative law judges in Apple-Qualcomm investigations disagreed over whether 5G concerns justified the denial of an exclusion order. This Comment argues that the ITC may lawfully interpret Section 337 to consider 5G—national security risks under the public interest factors and proposes a cybersecurity framework to assess the policy weight of these risks. These analyses will guide businesses and ITC officials through the next generation of patent disputes.

INTRODUCTION.....	1972
I. BACKGROUND: ITC PATENT ENFORCEMENT AND 5G—NATIONAL SECURITY RISKS.....	1975
A. The ITC and the Public Interest Factors	1975
B. 3G and 4G Investigations	1978
C. 5G and National Security	1980
II. THE ITC’S NATIONAL SECURITY AUTHORITY	1983
A. The Statutory Interpretation Case for National Security.....	1984
1. The ordinary meaning.....	1985
2. The whole provision	1986
3. The whole act.....	1986

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4. The whole code.....	1988
5. The statutory scheme.....	1990
B. Anticipating a <i>Chevron</i> Court Challenge	1994
III. THE 5G PUBLIC WELFARE FACTOR: A CYBERSECURITY FRAMEWORK	1997
A. Justifying the Cybersecurity Framework	1999
B. The Three Cybersecurity Risks	2001
1. Critical infrastructure.....	2001
2. Nationwide testing	2003
3. Monocultures	2006
CONCLUSION	2010

INTRODUCTION

From 2017 to 2019, two U.S. technology giants, Apple and Qualcomm, engaged in a war of patent suits across the world.¹ One battle took place at the International Trade Commission (ITC), a federal agency that prevents patent-infringing products from entering the United States.² Qualcomm alleged that Apple iPhones infringed Qualcomm’s mobile chipset patents, which allow devices to connect to wireless networks.³ Administrative Law Judge (ALJ) Thomas Pender found that the iPhones infringed Qualcomm’s patent. Nonetheless, he would have allowed Apple to import them because excluding them would diminish innovation in 5G (fifth generation) technology and thereby harm national security.⁴

5G is often described as the next frontier of communications technology.⁵ It promises stronger and faster wireless networks that will enable remote surgeries, autonomous vehicles, and electric grids—all from the convenience of a device. But its promises pose new and dangerous national security risks. For instance, China has emerged as a serious competitor to the United States in the “race” to 5G dominance,⁶ prompting comparisons to the

¹ See Klint Finley, *Apple and Qualcomm End Their Legal Beef and Drop Lawsuits*, WIRED (Apr. 16, 2019), <https://perma.cc/3RJS-8XVV>.

² 19 U.S.C. § 1337(a)(1)(B), (d)(1).

³ See Certain Mobile Elec. Devices & Radio Frequency & Processing Components Thereof (*Electronic Devices*), Inv. No. 337-TA-1065, USITC Pub. 4981, at 1 (Sept. 28, 2018) (Public Initial Determination).

⁴ See *id.* at 195, 197, 199.

⁵ See *City of Portland v. United States*, 969 F.3d 1020, 1033 (9th Cir. 2020).

⁶ See Charles Duan, *Of Monopolies and Monocultures: The Intersection of Patents and National Security*, 36 SANTA CLARA HIGH TECH. L.J. 369, 374–77 (2020) (summarizing the 5G “race” between the United States and China).

nuclear arms race with the former Soviet Union.⁷ The bottom-line risk is simple: China's control or infiltration of 5G networks could expose 5G-connected devices to the will of the Chinese Communist Party.⁸

The United States' quest to develop 5G technology requires rigorous market competition and, under traditional intellectual-property theories, patent enforcement. Patents are typically critical because they incentivize companies to compete and invest in research and development (R&D). Patent holders may seek to enforce their U.S. patent rights at the ITC under Section 337 of the Tariff Act of 1930⁹ (1930 Act), which authorizes the ITC to "exclude[]" or stop patent-infringing products from entering the country.¹⁰ But before issuing an exclusion order, the ITC is required by the statute to consider the order's effect on (1) "the public health and welfare," (2) "competitive conditions in the United States economy," (3) "the production of like or directly competitive articles in the United States," and (4) "United States consumers."¹¹ If these four public interest factors, taken together, outweigh the social utility of enforcing patent rights, the ITC may deny the patent owner the exclusion order.¹²

Despite this statutory mandate, the ITC has denied an exclusion order for public interest reasons only three times.¹³ Apple-Qualcomm presented the potential for a fourth denial but in a new context. For the first time in the agency's history, ALJ Pender recommended that the ITC commissioners deny an exclusion order because national security trumped patent rights. In a parallel Apple-Qualcomm investigation that involved a different patent but the same public interest arguments, ALJ MaryJoan McNamara reached the opposite conclusion. Before the ITC could decide which recommendation to adopt,¹⁴ however, the parties

⁷ See, e.g., *Dealbook Briefing: 5G Is the New Arms Race with China*, N.Y. TIMES DEALBOOK, <https://perma.cc/3PV6-PVGN>.

⁸ See *5G: The Impact on National Security, Intellectual Property, and Competition: Statement Before the S. Comm. on the Judiciary*, 116th Cong. 4 (2019) [hereinafter *Hearings*] (written testimony of James A. Lewis, Senior Vice President and Dir., Ctr. for Strategic and Int'l Stud.).

⁹ 19 U.S.C. §§ 1202–1683g.

¹⁰ 19 U.S.C. § 1337(d)(1).

¹¹ 19 U.S.C. § 1337(d)(1).

¹² 19 U.S.C. § 1337(d)(1).

¹³ Colleen V. Chien & Mark A. Lemley, *Patent Holdup, the ITC, and the Public Interest*, 98 CORNELL L. REV. 1, 21–23 (2012).

¹⁴ An ALJ's recommended remedy takes automatic legal effect after sixty days unless the ITC orders review, as it did in both investigations. 19 C.F.R. § 210.42(h)(2).

settled.¹⁵ Therefore, the question remains: When, if ever, may the ITC deny injunctive relief to a patent holder due to 5G–national security concerns? This Comment answers this question.

Like all questions of agency power, the inquiry starts with the authorizing statute. This Comment argues that the ITC may interpret the “public health and welfare” factor to cover national security considerations and that such interpretation would be lawful under *Chevron* review at the Federal Circuit. Section 337 authorizes the ITC to evaluate national security concerns under the public interest factors for five interpretative reasons. First, national security is consistent with the ordinary meaning of the “public health and welfare” factor. Second, the factor is not expressly limited to domestic considerations. Third, another provision in Section 337 implies the consideration of national security issues by instructing the ITC to consult with the Department of Justice (DOJ), which regularly prosecuted national security cases at the time of enactment. Fourth, the Title of the U.S. Code under which Section 337 is categorized implies that “public health and welfare” concerns include defense initiatives related to science and technology. Fifth, a broad understanding of public welfare comports with the policy nature of the public interest factors and Section 337’s protectionist mission.

But even if the ITC has the statutory authority to consider national security, why and when should national security concerns outweigh the benefit of patent enforcement? After all, enforcing 5G patents benefits society by incentivizing companies to develop strong and secure 5G products. Contrary to this conventional justification, exclusion orders can also slow or halt the importation of 5G devices, which are critical to securing the development of 5G networks against cyberattacks. In particular, an exclusion order may harm the development of secure 5G networks in the following three ways.

First, limiting the importation of 5G devices can jeopardize the cybersecurity of critical infrastructure that relies on such devices. Second, if too many devices are excluded due to patent infringement, there would be fewer devices that researchers and companies could use to test 5G. Third, limiting the importation of 5G devices could stifle competition and lead to monopolies that impair the innovation of more secure technology. The ITC should

¹⁵ *Qualcomm and Apple Agree to Drop All Litigation*, APPLE (Apr. 16, 2019), <https://perma.cc/HB8F-K9ML>.

determine whether any of these three cybersecurity risks are supported by the record and, if so, should deny an exclusion order on that basis.

This Comment proceeds as follows: Part I provides an overview of the ITC, the role of the public interest factors, and 5G–national security threats. Part II addresses the threshold question of whether Section 337 authorizes the ITC to consider national security concerns under the public interest factors. Applying principles of statutory interpretation and *Chevron*, it concludes that national security is a lawful interpretation of the “public health and welfare” factor. Part III then introduces a three-part cybersecurity framework to assess public welfare risks associated with critical infrastructure, nationwide testing, and monocultures that may justify denying an exclusion order. This framework is designed to help prepare the ITC and businesses for the next generation of Section 337 investigations.

I. BACKGROUND: ITC PATENT ENFORCEMENT AND 5G–NATIONAL SECURITY RISKS

This Part outlines the background knowledge necessary to understand the 5G–national security issue. Section A introduces the history of the ITC and the public interest factors. The relevant statute requires the agency to consider an exclusion order’s impact on the factors, but the ITC has rarely done so. Section B then explains how an increase in ITC 3G and 4G investigations has made the public interest factors more relevant. Section C describes 5G technology and why it compels the ITC to consider national security like never before.

A. The ITC and the Public Interest Factors

The ITC is an independent, quasi-judicial agency with broad powers to investigate trade-related issues.¹⁶ Its predecessor, the U.S. Tariff Commission, was created in 1916 as an advisory body to help Congress set tariff rates.¹⁷ Since then, it has gradually focused on administering trade remedy laws, which allow governments to restrict imports that cause injury to a domestic industry. Section 337 of the 1930 Act authorized the ITC to investigate unfair trade practices—but only the president could issue a

¹⁶ *About the USITC*, U.S. INT’L TRADE COMM’N, <https://perma.cc/9CPC-EKBP>.

¹⁷ Revenue Act, ch. 463, § 700, 39 Stat. 795 (1916).

remedy.¹⁸ One such practice was the importation of products that infringe valid U.S. patents rights.¹⁹ For the next half-century, Section 337 was not frequently used, in part because the United States dominated the global economy.²⁰

As part of a comprehensive trade reform effort, Congress passed the Trade Act of 1974²¹ (1974 Act), which amended Section 337 in two ways. First, it transferred the authority to issue a remedy from the president to the ITC. Second, it transformed the agency into a “mini-federal court”²² subject to the extensive formal adjudication requirements of the Administrative Procedure Act²³ (APA). Patent holders could now request a hearing before an impartial ALJ²⁴ whose decision was subject to review by the ITC²⁵ and therefore more isolated from the president’s political whims.²⁶ These two changes provided a reliable enforcement forum and facilitated a tremendous rise in patent-based Section 337 claims.²⁷ The Omnibus Trade and Competitiveness Act of 1988²⁸ (“1988 Act” or “1988 amendments”) further protected U.S. patent owners against foreign infringers by easing the requirements for filing a complaint.²⁹

But Section 337 does not automatically provide a remedy against every patent-infringing import. Unlike the relief that

¹⁸ Tariff Act, § 337, 46 Stat. at 703–04.

¹⁹ See, e.g., *Synthetic Phenolic Resin, Form C and Articles Made Wholly or in Part Thereof*, Inv. No. 316-4 (U.S. Tariff Comm’n May 25, 1927); *Frischer & Co., Inc., v. Bakelite Corp.*, 39 F.2d 247 (C.C.P.A. 1930).

²⁰ U.S. INT’L TRADE COMM’N, *A CENTENNIAL HISTORY OF THE UNITED STATES INTERNATIONAL TRADE COMMISSION* 320 (Paul R. Bardos ed., 2017).

²¹ 19 U.S.C. §§ 1202–1683g.

²² Donald R. Dinan, *Federal Unfair Competition Actions: Practice and Procedure Under Section 337 of the Tariff Act of 1930*, 25 INT’L L. 777, 778 (1991) (reviewing DONALD KNOX DUVAL, *FEDERAL UNFAIR COMPETITION ACTIONS: PRACTICE AND PROCEDURE UNDER SECTION 337 OF THE TARIFF ACT OF 1930* (1990)).

²³ Pub. L. No. 79-404, 60 Stat. 237 (codified as amended in scattered sections of 5 U.S.C.); see also 19 U.S.C. § 1337(c) (“Each determination under subsection (d) . . . shall be made on the record after notice and opportunity for a hearing in conformity with the provisions of subchapter II of chapter 5 of title 5.”).

²⁴ 19 C.F.R. § 210.36(d).

²⁵ 19 U.S.C. § 1337(c).

²⁶ See S. REP. NO. 93-1298, at 11 (1974), *reprinted in* 1974 U.S.C.C.A.N. 7186, 7193 (stating that the 1974 Act was a reaction to the “Executive’s unwillingness to enforce U.S. trade statutes in response to foreign unfair trade practices” and his “trade concessions to accomplish political objectives”). Although the president appoints the six commissioners, the statute largely protects them from his or her partisan influence. 19 U.S.C. § 1330(a)–(b); U.S. INT’L TRADE COMM’N, *supra* note 20, at 17–27.

²⁷ See U.S. INT’L TRADE COMM’N, *supra* note 20, at 133, 355.

²⁸ Pub. L. No. 100-418, 102 Stat. 1211 (1988) (codified in scattered sections of 19 U.S.C.).

²⁹ See Omnibus Trade and Competitiveness Act § 1341, 102 Stat. at 1211.

district courts may offer under the Patent Act, the ITC remedy is not “intended for the [patent] owner *per se* [but rather] applied to protect the public interest.”³⁰ Because of this collectivist trade mission, every Section 337 investigation requires the ITC to consider how a remedy would affect the public interest:

If the Commission determines, as a result of an investigation under this section, that there is a violation of this section, it shall direct that the articles concerned, imported by any person violating the provision of this section, be excluded from entry into the United States, unless, after considering the effect of such exclusion upon the public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers, it finds that such articles should not be excluded from entry.³¹

In other words, the ITC has the discretion to allow patent-infringing products to enter the country if enforcing patent rights would harm the U.S. economy or welfare.³²

Despite this public interest mandate, the ITC has rarely invoked the public interest factors³³ and instead strongly prefers patent enforcement.³⁴ It has only denied an exclusion order for

³⁰ Ron D. Katznelson, *The Burden of Proof for Invoking the Public Interest Exception to ITC Exclusion Orders Under Section 337*, at 2 (Sept. 10, 2019) (unpublished manuscript), <https://perma.cc/S3C9-AVVL>.

³¹ 19 U.S.C. § 1337(d)(1).

³² The public interest factors may be considered by four different actors: the Office of Unfair Import Investigations (OUII), ALJs, ITC commissioners, and the president. First, the OUII, an independent arm within the ITC, is tasked with screening complaints and recommending to the ITC whether it should initiate an investigation. 19 C.F.R. § 207.102(a)(2). When initiating an investigation, the ITC can assign the OUII to represent the public interest as a third-party participant in the investigation—bringing arguments and producing evidence on the factors. Second, an ALJ must find facts related to public interest only if the commissioners assign such fact-finding to the ALJ. 19 C.F.R. § 210.10(b)(2). Pursuant to 2011 rules intending to prioritize public interest fact-finding, the ALJ oversees discovery produced by the litigants. *See* 19 C.F.R. § 210.8(b)–(c). Third, after the ALJ “recommend[s]” a determination, the ITC commissioners decide whether to adopt the recommendation. They have the primary authority to impose or deny a remedy. *See* 19 U.S.C. § 1337; 19 C.F.R. § 210.10(b)(2). Fourth, the president may reverse the ITC’s remedial decision for “policy reasons.” 19 U.S.C. § 1337(j)(2).

³³ *See* P. Andrew Riley & Scott A. Allen, *The Public Interest Inquiry for Permanent Injunctions or Exclusion Orders: Shedding the Myopic Lens*, 17 VAND. J. ENT. & TECH. L. 751, 765 (2015) (noting that the “vast majority” of ITC opinions merely state that the factors do not alter the decision to exclude infringing products).

³⁴ *See, e.g.*, Certain Baseband Processor Chips & Chipsets, Transmitter & Receiver (Radio) Chips, Power Control Chips, and Prods. Containing Same, Including Cellular Tel.

public interest reasons three times, all within ten years of the 1974 Act's passing.³⁵ These investigations occurred during an anomalous five-year period and were narrowly limited to "life or death situation[s] or [] national emergenc[ies],"³⁶ namely, shortages of hospital beds,³⁷ energy efficient cars,³⁸ and nuclear research.³⁹ Although denial of exclusion has been rare, the next Section explains that the public interest factors have gained more relevance because of technological advancements.

B. 3G and 4G Investigations

The twenty-first-century economy has transformed the ITC's docket, and the ITC has, in turn, gradually opened up to public interest concerns. In 2007, Apple released its first iPhone, which revolutionized the economy.⁴⁰ In the following decade, the ITC dramatically increased its wireless technology investigations,⁴¹ which involved new public-interest concerns.⁴² Exclusion orders

Handsets (*Baseband Processor*), Inv. No. 337-TA-543, USITC Pub. 4258, at 150 (June 19, 2007) (Final) (Comm'n Op.) ("[T]he Commission relies on the strong public interest in enforcing [intellectual property] rights."). Many scholars believe that this preference for exclusion orders effectively operates as a legal presumption. See Katznelson, *supra* note 30, at 3 n.15 (stating that exclusion orders are the "presumptive rule" that can be rebutted by the public interest factors); Sapna Kumar, *The Other Patent Agency: Congressional Regulation of the ITC*, 61 FLA. L. REV. 529, 567 (2009) ("If the ITC finds that an imported article infringes a patent, then the default presumption under § 337 is that it will award an exclusion order."); Paul R. Michel, Adam Mossoff, Kristen Osenga, Brian O'Shaughnessy & Randall R. Rader, Putting the Public Back in "Public Interest" in Patent Law 7 (Jan. 22, 2020) (unpublished manuscript), <https://perma.cc/7C8A-5KNN> (stating that the ITC "creat[es] a presumption in favor of exclusion").

³⁵ Chien & Lemley, *supra* note 13, at 21–23.

³⁶ Sapna Kumar, *Regulating Digital Trade*, 67 FLA. L. REV. 1909, 1956 (2016); see also *Spanson, Inc. v. ITC*, 629 F.3d 1331, 1360 (Fed. Cir. 2010).

³⁷ *Certain Fluidized Supporting Apparatus & Components Thereof*, Inv. No. 337-TA-182/188, USITC Pub. 1667, at 23 (Oct. 5, 1984) (Final) (Comm'n Mem. Op.).

³⁸ *Certain Automatic Crankpin Grinders*, Inv. No. 337-TA-60, USITC Pub. 1022, at 18–20 (Dec. 17, 1979) (Final) (Comm'n Determination & Order).

³⁹ *Certain Inclined-Field Acceleration Tubes & Components Thereof (Inclined-Field Tubes)*, Inv. No. 337-TA-67, USITC Pub. 1119, at 29 (Dec. 29, 1980) (Final) (Comm'n Action & Order).

⁴⁰ Klint Finley, *The WIRED Guide to 5G*, WIRED (Sept. 10, 2020), <https://perma.cc/UT5W-MP8T>.

⁴¹ See *Section 337 Statistics*, U.S. INT'L TRADE COMM'N, <https://perma.cc/WP9N-PMEW> (stating that computer and telecommunications products comprised 17% of ITC investigations in 2009, 27% in 2012, and 46% in 2017).

⁴² See Shara L. Aranoff, *Lessons from 5 Years of Public Interest Delegation at ITC*, LAW360 (Aug. 5, 2015), <https://www.law360.com/articles/684495/lessons-from-5-years-of-public-interest-delegation-at-its> (stating that the ITC delegated only a "handful" of investigations to ALJs for public interest fact-finding prior to 2010, but it delegated about 25% of new investigations in the five years after 2010).

against network devices may harm the public interest because these markets tend to have fewer products meeting demand.⁴³ The devices are expensive to produce and require thousands of patented components each.⁴⁴ Enforcing one component's patent can disrupt the supply chains for companies that previously relied on that component.⁴⁵ For example, Apple may rely on licensing Qualcomm's patented chipset to make a certain model of iPhones only to discover that Qualcomm raised its royalties to an unaffordable price.⁴⁶

Therefore, the ITC was concerned that excluding patent-infringing smartphone imports would undermine the development of important 3G and 4G cellular networks. To address these concerns, the ITC increasingly "tailored" exclusion orders rather than excluding products outright. For example, in 2011, it delayed the exclusion of patent-infringing Android smartphones by four months because T-Mobile relied on the phones to expand its 4G cellular network, a development that the president and the DOJ prioritized.⁴⁷

But in other smartphone investigations, the ITC shied away from public interest arguments. In the landmark 2013 Apple-Samsung investigation, Samsung alleged that Apple—the patent owner—extracted excessive licensing fees, thereby harming

⁴³ See generally Ying Fan & Chenyu Yang, *Competition, Product Proliferation, and Welfare: A Study of the US Smartphone Market*, 12 AM. ECON. J.: MICROECON. 99 (2020) (concluding that there are too few products in the U.S. smartphone market and that a reduction in competition resulting from a merger further decreases product variety). *But see* Martin Cave, *How Disruptive Is 5G?*, 42 TELECOMM. POL'Y 653 (2018) (analyzing the possibility that 5G will disrupt the "small numbers" structure of the mobile technology industry).

⁴⁴ See Joshua D. Furman, Comment, *Reports of Section 337's Death Have Been Greatly Exaggerated: The ITC's Importance in an Evolving Patent Enforcement Environment*, 30 BERKELEY TECH. L.J. 489, 506 (2015) (describing the iPhone's various cellular standards and the use of components from foreign companies); Certain Mobile Elec. Devices & Radio Frequency & Processing Components Thereof (II), Inv. No. 337-TA-1093, 2019 WL 2058009, at *19 (Mar. 26, 2019) (Initial Determination) (noting Apple's network of 1,200 suppliers).

⁴⁵ To promote shared use of technologies, companies agree to license each other's standard-essential patents according to common technical standards and on fair, reasonable, and nondiscriminatory (FRAND) terms. *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1208–09 (Fed. Cir. 2014). A patent holder commits "hold-up" when it leverages the threat of an exclusion order to extract excessive licensing fees that violate a FRAND commitment. *Id.* at 1209.

⁴⁶ See generally *FTC v. Qualcomm Inc.*, 411 F. Supp. 3d 658 (N.D. Cal. 2019), *rev'd*, 969 F.3d 974 (9th Cir. 2020).

⁴⁷ Certain Pers. Data & Mobile Commc'ns Devices & Related Software (*Personal Data*), Inv. No. 337-TA-710, USITC Pub. 4331, at 80–83 (2011) (Final) (Comm'n Op.).

competition and consumers.⁴⁸ Former commissioner Shara Aranoff rejected this public interest argument, asserting that the ITC “is not a policy-making body.”⁴⁹ In at least nine investigations since,⁵⁰ the ITC has repeatedly avoided public interest issues by finding that patents were not infringed⁵¹ or that other requirements were not met.⁵²

C. 5G and National Security

Wireless networks are transitioning from 4G to 5G, the next generation of communication technology capable of supporting faster, more sophisticated networks.⁵³ But 5G will bring unprecedented national security risks because it will connect more of our daily lives to networks that are increasingly hacked by adversaries.⁵⁴ Unlike 3G and 4G, 5G will enable applications in the Internet of Things (IoT)—such as self-driving cars, remote medical surgeries, and virtual energy grids—by dramatically enhancing storage capacity and the speed of data transmission.⁵⁵ More connections create more exposure. In addition to the hacking

⁴⁸ Certain Elec. Devices, Including Wireless Commc’n Devices, Portable Music & Data Processing Devices, & Tablet Computs., Inv. No. 337-TA-794, 2013 WL 12410037, at *70 (July 5, 2013) (Final) (Comm’n Op.).

⁴⁹ *Id.* at *70 n.23.

⁵⁰ See David W. Long, *Litigating Standard Essential Patents at the U.S. International Trade Commission*, 17 SEDONA CONF. J. 671, 696–755 (2016) (summarizing the investigations, which occurred from 2013 to 2016).

⁵¹ See, e.g., Certain 3G Mobile Handsets & Components Thereof, Inv. No. 337-TA-613 (Remand), 2015 WL 13817114, at *29 (Sept. 21, 2015) (Final) (Comm’n Determination) (“[B]ecause we find no violation of section 337 in this investigation, and therefore need not substantively consider the public interest, the Commission denies Respondents’ motion as moot.”).

⁵² See, e.g., Certain Memory Modules & Components Thereof, Inv. No. 337-TA-1089, 2020 WL 4500711, at *2–3, *15 (Apr. 21, 2020) (Final) (Comm’n Op.) (finding that the complainant failed to meet the domestic industry requirement, therefore mooting the public interest issue—even though the ITC received over ten public interest comments from third parties); see also Bill Watson, *Public Interest Procrastination by ITC in Qualcomm v. Apple*, ITC POLY PROJECT (Mar. 27, 2019), <https://perma.cc/26RU-JG23> (“[T]he current policy of the Commission seems to be to ignore a key part of its own statute.”).

⁵³ *New York v. Deutsche Telekom AG*, 439 F. Supp. 3d 179, 192 (S.D.N.Y. 2020).

⁵⁴ See CYBERSEC. & INFRASTRUCTURE SEC. AGENCY, OVERVIEW OF RISKS INTRODUCED BY 5G ADOPTION IN THE UNITED STATES 8–11 (2019); DEF. INNOVATION BD., THE 5G ECOSYSTEM: RISKS & OPPORTUNITIES FOR DoD 25–26 (2019).

⁵⁵ See CYBERSEC. & INFRASTRUCTURE SEC. AGENCY, EDGE VS. CORE - AN INCREASINGLY LESS PRONOUNCED DISTINCTION IN 5G NETWORKS 1–3 (2020); DEF. INNOVATION BD., *supra* note 54, at 7; *Deutsche Telekom AG*, 439 F. Supp. 3d at 192.

threat, 5G networks tend to rely on standardized patents⁵⁶ and may therefore be subject to the whim of one patent holder, whose decision to enforce the patent could crash the system.⁵⁷

The national security risks are both short-term and long-term. In the short term, foreign actors increasingly hack critical U.S. infrastructure and steal personal and business information.⁵⁸ In 2020 and 2021 alone, China gained access to at least 30,000 Microsoft accounts, and Russia spied on at least 9 U.S. government agencies and hundreds of companies.⁵⁹ Because of this growing threat, and because 5G connects more of our critical infrastructure, the security of 5G networks has become an urgent national priority.⁶⁰

In the long term, many think that countries like China will dominate the economic race to 5G supremacy in hopes of achieving permanent hacking capabilities.⁶¹ The short-term and long-term risks can converge: the U.S. government believes that China currently uses illegal economic and technological means to win the long-term race—such as stealing U.S. intellectual property and highly subsidizing 5G equipment suppliers like Huawei, who have outpaced Western competitors in installing equipment in Africa and parts of Asia.⁶² Once 5G equipment is installed in the United States, China could “send a command to [the] equipment . . . instructing it to disrupt [critical IoT] service[s],” like by

⁵⁶ See generally Maria R. Palattella, Mischa Dohler, Alfredo Grieco, Gianluca Rizzo, Johan Torsner, Thomas Engel & Latif Ladid, *Internet of Things in the 5G Era: Enablers, Architecture, and Business Models*, 34 IEEE J. ON SELECTED AREAS IN COMM'NS 510 (2016) (describing a number of shared protocols that enable 5G IoT technologies).

⁵⁷ See AMORY B. LOVINS & L. HUNTER LOVINS, *BRITTLE POWER: ENERGY STRATEGY FOR NATIONAL SECURITY* 15–16, 20–22 (2d ed. 2001) (describing “accident[al]” threats to networked energy systems).

⁵⁸ See Cyril K. Yancey, *Cyber Security: China and Russia's Erosion of 21st Century United States' Hegemony*, 12 MCNAIR SCHOLARS RSCH. J. 101, 110 (2019).

⁵⁹ Dustin E. Sanger, Julian E. Barnes & Nicole Perloth, *Preparing for Retaliation Against Russia, U.S. Confronts Hacking by China*, N.Y. TIMES (Mar. 7, 2021), <https://perma.cc/Q7YZ-XUQL>; Alyza Sebenius, *Nine U.S. Agencies Have Largely Removed Russia-Linked Malware*, BLOOMBERG (Mar. 30, 2021), <https://perma.cc/3EXL-4E55>.

⁶⁰ CYBERSEC. & INFRASTRUCTURE SEC. AGENCY, *supra* note 54, at 8.

⁶¹ See Jeanne Suchodolski, Suzanne Harrison & Bowman Heiden, *Innovation Warfare*, 22 N.C. J.L. & TECH. 175, 195–205 (2020) (describing China's economic and innovation activities as national security strategies that, inter alia, “inappropriately us[e] backdoors built into telecommunications equipment to monitor” people throughout the world).

⁶² U.S. DEPT OF STATE, *HUAWEI: MYTH VS FACT* (2020), <https://perma.cc/YK9N-HKP3>. *But see* HUAWEI, *5G SECURITY: HUAWEI: FACTS, NOT MYTHS*, <https://perma.cc/JW5C-CEKF>.

shutting down the U.S. power grid.⁶³ Therefore, the development of secure 5G has become a prominent national priority.⁶⁴

To counter these national security threats, the United States must develop a secure 5G network of its own, but overenforcement of patents may hamper such development. First, because critical infrastructure, like hospital systems, may rely on infringing technology for 5G network security, the ITC's exclusion of that technology can disrupt its safe functioning. Second, secure networks require robust 5G development—including the testing, or R&D, of 5G devices. Third, strong 5G development requires the maintenance of competitive conditions in 5G markets.

The 2019 Apple-Qualcomm investigations brought the competitive-conditions issue before the ITC. Qualcomm sought to exclude Apple's iPhones because the iPhones used chipsets that allegedly infringed Qualcomm's patents.⁶⁵ Apple bought these chipsets from Intel, Qualcomm's only competitor in the mobile chipset market.⁶⁶ ALJ Pender determined that an exclusion order would drive Intel out of the market, leaving Qualcomm as a monopolist. The existence of a monopoly could impede U.S. 5G development and thus harm "national security."⁶⁷

In a separate but related investigation, ALJ McNamara found that these national security concerns were speculative and insufficient to deny an exclusion order.⁶⁸ Instead, she recommended a tailored order that allowed the importation of Intel's 3G and 4G chips, but only for a limited period of time.⁶⁹ Because Apple and Qualcomm settled before the ITC could review the investigations, the issue was left unresolved.

⁶³ *Hearings, supra* note 8, at 4.

⁶⁴ *See* Secure 5G and Beyond Act of 2020, Pub. L. No. 116-129, 132 Stat. 223 (2020); WHITE HOUSE, NATIONAL STRATEGY TO SECURE 5G, at 6 (2020).

⁶⁵ *See* Certain Mobile Elec. Devices & Radio Frequency & Processing Components Thereof (II), Inv. No. 337-TA-1093, 2019 WL 2296159, at *2–3 (Apr. 16, 2019) (Recommended Determination).

⁶⁶ *See id.* at *13–14.

⁶⁷ *See Electronic Devices*, USITC Pub. 4981, at 193–95 (finding that national security should have "pre-eminent importance" and, therefore, concluding that the ITC had a "duty to err on the side of caution" and not issue an exclusion order).

⁶⁸ *See Electronic Devices II*, 2019 WL 2296159, at *10, *24 (finding the ITC's "history of protecting intellectual property" persuasive and concluding that 5G-development concerns did not override the benefit of an exclusion order).

⁶⁹ *Id.* at *27; *see also id.* at *28 (recognizing that "some mitigation . . . may be necessary" to address the competitive harm of banning Intel's chipsets because "Intel's contribution [to 5G] has been important and significant;" therefore, permitting the importation of infringing chipsets for four months (emphasis in original)).

New investigations like Apple-Qualcomm are already emerging⁷⁰ and will continue to do so. The ITC's historic interest in enforcing patent rights will be confronted with national security concerns. The resolution of this conflict will have growing importance in the broader world of patents, antitrust, and national security because the ITC has become a prominent patent-litigation forum,⁷¹ because the public interest factors are gaining prevalence within the ITC community,⁷² and because 5G national security has become a hot-button issue in the mobile-technology industry.⁷³ This Comment clarifies the role of 5G and national security in Section 337 investigations in two Parts. First, it establishes that the ITC has the legal authority to weigh 5G–national security concerns in determining whether to issue an exclusion order. Second, it defines specific 5G risks that may justify the denial of an exclusion order, introducing an interdisciplinary framework for agency officials and practitioners.

II. THE ITC'S NATIONAL SECURITY AUTHORITY

The threshold question is whether Section 337 authorizes the ITC to consider national security under the public interest factors. This Part applies principles of statutory interpretation to answer the question because the ITC—like nearly all federal agencies—derives its authority from a statute.⁷⁴ Recall, Section 337 authorizes the ITC to exclude infringing products unless “the public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers” counsels against the exclusion.⁷⁵ One must determine whether any of these four factors can encompass national security. This question is primarily an interpretative one.

⁷⁰ See *infra* notes 213–11 and accompanying text; Grace Dixon, *ITC Takes Up Samsung Claims over Ericsson 5G Imports*, LAW360 (Feb. 9, 2021), <https://www.law360.com/internationaltrade/articles/1353637> (describing two 2021 complaints filed by Ericsson against Samsung related to 5G networking equipment); Certain Semiconductor Devices, Wireless Infrastructure Equip. Containing the Same, and Components Thereof, Inv. No. 337-TA-1254, 2021 WL 871431 (Mar. 4, 2021) (Notice of Institution of Investigation) (Samsung's retaliatory ITC claims against Ericsson).

⁷¹ See U.S. INT'L TRADE COMM'N, *supra* note 20, at 133, 355.

⁷² See *supra* notes 41–42 and accompanying text.

⁷³ See *supra* notes 53–64 and accompanying text.

⁷⁴ See *Kyocera Wireless Corp. v. ITC*, 545 F.3d 1340, 1355 (Fed. Cir. 2008) (“The ITC is a creature of statute, and must find authority for its actions in its enabling statute.” (citing *VastFame Camera, Ltd. v. ITC*, 386 F.3d 1108, 1112 (Fed. Cir. 2004))).

⁷⁵ 19 U.S.C. § 1337(d)(1).

In *Apple-Qualcomm*, both ALJs skipped this threshold question and simply assumed national security was a valid public interest concern—though they disagreed over how heavily it weighed.⁷⁶ But this conclusion is far from obvious: the ITC is a trade agency often viewed as a body with patent expertise,⁷⁷ not national security expertise. Thoughtful analysis of this question is necessary because future 5G investigations require the answer, which may be appealed to the Federal Circuit.

Section A considers the ordinary meaning, statutory context, and legislative purpose of Section 337 as they relate to national security. It concludes that the “public health and welfare” factor may be interpreted to cover 5G—national security concerns. Section B then evaluates this interpretation under the applicable standard of review—the *Chevron* test—to conclude that the ITC may lawfully deny an exclusion order for 5G—national security reasons.

A. The Statutory Interpretation Case for National Security

To determine whether the public interest factors cover national security, the relevant text is the natural starting point. The factors are located in multiple provisions of Section 337. None of them expressly addresses whether the ITC may consider national security. Instead, every provision follows the same basic structure⁷⁸: “[i]f the Commission determines . . . that there is a violation” of Section 337, it may issue a permanent exclusion order,⁷⁹ temporary exclusion order,⁸⁰ cease and desist order,⁸¹ or default order,⁸² “unless” it determines that it should not issue such an order “after considering [the] effect . . . [on] the public health and welfare, competitive conditions,” availability of substitutes, and consumers. Of the four factors, “public health and welfare” is the only factor that does not strictly pertain to economic conditions and

⁷⁶ See *Electronic Devices II*, 2019 WL 2296159, at *3 (finding “little doubt” that a monopoly in the mobile chipset market would be “concerning” and noting no dispute among the parties that 5G was important to national security interests); *Electronic Devices*, USITC Pub. 4981, at 193 (“5G is crucial to U.S. national security.”).

⁷⁷ See Sapna Kumar, *Expert Court, Expert Agency*, 44 U.C. DAVIS L. REV. 1547, 1590 (2011) (noting that scholars, practitioners, and a Federal Circuit judge recognize the patent expertise of ITC commissioners because of the agency’s high volume of patent-related investigations).

⁷⁸ The exception is 19 U.S.C. § 1337(c), which discusses judicial review of the public interest factors.

⁷⁹ 19 U.S.C. § 1337(d)(1).

⁸⁰ 19 U.S.C. § 1337(e)(1).

⁸¹ 19 U.S.C. § 1337(f)(1).

⁸² 19 U.S.C. § 1337(g)(1)(E).

therefore could conceivably cover national security. But Section 337 does not define “public health and welfare,” nor does it state examples of what the term might cover. “When a statute does not define a term,” as here, courts “typically ‘give[] the phrase its ordinary meaning.’”⁸³

1. The ordinary meaning.

To ascertain the ordinary meaning of text, courts commonly utilize dictionary definitions.⁸⁴ But definitions of “public health and welfare” do not get us far. Because the word “public” is generally uncontroverted,⁸⁵ this Section focuses on whether “health” or “welfare” encompasses national security.

First, the word “health.” When Congress passed the 1974 Act, “health” was defined in *Webster’s Dictionary* as “the condition of an organism . . . in [] perform[ing] its vital functions normally.”⁸⁶ Hence, the word referred primarily to medical and bodily concerns, which are distinct from broader matters of national security.

Second, the word “welfare.” “Welfare” was defined in *Webster’s Dictionary* as “the state of faring or doing well” or “a state characterized especially by good fortune, happiness, well-being, or prosperity.”⁸⁷ The definition’s emphasis on “well-being” is a broader conception than that of “health” and could be construed to cover national security: Well-being includes physical well-being or public safety, and national security is part and parcel of ensuring public safety.⁸⁸ But well-being could also refer chiefly to economic well-being, consistent with popular conceptions of the welfare state.⁸⁹

⁸³ *FCC v. AT&T Inc.*, 562 U.S. 397, 403 (2011) (citing *Johnson v. United States*, 559 U.S. 133, 138 (2010)).

⁸⁴ See Anita S. Krishnakumar, *Metarules for Ordinary Meaning*, 134 HARV. L. REV. F. 167, 167 n.2 (2021) (listing sources).

⁸⁵ See *Public*, WEBSTER’S THIRD NEW INTERNATIONAL DICTIONARY 1836 (1971) (referring to “the people as a whole” or general populace).

⁸⁶ *Health*, WEBSTER’S THIRD NEW INTERNATIONAL DICTIONARY 1043 (1971).

⁸⁷ *Welfare*, WEBSTER’S THIRD NEW INTERNATIONAL DICTIONARY 2594 (1971).

⁸⁸ See Malcolm Abbott, *Is the Security of Electricity Supply a Public Good?*, 14 ELEC. J. 31, 32 (2001) (stating that national defense is the “classic example of a public good”).

⁸⁹ Specifically, one could argue that most people in the United States in 1974 would have ordinarily viewed “welfare” like this, see Krishnakumar, *supra* note 84, at 167 n.3 (discussing the field of corpus linguistics), even if not so confined in the dictionary, see *Taniguchi v. Kan Pacific Saipan, Ltd.*, 566 U.S. 560, 568 (2012) (noting that just because a dictionary “definition is broad enough to encompass one sense of a word does not establish . . . that the word is ordinarily understood in that sense”).

Between these two conceptions of “welfare,” the pairing of “welfare” with “health” counsels a broader conception. By applying the rule against surplusage—which says that “[i]f possible, every word and every provision is to be given effect”⁹⁰—one may interpret “health” as pertaining to medical well-being and “welfare” as pertaining to broader matters of well-being like physical safety. In any event, it will help to look beyond the words at issue to other relevant text.

2. The whole provision.

The narrower welfare-state conception of “welfare” is unconvincing because it assumes geographic and economic limitations that are not in the text. “Ultimately, context determines meaning,”⁹¹ and context includes surrounding terms.⁹² Here, the terms that surround “public health and welfare” are the three other public interest factors: “competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers.”⁹³ Whereas those three factors are explicitly limited to the United States, “public health and welfare” is not.⁹⁴ This difference suggests that “welfare” extends beyond just domestic or economic well-being, instead covering a conception of physical well-being that crosses borders. Put differently, analyzing national security threat activity occurring abroad goes beyond simply weighing economic harms occurring in the United States.

3. The whole act.

The “whole act rule” is a textual canon that instructs courts to read the entire statute as a whole when interpreting particular provisions.⁹⁵ When the rule is applied here, the term “public health and welfare” covers national security because 19 U.S.C. § 1337(b)(2) envisions that the ITC’s public interest analysis could overlap with

⁹⁰ ANTONIN SCALIA & BRYAN A. GARNER, *READING LAW: THE INTERPRETATION OF LEGAL TEXTS* 172 (2012).

⁹¹ *Johnson v. United States*, 559 U.S. 133, 138 (2010) (citing *Jarecki v. G.D. Searle & Co.*, 367 U.S. 303, 307 (1961)).

⁹² *See Smith v. United States*, 508 U.S. 223, 229 (1993) (“The meaning of a word that appears ambiguous if viewed in isolation may become clear when the word is analyzed in light of the terms that surround it.”).

⁹³ 19 U.S.C. § 1337(d)(1).

⁹⁴ 19 U.S.C. § 1337(d)(1).

⁹⁵ *United States v. Kozeny*, 541 F.3d. 166, 171 (2d Cir. 2008) (quoting *Richards v. United States*, 169 U.S. 1, 11 (1962)).

the DOJ's national security authority. Subsection (b)(2)—which I refer to as the “interagency consultation provision”—states that “[d]uring the course of each investigation . . . the Commission *shall* consult with, and seek advice and information from, the Department of Health, Education, and Welfare [(HEW)], the [DOJ], the Federal Trade Commission [(FTC)], and such other departments and agencies as it considers appropriate.”⁹⁶ Congress wanted the provision to apply to determinations on the public interest factors because non-ITC agencies would “often have significant information” and “sound advice” about the impact of an exclusion order on the public interest.⁹⁷

One might argue that the provision's inclusion of the HEW, FTC, and DOJ—and its exclusion of the Department of Defense (DoD) and Department of Homeland Security (DHS)—suggests that the rule was primarily concerned about domestic health, competition, and law enforcement rather than national security. This argument is supported by the fact that the DOJ did not have a National Security Division (NSD) when the provision took effect.⁹⁸ This argument reflects the canon of *expressio unius est exclusio alterius*, which suggests that where certain terms have been explicitly set forth in a statute, the statute may be interpreted not to apply to terms excluded from the statute.⁹⁹

But this argument is not convincing. Although the DOJ had not yet formalized its NSD, the agency regularly worked on national security cases during that time. According to the attorney general's 1974 report to Congress, the DOJ “enforc[ed] criminal statutes relating to national security and foreign relations,” including matters involving science and trade.¹⁰⁰ For example, it prosecuted “atomic energy matters,” unlawful importing of ore, illegal fishing by foreign vessels, and other maritime violations committed by foreign governments.¹⁰¹ So when the 1974 Act instructed the ITC to consult with the DOJ on the “public health

⁹⁶ Trade Act of 1974 § 337, 88 Stat. at 2054 (emphasis added).

⁹⁷ S. REP. NO. 93-1298, at 195, *reprinted in* 1974 U.S.C.C.A.N. at 7328; *see also* 19 C.F.R. § 210.50(a)(2) (codifying this principle and affirming that interagency consultation applies to the factors).

⁹⁸ The NSD was formed in 2006. *National Security Division*, U.S. DEPT OF JUSTICE, <https://perma.cc/AQD3-5WTU> (last updated Apr. 12, 2019).

⁹⁹ SCALIA & GARNER, *supra* note 90, at 107.

¹⁰⁰ EDWARD H. LEVI, ANNUAL REPORT OF THE ATTORNEY GENERAL OF THE UNITED STATES 1974, at 101 (1974).

¹⁰¹ *Id.*

and welfare” factor, such instruction covered national security activity.

Just as the DOJ worked on national security cases related to science and trade in 1974, it now works on national security matters related to 5G technology and smartphone trade. Since 2018, the DOJ has helped block an acquisition of Qualcomm for 5G—national security reasons,¹⁰² asked the Ninth Circuit to void an antitrust action against Qualcomm because of similar concerns,¹⁰³ and approved a merger between T-Mobile and Sprint to expedite 5G deployment.¹⁰⁴ So when today’s Section 337 instructs the ITC to consult with the DOJ on “public health and welfare” concerns, the term envisions 5G-related national security activity.

4. The whole code.

For another indication of what Congress meant by “public health and welfare,” one can look to Title 42 of the U.S. Code. The “whole code rule”—essentially an extension of the whole act rule—encourages courts to give similar words in different statutes the same meaning throughout the U.S. Code.¹⁰⁵ In 1926, Congress established the Code to categorize statutes by subject matter under different titles and chapters.¹⁰⁶ As early as 1940, Congress named Title 42 “The Public Health and Welfare,”¹⁰⁷ exactly the same phrase as the “public health and welfare” factor. Over the next few decades, Congress added chapters to Title 42 governing the National Space Program,¹⁰⁸ the “Development and Control of Atomic Energy,”¹⁰⁹ and the National Science Foundation (NSF).¹¹⁰ The National Science Foundation Act¹¹¹ (NSF Act) is particularly

¹⁰² See Kate O’Keefe, *Trump Orders Broadcom to Cease Attempt to Buy Qualcomm*, WALL ST. J. (Mar. 13, 2018), <https://perma.cc/GAX4-875P> (describing the DOJ’s efforts to block the merger because the foreign acquirer’s ownership would reduce Qualcomm’s 5G investments).

¹⁰³ See Brief of the United States of America as Amicus Curiae in Support of Appellant & Vacatur at 31–33, *FTC v. Qualcomm Inc.*, 969 F.3d 974 (9th Cir. 2020) (No. 19-16122) (arguing that the district court’s injunction would harm national security by reducing Qualcomm’s 5G activity).

¹⁰⁴ *New York v. Deutsche Telekom AG*, 439 F. Supp. 3d 179, 197–98 (S.D.N.Y. 2020).

¹⁰⁵ Anita S. Krishnakumar, *Cracking the Whole Code Rule*, 96 N.Y.U. L. REV. 76, 81–82, 103–04 (2021).

¹⁰⁶ Act of 1926, Pub. L. No. 69-440, 44 Stat. 777.

¹⁰⁷ 42 U.S.C. § 1 (Supp 1 1940).

¹⁰⁸ 42 U.S.C. §§ 2451–2476 (1958).

¹⁰⁹ 42 U.S.C. §§ 1801–1819 (1946).

¹¹⁰ 42 U.S.C. §§ 1861–1875 (1952).

¹¹¹ National Science Foundation Act § 3(a)(3), 64 Stat. at 149.

relevant here because Congress established the agency in part to “support specific scientific research activities . . . relating to the national defense” at the request of the secretary of defense.¹¹² In other words, by the time the 1974 Act created the public interest factors, Congress had employed the phrase “public health and welfare” for thirty-four years and had categorized national security research as a “public health and welfare” concern.

There are several potential objections to this inference. First, when the 1974 Act was passed, Title 42 covered at least fifty other subject matter areas that did not relate to science or national defense, such as social security and fair housing.¹¹³ It seems unrealistic to infer a specific congressional intent of national security from a term that could cover so many disparate topics. But the claim is not that Congress specifically intended national security. Rather, the claim is that Congress envisioned that the ITC would consider a wide range of “public health and welfare” concerns, including national security. Second, Title 42 may not primarily relate to national security because Title 50 references national security more explicitly under “War and National Defense.”¹¹⁴ But Title 50 is not an exhaustive compilation of national-security laws, nor is it mutually exclusive with Title 42’s inclusion of scientific initiatives that have unambiguous national security mandates.

An interpretation of public welfare that includes national security is not without precedent. In the 1980 *Inclined-Field Tubes*¹¹⁵ investigation, the ITC interpreted public welfare to include national security and denied an exclusion order because the public interest in nuclear research outweighed the public utility of enforcing patents.¹¹⁶ It declared that nuclear research—conducted with infringing acceleration tubes—was “precisely the kind of activity” that Congress intended to capture under the

¹¹² National Science Foundation Act of 1950 § 3(a)(3), Pub. L. No. 81-507, 64 Stat. 149, 149 (codified as amended at 42 U.S.C. § 1861(b)). Although the NSF’s mission is broader than national security, national security was a major factor in its creation, see VANNEVAR BUSH, OFF. OF SCI. RSCH. & DEV., *SCIENCE: THE ENDLESS FRONTIER* 17 (1945) (describing the U-boat battle during World War II as a “dangerously” close technological battle and thus calling for a public research organization that works closely with the military), and continues to be a primary mission today, see *About the National Science Foundation*, NAT’L SCI. FOUND., <https://perma.cc/HU4T-3HWL> (stating that the NSF is vital because its support enhances the nation’s security and advances knowledge to sustain global leadership).

¹¹³ 42 U.S.C. §§ 1–4801 (1970).

¹¹⁴ 50 U.S.C. §§ 1–1511 (1970).

¹¹⁵ USITC Pub. 1119 (Dec. 29, 1980) (Final) (Comm’n Action & Order).

¹¹⁶ *Id.* at 29.

“public health and welfare” factor because (1) the NSF Act supported the research and (2) the NSF was codified under “Public Health and Welfare” in Title 42.¹¹⁷ Like nuclear energy, 5G is a national defense priority that the NSF has specifically spearheaded and invested money in.¹¹⁸ Just as nuclear research played a pivotal role in the arms race against the Soviet Union, 5G development plays a pivotal role in the race against China.¹¹⁹

Pursuant to the whole code rule, the ITC may interpret “public health and welfare”—as understood by Congress in 1974 in Title 42—to include innovation-related national security concerns.

5. The statutory scheme.

This interpretation is also consistent with the overall scheme of Section 337. Namely, allowing infringing imports that benefit national security is consistent with the public interest factors’ policy nature and the statute’s protectionist mission.

The text and legislative history of Section 337—as well as the structure of the ITC—support broadly reading the public interest factors to include a range of policy considerations. The text does not narrowly confine the factors to particular subject matter.¹²⁰ Similarly, the 1974 Senate report states that the public health and welfare and U.S. competitive conditions “must be paramount”¹²¹ and “overriding considerations in the administration of [Section 337].”¹²² Although the 1988 Act sought to strengthen the ITC’s patent enforcement,¹²³ the Act did so by eliminating the complainant’s requirement of proving injury to a domestic industry, not by narrowing the public interest factors to specific types

¹¹⁷ *Id.* at 22–23.

¹¹⁸ In 2015, the agency established the Advanced Wireless Research Initiative to “win the next generation of mobile technology” and manage 5G-testing platforms. *Fact Sheet: Administration Announces an Advanced Wireless Research Initiative, Building on President’s Legacy of Forward-Leaning Broadband Policy*, WHITE HOUSE (July 15, 2016), <https://perma.cc/RJL7-NNCX>. This initiative’s national defense priority is evidenced by its close partnership with DoD. PAWR Project Off., *New \$2.7M PAWR Project Funded by the U.S. Department of Defense*, PAWR (May 27, 2020), <https://perma.cc/C3RX-UU5E>; George I. Seiffers, *U.S. Defense Department Expands 5G Experimentation*, SIGNAL MEDIA (Mar. 1, 2021), <https://perma.cc/W549-258L>.

¹¹⁹ See *supra* notes 5–8 and accompanying text.

¹²⁰ See *supra* Part II.A.1.

¹²¹ S. REP. NO. 93-1298, at 193, *reprinted in* 1974 U.S.C.C.A.N. at 7326.

¹²² *Id.* at 197, *reprinted in* 1974 U.S.C.C.A.N. at 7330.

¹²³ S. REP. NO. 100-71, at 128.

of harm.¹²⁴ Finally, a broad reading is consistent with the ITC's tripartite structure of ALJ adjudication, ITC review, and presidential review. To ensure "swift and certain" patent enforcement¹²⁵ in lieu of the president's political whims,¹²⁶ the 1974 Act transferred the authority to exclude imports from the president to the ITC.¹²⁷ While the president retained some power through the ability to reverse agency determinations "for policy reasons,"¹²⁸ the Act empowered the ITC to consider public interest factors and consult with other agencies.¹²⁹ The ITC created the ALJ office to implement the Act's adoption of the APA's ALJ procedures.¹³⁰ Therefore, the ITC serves as a public interest buffer between the reliability of ALJ adjudication and the unpredictability of the president's decisions. National security could fall under that buffer with the "public health and welfare" factor.

A more conventional interpretation—advanced by former commissioner Aranoff in *Apple-Samsung*¹³¹—asserts that the ITC "is not a policy-making body"¹³² and that only the president can weigh policy issues because § 1337(j)(2) uses the word "policy" to define the president's reversal authority.¹³³ The latter argument is one of statutory interpretation, and the former is one of institutional competence. Both are unpersuasive. First, Aranoff's statutory distinction between the ITC's public interest authority and the president's "policy" authority is unpersuasive because the

¹²⁴ When stating that "the ITC, in considering the public health and welfare [should not] reintroduce [the domestic industry requirement]," S. REP. NO. 100-71, at 129, the Senate Finance Committee meant that the public interest factor should not be ratcheted up as a backdoor to negate the effect of eliminating the requirement. But this statement does not reveal an intention to diminish the scope of the factors independent of the requirement.

¹²⁵ S. REP. NO. 93-1298, at 31, *reprinted in* 1974 U.S.C.C.A.N. at 7302.

¹²⁶ *See id.* at 11, *reprinted in* 1974 U.S.C.C.A.N. at 7193 (stating that the executive "too often" made unpredictable concessions for political reasons when enforcing trade statutes, hence the need for the 1974 Act).

¹²⁷ *Id.* at 193, *reprinted in* 1974 U.S.C.C.A.N. at 7326.

¹²⁸ 19 U.S.C. § 1337(j)(2).

¹²⁹ S. REP. NO. 93-1298, at 197, *reprinted in* 1974 U.S.C.C.A.N. at 7330.

¹³⁰ U.S. INT'L TRADE COMM'N, *supra* note 20, at 334; 19 U.S.C. § 1337(c) (citing 5 U.S.C. §§ 556–557).

¹³¹ *See* Certain Elec. Devices, Including Wireless Commc'n Devices, Portable Music & Data Processing Devices, & Tablet Computs., Inv. No. 337-TA-794, 2013 WL 12410037, at *80–83 (July 5, 2013) (Final) (Comm'n Op.) (rejecting Samsung's public interest claim that an exclusion order would harm competitive conditions).

¹³² *Id.* at *70 n.23.

¹³³ *Id.* at *67 n.21 (citing 19 U.S.C. § 1337(j)(2)).

public interest factors are inherently policy considerations.¹³⁴ Legislative history and case law support this characterization.¹³⁵ Second, these policy considerations do not transform the ITC into a “policy-making” body as Aranoff fears. It is true that “a key feature of the [ITC] is its separation from the policymaking arms of government” like the Office of the U.S. Trade Representative (USTR),¹³⁶ but she misunderstands this feature’s application to the Section 337 issue. When the ITC analyzes public interest harm, it is not “making” policy in the same way that the USTR does when it “direct[s] negotiations” with other countries.¹³⁷ Instead, the ITC adjudicates investigations on a case-by-case basis.

The ITC’s policy authority under the public interest factors includes national security policy, and this view promotes Section 337’s protectionist mission. The centuries-old overlap between trade policy and national security policy¹³⁸ was reflected in the 1974 Act. The comprehensive reform bill was a compromise between protectionist and free trade interests. On net, the Act was intended to liberalize trade by proposing reduced barriers and additional

¹³⁴ The ITC’s own history book references the factors as a “non-adjudicative policy oriented review . . . to decide whether to issue a remedy.” U.S. INT’L TRADE COMM’N, *supra* note 20, at 333 (quoting Brian G. Brunsvold, Charles F. Schill & Ursula Schwendemann, *Injury Standards in Section 337 Investigations*, 4 NW. J. INT’L L. & BUS. 75, 103 (1982)). Scholars widely agree. See Bruno G. Simões, *What’s the Deference? Why the Federal Circuit’s Treatment of ITC Section 337 Cases Raises Agency-Specific Precedent Concerns*, 23 KAN. J.L. & PUB. POL’Y 104, 111, 113 (2013) (noting that Congress, through the public interest factors, expressly allowed the ITC to include “broad policy considerations” in its decision to issue an exclusion order); Kumar, *supra* note 34, at 538 (“The ITC . . . must consider policy implications of an exclusion order before issuing one.”); Chien & Lemley, *supra* note 13, at 20 (noting that the three investigations in which the Commission denied an exclusion order involved products necessary for “human health or some other nationally recognized policy goal”).

¹³⁵ See S. REP. NO. 93-1298, at 199, *reprinted in* 1974 U.S.C.C.A.N. at 7331. (stating that “the President would often be able to best see the impact which the relief ordered by the Commission may have upon the [public interest factors]”); *Duracell, Inc. v. ITC*, 778 F.2d 1578, 1581–82 (Fed. Cir. 1985) (stating that “policy” is a “broad concept which includes . . . [the] impact . . . upon the public health and welfare.”). Although both of these references were made in the context of the president’s reversal authority, the identity of the decision maker does not practically change the inherent policy orientation of the public interest factors.

¹³⁶ CRAIG VANGRASSTEK, *THE CHALLENGES OF TRADE POLICYMAKING: ANALYSIS, COMMUNICATION AND REPRESENTATION* 14, *in* UNITED NATIONS, *POLICY ISSUES IN INTERNATIONAL TRADE AND COMMODITIES STUDY SERIES* (2008).

¹³⁷ *Id.* at 17; see also *id.* at 14 n.26 (noting that the ITC’s role in trade remedy law is an exception to the “general rule” that it can be trusted as an advisory commission wholly independent of partisan pressure).

¹³⁸ See generally Richard N. Cooper, *Trade Policy is Foreign Policy*, 9 FOREIGN POL’Y 18 (1972).

power for the president to set foreign policy.¹³⁹ But members of Congress feared vesting too much discretion in the president at the expense of American jobs and values.¹⁴⁰ For example, they advocated for the Jackson-Vanik Amendment, which required the president to determine that the Soviet Union was not violating human rights before offering nondiscriminatory access to U.S. markets.¹⁴¹

To overcome such skepticism and gain protectionist support, President Richard Nixon proposed Section 337.¹⁴² Exclusion orders against infringing products restrict free trade to protect domestic business. But denying an exclusion order for national security reasons is equally a protectionist measure because, although it liberalizes trade by allowing an import to enter the country, it primarily serves to protect domestic interests. Section 337 delegated the discretion to make both types of protectionist judgments to the ITC.

Granted, we may prefer the president and more traditional national security agencies, like the DoD and DHS, to make the ultimate national security judgments because they are better situated and more knowledgeable. But Section 337 envisions that the ITC will make decisions with input from national security agencies through the interagency consultation provision. This interpretation is most consistent with the 1974 Act's creation of the public interest factors alongside the interagency consultation provision, the transfer of exclusion authority from the president to

¹³⁹ See EDWARD S. KAPLAN, *AMERICAN TRADE POLICY, 1923–1995*, at 89 (1996); Trade Act § 102, 88 Stat. at 1982–83:

Whenever the President determines that any barriers to . . . international trade . . . unduly burden and restrict the foreign trade of the United States or adversely affect the United States economy, . . . the President . . . may enter into trade agreements with foreign countries or instrumentalities providing for the harmonization, reduction, or elimination of such barriers.

See also U.S. INT'L TRADE COMM'N, *supra* note 20, at 131–32.

¹⁴⁰ See Hearings on H.R. 6767 Before the Committee on Ways and Means, 93rd Cong. 5176–77; 5054–55; 5058–61, 5109 (1973) (noting that negotiations on “nontariff barriers . . . are so inextricably intertwined in a web of domestic social, economic, and political considerations that Congress would benefit by knowing what the executive branch has in mind before they enter into negotiations”).

¹⁴¹ See Trade Act of 1974 § 402 (codified as amended at 19 U.S.C. § 2432(a) (1994)) (“[T]he President of the United States shall not conclude any commercial agreement with any such country, during the period beginning with the date on which the President determines that such country [] denies its citizens the right or opportunity to emigrate.”).

¹⁴² See President's Special Message to Congress Proposing Trade Reform Legislation, 5 PUB. PAPERS 258, 261, 265 (Apr. 10, 1973) (seeking trade reform by “subjecting cases involving imports to judicial proceedings similar to those which involve domestic infringement”).

the ITC, and the Senate Finance Committee's statement that public interest concerns should be "paramount" for the ITC.¹⁴³ The president would still retain authority to ultimately make a different decision based on his or her more operational understanding of foreign relations. And, practically, as 5G matters become more political,¹⁴⁴ the president may become more likely to exercise such authority. But that does not mean that the ITC cannot make its own judgment under the protectionist structure of Section 337. Rather, it behooves ITC commissioners to adequately gather facts and evaluate public welfare harms.¹⁴⁵

B. Anticipating a *Chevron* Court Challenge

If the ITC interprets the public welfare to encompass national security and denies an exclusion order, a patent holder may challenge the interpretation in court. The patent holder would likely invoke § 706(2)(C) of the APA to argue that the ITC's interpretation exceeds its statutory authority under Section 337.¹⁴⁶ This Section anticipates such a challenge and argues that the statutory arguments in Section A would likely withstand the scrutiny of a reviewing court.

¹⁴³ S. REP. NO. 93-1298, at 193, reprinted in 1974 U.S.C.C.A.N. at 7326.

¹⁴⁴ Steven Lee Myers & Paul Mozur, *Caught in "Ideological Spiral," U.S. and China Drift Toward Cold War*, N.Y. TIMES (July 23, 2020), <https://perma.cc/HY9D-HAQE>.

¹⁴⁵ See Letter from Michael B.G. Froman, Ambassador, Exec. Off. of the President, to Irving A. Williamson, Chairman, U.S. Int'l Trade Comm'n 3 (Aug. 3, 2013), <https://perma.cc/X2P3-LRBB> (urging the ITC to "examine thoroughly and carefully on its own initiative the public interest issues presented" by standard-essential patents under the competitive conditions and consumers prongs).

¹⁴⁶ 5 U.S.C. § 706(2)(C). A patent holder could also invoke § 706(2)(A) of the APA to argue that the ITC's denial of an exclusion order based on national security considerations is "arbitrary, capricious, [or] an abuse of discretion." But this framing of the appeal is less likely to succeed. Because Section 337 establishes an adjudicative process with elaborate fact-finding and multiple levels of review, it would be difficult for a court to find that the ITC abused its discretion after carefully considering 5G-national security concerns.

In fact, the Federal Circuit has always upheld the ITC's exclusion orders under arbitrary and capricious review, including one case that involved the public interest factors. See, e.g., *Spansion, Inc. v. ITC*, 629 F.3d 1331, 1358–59 (Fed. Cir. 2010) (affirming an exclusion order and rejecting the consideration of "traditional equitable principles" under the "public health and welfare" factor because Congress wanted to make injunctive relief the "normal remedy" through the 1988 Act); *Hyundai Elecs. Indus. Co. v. ITC*, 899 F.2d 1204, 1209 (Fed. Cir. 1990) (affirming ITC's requirement that respondents certify the non-infringement of downstream products because the remedy reflected a "careful and common-sense balancing of the parties' conflicting interests" and was limited in scope). By contrast, the Federal Circuit has not always deferred to the ITC's interpretations of Section 337. See *infra* notes 159–61 and accompanying text.

Agency actions are generally not reviewed with a blank slate but are rather accorded some level of deference by a reviewing court.¹⁴⁷ The ITC's interpretation of "public health and welfare" would be reviewed under the Supreme Court's deferential *Chevron* test.¹⁴⁸ *Chevron's* two-step inquiry asks (Step One) whether the statute has unambiguously addressed an issue and, if not, (Step Two) whether an agency's interpretation of the authorizing provision is reasonable.¹⁴⁹ The *Chevron* test applies because the ITC would interpret "public health and welfare" through formal adjudication pursuant to §§ 556 and 557 of the APA.¹⁵⁰

The state of *Chevron* deference—and the mechanics of its application—are in flux, particularly at the Supreme Court.¹⁵¹ For example, *Chevron* instructs a court to use "traditional tools of statutory interpretation" at Step One,¹⁵² but the Supreme Court and lower courts have diverged widely on which tools to apply—some emphasize the plain text, others emphasize the purpose and legislative history, and others utilize all tools.¹⁵³ To fully address the issue, Section A set forth several plausible arguments in support of a national security interpretation of the public welfare prong. But determining exactly how each argument fits within *Chevron*—among the various courts' conflicting case law—is beyond the scope of this Comment.

Rather, the more fruitful task is to focus on the Federal Circuit's approach to *Chevron* because most appeals of ITC actions start and

¹⁴⁷ See Robert J. Krotoszynski, Jr., *Why Deference?: Implied Delegations, Agency Expertise, and the Misplaced Legacy of Skidmore*, 54 ADMIN. L. REV. 735, 739–41 (2002) (explaining that deference is warranted either because Congress intends the agency to enforce the authorizing statute or because the agency has special expertise to enforce the statute). *But see generally* Aditya Bamzai, *The Origins of Judicial Deference to Executive Interpretation*, 126 YALE L.J. 908 (2017) (questioning the origins of judicial deference to administrative agencies).

¹⁴⁸ *Chevron U.S.A., Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837, 845 (1984).

¹⁴⁹ *Id.* at 842–43.

¹⁵⁰ Before applying the *Chevron* test, a court engages in a Step Zero analysis, asking whether *Chevron* applies in the first place. *United States v. Mead Corp.*, 533 U.S. 218 (2001) (citing *Skidmore v. Swift & Co.*, 323 U.S. 134 (1944)); *see also* Thomas W. Merrill & Kristin E. Hickman, *Chevron's Domain*, 89 GEO. L.J. 833, 873 (2001). Explicitly referring to the formal adjudicative provision of the APA, as Section 337 does here, easily meets *Mead's* formality requirement. *See Suprema v. ITC*, 796 F.3d 1338, 1346 (Fed. Cir. 2016).

¹⁵¹ *See generally* Nathan Richardson, *Deference is Dead (Long Live Chevron)*, 73 RUTGERS L. REV. 441 (2021).

¹⁵² *Chevron*, 467 U.S. at 843 n.9.

¹⁵³ *Petit v. U.S. Dep't of Educ.*, 675 F.3d 769, 781 (D.C. Cir. 2012); *see also, e.g.*, Kristin E. Hickman & Nicholas R. Bednar, *Chevron's Inevitability*, 85 GEO. WASH. L. REV. 1392, 1425 (2017) (describing a circuit split over the appropriateness of legislative history in Step One).

end there.¹⁵⁴ To predict whether the ITC's national security interpretation would withstand Federal Circuit review, we look to the court's past treatment of the *Chevron* doctrine.

The Federal Circuit has routinely deferred to the ITC's interpretations of Section 337.¹⁵⁵ In a 2015 en banc case, *Suprema, Inc. v. ITC*,¹⁵⁶ the court deferred to the interpretation that "infringement" covered inducement of postimportation infringement because the text was ambiguous, surrounding provisions referred to postimportation sales, and the result furthered Section 337's mission to address "every type and form of unfair [trade] practice."¹⁵⁷ But the court has rejected deference in other cases. In *Kyocera Wireless Corp. v. ITC*,¹⁵⁸ it found that the exclusion of downstream manufacturers was unlawful at Step One because § 1337(d)(2) expressly limited exclusions to "persons . . . violating" Section 337 absent specified situations.¹⁵⁹ In *ClearCorrect Operating, LLC v. ITC*,¹⁶⁰ the court did not defer to the ITC's Step Two interpretation that "articles" included digital data because contemporaneous definitions mostly limited "articles" to tangible things, other provisions would not make sense when applied to data, and the scheme of excluding imports could only work against tangible things.¹⁶¹

The interpretation that includes national security as public welfare is more consonant with *Suprema's* reasoning than that of *ClearCorrect* and *Kyocera*. At Step One, the plain text of "public health and welfare" does not clearly include or exclude national security considerations. Unlike in *Kyocera*, where the relevant provision expressly limited an exclusion order to certain persons, the "public health and welfare" factor is not expressly limited to a particular subject matter. As in *Suprema*, where a surrounding provision implied consideration of postimportation activity, the "United States" qualifier in the three surrounding public interest factors—and the lack thereof in the "public health and welfare"

¹⁵⁴ See Paul R. Gugliuzza, *The Federal Circuit as a Federal Court*, 54 WM. & MARY L. REV. 1791, 1841–42 (2013).

¹⁵⁵ See, e.g., *Suprema, Inc. v. ITC*, 796 F.3d 1338, 1352 (Fed. Cir. 2015) (en banc) (listing six cases in which the Federal Circuit has "consistently deferred to the [ITC]").

¹⁵⁶ 796 F.3d 1338, 1352 (Fed. Cir. 2015) (en banc).

¹⁵⁷ *Id.* at 1349–52 (emphasis omitted) (quoting S. REP. NO. 67–595, at 3 (1922)).

¹⁵⁸ 545 F.3d 1340 (Fed. Cir. 2008).

¹⁵⁹ *Id.* at 1358.

¹⁶⁰ 810 F.3d 1283 (Fed. Cir. 2015).

¹⁶¹ *Id.* at 1290–96, 1300.

factor—implies consideration of international public interest harm.

At Step Two, interpreting public welfare to cover national security is reasonable. Unlike in *ClearCorrect*, where contemporaneous definitions limited “articles” to tangible things, contemporaneous definitions of “public welfare”—particularly when paired with “health”—were not limited to domestic or economic effects. This interpretation is consistent with the interagency consultation provision’s reference to the DOJ’s national security activities and Title 42’s reference to the NSF’s defense activities. As in *Suprema*, in which the Federal Circuit deferred to an interpretation that furthered Section 337’s mission to enforce against many types of unfair practices, a reviewing court could defer to an interpretation that makes the factors “paramount” in the ITC’s remedial decision.¹⁶² Furthermore, unlike in *ClearCorrect*, where the court declined to defer because the scheme of exclusion orders wouldn’t work against digital data, allowing infringing patented goods that benefit national security would be wholly consistent with the ITC’s protectionist mission. Therefore, the ITC may lawfully consider national security as a public welfare concern.

III. THE 5G PUBLIC WELFARE FACTOR: A CYBERSECURITY FRAMEWORK

The ITC may interpret public welfare to include national security concerns because such an interpretation would comport with the plain text, statutory context, and legislative history of Section 337. This is a reasonable agency interpretation likely to withstand judicial review under the deferential *Chevron* test. But there is a second, equally important inquiry: Why and when are 5G risks sufficiently serious to justify denying an exclusion order?

In an investigation where the ITC has found a patent-based Section 337 violation and a national security interest that counsels against enforcing that patent, it must weigh the patent-enforcement interest against the public’s interest in national security, competition, consumer welfare, and the availability of substitutes.¹⁶³ The agency has wide discretion to balance these policy interests¹⁶⁴ and historically has almost always ruled for the

¹⁶² S. REP. NO. 93-1298, at 193, reprinted in 1974 U.S.C.C.A.N. at 7326.

¹⁶³ See 19 U.S.C. § 1337(d)(1) (stating that “the Commission . . . shall direct that the articles . . . be excluded from entry” unless the public interest factors mandate otherwise).

¹⁶⁴ See *supra* Part II.

patent holder.¹⁶⁵ The ITC's justification has been that strong patent enforcement benefits society by incentivizing companies to invest in developing products that would otherwise not exist.¹⁶⁶ As applied to 5G, this heightened innovation typically promotes the public interest by producing higher quality and more secure 5G.

But this Comment argues that the unprecedented nature of 5G warrants a different approach. Excessive patent enforcement has harmed national security in the past,¹⁶⁷ and for reasons specific to 5G, it is more likely to do so today. Unlike previous technologies, 5G fundamentally alters the cybersecurity of U.S. networks because it (1) expands critical infrastructure that is vulnerable to hacking or reliant on patent-infringing technology, (2) requires nationwide testing of devices, and (3) can expose networks to monopolization that increases cyber vulnerabilities. Thus, ITC commissioners and ALJs should determine whether any of these three cybersecurity risks are supported by the record and, if so, should deny an exclusion order on that basis. But in weighing these risks, they must also keep in mind that enforcing patent rights may incentivize the development of 5G products and, therefore, strengthen the security of 5G products and networks. Section A justifies cybersecurity as the principal framework. Section B then specifies the three cybersecurity risks.

This new framework will guide the ITC's public interest adjudications, helping it identify 5G harms that truly count under the public welfare factor. This framework can be manifested in one of two ways. First, the ALJ or ITC commissioners could adopt the framework in their written opinions on an investigation-by-investigation basis. Second, under § 553(b)(3)(A) of the APA, the ITC could issue two *ex ante* guidance documents: an "interpretative rule" that interprets "public health and welfare" per Part II.A

¹⁶⁵ See *supra* notes 35–39 and accompanying text.

¹⁶⁶ See *supra* note 34; S. REP. NO. 100-71, at 117 (1987) (stating that unfair trade practices threaten U.S. producers' ability to innovate products "because of the long lead times from product design to actual production, business uncertainties, lost marketing opportunities, and erosion of profitability").

¹⁶⁷ See Duan, *supra* note 6, at 387–94 (explaining that the United States' dependence on a single company's torpedo left the Navy unprepared for World War I, that its dependence on an airplane manufacturer's patent-licensing suits left the military underequipped for the same war, and that a pharmaceutical company's refusal to permit generic manufacturing of its patented anthrax treatment left the government vulnerable to post-9/11 bioterrorism).

and a “general statement of policy” that explains how the ITC will apply 5G development policies per Part III.¹⁶⁸

Whichever form it takes, the cybersecurity framework is sorely needed because litigants currently have no guidance when patent rights collide with 5G national security. The ITC has declined to adjudicate these types of public interest issues.¹⁶⁹ This uncertainty harms companies that may engage in unnecessary public interest discovery to protect themselves¹⁷⁰ or decline to invest in 5G for fear that new public interest arguments will devalue their investment.¹⁷¹

A. Justifying the Cybersecurity Framework

The cybersecurity framework is primarily justified by technical literature and government security reports.¹⁷² These sources are appropriate because the lawful exercise of policy discretion depends in part on how sound the policy is.¹⁷³ Sound policy comes from well-established principles in the relevant subject matter. Thus, we look to 5G scholars, researchers, and federal government experts to guide the ITC’s policy inquiry.

Concerns over 5G networks relate to cybersecurity. Cybersecurity includes security of data but increasingly implicates

¹⁶⁸ Unlike a written opinion, a guidance document does not typically receive *Chevron* deference because it is exempt from formal notice-and-comment requirements. *Christensen v. Harris County*, 529 U.S. 576, 587 (2000). But a guidance document may withstand the scrutiny of a reviewing court under *Skidmore* deference if the court finds that the guidance is not masquerading as a binding legislative rule. *See id.*; *Am. Min. Cong. v. Mine Safety & Health Admin.*, 995 F.2d 1106, 1108–09 (D.C. Cir. 1993); Administrative Procedure Act, 5 U.S.C. § 553(b)(3)(A).

¹⁶⁹ *See supra* notes 50–52 and accompanying text.

¹⁷⁰ *See Aranoff, supra* note 42 (noting that increased public interest delegations have “resulted in new discovery obligations and costs for the parties”).

¹⁷¹ *See Taras M. Czebiniak, Comment, When Congress Gives Two Hats, Which Do You Wear? Choosing Between Domestic Industry Protection and IP Enforcement in § 337 Investigations*, 26 BERKELEY TECH. L.J. 93, 129–30 (2011) (arguing that the lack of guidance about the public interest factors could deter innovation in complex technology).

¹⁷² This interdisciplinary approach is inspired by J. Gregory Sidak, *International Trade Commission Exclusion Orders for the Infringement of Standard-Essential Patents*, 26 CORNELL J.L. & PUB. POL’Y 125, 158 (2016) (proposing a new factual inquiry under the public interest factors specific to standard-essential patents based on economic principles).

¹⁷³ *See Louis J. Virelli III, Deconstructing Arbitrary and Capricious Review*, 92 N.C. L. REV. 721, 758 (2014) (describing arbitrary and capricious review, in part, as an inquiry into the “quality of the agency’s value judgment—the specifics of its policy position and whether its stated justifications offer persuasive logical support for that position”).

physical security as well.¹⁷⁴ Developing a secure cybernetwork to protect our critical infrastructure is a national security imperative.¹⁷⁵ Russia both hacked election data from the United States in 2016¹⁷⁶ and successfully disrupted a U.S. hospital’s “provision of critical medical services” in 2017.¹⁷⁷

5G fundamentally alters the cybersecurity landscape because of a feature called edge computing. Whereas 3G and 4G relied heavily on a centralized system, 5G moves core functions—like data processing and storage—to the “edge” of the network.¹⁷⁸ Edge computing eliminates the time and energy it takes to transfer data to the center, thereby enabling new IoT applications that were otherwise too data intensive for 4G to handle.¹⁷⁹ Because the IoT includes everyday items like cars and thermostats, edge computing creates additional “vectors” through which foreign adversaries can attack.¹⁸⁰ Thus, 5G could create more dangers to the public welfare.¹⁸¹

¹⁷⁴ See Jeff Kosseff, *Defining Cybersecurity Law*, 103 IOWA L. REV. 985, 995 (2018) (“Cybersecurity focuses not only on the protection of data, but also on the systems and networks of the public and private sector.”).

¹⁷⁵ *Cyber Security Is National Security*, U.S. DEP’T OF ENERGY (Oct. 5, 2014), <https://perma.cc/K8Y8-D6P7>.

¹⁷⁶ See, e.g., REPORT OF THE U.S. SENATE SELECT COMMITTEE ON INTELLIGENCE, RUSSIAN ACTIVE MEASURES CAMPAIGNS AND INTERFERENCE IN THE 2016 U.S. ELECTION, VOLUME 1: RUSSIAN EFFORTS AGAINST ELECTION INFRASTRUCTURE 22 (discussing the breach of Illinois voter registration data).

¹⁷⁷ *Six Russian GRU Officers Charged in Connection with Worldwide Deployment of Destructive Malware and Other Disruptive Actions in Cyberspace*, U.S. DEP’T OF JUST. (Oct. 19, 2020), <https://perma.cc/RJ4R-JBKZ>; see also Lawrence J. Trautman & Peter C. Ormerod, *Wannacry, Ransomware, and the Emerging Threat to Corporations*, 86 TENN. L. REV. 503, 517–21 (2019).

¹⁷⁸ CYBERSEC. & INFRASTRUCTURE SEC. AGENCY, *supra* note 55, at 1–2; see also Najmul Hassan, Kok-Lim Alvin Yau & Celimuge Wu, *Edge Computing in 5G: A Review*, 7 IEEE ACCESS 127276, 127277–78 (2019) (explaining the importance of edge computing to 5G).

¹⁷⁹ See CYBERSEC. & INFRASTRUCTURE SEC. AGENCY, *supra* note 55, at 2 fig.1.

¹⁸⁰ Benedictos Iorga, *The Impact of 5G Technology on Cybersecurity Environment* 24 (2019) (unpublished manuscript), <https://perma.cc/G5EJ-RHKW>; see also JAMES LEWIS, *CAN TELEPHONES RACE? 5G AND THE EVOLUTION OF TELECOM: PART I*, at 7 (2020) (stating that moving processing to the radio access network provides “hostile actors better access to data”).

¹⁸¹ Compare Tom Wheeler & David Simpson, *Why 5G Requires New Approaches to Cybersecurity*, BROOKINGS (Sept. 3, 2019), <https://perma.cc/H23E-4ZVU> (arguing that 5G networks are more vulnerable to cyberattacks than their predecessors because 5G’s dramatic expansion of bandwidth and its ability to connect “tens of billions of hackable smart devices” create “additional avenues of attack”), with AT&T CYBERSECURITY, *5G Is a Journey and Demands Changes to Security*, in AT&T CYBERSECURITY INSIGHTS REPORT: 5G AND THE JOURNEY TO THE EDGE 4, 4 (10th ed. 2021) (concluding that “[s]tandalone 5G is

This core insight informs three ways in which 5G risks manifest. We now turn to each risk and give examples of investigations that may justify denying an exclusion order under the public welfare factor.

B. The Three Cybersecurity Risks

1. Critical infrastructure.

5G increases the risks to critical infrastructure. The DHS definition of critical infrastructure covers sixteen sectors, including transportation, energy, telecommunications, and emergency services.¹⁸² Concerns about the latter two are already familiar to the ITC. In a 2011 investigation, *Baseband Processor*,¹⁸³ the ITC found a public health and welfare concern in 3G networks because first responders relied on them to communicate.¹⁸⁴ Cybersecurity was a growing concern for infrastructure security even before 5G.¹⁸⁵ But unlike 3G and 4G, 5G provides dramatically more support for critical infrastructure like electrical grids, industrial systems, and remote surgeries.¹⁸⁶ This digitization of critical infrastructure expands the possible risks in the sixteen DHS-identified sectors.

The risks are that foreign actors will seek to exploit vulnerabilities in a nascent 5G network¹⁸⁷ and, relatedly, that the network may depend on important 5G patents, therefore subjecting

more secure than any previous network generation”). See also Lily H. Nerman, *5G Is More Secure than 4G and 3G—Except When It’s Not*, WIRED (Dec. 15, 2019), <https://perma.cc/X45X-79L3> (summarizing the debate); David Basin, Jannick Dreier, Lucca Hirschi, Saša Radomirović, Ralf Sasse & Vincent Stettler, *A Formal Analysis of 5G Authentication 6–7* (Jan. 2020) (unpublished manuscript), <https://perma.cc/JBY2-JTKQ> (finding that 5G protects against “fake authentication requests” in ways that 4G and 3G cannot but that the assumptions underlying this insight are incomplete).

¹⁸² *Critical Infrastructure Sectors*, CYBERSEC. & INFRASTRUCTURE SEC. AGENCY (last updated Oct. 21, 2020), <https://perma.cc/AJ6W-Y866>.

¹⁸³ USITC Pub. 4258 (June 19, 2007) (Final) (Comm’n Op.).

¹⁸⁴ See *id.* at 146–49 (citing concerns that excluding 3G handsets would interfere with first responders’ ability to locate and communicate with callers during emergencies).

¹⁸⁵ See Eldar Haber & Tal Zarsky, *Cybersecurity for Infrastructure: A Critical Analysis*, 44 FLA. ST. U. L. REV. 515, 519–25 (2018).

¹⁸⁶ See *5G Introduces New Benefits, Cybersecurity Risks*, U.S. DEPT OF HOMELAND SEC. (Oct. 15, 2020), <https://perma.cc/VED3-DTRZ> (“[5G] benefits will pave the way for additional new capabilities . . . for . . . smart homes and cities, industrial automation, autonomous vehicles, telemedicine, and virtual/augmented reality.”).

¹⁸⁷ See Rep. of the European Union Network and Information Systems Cooperation Group, *EU Coordinated Risk Assessment of the Cybersecurity of 5G Networks*, at 14–15 fig.1 & 19–29 (Oct. 9, 2019) (reporting that nation-state actors pose the highest risk to European Union members’ 5G networks).

its security to the whim of the patent holder.¹⁸⁸ First, there are the immediate hacking vulnerabilities. Take remote surgeries, for example. At the time of *Baseband Processor*, a medical patient faced the risk that an ambulance couldn't communicate with the hospital over 3G. Today, patients might face the risk that malicious actors will disrupt their ambulance ride as well as their surgery.¹⁸⁹

Second, there is the risk of reliance on a single patent holder. Take self-driving cars. Today, most people in the United States operate their cars themselves. But 5G may soon enable vehicles to drive themselves,¹⁹⁰ creating an unprecedented opportunity for a hacker to seize physical control.¹⁹¹ Technology companies, especially licensing entities, have already started filing patent suits related to autonomous vehicles against traditional automobile manufacturers.¹⁹² In some circumstances, an exclusion order could potentially affect the safe functioning of the autonomous vehicle ecosystem.

To understand the reliance risk, a hypothetical scenario—based in part on a real ITC investigation—is useful. Ten years ago, a patent-licensing entity (Beacon) alleged that 93% of U.S. car manufacturers had infringed its patent with an imported “vehicle navigation system and method using GPS velocities.”¹⁹³ But instead of a GPS patent in 2011, imagine the patent at issue is a 2030 5G signaling mechanism that directs autonomous vehicles' movements by connecting them to traffic lights. Also imagine

¹⁸⁸ See *supra* note 57.

¹⁸⁹ Cf. William Ralston, *The Untold Story of a Cyberattack, a Hospital and a Dying Woman*, WIRED (Nov. 11, 2020), <https://perma.cc/5ANJ-N82E> (noting the possibility that a ransomware attack on a German hospital system contributed to a victim's death even if it was not sufficient to meet legal causation standards).

¹⁹⁰ See KERSTEN HEINEKE, PHILIPP KAMPSHOFF, ARMEN MKRTCHYAN & EMILY SHAO, SELF-DRIVING CAR TECHNOLOGY: WHEN WILL ROBOTS HIT THE ROAD? 4 (2017) (predicting that “high-automation” vehicles could emerge by 2022 but fully autonomous vehicles may not emerge until 2027).

¹⁹¹ See, e.g., Skanda Vivek, David Yanni & Peter J. Yunker, *Cyber-Physical Risks of Hacked Internet-Connected Vehicles* 4–6 (Mar. 4, 2019) (unpublished manuscript), <https://perma.cc/W5LM-FT2T> (showing how a large, disseminated hack of autonomous vehicles would disrupt traffic in Manhattan).

¹⁹² Chethan K. Srinivasa, *They Started It!*, NAT'L L. REV. (May 30, 2019), <https://perma.cc/8VSV-8HFJ>.

¹⁹³ Certain Auto. GPS Navigation Sys., Components Thereof, & Prods. Containing Same, Inv. No. 337-TA-814, 2012 WL 13046439, at *1 (June 7, 2012) (Final) (Comm'n Determination) (listing General Motors, Ford, Toyota, Chrysler, Honda, Nissan, Hyundai, Volkswagen, Daimler, BMW, and Mazda as respondents); Mathilde Carlier, *Automotive Manufactureres - Estimated Market Share in the U.S. 2020*, STATISTA (Aug. 4, 2021), <https://www.statista.com/statistics/249375/us-market-share-of-selected-automobile-manufacturers/> (displaying respondents' respective market shares).

that major U.S. cities have fully functioning self-driving systems. Because Beacon is the only company that holds such a patent, manufacturers rely on Beacon's licensing and are now left with no alternative.¹⁹⁴

In this hypothetical scenario, the four public interest factors counsel against an exclusion order.¹⁹⁵ Under the competitive-conditions and availability-of-substitutes factors, the lack of an alternative signaling technology gives Beacon the power to extract excessive royalties,¹⁹⁶ which may increase the price of cars. Under the U.S.-consumers prong, car purchasers would either have to pay higher prices or revert to manual cars, the latter of which could be infeasible in cities with fully integrated autonomous cars. Finally, under the "public health and welfare" factor, the temporary shortfall of autonomous-vehicle production as a result of the exclusion order could significantly disrupt the functioning of critical infrastructure because the cities' transportation systems rely on vehicles that communicate with one another through 5G.¹⁹⁷ It is worth noting that this result can arguably be reached without framing it as a national security issue. But the increasing likelihood that the attacker is a malicious foreign state raises the public welfare concern,¹⁹⁸ especially in times of geopolitical conflict.¹⁹⁹

In sum, critical infrastructure—which falls under the ITC's traditional public welfare purview—will extend to new ways of life. The ITC should take notice of such possibilities.

2. Nationwide testing.

Secure 5G development requires that a sufficient number of 5G devices are tested in the network. This quantitative, or "testing," approach is justified by the incentives of several actors. Researchers rely on devices, especially smartphones, to test the

¹⁹⁴ Cf. Mary-Ann Russon, *Carmakers Urge FTC to Fight Qualcomm Ruling*, BBC NEWS (Aug. 24, 2020), <https://perma.cc/MX53-H55Q> (stating that Tesla, Ford, Honda, and Daimler feared that Qualcomm's abusive licensing techniques could soon extend to automotive technology).

¹⁹⁵ A real investigation would entail extensive fact discovery and market-specific inquiries. For illustrative purposes, this Comment makes factual assumptions where appropriate.

¹⁹⁶ See *supra* note 45.

¹⁹⁷ Ibrar Yaqoob, Latif U. Khan, S.M. Ahsan Kazmi, Muhammad Imran, Nadra Guizani & Choong Seon Hong, *Autonomous Driving Cars in Smart Cities: Recent Advances, Requirements, and Challenges*, 23 IEEE NETWORK 174, 175 (2020).

¹⁹⁸ See Yancey, *supra* note 58.

¹⁹⁹ See Myers & Mozur, *supra* note 144.

strength of 5G networks.²⁰⁰ Recognizing this, the U.S. government has invested millions of dollars to deploy mobile 5G platforms in major cities.²⁰¹ Similarly, wireless carriers rely on successful commercial 5G testing to invest in critical 5G infrastructure.²⁰²

In addition to these incentives, there is a national security imperative for 5G device adoption because, compared to 3G and 4G devices, 5G devices are more exposed to foreign adversaries due to the increased surface area of attack.²⁰³ The heightened national security risks make imperative more R&D and testing.²⁰⁴ Therefore, the ITC should consider the quantity of devices affected by an exclusion order and whether the removal of those devices would disrupt nationwide testing of 5G networks.

To date, ITC investigations are ambiguous on this principle. In *Apple-Qualcomm*, ALJ McNamara dismissed infringing iPhones as “common consumer goods . . . [that did] not present . . . [public] safety or welfare concerns.”²⁰⁵ But in the 2011 *Personal Data*²⁰⁶ investigation, the ITC delayed an exclusion order of Android phones because a wireless carrier relied on those devices to build out its 4G network.²⁰⁷ Because the ITC addressed this concern

²⁰⁰ See Arvind Narayanan, Eman Ramadan, Jason Carpenter, Qingxu Liu, Yu Liu, Feng Qian & Zhi-Li Zhang, *A First Look at Commercial 5G Performance on Smartphones 2–10* (2020) (unpublished manuscript), <https://perma.cc/A3FF-23KN> (measuring the performance of 5G networks on smartphones across three U.S. cities to identify successes and challenges in deployment); Ejder Baştuğ, Mehdi Bennis & Mérouane Debbah, *Living on the Edge: The Role of Proactive Caching in 5G Wireless Networks*, 52 IEEE COMM’NS MAG. 82, 82–88 (2014) (conducting two experiments and concluding that predictions of smartphone users’ social networking activity can strengthen 5G networks); Finley, *supra* note 40 (stating that the deployment of nationwide 5G requires hardware makers to create “new devices” that can handle 5G waves).

²⁰¹ *Fact Sheet: Administration Announces an Advanced Wireless Research Initiative, Building on President’s Legacy of Forward-Leaning Broadband Policy*, WHITE HOUSE (July 15, 2016), <https://perma.cc/RJL7-NNCX>; see *supra* note 118.

²⁰² Ferry Grijpink, Tobias Härlin, Harrison Lung & Alexandre Ménard, *Cutting Through the 5G Hype: Survey Shows Telcos’ Nuanced Views*, MCKINSEY & CO. (Feb. 13, 2019), <https://perma.cc/TER3-YHNX>; see also JILL C. GALLAGHER & MICHAEL E. DEVINE, CONG. RSCH. SERV., R45485, FIFTH-GENERATION (5G) TELECOMMUNICATIONS TECHNOLOGIES: ISSUES FOR CONGRESS 22 (2019) (“The availability of 5G devices will drive adoption and revenues for all telecommunications providers. Hence, the availability of equipment and devices is an important factor in the race to 5G.”). *But see* Lewis, *supra* note 180, at 4 (“It is not the number of . . . consumers carrying 5G phones that will drive economic growth.”).

²⁰³ See *supra* Part III.A.

²⁰⁴ See COUNCIL ON FOREIGN RELS., INDEPENDENT TASK FORCE REPORT, NO. 77: INNOVATION AND NATIONAL SECURITY 53–60 (2019) (encouraging the restoration of federal funding for 5G R&D as a national security imperative).

²⁰⁵ *Electronic Devices II*, 2019 WL 2296159, at *11.

²⁰⁶ USITC Pub. 4331 (2011) (Final) (Comm’n Op.).

²⁰⁷ *Id.* at 80–83.

under the competitive-conditions factor, it did not speak to the merits of the testing principle. Rather, it hinged its tailored order on the availability of substitutes to encourage market competition and, thus, 4G development.²⁰⁸

A potential objection to the testing principle is a slippery-slope argument. A company sued for patent infringement will be motivated to invoke the public interest by virtue of its large size: the company produces many devices used in the United States, hence 5G testing will be harmed.²⁰⁹ But the ITC can filter out such frivolous arguments through screening and preliminary reviews.²¹⁰ The burden would be minimal because the ITC already delegates such tasks to the Office of Unfair Import Investigations, an independent arm within the agency.²¹¹ Still, filtering may require some level of discovery, which increases litigation costs.²¹² Whether the benefits of preventing national security harm outweigh these costs requires empirical data beyond the scope of this Comment.

Even if frivolous claims are successfully filtered, how would the ITC resolve claims resting on the 5G testing principle? A recent investigation—*Touch-Controlled Devices*—offers an idea.²¹³ In 2019, an Irish licensing entity filed a complaint alleging that Samsung, Microsoft, Hewlett-Packard, and other major manufacturers imported smartphones, computers, and tablets that infringed its patented touchscreen technology.²¹⁴ Some observers estimated that an exclusion order could have banned 86% of

²⁰⁸ See *id.* at 73–76 (rejecting Google’s arguments that excluding their smartphones would impair research and military applications because there was no evidence that the devices played a “distinct role” compared to other phones).

²⁰⁹ Cf. *id.* at 81 n.56 (rejecting the idea that a patent should be denied protection merely because it discloses technologies in a growing field, as most Section 337 investigations involve “cutting edge technologies”).

²¹⁰ See 19 C.F.R. § 210.9 (requiring the ITC to examine the sufficiency of the complaint and informally inquire into the availability of relevant information).

²¹¹ See *Office of Unfair Import Investigations (OUII)*, U.S. INT’L TRADE COMM’N, <https://perma.cc/XZU2-C9AN> (stating that the OUII reviews sufficiency, recommends to the ITC whether to institute investigations, and conducts preliminary investigations).

²¹² See Aranoff, *supra* note 42 (finding that 2011 procedural rules permitting early public interest inquiries increased discovery costs, despite a provision that instructed ALJs to not allow “such discovery to delay the investigation”) (citing 19 C.F.R. § 210.10(b)(2)).

²¹³ Certain Touch-Controlled Mobile Devices, Comput., & Components Thereof, Inv. No. 337-TA-1162, 2019 WL 2563518, at *1–2 (June 19, 2019) (Inst. of Investigation).

²¹⁴ *Id.*

Windows tablets, 80% of Android tablets, and 50% of Android smartphones in the United States.²¹⁵

Accepting that the claim is not frivolous,²¹⁶ the ITC could deny an exclusion order because of 5G testing impairment. There would be issues under the competitive-conditions and consumers factors because the hypothetical order would exclude all non-Apple devices in the United States. Because Apple was not accused, its iPhones and iPads would serve as noninfringing substitutes. But even accounting for these substitutes, exclusion could eliminate up to 35% of tablets,²¹⁷ 76% of personal computers,²¹⁸ and 60% of smartphones in the United States.²¹⁹ Such a large ban would distort competitive pressures on Apple, increase the prices of iPhones and iPads, and therefore harm consumers. Finally, under the “public health and welfare” factor, the ban would deprive researchers of test applications and wireless carriers of crucial revenue. The resulting delay in 5G innovation could increase cybersecurity risks to foreign adversaries.²²⁰

3. Monocultures.

A 5G monopoly could undermine cybersecurity by diminishing innovation that strengthens the network.²²¹ Therefore, an

²¹⁵ Roslyn Layton, *ITC Exclusion Order Could Threaten Future of 5G*, FORBES (Jan. 6, 2020), <https://perma.cc/4ME9-6488>.

²¹⁶ The parties settled before the ITC could assess whether infringement occurred and whether the public interest warranted an exclusion order. Certain Touch-Controlled Mobile Devices, Comput., & Components Thereof, Inv. No. 337-TA-1162, 2021 WL 509094, at *2 (Feb. 8, 2021) (Termination of Investigation).

²¹⁷ See Lionel Sujay Vailshery, *Market Share of Leading Tablet Device Vendors in the United States from October 2019 to October 2020*, STATISTA (Jan. 22, 2021), <https://www.statista.com/statistics/1120402/market-share-tablet-device-vendors-us> (noting Apple’s 64.6% share, Amazon’s 13.7% share, and Samsung’s 13.5% share). This Comment assumes that the remaining 8.2% is covered by respondents. The sum of 13.7%, 13.5%, and 8.2% is 35.4%.

²¹⁸ See Kyle Alspach, *Lenovo Continues Gains in U.S. PC Market, Microsoft in Top 5*, CRN (Oct. 11, 2018), <https://perma.cc/M5DP-GDA4> (noting Apple’s 13.7% share and respondents’ remaining 76.1% share).

²¹⁹ See *US Smartphone Market Share: By Quarter*, COUNTERPOINT (Nov. 16, 2020), <https://perma.cc/GVE7-PGDH> (noting Apple’s 40% share, Samsung’s 30%, LG’s 13%, and Lenovo’s 6%). This Comment assumes that the remaining 11% is covered by the other respondents. The sum of 30%, 13%, 6%, and 11% is 60%.

²²⁰ See COUNCIL ON FOREIGN RELS., *supra* note 204, at 79 (providing additional and dissenting views) (“The United States can only succeed in mitigating the dangers posed by China’s industrial policies if it innovates faster.”).

²²¹ See Brief of Amicus Curiae Law and Economics Scholars in Support of Appellee and Affirmance at 5–21, *FTC v. Qualcomm Inc.*, 969 F.3d 974 (9th Cir. 2020) (No. 19-16122) (arguing that Qualcomm’s monopolistic conduct “impedes follow-on innovation”).

exclusion order that results in a 5G monopoly could harm the public welfare. Several scholars would readily object and argue that a temporary limited monopoly can be beneficial for innovation and wholly consistent with antitrust principles.²²² This Section does not pretend to resolve this historic debate in antitrust law. But, because the monoculture theory underlies the national security argument in *Apple-Qualcomm*, we explore it as a potential public interest harm that may or may not justify denying an exclusion order. In *Apple-Qualcomm*, ALJ McNamara rejected the theory—but she did not analyze the issue from a cybersecurity framework. This Section fills in the gap and re-examines her reasoning by applying the theory.

As documented by Charles Duan in his law review article, security researchers in the early 2000s developed the theory of “monocultures” to describe the prevalence of computer viruses in Microsoft’s operating system,²²³ which was then considered a monopoly.²²⁴ Because a monopolized system hosted a disproportionate share of users, a single cyberattack could infect the entire internet ecosystem.²²⁵ Thus, greater diversity in online systems offered a “greater possibility of surviving security attacks.”²²⁶ The monoculture theory remains popular today.²²⁷ Preventing monoculture is a cybersecurity concern, thus an exclusion order resulting in a single vendor could be rejected under the “public health and welfare” factor.

A finding of monopoly naturally fits under the competitive-conditions factor.²²⁸ But in 5G investigations, the “public health

²²² See, e.g., Lindsey M. Edwards, Douglas H. Ginsburg & Joshua D. Wright, *Section 2 Mangled: FTC v. Qualcomm on the Duty to Deal, Price Squeezes, and Exclusive Dealing*, 8 J. ANTITRUST ENFT 335, 338–39 (2020); Richard Epstein, *Toward the Peaceful Coexistence of Patent and Antitrust Law*, in THE GLOBAL ANTITRUST INSTITUTE REPORT ON THE DIGITAL ECONOMY 369, 385–91 (Joshua D. Wright & Douglas H. Ginsburg eds., 2020).

²²³ Duan, *supra* note 6, at 396.

²²⁴ See *United States v. Microsoft Corp.*, 253 F.3d 34, 58–80 (D.C. Cir. 2001) (affirming the district court’s finding of monopolization violations under the Sherman Act).

²²⁵ Duan, *supra* note 6, at 396–97.

²²⁶ *Id.* at 397 (citing Yongguang Zhang, Harrick Vin, Lorenzo Alvisi, Wenke Lee & Son K. Dao, *Heterogenous Networking: A New Survivability Paradigm* 33–34 (Sept. 2001) (unpublished manuscript), <https://perma.cc/62WG-JW2K>).

²²⁷ See *id.* at 397–98; NIS COOP. GRP., *CYBERSECURITY OF 5G NETWORKS EU TOOLBOX OF RISK MITIGATING MEASURES* 42–44 (2020), <https://perma.cc/89HH-EBW4>; Dan Geer, Eric Jardine & Eireann Leverett, *On Market Concentration and Cybersecurity Risk*, 5 J. CYBER POL’Y 9, 21–24 (2020).

²²⁸ See Rundong Liu, *Public Interest Factors - A Shared Zone of Antitrust and ITC337 Investigations* 8–22 (Mar. 3, 2014) (unpublished manuscript), <https://perma.cc/3GGF-VBJW> (arguing that antitrust law has always been about innovation and consumer welfare, which overlaps with competitive conditions under the public interest factors).

and welfare” factor should inform the competitive-conditions factor—and vice versa—because of the overlap between national cybersecurity and monopoly. This approach is supported by the monoculture theory and the plain language of Section 337, which places the two factors on the same side of the balancing inquiry.²²⁹

To apply the monoculture theory, we now return to the pilot episode of this Comment—Apple-Qualcomm—with the benefit of hindsight. ALJ McNamara rejected a monopoly-based public interest argument under the competitive-conditions factor because she believed that Intel could remain competitive in the chipset market by selling nonsmartphone devices to non-Apple clients.²³⁰ But her prediction turned out to be wrong: Intel exited the personal computer market in November 2019 in response to the Apple-Qualcomm settlement²³¹—an agreement reached in part because of her recommended exclusion order.²³² And the only non-Apple client she cited for Intel’s future revenue was a Chinese-owned company, Spreadtrum, specifically geared for the Chinese market.²³³ She discounted the Chinese affiliation because she found little evidence that “Spreadtrum would be barred from installing its application processors in smart devices sold in the United States.”²³⁴

²²⁹ See 19 U.S.C. § 1337(d)(1).

²³⁰ *Electronic Devices II*, 2019 WL 2296159, at *18.

²³¹ See Chaim Gartenberg, *Intel Says Apple and Qualcomm’s Surprise Settlement Pushed It to Exit Mobile 5G*, THE VERGE (Apr. 25, 2019), <https://perma.cc/4K6J-L5R6> (stating that Intel sold its 5G smartphone chipset business because Apple and Qualcomm settled for a new business deal); Jeremy Horwitz, *Intel Picks MediaTek as 5G PC Modem Supplier After Selling Chip Unit*, VENTURE BEAT (Nov. 25, 2019), <https://perma.cc/4N7Z-97CH> (reporting that Intel stopped making its own 5G modems for PCs and, instead, selected modems manufactured by MediaTek, a Taiwanese rival chip supplier, likely because of the “transfer of its 5G assets” resulting from the Apple-Qualcomm settlement).

²³² Because ALJ McNamara’s recommendation was released on March 26, 2019, and the settlement occurred just two weeks after, it is possible that Apple settled in part because it feared that the ITC would adopt her recommendation. Certain Mobile Elec. Devices & Radio Frequency Processing Components Thereof (II), Inv. No. 337-TA-1093, 2019 WL 2058009, at *4 (Mar. 26, 2019) (Initial Determination); *Qualcomm and Apple Agree to Drop All Litigation*, *supra* note 15. But see Ian King & Mark Gurman, *Apple Puts Need for 5G Ahead of Legal Fight in Qualcomm Deal*, BLOOMBERG (Apr. 16, 2019), <https://perma.cc/CWS5-5TK4> (surmising that Apple might have settled because it realized that Intel’s 5G chipsets would not be ready for the next iPhone release).

²³³ See *Electronic Devices II*, 2019 WL 2296159, at *18 (stating that “there are other manufacturers who also use standalone modems in smartphones” but only specifying Spreadtrum as an example); *Intel and Unigroup Spreadtrum & RDA Announce 5G Strategic Collaboration*, INTEL (Feb. 22, 2018), <https://perma.cc/LJ9S-PG6W> (noting that Intel and Spreadtrum had teamed up to develop a 5G mobile platform for the “China market,” not the U.S. market).

²³⁴ *Electronic Devices II*, 2019 WL 2296159, at *18 n.29.

Her reasoning was flawed because she failed to factor in the national security risk that a Chinese-owned smartphone in the U.S. market could expose sensitive data to the Communist Party.²³⁵ In fact, just one year after her determination, Intel and Spreadtrum canceled their business deal because of the U.S.-China trade wars.²³⁶ Perhaps if she realized this, she would have found sufficient evidence that Intel would have had to leave the market for lack of revenue, therefore leaving Qualcomm as a monopoly. The resulting monoculture would have then implicated broader concerns of cybersecurity harm under the “public health and welfare” factor.²³⁷

Critics argue that this approach inevitably punishes companies like Qualcomm simply for achieving more success than companies like Intel.²³⁸ Therefore, it incentivizes companies to free ride off others’ patents and request the ITC to rescue them. This slippery slope argument is not without merit. 5G will cover more industries than ever before,²³⁹ and it would be unwise to categorically excuse a company of patent infringement simply because it is a major contributor to 5G. Because 5G markets are inherently oligopolistic,²⁴⁰ this logic would open up public interest challenges to almost every ITC investigation and unduly harm patent interests.

²³⁵ See DEF. INNOVATION BD., *supra* note 54, at 25–26 (finding evidence of backdoors and security vulnerabilities in a variety of Chinese-made devices).

²³⁶ See Michael Herh, *Intel’s Break-Up with Tsinghua Unigroup May Benefit Samsung Electronics*, BUS. KOREA (Mar. 1, 2019), <https://perma.cc/PF6P-2NFW> (explaining that Intel halted its 5G modem partnership with Spreadtrum, a Chinese company backed by the Chinese government, because of the recent U.S.-China trade war).

²³⁷ See Fan & Yang, *supra* note 43, at 101 (“[R]emoving a [smartphone] product leads to a decrease in total welfare, even considering the maximum possible saving in the fixed cost.”).

²³⁸ See Michel et al., *supra* note 34 at 9 (criticizing the use of public interest factors to “pick[] winners and losers” in nascent technology markets); Dan Schneider, *Why the ITC’s Bizarre Interpretation of Property Rights Matters*, REALCLEARMARKETS (Nov. 7, 2018), https://www.realclearmarkets.com/articles/2018/11/07/why_the_its_bizarre_interpretation_of_property_rights_matters_103481.html (lamenting that ALJ Pender’s decision means that “[w]e are all socialists today”); Kristen J. Osenga & Adam Mossoff, *The Use and Abuse of the “Public Interest” in the ITC and in Article III Courts: Public Interest Comment in 337-ITC-1065*, at 12–13 (Feb. 7, 2019) (unpublished manuscript), <https://perma.cc/2TZM-2FYZ> (arguing that national security concerns were “wrongly applied in [Apple-Qualcomm]” because the weakening of Qualcomm’s patent rights reduces 5G innovation).

²³⁹ See WORLD ECON. F., *THE IMPACT OF 5G: CREATING NEW VALUE ACROSS INDUSTRIES AND SOCIETY* 12–17 (2020), <https://perma.cc/YPV7-PU9G> (describing 5G case studies in health care, energy, and other industries).

²⁴⁰ See *supra* note 43.

But a categorical approach in the other direction is equally unwise. First, Congress included the public interest—factors provision in Section 337 precisely because it recognized that other interests may sometimes trump patent ones.²⁴¹ A failure to consider 5G can leave the country vulnerable to exclusion orders that place lives in harm's way. Second, the ITC can filter genuine cybersecurity risks from frivolous ones by relying on economic experts and interagency consultation. Third, the criticism presumes a long-term strategy that is highly unlikely to succeed because 5G markets are dynamic in the short term and ITC public interest proceedings are case specific and relatively unpredictable. Fourth, government interference with markets to preserve competition is not an uncommon government mandate in the telecommunications industry, precisely because of its oligopolist tendencies.²⁴² If the ITC finds credible evidence of antitrust harm, it is uniquely justified in saving Intel because no other agency is similarly situated to step in.²⁴³ Semiconductors and smartphones involve a patent-based international supply chain, thus exclusively falling under the agency's Section 337 purview. Only the ITC can prevent the nascent 5G submarket from reverting to a monopoly before it is too late.

CONCLUSION

When Qualcomm filed Section 337 complaints against Apple in 2017 and 2018, it seemed to be just another patent war between technology giants. Since the 1974 Act, the ITC has summarily resolved such complaints by issuing exclusion orders against patent-infringing imports. Although Section 337 mandates that the ITC consider how an order would affect the public interest factors, the ITC rarely finds that these factors outweigh the benefits of patent enforcement.²⁴⁴

But 5G technology is a transformative asset that presents serious national security risks.²⁴⁵ These public health and welfare concerns transform ordinary smartphone investigations into ones

²⁴¹ See *supra* Part II.

²⁴² See *supra* notes 102–04 and accompanying text.

²⁴³ Section 232, conducted under the Trade Expansion Act of 1962, addresses imports that “threaten to impair the national security.” See 19 U.S.C. § 1862(b)–(c) (authorizing the Department of Commerce—after consulting with the secretary of defense—to investigate such imports and the president to block such imports). By contrast, Section 337 addresses circumstances where the blocking of imports threatens to impair national security.

²⁴⁴ See *supra* notes 33–35 and accompanying text.

²⁴⁵ See *supra* Part I.C.

requiring closer scrutiny. Accordingly, ALJ Pender determined in Apple-Qualcomm that national security was a public interest consideration that overrode Qualcomm's patent interests.²⁴⁶

The ITC is authorized to consider national security in Section 337 investigations because the "public health and welfare" factor includes national security. The ordinary meaning of "welfare" covers physical well-being, and it extends to national security because the term is not expressly limited to matters within the United States. The relevant provision in the Act and the relevant portion of the U.S. Code reference innovation-related national security activity. A broad reading of the public welfare factor accords with the policy nature of public interest factors and the statute's protectionist mission. These arguments would likely withstand *Chevron* review at the Federal Circuit.

The ITC's broad authority to consider national security should be tempered by the desire not to unduly interfere with emerging markets. But the language of the public interest factors and the agency's complete lack of guidance in this area leaves open the possibility for misguided interference.²⁴⁷ Therefore, this Comment proposes a cybersecurity framework to guide the public interest analysis of 5G development threats—either through an ALJ or ITC written opinion or through a general policy statement. Under the "public health and welfare" factor, it asks an ALJ or ITC to identify 5G threats to (1) critical infrastructure, (2) nationwide testing, and (3) monocultures. By adopting this framework, the ITC will be better equipped to adjudicate the next generation of Section 337 claims.

²⁴⁶ See *supra* note 67 and accompanying text.

²⁴⁷ See *supra* notes 170–71 and accompanying text.