

ESSENTIAL FACILITIES, ESSENTIAL PATENTS, AND THE ESSENTIAL OVERSIGHT OF *QUALCOMM*

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I. INTRODUCTION

In the United States today, almost everyone owns a cellphone.¹ As the cellular technology behind these devices has improved and smartphones have come to dominate the cellular market, average users rely on their phones for more and more activities—from calling and texting to translating between languages and navigating city streets in real time. But despite this ubiquitous reliance, most users have very little technical understanding of how their cellphones actually do what they do.

One important piece of cellphone functionality is the cellphone’s ability to communicate with other devices. Whether it is connecting a call to another telephone or transferring high-speed data to a large server, the phone is rendered useless if it cannot perform this communication function. Interoperability between different networks and phone manufacturers is paramount.

With so many different firms operating in the cellular communications industry (from network owners like AT&T to phone makers like Apple), interoperability has been facilitated by the development of communications standards.² To date, there have been four “generations” of cellular communications standards: 1G, 2G, 3G, and 4G.³ 1G standards supported

DOI: <https://doi.org/10.15779/Z38000016>

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† J.D. 2022, University of California, Berkeley, School of Law. I would especially like to thank Professor Talha Syed and Student Advisor Carmen Sobczak for their invaluable suggestions and guidance throughout the research, writing, and editing process. My sincere thanks also to my fellow students in the 2020 Law & Technology Writing Workshop at Berkeley Law and the Berkeley Technology Law Journal editors.

1. In 2019, 96% of Americans owned a cell phone. 81% of these were smartphones. *Mobile Fact Sheet*, PEW RSCH. CTR. (Apr. 7, 2021), <https://www.pewresearch.org/internet/fact-sheet/mobile> [https://perma.cc/55PL-6HGA].

2. See Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CALIF. L. REV. 1889, 1896 (2002) (discussing consumer benefits of standards in many markets); A. Douglas Melamed & Carl Shapiro, *How Antitrust Law Can Make FRAND Commitments More Effective*, 127 YALE L.J. 2110, 2111 (2018) (“[M]any of the benefits generated by the recent and dramatic advances in information technology would have been difficult or impossible to achieve without compatibility standards.”).

3. Complaint at 6, Fed. Trade Comm’n v. Qualcomm, Inc., 411 F. Supp. 3d 658 (N.D. Cal. 2019) (No. 5:17-cv-00220). In addition, 5G is right around the corner. Sascha Segan, *What*

only the analog transmission of calls; the currently dominant 4G standard supports the high-speed data transfers so important to smartphones today.⁴ Phones must comply with one or more standards to communicate with other devices.

Qualcomm, a multinational technology company, is a major player in two parts of the cellular technology market. First, Qualcomm holds thousands of patents that cover all kinds of important cellular technology.⁵ It earns money from these patents by entering into licensing agreements and collecting royalties from parties that want to use the patented technologies. Some of Qualcomm's patents are standard-essential patents (SEPs). This label means that the technology covered by these patents has been deemed an essential component of a cellular communications standard.⁶ Qualcomm has SEPs that cover technologies in 2G, 3G, and 4G standards.⁷

Second, Qualcomm is one of the largest manufacturers of the baseband processors ("chips") that go into smartphones.⁸ Like smartphones, chips must comply with one or more standards. "While the chips themselves do not enable all of the functionality specified by the standard (e.g., one does not actually speak into a modem chip to make a phone call), these highly complex chips *do* embody the principal technical features of the standard."⁹ Thus, Qualcomm's chips contain the 2G, 3G, or 4G technology covered by its SEPs, depending on the type of chip. In that sense, the chips are downstream from Qualcomm's patents. Though there are competing chip manufacturers, Qualcomm has maintained clear dominance in multiple chip markets for over a decade.¹⁰ Qualcomm sells its chips to original equipment manufacturers (OEMs), like Apple, who make smartphones or other smart devices.¹¹

Is 5G?, PCMag (Nov. 24, 2020), <https://www.pcmag.com/news/what-is-5g> [<https://perma.cc/7ZLP-6WN7>].

4. Complaint, *supra* note 3, at 6.

5. *Qualcomm Welcomes the Court of Appeals' Complete, Unanimous Reversal of the District Court's Judgment in the FTC Case*, QUALCOMM, <https://www.qualcomm.com/ftc> [<https://perma.cc/9DDD-C46N>] (noting that Qualcomm holds 140,000 patents).

6. Fed. Trade Comm'n v. Qualcomm, 969 F.3d 974, 983 (9th Cir. 2020).

7. Complaint, *supra* note 3, at 13–14.

8. *Id.* at 9.

9. Brief of *Amicus Curiae* Professor Jorge L. Contreras in Support of Appellee and Affirmance at 13, Fed. Trade Comm'n v. Qualcomm, 969 F.3d 974 (9th Cir. 2020) (No. 19-16122).

10. See Fed. Trade Comm'n v. Qualcomm, Inc., 411 F. Supp. 3d 658, 690, 695 (N.D. Cal. 2019) (concluding that Qualcomm has monopoly power in Code Division Multiple Access (CDMA) and Long-Term Evolution (LTE) modem chips).

11. Qualcomm, 969 F.3d at 985.

It is against this backdrop that the Federal Trade Commission (FTC) filed its antitrust case against Qualcomm. Described as “one of the most important antitrust cases of the twenty-first century,” the case was closely watched by the media, industry players, and economists.¹² Throughout the litigation, these actors, plus former government officials, the Antitrust Division of the Department of Justice, and law professors, weighed in as *amici* on both sides.¹³

This Note discusses two of Qualcomm’s business practices that the FTC alleged were in violation of antitrust law.¹⁴ First and most relevant was Qualcomm’s practice of not offering patent licensing agreements to its rival chipmakers. Second was Qualcomm’s “no license, no chips” (NLNC) policy, under which Qualcomm refused to sell chips to an OEM unless that OEM agreed to enter into a patent licensing agreement and pay royalties to Qualcomm based on the price of the final product, the smartphone.

The District Court for the Northern District of California agreed with the FTC that both practices harmed competition and violated antitrust law.¹⁵ In May 2019, the court enjoined Qualcomm from engaging in these practices.¹⁶ On August 11, 2020, the Ninth Circuit summarily reversed the district court.¹⁷ It held that none of Qualcomm’s practices violated antitrust law, and it criticized much of the district court’s analysis as contrary to accepted legal standards.¹⁸ The two decisions are polarizing, to say the least. Some commentators applaud the Ninth Circuit for correctly reining in an

12. *See, e.g.*, Brief of 46 Amici Curiae Law and Economics Scholars in Support of Petition for Rehearing En Banc at 2, Fed. Trade Comm’n v. Qualcomm, Inc. 969 F.3d 974 (9th Cir. 2020) (No. 19-16122).

13. *See* Docket No. 19-16122, Fed. Trade Comm’n v. Qualcomm, Inc. 969 F.3d 974 (9th Cir. 2020) (listing over twenty amicus briefs submitted to the Ninth Circuit before its ruling).

14. The FTC also challenged Qualcomm’s exclusive dealing agreements with Apple. Complaint, *supra* note 3, at 24. This Note does not discuss the exclusive dealing agreements though the district court and the Ninth Circuit disagreed on this front also.

15. Fed. Trade Comm’n v. Qualcomm, 411 F. Supp. 3d 658, 762, 743 (N.D. Cal. 2019) (finding Qualcomm had a duty to license its rivals and anticompetitively harmed OEMs).

16. *Id.* at 818.

17. Qualcomm, 969 F.3d at 987.

18. *Id.* at 987, 992.

overreaching district court;¹⁹ others argue that the Ninth Circuit's reasoning grossly muddied the waters of antitrust law and will lead to future confusion.²⁰

While this Note agrees with the outcome in the district court, its central critique is that neither the Ninth Circuit nor the district court properly factored Qualcomm's SEPs into the antitrust analysis.

This Note argues that *Qualcomm*²¹ should have utilized the essential facilities doctrine, an antitrust theory of liability not mentioned in either court's decision.²² The essential facilities doctrine appropriately accounts for Qualcomm's activity in two parts of the cellular market (patents and chips) and provides a framework through which to analyze the power of Qualcomm's SEPs. Had the courts applied this doctrine, the Ninth Circuit may have reached the opposite result and the district court may have reached the same result in a better way. This Note applies the elements of the essential facilities doctrine to the facts of *Qualcomm*. Even though this is a backward-looking exercise,²³ it illustrates how courts and parties should use the essential facilities doctrine as a tool of analysis in future antitrust cases involving SEPs and standards-dominated markets.

19. See, e.g., Douglas H. Ginsburg, Joshua D. Wright & Lindsey M. Edwards, *Section 2 Mangled: FTC v. Qualcomm on the Duty to Deal, Price Squeezes, and Exclusive Dealing* 1 (George Mason L. & Econ. Rsch. Paper Series, No. 19-21), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3433564 (describing the district court's ruling as an "inappropriate extension of antitrust liability"); Matthew M. Martino, Tara L. Reinhart, Steven C. Sunshine & Julia K. York, *Ninth Circuit Strikes Down Sweeping Injunction Against Qualcomm and Reins in Expansive Interpretation of Sherman Act*, SKADDEN (Aug. 14, 2020), <https://www.skadden.com/insights/publications/2020/08/ninth-circuit-strikes-down-sweeping-injunction> [<https://perma.cc/2NND-BVHW>].

20. See, e.g., Alex Moss, *Throwing Out the FTC's Suit Against Qualcomm Moves Antitrust Law in the Wrong Direction*, ELEC. FRONTIER FOUND. (Aug. 26, 2020), <https://www.eff.org/deeplinks/2020/08/throwing-out-ftcs-suit-against-qualcomm-moves-antitrust-law-wrong-direction>.

21. This Note uses "*Qualcomm*" to refer to the litigation as a whole, in both the district court and the Ninth Circuit. When referring to either the Ninth Circuit or the district court decision alone, the court will be identified.

22. Based on a non-exhaustive review of the record, it seems the essential facilities doctrine was also not mentioned in the underlying briefing; except for a cursory mention on page 101 of Qualcomm's motion for leave to file an enlarged opening brief. See Appellant's Unopposed Motion for Leave to File an Enlarged Opening Brief at 101, Fed. Trade Comm'n v. Qualcomm, 969 F.3d 974 (9th Cir. 2020) (No. 19-16122) ("As to chip sales to OEMs, the Sherman Act would not compel Qualcomm to sell chips to an OEM at all—because Qualcomm is not an essential facility and unquestionably has no antitrust 'duty to deal' with OEMs.").

23. On October 28, 2020, the Ninth Circuit denied the FTC's petition for rehearing en banc, marking the end of the three-year litigation. Order, Fed. Trade Comm'n v. Qualcomm, 969 F.3d 974 (9th Cir. 2020) (No. 1916122).

This Note will proceed as follows. Part II will provide background on Qualcomm’s business model, as well as antitrust and patent law concepts relevant for analyzing *Qualcomm*. Part III will discuss and compare the holdings and reasoning of the two *Qualcomm* decisions. Part IV will introduce the essential facilities doctrine and make the case for its application to *Qualcomm* while also addressing criticisms of the doctrine and demonstrating how it might have affected the *Qualcomm* analysis. Part V concludes, noting the future applicability of the essential facilities doctrine in the SEP context.

II. BACKGROUND

The complexity of *Qualcomm* (and its significance) stems from Qualcomm’s unique market position, which implicates antitrust law, patent law, and standard setting. This Part clarifies that complexity, laying the groundwork for the discussion and critique of the *Qualcomm* decisions in Parts III and IV. To that end, Section II.A describes in greater detail the two business practices at issue in *Qualcomm*—Qualcomm’s “no license, no chips” policy and its refusal to license its SEPs to rival chipmakers. Section II.B turns to the legal background, first introducing the basic antitrust law framework governing *Qualcomm* and then discussing the law on unilateral refusals to deal. Section II.C turns to the patent issues at play in *Qualcomm*. First, it provides a primer on the relationship between antitrust and patent law. Then, it describes the standard-setting landscape in which Qualcomm’s patents gained SEP-status, a landscape that both courts drew on in their analysis of Qualcomm’s business practices.

A. QUALCOMM’S BUSINESS MODEL

Qualcomm is a San Diego-based company that manufactures semiconductors and software components used in all kinds of wireless technology, from cell phones to smart cars.²⁴ Qualcomm possesses a large patent portfolio relating to its technologies.²⁵ Some of these patents are cellular SEPs needed to practice 3G Code Division Multiple Access (CDMA) and 4G Long-Term Evolution (LTE) telecommunications standards.²⁶

Two-thirds of Qualcomm’s company value comes from its patent licensing business.²⁷ In addition, it has a successful business manufacturing and selling

24. *About Qualcomm*, QUALCOMM, <https://www.qualcomm.com/company/about> [<https://perma.cc/HCD9-E6LN>] (last visited Feb. 26, 2021).

25. Fed. Trade Comm’n v. Qualcomm, 411 F. Supp. 3d 658, 672 (N.D. Cal. 2019).

26. Fed. Trade Comm’n v. Qualcomm, 969 F.3d 974, 983 (9th Cir. 2020). Qualcomm’s patents include cellular SEPs (the topic of this Note), non-cellular SEPs, and non-SEPs.

27. *Id.*

cellular modem chips that incorporate its patents.²⁸ This posture is unique in the industry—most companies with comparable patent portfolios do not manufacture chips, and vice versa.²⁹ And Qualcomm has considerable market share in both markets. Until 2016, its chips represented 90% of the CDMA chip market and 70% of the LTE chip market.³⁰ Qualcomm also commands 25% of global patent licensing revenue in the cellular handset space and more than 50% in the modem chip market.³¹

Qualcomm sells its chips to OEMs on the condition that OEMs enter into patent licensing agreements. This is referred to as Qualcomm’s “no license, no chips” (NLNC) policy. OEMs pay Qualcomm a running royalty of 5% of the price of the handset, the cellular phone sold by the OEM.³² It is estimated that Qualcomm makes about twenty dollars on every smartphone sold.³³

Qualcomm does not offer patent licensing agreements to rival chipmakers. Instead, it enters into “CDMA ASIC Agreements” with these competitors, who practice Qualcomm’s SEPs “by necessity.”³⁴ These agreements provide that Qualcomm “promises not to assert its patents in exchange for the company promising not to sell its chips to unlicensed OEMs.”³⁵ In addition, they impose “reporting requirements that allow Qualcomm to know the details of its rivals’ chip supply agreements with various OEMs.”³⁶ In exchange, rivals are permitted to practice Qualcomm’s SEPs royalty-free.³⁷ Unlike a traditional license, these agreements constrict rivals’ customer base to OEMs licensed with Qualcomm, rather than any OEM willing to purchase a rival chip. Together, the ASIC Agreements and NLNC policy ensure that any OEM who purchases a chip with embedded Qualcomm technologies will pay royalties to Qualcomm, regardless of whether the OEM buys the chip from Qualcomm or a rival chipmaker.

28. *Id.*

29. *Id.*

30. *Id.*

31. Qualcomm, 411 F. Supp. 3d at 674.

32. *Id.* at 673.

33. Rick Merritt, *Apple Reveals Qualcomm Patent Fees*, EETIMES (Jan. 14, 2019), <https://www.eetimes.com/apple-reveals-qualcomm-patent-fees/> (noting also that the exact fee depends on the particular licensing agreement).

34. *Qualcomm*, 969 F.3d at 984. ASIC stands for “application-specific integrated circuit,” and is another term for a modem chip.

35. *Id.*

36. *Id.* at 984–85.

37. *Id.*

The FTC challenged both Qualcomm's NLNC policy towards OEMs and its refusal to license its patents to rivals. The FTC alleged that Qualcomm's behavior was anticompetitive, violating sections 1 and 2 of the Sherman Act.³⁸

B. RELEVANT ANTITRUST LAW CONCEPTS

1. *The Sherman Act and the Rule of Reason*

The Sherman Antitrust Act of 1890 was the first U.S. antitrust legislation.³⁹ Section 1 makes “[e]very contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce” illegal.⁴⁰ Section 2 makes it illegal to “monopolize, or attempt to monopolize, or combine or conspire . . . to monopolize any part of the trade or commerce”⁴¹ In general, section 1 targets “concerted anticompetitive conduct” and section 2 targets “independent anticompetitive conduct,”⁴² though sometimes a firm is held independently liable for conduct that violates section 1, as Qualcomm was in the district court decision.⁴³ Like *Qualcomm*, this Note focuses on the independent conduct (also referred to as unilateral or monopolizing conduct) targeted by section 2.⁴⁴

In part because the Sherman Act's language is so broad, the debate about antitrust enforcement has been a debate over the proper scope and application of the law. That debate continues to this day. No one doubts that antitrust law

38. The FTC also alleged that Qualcomm violated section 5 of the FTC Act. Section 5 allows the FTC to prosecute a wider range of “unfair methods of competition” that may not incur Sherman Act liability but violate the spirit of the law. Because the district court found Qualcomm liable under Sherman Act sections 1 and 2, it did not specifically analyze Qualcomm's liability under the FTC Act. *Fed. Trade Comm'n v. Qualcomm*, 411 F. Supp. 3d 658, 812 (N.D. Cal. 2019); *see also* 15 U.S.C. § 45.

39. 15 U.S.C. §§ 1–38. Antitrust law gained a foothold in the United States in the late nineteenth century, in part as a response to the increasing consolidation in the railroads and other industries. *See* Lina Khan, *Amazon's Antitrust Paradox*, 126 *YALE L.J.* 710, 739 (2017).

40. 15 U.S.C. § 1.

41. 15 U.S.C. § 2.

42. *Qualcomm*, 969 F.3d at 989–90 (emphasis removed).

43. *Qualcomm*, 411 F.3d at 812 (holding Qualcomm alone liable under section 1 for its licensing practices). Note that the district court did not clarify which theories of liability violated which Sherman Act section; it simply found that Qualcomm had violated both sections 1 and 2. *Id.* The *Qualcomm* decisions have been criticized for conflating the section 1 and 2 standards of liability. *See, e.g.*, Thomas F. Cotter, *Two Errors in the Ninth Circuit's Qualcomm Opinion*, *PATENTLY-O PAT. L.J.* (2020).

44. Liability under the essential facilities doctrine is generally thought to fall under Sherman Act section 2. However, as discussed in Part IV.A below, the inquiry under the essential facilities doctrine is distinct from the inquiry under other types of section 2 liability.

should protect and promote healthy competition—rather, the disagreement is over how best to do that and what healthy competition even looks like.⁴⁵

As early as 1911, only twenty-one years after the passage of the Sherman Act, the Supreme Court transitioned from enforcing it literally (finding that *any* agreement that on its face restrained trade or *any* act of monopolization violated the Sherman Act), to using a “rule of reason” framework to analyze alleged antitrust violations.⁴⁶ In its simplest expression, this framework means that only *unreasonable* or *unlawful* contracts in restraint of trade or acts of monopolizing will be punished under sections 1 or 2.⁴⁷ For alleged unilateral violations, the question then becomes: what is an unreasonable or unlawful act of monopolizing? There is no easy answer, nor is the standard courts use to evaluate unilateral conduct easy to articulate without falling into tautology.⁴⁸ In general, courts will look to the circumstances of the case and the effects on the market to decide whether a practice is reasonable or unreasonable under the Sherman Act.⁴⁹ The rule of reason framework guides this inquiry.

A “threshold step” for analyzing unilateral conduct under the rule of reason framework is to define the “relevant market” for antitrust purposes.⁵⁰ This narrows the field of vision, allowing courts to “focus on anticompetitive effects in the market where competition is allegedly being restrained.”⁵¹ Injuries that occur outside the relevant market, even if caused by the allegedly anticompetitive behavior, are “beyond the scope of antitrust law.”⁵² One way

45. Though beyond the scope of this Note, the debate is currently dominated by two camps—those who advocate adhering to the currently dominant Chicago School-driven consumer welfare approach to antitrust and those who advocate expanding this understanding of consumer welfare and market competition to better account for dynamic competition in modern markets. On the latter side, see, for example, Khan, *supra* note 39, at 710 (“[P]egging competition to ‘consumer welfare’ . . . is unequipped to capture the architecture of market power in the modern economy.”); Maurice E. Stucke, *Reconsidering Antitrust’s Goals*, 53 B.C. L. REV. 551, 556 (2012) (“[D]efining the goals of antitrust is paramount: [e]verything else follows from the answer we give.” (internal citation omitted)).

46. *See* Standard Oil Co. v. United States, 221 U.S. 1, 62 (1911).

47. *Id.* at 87. This was a departure from the previously capacious interpretation of the Sherman Act. *See id.* at 83 (Harlan, J., concurring) (noting that those who remember the condition of the country in 1890 remember that the concern was the aggregation of capital, and thus the Court previously rejected attempts to limit the Sherman Act with a rule of reason).

48. Stucke, *supra* note 45, at 569 (“Antitrust becomes a tautology. The goal of competition law is ‘promoting competition by discouraging anti-competitive behaviour.’”).

49. Fed. Trade Comm’n v. Qualcomm, 969 F.3d 974, 989 (9th Cir. 2020) (“The rule of reason requires courts to conduct a fact-specific assessment of market power and market structure to assess the . . . *actual* effect on competition.” (internal citations omitted)).

50. *Id.* at 992.

51. *Id.* (internal citations omitted).

52. *Id.* at 993.

of identifying the relevant market is the “hypothetical monopolist” test.⁵³ Courts ask whether a hypothetical monopolist could profitably impose a small but significant and non-transitory price increase (SSNIP) on the proposed market without losing its monopoly.⁵⁴ If the answer is yes, then the proposed market is a relevant market for antitrust purposes. But if the imposition of an SSNIP would cause customers to leave the hypothetical monopolist, the proposed market definition is too narrow.⁵⁵

Once the relevant market is identified using this hypothetical, the court will analyze whether the defendant actually held market power in the relevant market.⁵⁶ Market power means the dominant firm has the ability to “profitably raise prices substantially above the competitive level.”⁵⁷ Courts often use market share as a proxy for market power, though large market share may not always correlate with market power, and vice versa.⁵⁸ Other factors such as barriers to entry (the costs for a competitor to enter the market and compete) may be relevant to whether or not a firm possesses market power.⁵⁹ In antitrust, market power and monopoly power are often used interchangeably, as both indicate control over price. For a firm to be a monopolist for antitrust purposes, it must have this pricing power (with market share often used as a proxy), but it does not need to be the only player in the market.⁶⁰

After establishing that the defendant had market power in the relevant market, courts engage in a three-part burden-shifting framework to analyze allegations of unilateral anticompetitive conduct.⁶¹ First, the plaintiff must

53. HERBERT HOVENKAMP, PRINCIPLES OF ANTITRUST 67–69 (2nd ed. 2017) [hereinafter HOVENKAMP, PRINCIPLES OF ANTITRUST]; Fed. Trade Comm’n v. Qualcomm, Inc., 411 F. Supp. 3d 658, 684 (N.D. Cal. 2019).

54. *Qualcomm*, 411 F. Supp. 3d at 684.

55. *Id.* If customers leave, it suggests that there are available substitutions to the product such that even the hypothetical monopolist could not impose an SSNIP. Therefore, the market definition needs to be expanded to include these substitute products, since the hypothetical monopolist would need a monopoly over the substitutes to impose the SSNIP successfully. See Herbert Hovenkamp, *FRAND and Antitrust*, 105 CORNELL L. REV. 1683, 1707 (2020) [hereinafter Hovenkamp, *FRAND*] (“Any factor that limits substitution . . . can result in a narrower market definition.”).

56. *Qualcomm*, 411 F. Supp. 3d at 684.

57. *Id.*

58. *Id.*

59. *Id.* at 684–85. The higher the barrier the entry, the more likely a firm already in the market will possess market power.

60. Qualcomm exemplifies this. In chips, Qualcomm has monopoly power for purposes of antitrust law, without fitting into the colloquial idea of a monopolist (a firm completely without competitors in the market).

61. *Qualcomm*, 411 F. Supp. 3d at 695; Fed. Trade Comm’n v. Qualcomm, 969 F.3d 974, 991 (9th Cir. 2020).

show that the defendant's exclusionary conduct (also referred to as anticompetitive conduct) had an anticompetitive effect in the relevant market. Next, if the plaintiff satisfies its burden, the defendant must proffer a non-pretextual procompetitive justification for its exclusionary conduct. Last, the plaintiff must either rebut the procompetitive justification or show that the anticompetitive harms of the exclusionary conduct outweigh its procompetitive benefits.⁶²

What qualifies as an anticompetitive effect is up for debate.⁶³ In *Qualcomm*, the Ninth Circuit and the district court defined an anticompetitive effect as one that "harm[s] the competitive process and thereby harm[s] consumers," not just competitors.⁶⁴ The district court noted that possible anticompetitive effects might include "reduced output, increased prices, or decreased quality in the relevant market."⁶⁵ Overall, the process of identifying the relevant market, establishing market power, and engaging in a full rule of reason analysis can be an extremely complex, intensive, and burdensome undertaking.

2. *Unilateral Refusals to Deal*

Over time, categories of suspect unilateral conduct have emerged. Unilateral refusals to deal are one such category. While a firm's refusal to deal may be suspect, it only violates antitrust law if it is *anticompetitive*, which courts will assess using the rule of reason framework. This is how the courts in *Qualcomm* analyzed Qualcomm's refusal to license its rivals.

There is no general antitrust duty to deal with rivals "[i]n the absence of any purpose to create or maintain a monopoly."⁶⁶ In general, competitors can deal with rivals (or refuse to) as they please. Courts are hesitant to impose a duty to deal, in part because "compelled sharing may actually provide opportunities for collusion, which is the 'supreme evil of antitrust.'"⁶⁷

62. *Qualcomm*, 969 F.3d at 991–92.

63. What constitutes "anticompetitive" can change based on one's definition of consumer welfare. See Stucke, *supra* note 45, at 576. While there is general agreement (based on Chicago School theories) that higher prices and lower output are anticompetitive effects, other schools of thought would include noneconomic effects or scrutinize other aspects of the overall market. See, e.g., Khan, *supra* note 39, at 803 ("[C]urrent law underappreciates . . . how integration across distinct business lines may prove anticompetitive."). These debates are beyond the scope of this Note but will prove very important for antitrust law in the years to come.

64. *Qualcomm*, 969 F.3d at 990 (emphasis removed); *Qualcomm*, 411 F. Supp. 3d at 797.

65. *Qualcomm*, 411 F. Supp. 3d at 696.

66. *United States v. Colgate & Co.*, 250 U.S. 300, 307 (1919).

67. *Aerotec Int'l, Inc. v. Honeywell Int'l, Inc.*, 836 F.3d 1171, 1183 (9th Cir. 2016) (internal citation omitted).

However, in very limited circumstances, courts will impose a duty to deal on a firm whose refusal to deal is determined to be anticompetitive.

One such limited circumstance is recognized in *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*⁶⁸ In this case, Aspen Skiing operated three ski areas, while Aspen Highlands Skiing operated only one.⁶⁹ Though previously the companies collaborated through selling four-mountain ski passes, splitting the profits based on usage, Aspen Skiing terminated this agreement and began selling its own three-area passes.⁷⁰ Since three-mountain passes were more desirable for consumers than one-mountain passes, the competitor resort successfully argued that it was being squeezed out of business.⁷¹ From this case came the *Aspen Skiing* exception, which imposes a duty to deal on a competitor who 1) terminates a profitable prior course of dealing and 2) whose only conceivable reason for the termination is to sacrifice short-term benefits for the long-term benefit of excluding competition.⁷²

In the past, the Supreme Court also imposed a duty to deal where a vertically integrated⁷³ firm denied service to a downstream customer with which it competed. Imposing a duty to deal in these circumstances was in part based on leverage theory, which posits that a firm could use “dominance in one line of business to establish dominance in another.”⁷⁴ *Otter Tail Power* exemplifies this approach.⁷⁵ Otter Tail owned the only local power transmission lines and operated as the exclusive retail power seller in 465 towns.⁷⁶ When Otter Tail’s contracts ended, some towns voted to establish their own municipal retail power systems.⁷⁷ Otter Tail refused to sell wholesale power to these municipal systems and engaged in extensive litigation against them to maintain its status in the retail market.⁷⁸ The Court found that Otter Tail violated antitrust law by anticompetitively refusing to deal.⁷⁹ In so holding, the Court found the Federal Power Act had the authority to compel power companies to interconnect and did not displace antitrust law jurisdiction over

68. 472 U.S. 585 (1985).

69. *Id.* at 593.

70. *Id.* at 604.

71. *Id.* at 608.

72. Fed. Trade Comm’n v. Qualcomm, 969 F.3d 974, 993–94 (9th Cir. 2020).

73. A vertically integrated firm is one that operates in two lines of business that are upstream or downstream of each other. For example, a firm that manufactures tires and cars that use those tires would be vertically integrated.

74. See Khan, *supra* note 39, at 731.

75. *Otter Tail Power Co. v. United States*, 410 U.S. 366 (1973).

76. *Id.* at 370.

77. *Id.* at 371.

78. *Id.* 371–72.

79. *Id.* at 377.

power companies.⁸⁰ It also noted that Otter Tail's interest in maintaining its business, though legitimate, did not "immunize otherwise illegal conduct."⁸¹

A 2004 Supreme Court case, *Trinko*, turned away from the refusal to deal theories adopted in *Otter Tail Power*.⁸² In *Trinko*, Verizon, the incumbent telephone service provider, denied access to its wholesale cellular infrastructure to new competitors in the local market. This violated the Telecommunications Act of 1996, which required incumbents to share their networks.⁸³ Though the Court agreed Verizon had violated its duty to deal under the Telecommunications Act, it found that Verizon had no antitrust duty to deal and did not fit into the *Aspen Skiing* exception.⁸⁴ Thus, Verizon had not violated antitrust law.

For the Court, the existence of the Telecommunications Act weighed against finding an antitrust duty to deal, even though the Act imposed on Verizon a duty to share its network. The Court noted that "the existence of a regulatory structure designed to deter and remedy anticompetitive harm" cautioned against using antitrust law as a remedy.⁸⁵ It emphasized that "[n]o court should impose a duty to deal that it cannot explain or adequately and reasonably supervise."⁸⁶ Thus, when "compulsory access" would "require[] the court to assume the day-to-day controls characteristic of a regulatory agency," the "problem should be deemed irremediable by antitrust law."⁸⁷ Overall, the Court in *Trinko* "expressed great skepticism about unilateral, unconditional refusal-to-deal cases," perhaps leaving only the *Aspen Skiing* exception.⁸⁸

C. RELEVANT PATENT LAW CONCEPTS

Though *Qualcomm* is an antitrust case, patent law is an important backdrop informing its analysis. Since the FTC alleged that Qualcomm's patent licensing practices were anticompetitive, the two legal regimes collided. This Section

80. *Id.* at 374–75.

81. *Id.* at 380.

82. *Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko*, 540 U.S. 398 (2004). See HOVENKAMP, PRINCIPLES OF ANTITRUST, *supra* note 53, at 311 (noting that *Trinko* "very likely ended the long run of a controversial doctrine [leverage theory]").

83. *Trinko*, 540 U.S. at 402–03. In addition, the FCC had already ordered Verizon to share its network. *Id.* at 413.

84. *Id.* at 409. The Court characterized *Aspen Skiing* as "at or near the outer boundary of § 2 liability." *Id.*

85. *Id.* at 412. *But see* Brett Frischmann & Spencer Weber Waller, *Revitalizing Essential Facilities*, 75 ANTITRUST L.J. 1, 25 (2008) ("Verizon was prepared to incur litigation expenses far in excess of this modest fine and reporting obligations to avoid the one set of penalties that actually would be effective in mandating nondiscriminatory access.").

86. *Trinko*, 540 U.S. at 415.

87. *Id.* (internal alterations omitted).

88. *Melamed & Shapiro*, *supra* note 2, at 2125.

first discusses the conceptual relationship between antitrust and patent law and then provides background on the specific patents at issue in this Note—SEPs and the standard-setting context in which those patent rights are created.

1. *Relationship Between Antitrust and Patent Law*

Patent law’s constitutionally mandated mission is to “promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right” to their discoveries.⁸⁹ Patent law seeks to promote innovation by incentivizing inventors, rewarding their investments with the exclusive right to profit from an idea and control its use for a limited time.⁹⁰ Patent holders can choose to use their ideas exclusively, or to license them and collect royalty payments from licensees.⁹¹ These exclusive rights prevent “free riders,” who made no investment to develop the technology, from profiting off of it without cost.⁹² However, patent protections are not granted in perpetuity, as widespread access to and application of patented ideas can be important sparks for further discovery.⁹³ Thus, always with the goal of promoting innovation, patent law operates along a continuum of exclusion and access, seeking to find the perfect equilibrium between the two.⁹⁴

Though antitrust law also seeks to promote innovation, its means to this end look very different. While patent rights necessarily foreclose some level of competition, antitrust seeks to maximize competition, premised on the idea that unfettered competition leads to more innovation and a healthier economy (with happier consumers). In this respect, the two legal regimes can be at odds.

When the two regimes collide, one often simply gives way to the other⁹⁵—however, patent rights should factor into the antitrust market analysis. Patent

89. U.S. CONST. art. 1 § 8, cl. 8.

90. See Oren Bracha & Talha Syed, *Beyond the Incentive-Access Paradigm-Product Differentiation & Copyright Revisited*, 92 TEX. L. REV. 1841, 1850 (2014) (noting that the “basic economic function of . . . patent protection is to enable the creator of an informational work to charge a price for assessing that work that recoups some of the sunk costs incurred in developing it”); see also Melamed & Shapiro, *supra* note 2, at 2121 (“The patent laws are intended to limit, not maximize, the royalties to which patent holders are entitled.”).

91. See Moss, *supra* note 20 (“[P]atent owners have no obligation to let anyone use technology their patent covers.”).

92. Frischmann, *supra* note 85, at 2 (“[A]t the core of intellectual property is the right to exclude, without which some producers would abandon their efforts for fear of free riding (unlicensed sharing) by competitors.”).

93. See Melamed & Shapiro, *supra* note 2, at 2122 (“[T]he purpose of patent law is to promote innovation, not to maximize the returns to patent holders.”).

94. Frischmann, *supra* note 85, at 2.

95. HERBERT HOVENKAMP, MARK D. JANIS, MARK A. LEMLEY, CHRISTOPHER R. LESLIE & MICHAEL A. CARRIER, *IP AND ANTITRUST: AN ANALYSIS OF ANTITRUST PRINCIPLES APPLIED TO INTELLECTUAL PROPERTY LAW* § 1.03, 18 (3rd ed. 2017) [hereinafter

rights confer market power.⁹⁶ A patent is a barrier to entry for competitors, and, if valuable, it allows a patent holder to set a supracompetitive price.⁹⁷ Of course, market power alone is not enough to generate antitrust scrutiny—a firm with market power must also *monopolize*, not just exist as a monopoly. But for antitrust purposes, a patent right does not create a presumption of market power or monopoly.⁹⁸ In general, then, the “exercise of intellectual property rights is . . . neither particularly free from scrutiny under the antitrust laws, nor particularly suspect under them.”⁹⁹

Ideally, the two legal regimes should work in tandem, so that more powerful patent rights are balanced by more detailed antitrust scrutiny.¹⁰⁰ Technological standard-setting, at least where those standards incorporate patented technology, is a particular area in which a balance must be struck between the competitive benefits of sharing resources and the innovative benefits of patent protection.

2. *Alphabet Soup: Standard-Setting Organizations (SSOs), Standard-Essential Patents (SEPs), and Fair, Reasonable, and Nondiscriminatory (FRAND) Commitments*

Standards “specify design features that enable products manufactured by different vendors to work together in a manner that is largely invisible to the consumer.”¹⁰¹ Standards and standardization are nothing new—older examples include electrical plug and drill bit specifications—but they have

HOVENKAMP, IP AND ANTITRUST] (“[T]he history of the intersection [of IP and antitrust] has been characterized by cycles of over- and under-enforcement, in which first antitrust and then intellectual property is on the ascendancy while the other recedes into the background.”). Currently, in the United States, patent law seems to be on top. *See* Spencer Weber Waller, *The Omega Man or the Isolation of U.S. Antitrust Law*, 52 CONN. L. REV. 123, 161 (noting that former head of DOJ Antitrust, Makan Delrahim, is a member of the patent bar who “has been on record against the use of antitrust law to weaken IP protection for over twenty years”).

96. *See* Bracha & Syed, *supra* note 90, at 1852 (“[I]t is necessary for IP protection, if it is to achieve its incentive function at all, to confer some supramarginal pricing power. In the absence of any degree of pricing power, there will be no added ability to recoup the fixed costs of development and no added incentive.”).

97. *See id.*

98. It used to, but this precedent was overruled in *Illinois Tool Works v. Independent Ink*, 547 U.S. 28, 31 (2006).

99. DOJ & FTC, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY 3 (Jan. 12, 2017) <https://www.justice.gov/atr/IPguidelines/download>.

100. *See* HOVENKAMP, IP AND ANTITRUST, *supra* note 95, at 18–19.

101. Jorge L. Contreras, *Technical Standards, Standards-Setting Organizations and Intellectual Property: A Survey of the Literature (With an Emphasis on Empirical Approaches)* in RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW, Vol. II Analytical Methods 4 (Peter S. Menell & David Schwartz, eds., 2019), <https://ssrn.com/abstract=2900540>.

increased in prevalence and importance with the rise of network and telecommunications technologies, becoming “essential to the global technology infrastructure.”¹⁰² Standards in technology provide the important benefits of interoperability and “compatibility between products made by different manufacturers.”¹⁰³ Today, standards “are pervasive in technology markets.”¹⁰⁴

Increasingly over the last two decades, “interoperability standards have been developed by groups of market participants that collaborate within voluntary associations known as . . . standards-setting organizations (SSOs).”¹⁰⁵ SSOs, generally comprised of industry participants, establish standards in a given industry. At issue in *Qualcomm* are 2G, 3G, and 4G telecommunications standards, all determined by SSOs. One such standard, in which Qualcomm technology dominates, is CDMA, a 2G and 3G standard.¹⁰⁶ Qualcomm’s technologies also play a significant role in LTE, the primary 4G standard,¹⁰⁷ though to a lesser extent than in CDMA.¹⁰⁸ Importantly, LTE builds upon CDMA and other 3G standards.¹⁰⁹

If an SSO adopts a standard that includes an already-patented technology, the patent on that technology becomes a standard-essential patent (SEP).¹¹⁰ Once a standard is adopted, any firm that wishes to operate using the standard

102. *Id.*

103. Lemley, *supra* note 2, at 1893.

104. Contreras, *supra* note 101, at 7. Well-known examples of standards include USB, Wi-Fi, and Bluetooth. *Id.* at 4.

105. *Id.* at 4. It is an open question whether SSOs themselves present antitrust concerns, since they involve competitors collaborating, but that question is beyond the scope of this Note. See Lemley, *supra* note 2, at 1993; Hovenkamp, *FRAND*, *supra* note 55, at 1695 (describing SSOs as “bona fide joint ventures” that should not be undermined by antitrust law).

106. Complaint, *supra* note 3, at 6, 13.

107. *Id.* at 6.

108. *Id.* at 13–14.

109. *Id.* at 7. Because the standards build on each other, an LTE chip generally needs to comply with LTE, 2G, and 3G.

110. An SEP covers patented technology that has been “adopted as an ‘essential’ component” of a network standard. HOVENKAMP, PRINCIPLES OF ANTITRUST, *supra* note 53, at 327. Firms are generally required by SSOs to disclose to the SSO that they believe they hold patents covering technology essential to the standard. Contreras, *supra* note 101, at 23. Their judgments of essentiality are not tested by the SSO, except by subsequent litigation. *Id.* at 28 (“[T]he determination whether a particular patent is indeed essential to a particular standard is typically left to the patent holder.”). One standard can contain zero, a few, or hundreds of patented technologies, all of which would become SEPs. *Id.* at 9.

“[has] no choice but to use the patented technology” embedded in that standard.¹¹¹ “[T]he patent holder owns an asset that is essential”¹¹²

Patent-holding members of SSOs generally volunteer to have their technology incorporated into standards because holding an SEP for technology that is part of an important standard is likely to increase demand for patent licenses.¹¹³ Once an SEP is conferred by an SSO, an SEP holder may have an incentive to engage in patent holdup,¹¹⁴ that is, to “‘hold-up’ the market by demanding excessive royalty rates after a standard has been widely adopted and manufacturers which have made investments in the standardized technology have become ‘locked-in.’”¹¹⁵

To combat this risk and the significant power that comes with owning an SEP, the “price for [SEP] status” is generally an obligation to “license the patent to network participants at ‘fair, reasonable, and nondiscriminatory’ royalties,” known as FRAND commitments.¹¹⁶ However, “[v]irtually no SSO specifies” what FRAND commitments require in practice.¹¹⁷ Further, whether and how courts will enforce FRAND commitments is relatively untested. Heated debate exists as to whether enforcing FRAND commitments would discourage innovation or act as a necessary limit to possible monopolistic opportunism.¹¹⁸ Regardless, FRAND commitments represent an attempt to balance the innovative benefits of exclusion and the competitive benefits of access.

111. Melamed & Shapiro, *supra* note 2, at 2113.

112. *Id.*

113. Erik Hovenkamp & Timothy S. Simcoe, *Tying and Exclusion in FRAND Licensing: Evaluating Qualcomm 7* (Boston Univ. Questrom Sch. of Bus. Rsch. Paper No. 3523797) (Jan. 22, 2020), <https://ssrn.com/abstract=3523797>.

114. Brief of *Amicus Curiae* Timothy J. Muris in Support of Appellee at 18, Fed. Trade Comm’n v. Qualcomm, 969 F.3d 974 (9th Cir. 2020), No. 19-16122 (“SEP holders have the incentive and ability to engage in holdup.”).

115. Contreras, *supra* note 101, at 17.

116. HOVENKAMP, PRINCIPLES OF ANTITRUST, *supra* note 53, at 327.

117. Lemley, *supra* note 2, at 1964–65.

118. Compare Melamed & Shapiro, *supra* note 2, at 2116 [parenthetical needed], with Alden Abbott, *The New Madison Approach and the Harmonization of Antitrust and Patent Law: A Retrospective Summary*, IPWATCHDOG (Feb. 15, 2021), <https://www.ipwatchdog.com/2021/02/15/new-madison-approach-harmonization-antitrust-patent-law-retrospective-summary/id=129912/> [<https://perma.cc/A8BW-PXEA>] (describing the New Madison Approach, which posits that holdup is not an antitrust problem and therefore antitrust law should not enforce FRAND).

III. THE QUALCOMM CASE

By way of refresher, Qualcomm holds numerous SEPs covering technology embedded in 2G, 3G, and 4G standards. Qualcomm is also the leading manufacturer of CDMA (2G, 3G) and LTE (4G) chips, all of which contain the SEP technology needed to make the chips standard-compliant. In addition, Qualcomm committed to at least two SSOs to license its SEPs on FRAND terms. Qualcomm engaged in two allegedly anticompetitive practices regarding its SEPs: (1) it refused to license its SEPs to rivals, instead offering them CDMA ASIC Agreements and (2) it required OEMs who wanted to purchase Qualcomm chips to license Qualcomm's SEPs ("no license, no chips").

In January of 2017, the FTC sued Qualcomm, challenging both practices as anticompetitive and in violation of antitrust law.¹¹⁹ Specifically, it alleged that Qualcomm had engaged in both practices while holding a monopoly in the modem chip market (2006–2016 for CDMA chips and 2011–2016 for premium LTE chips). This, the FTC contended, meant Qualcomm had violated sections 1 and 2 of the Sherman Act.

This Part discusses the district court and Ninth Circuit opinions in *Qualcomm*. It illuminates the divisions between the two courts and grounds Part IV's analysis of how the essential facilities doctrine could have applied in this case.

A. THE DISTRICT COURT DECISION

In May 2019, Judge Lucy H. Koh of the Northern District of California issued a lengthy opinion finding that Qualcomm violated sections 1 and 2 of the Sherman Act. This decision rested on extensive factual findings¹²⁰ made at the conclusion of a ten-day bench trial.¹²¹ The district court agreed with the FTC that both challenged practices were anticompetitive and illegal. The court issued a nationwide injunction against Qualcomm, which, among other things, prohibited Qualcomm from conditioning chip purchases on license status and required it to license its SEPs to rival chip suppliers on FRAND terms.¹²²

As a threshold matter, the district court used the hypothetical monopolist test to determine that the relevant antitrust markets were the markets for

119. Fed. Trade Comm'n v. Qualcomm, 411 F. Supp. 3d 658, 675 (N.D. Cal. 2019).

120. Judge Koh cited to extensive documentary evidence, noted at length that she found Qualcomm's witnesses and documentary evidence prepared for trial unreliable, and then spent over fifty pages discussing Qualcomm's conduct towards individual OEMs and rivals. *Id.* at 676–80 (credibility issues); *id.* at 698–751 (conduct toward OEMs and rivals).

121. *Id.* at 669.

122. *Id.* at 820–21.

CDMA and LTE modem chips.¹²³ The court then found that Qualcomm held monopoly power in those markets, regardless of the company's assertions that rivals were "steadily . . . eating away" at Qualcomm's market share.¹²⁴ Qualcomm held almost 100% of market share in the CDMA chip market from 2006–2016, and still held almost 80% of market share in 2018.¹²⁵

The district court then used the rule of reason framework to analyze the alleged anticompetitive conduct. Ultimately, it found that the FTC proved anticompetitive conduct and harm, and that Qualcomm's procompetitive justifications were pretextual and inadequate to justify the anticompetitive harms.¹²⁶

1. *Qualcomm's Refusal to License Rivals*

The district court held that Qualcomm's refusal to license its rival chipmakers violated the Sherman Act. It stressed that Qualcomm's license refusals had promoted rival exit from the market, prevented rival entry, and delayed or hampered the success of other rivals.¹²⁷ The court found Qualcomm had a duty to deal with (license) its rivals because (1) Qualcomm's FRAND commitments required it to license its SEPs to rivals, and (2) even without the FRAND commitments, Qualcomm's conduct fit into the *Aspen Skiing* exception.

First, in an order granting partial summary judgment for the FTC, the district court held that Qualcomm's FRAND commitments to two SSOs required it to provide licenses to its rivals.¹²⁸ The court applied California contract law in reaching this conclusion.¹²⁹ Both the FTC and Qualcomm conceded that Qualcomm's written assurances that it would license on FRAND terms constituted binding contracts with the SSOs, but Qualcomm argued that these contracts only required it to provide licenses to OEMs.¹³⁰ The district court disagreed, finding that the text of the agreements and precedent made it clear that an "SEP holder that commits to license its SEPs on FRAND terms must license those SEPs to all applicants."¹³¹ The district

123. *Id.* at 684.

124. *Id.* at 690.

125. *Id.* at 690–91. In LTE, Qualcomm's market share was almost 90% in 2014 and around 65% in 2017. *Id.* at 694.

126. *Id.* at 756, 778.

127. *Id.* at 744–51.

128. *Id.* at 751.

129. Order Granting FTC's Motion for Partial Summary Judgment, Fed. Trade Comm'n v. Qualcomm, 411 F. Supp. 3d 658 (N.D. Cal. 2019) (No. 17-cv-00220), 2018 WL 5848999, at *8.

130. *Id.* at *7, *9.

131. *Id.* at *11.

court revisited this reasoning in its final disposition of the case.¹³² It recognized that standards, while important for interoperability, conferred disproportionate market power.¹³³ The court acknowledged that licensing to OEMs was more lucrative for Qualcomm (since royalties were based on the handset price), but did not accept this profit motive as a procompetitive justification for Qualcomm's behavior, dismissing it as "self-serving and pretextual."¹³⁴

Second, the district court also held that Qualcomm fit into the *Aspen Skiing* exception because it had terminated a voluntary and profitable course of dealing with an anticompetitive intent and, therefore, had an antitrust duty to deal.¹³⁵ The court found that at one point Qualcomm had licensed its SEPs to rivals, but that it had stopped doing so because of changes to patent exhaustion law.¹³⁶ These changes meant that Qualcomm would no longer be able to assert its patents against OEMs who purchased chips from licensed rival chipmakers. The court did not accept Qualcomm's proffered procompetitive justifications (profit, reduced transaction costs) for ceasing what it deemed to be a voluntary and profitable course of dealing, finding that its change in policy was motivated by anticompetitive malice.¹³⁷

2. *No License, No Chips Policy*

In addition, the district court found that Qualcomm used its chip monopolies to coerce OEMs into signing patent license agreements.¹³⁸ By forcing OEMs to become licensees before allowing them to buy Qualcomm's chips (which many OEMs relied on as their primary chip supply), Qualcomm ensured it could receive patent royalties based on the price of the smartphone.¹³⁹ In over forty pages of its opinion, the district court meticulously analyzed Qualcomm's conduct during licensing negotiations with OEMs and the resulting license agreements.¹⁴⁰ It found that, in multiple negotiations, Qualcomm had threatened to cut off chip supply in order to obtain more favorable licensing terms.¹⁴¹ In other negotiations, Qualcomm had

132. *Qualcomm*, 411 F. Supp. 3d at 751.

133. *Id.*

134. *Id.* at 756.

135. *Id.* at 762.

136. *Id.* at 754. Patent exhaustion is a doctrine establishing that the sale of an item embedding patented technology terminates the patent rights in that technology for the purposes of that one item ("exhausts" them). *Id.* at 698.

137. *Id.* at 760.

138. *Id.* at 698.

139. *Id.* at 773.

140. *Id.* at 697–744.

141. *Id.* at 743.

offered significant royalty rebates if an OEM agreed to source its chips exclusively from Qualcomm.¹⁴²

Overall, the district court found, this conduct resulted in significant anticompetitive harms to OEMs and rivals.¹⁴³ OEMs were harmed because they were forced to pay Qualcomm's unreasonably high royalty rates based on the handset price.¹⁴⁴ Moreover, OEMs hesitated to challenge Qualcomm's rates with patent litigation because of possible threats to their chip supply.¹⁴⁵ The court reasoned that because OEMs had to pay royalties to Qualcomm no matter whose chips they purchased (since rivals with CDMA ASIC Agreements could not sell to unlicensed OEMs), they simply decided to stay with Qualcomm.¹⁴⁶ In turn, rival chipmakers were harmed by the lost OEM business.¹⁴⁷

Throughout its opinion, the district court repeatedly emphasized that Qualcomm's practices operated in tandem, reinforcing one another and creating insurmountable barriers for rivals.¹⁴⁸

B. THE NINTH CIRCUIT DECISION

Qualcomm appealed and, in August 2020, a three-judge panel of the Ninth Circuit summarily reversed all of the district court's findings and its injunction, in a far shorter opinion.¹⁴⁹ Though the Ninth Circuit agreed with the district court on the relevant antitrust market (the modem chip market) and the applicable legal standard (the rule of reason three-part burden-shifting test), their agreement stopped there.¹⁵⁰ The Ninth Circuit criticized the district court for focusing on licensing harm to OEMs which, it concluded, were outside the relevant antitrust market and therefore outside the scope of antitrust law.¹⁵¹ It also criticized the district court for looking beyond the modem chip market to the effects that Qualcomm's conduct had on the larger cellular market.¹⁵² Finally, it described the district court's analysis of the interrelatedness of Qualcomm's practices as inappropriate for antitrust.¹⁵³

142. *Id.* at 744.

143. *Id.* at 743–44.

144. *Id.* at 773.

145. *Id.* at 786–88.

146. *Id.* at 791.

147. *Id.*

148. *Id.* at 795–97.

149. Fed. Trade Comm'n v. Qualcomm, 969 F.3d 974, 987 (9th Cir. 2020).

150. *Id.* at 991–92.

151. *Id.* at 993.

152. *Id.* at 992–93.

153. *Id.* at 993.

Overall, the Ninth Circuit did not find any of Qualcomm's practices anticompetitive, only "hypercompetitive," which, it emphasized, made them perfectly legal.¹⁵⁴ Throughout its opinion, the court preached deference to technology markets, patent and contract law, and monopolists.¹⁵⁵ Since, in the Ninth Circuit's view, the FTC did not meet its burden of proving anticompetitive harm, it did not deeply analyze Qualcomm's procompetitive justifications, though it suggested it would have likely accepted them.¹⁵⁶

1. *Qualcomm's Refusal to License Rivals*

The Ninth Circuit overturned the district court's holding that Qualcomm had a duty to license its SEPs to its competitors.

First, it found that Qualcomm's conduct did not fit into the *Aspen Skiing* exception, which it stated was the "one, limited exception" to the general rule that there is no duty to deal.¹⁵⁷ It did not fit *Aspen Skiing* because, in the Ninth Circuit's view, Qualcomm had not wrongfully terminated a previous course of dealing in which it had granted licenses to rival chipmakers.¹⁵⁸ It had previously granted non-exhaustive licenses, but had ceased this practice in response to changes in patent exhaustion law.¹⁵⁹ This, the court reasoned, was a legitimate reason for terminating the practice, not one motivated by "sacrific[ing] short-term benefits in order to obtain higher profits in the long run from the exclusion of competition."¹⁶⁰ The Ninth Circuit concluded that Qualcomm simply "[chose] the path that was 'far more lucrative,' both in the short term and the long term, regardless of any impacts on competition."¹⁶¹

The Ninth Circuit also applauded the CDMA ASIC Agreements. It repeatedly noted that rivals benefited from being able to practice Qualcomm's patents royalty-free and found these agreements acted as "de facto licenses" (since Qualcomm promised not to assert its patents).¹⁶² The court

154. *Id.* at 982, 1005.

155. *Id.* at 990 (noting the court is especially hesitant to declare novel business practices unreasonable in technology markets); *id.* at 997 ("[T]he antitrust laws are not well suited to govern contract disputes between private parties in light of remedies available under contract or patent law." (internal citation omitted)); *id.* at 990 ("The mere possession of monopoly power, and the concomitant charging of monopoly prices, is not itself unlawful; instead, it is an important element of the free-market system." (internal quotations removed) (citing *Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko*, 540 U.S. 398, 407 (2004))).

156. *Id.* at 996.

157. *Id.* at 993. The FTC had conceded error on the district court's *Aspen Skiing* conclusion. *Id.* at 995.

158. *Id.* at 994.

159. *Id.*

160. *Id.*

161. *Id.* (internal citation omitted).

162. *Id.* at 996.

characterized the agreements as Qualcomm's "no license, no problem" policy.¹⁶³

Second, the Ninth Circuit did not find a duty to deal based on Qualcomm's FRAND commitments. The court did not decide the issue of whether Qualcomm's refusal to license rival chipmakers was a breach of its FRAND commitments to SSOs, vacating the district court's holding to that effect.¹⁶⁴ It leaned on the statements of *amici* and scholars to note that contract law, rather than antitrust, may be the appropriate forum for FRAND disputes.¹⁶⁵

However, it did note that *even if* Qualcomm had breached its FRAND commitments, the FTC did not "satisfactorily explain" how that breach caused anticompetitive harm, since competitors could still practice the patents royalty-free.¹⁶⁶ And, even if Qualcomm breaching its FRAND commitments had harmed competitors, that was not enough to show harm to *competition*, which the FTC needed to prove.¹⁶⁷ The Ninth Circuit emphasized that a few competitors had entered the modem chip market and dismissed the claims that Qualcomm's refusal to deal had harmed rivals' ability to develop and retain OEM customers, limited their growth, and delayed or prevented their market entry.¹⁶⁸ It was also relevant for the court that other companies with significant SEP portfolios had followed Qualcomm's lead in adopting OEM-level licensing policies.¹⁶⁹ Ultimately, the Ninth Circuit decided that the FTC had not met its burden of proving anticompetitive harm under the rule of reason framework.

2. *No License, No Chips Policy*

The Ninth Circuit also found that Qualcomm's NLNC policy did not run afoul of antitrust law. The court, in upholding the policy, repeatedly emphasized that it was "chip-supplier neutral."¹⁷⁰ OEMs were required to pay royalties to Qualcomm no matter who they sourced their chips from, and all chips contained Qualcomm's patents, to which Qualcomm was entitled to

163. *Id.* at 995. For an interesting look at this issue, see Jorge L. Contreras, "No License, No Problem"—Is *Qualcomm's* Antitrust Victory a Patent Exhaustion Defeat?, PATENTLY-O BLOG (Sept. 1, 2020), <https://patentlyo.com/patent/2020/09/qualcomms-antitrust-exhaustion.html> [<https://perma.cc/YUM5-NGZA>] (arguing that the ASIC Agreements look "suspiciously like licensing," and could be construed as such by future courts and thus be subject to patent exhaustion).

164. *Qualcomm*, 969 F.3d at 987, 995.

165. *Id.* at 997.

166. *Id.* at 995–96.

167. *Id.* at 996.

168. *Id.* (noting that Intel and Mediatek entered the chip market in 2015–2016).

169. *Id.*

170. *Id.* at 996, 1005.

royalties; therefore, in the Ninth Circuit's view, no one chipmaker was at a disadvantage.

In addition, the Ninth Circuit did not accept the district court's finding that Qualcomm's royalty rates were unreasonably high. Even assuming the rates were unreasonable, the Ninth Circuit dismissed this as an issue for patent law.¹⁷¹ It further noted that the unreasonably high royalty rates, if they existed, would harm OEMs, and such harm was beyond the scope of antitrust since OEMs were customers, not competitors, in the relevant antitrust market.¹⁷²

IV. QUALCOMM AND THE ESSENTIAL FACILITIES DOCTRINE

The two opinions in *Qualcomm* have one important commonality: neither adequately addresses the impact of Qualcomm's status as an SEP holder on the antitrust analysis. Though the two courts agreed that the relevant market for antitrust purposes was the modem chip market (and certainly, the chip market is one relevant market), both ignored the ways in which Qualcomm's SEPs affected the economic realities of that market and therefore should have affected the antitrust analysis. This Part argues that the essential facilities doctrine (EFD), a doctrine that can impose a duty to deal on a firm that owns an essential facility, provides an effective lens through which to analyze Qualcomm's SEPs, a lens that is conceptually clearer and appropriately cognizant of Qualcomm's dual monopolies (in chips and in SEPs). Applying the essential facilities doctrine to the facts of *Qualcomm* illuminates the holes in the Ninth Circuit's approach, leading to the same result as the district court (that a duty to deal should be imposed on Qualcomm), but providing a better, simpler way of getting there.

This Part is broken down into four sections. Section IV.A introduces the essential facilities doctrine and addresses critiques against it. Section IV.B explains why the EFD should apply in the SEP context. Section IV.C applies the EFD to the facts of *Qualcomm*, showing that Qualcomm's conduct likely met the traditional criteria for liability under an EFD theory. Section IV.D discusses the advantages of this approach over the three-part burden-shifting test used by the district court and the Ninth Circuit.

171. *Id.* at 999.

172. *Id.* at 999–1000. This reasoning has been widely criticized as contrary to settled antitrust law. *See, e.g.*, FTC Petition for Rehearing *En Banc* at 3–4, Fed. Trade Comm'n v. Qualcomm, 969 F.3d 974 (9th Cir. 2020) (No. 19-16122).

A. THE ESSENTIAL FACILITIES DOCTRINE

The essential facilities doctrine is an antitrust doctrine that imposes a duty to deal with rivals on a firm that controls an “essential facility.” Because the essential facilities doctrine imposes a duty to deal, it is often referred to as a variation on refusal to deal analysis. However, the essential facilities doctrine does not require the same relevant market inquiry or utilize the three-part burden-shifting test. Though the Supreme Court has never officially adopted the doctrine,¹⁷³ various scholars and lower courts that use the doctrine find support for it in Supreme Court precedent.¹⁷⁴ For example, *Otter Tail Power* is often cited as an essential facilities case, though the case never mentions the term.¹⁷⁵

The Supreme Court’s decision in *Terminal Railroad*¹⁷⁶ is regularly cited as the origin of the EFD, though again, the case itself does not use the term.¹⁷⁷ In *Terminal Railroad*, the Court, after finding that the Terminal Railroad Association had illegally monopolized the St. Louis railroad industry, declined to apply the traditional antitrust remedy for monopolizing—dissolution—and instead required the Terminal Railroad Association to give its competitors access to its tracks and bridges, its essential facilities.¹⁷⁸ This creative remedy was prompted by the Court’s recognition that the railroads might be a “natural monopoly” with high barriers to entry, such that breaking up the Terminal Railroad Association would create socially undesirable inefficiencies.¹⁷⁹ Since *Terminal Railroad*, courts have applied the EFD or its analytical equivalents to telephone infrastructure, sports stadiums, radio stations, and more.¹⁸⁰

173. See *Verizon Commc’ns Inc. v. Law Offices of Curtis V. Trinko*, 540 U.S. 398, 410 (2004) (noting that the Court does not consider the essential facilities doctrine “crafted by some lower courts” established law).

174. See, e.g., Frischmann, *supra* note 85, at 6 (noting that *Otter Tail* looks like an essential facilities case); *MCI Commc’ns Corp. v. Am. Tel. and Tel. Co.*, 708 F.2d 1081, 1132 (7th Cir. 1983) (applying the essential facilities doctrine and citing to *Otter Tail* and *Terminal Railroad* for support).

175. Phillip Areeda, *Essential Facilities: An Epithet in Need of Limiting Principles*, 58 ANTITRUST L.J. 841, 847 (1990).

176. *United States v. Terminal R.R. Ass’n of St. Louis*, 224 U.S. 383 (1912).

177. See, e.g., *Intergraph Corp. v. Intel Corp.*, 195 F.3d 1346, 1356 (Fed. Cir. 1999) (noting the EFD stems from *Terminal Railroad*); Teague I. Donahy, *Terminal Railroad Revisited: Using the Essential Facilities Doctrine to Ensure Accessibility to Internet Software Standards*, 25 AIPLA Q.J. 277, 279 (1997) (describing the EFD as a “creative antitrust remedy emanating from *Terminal Railroad*”).

178. Donahy, *supra* note 177, at 281.

179. *Id.* at 281–82.

180. *MCI Commc’ns Corp. v. Am. Tel. and Tel. Co.*, 708 F.2d 1081, 1132 (7th Cir. 1983) (telephone infrastructure); *Hecht v. Pro-Football, Inc.*, 570 F.2d 982, 992–93 (D.C. Cir. 1977)

The EFD does not require a firm to give rivals free access, only reasonable and nondiscriminatory access.¹⁸¹ Like *Aspen Skiing*, the EFD is a qualification on the general right to refuse to deal, one that can form the basis for monopolist liability.¹⁸² *Trinko* arguably limited the EFD's viability in dicta,¹⁸³ however, the Ninth Circuit and other lower courts continue to recognize and utilize the doctrine post-*Trinko*.¹⁸⁴

There is no perfectly settled articulation of the elements of the essential facilities doctrine. The threshold inquiry, however, is common: in order to succeed on an essential facilities claim, a plaintiff must first prove that access to the facility at issue is truly essential—an input necessary for other firms to compete.¹⁸⁵ This implies that the facility cannot reasonably be duplicated by competitors.¹⁸⁶ Often, the essential facility is some type of infrastructure that would be prohibitively expensive or inefficient for a competitor to recreate.¹⁸⁷ In the Ninth Circuit, a firm's facility will only be considered essential if control of the facility carries with it the power to eliminate, or at least severely handicap, competition in the downstream market.¹⁸⁸

Another (often implicit) requirement for an essential facilities claim is that the owner of the essential facility be in downstream competition with those who seek access to that facility. In other words, the essential facility owner is vertically integrated, operating the essential facility upstream and competing in a downstream market that requires the facility as an input.¹⁸⁹ This requirement makes sense—without competition between the facility owner and those who seek to use the facility, the facility owner would have no incentive to deny

(football stadium); *Nobody in Particular Presents, Inc. v. Clear Channel Commc'ns, Inc.*, 311 F. Supp. 2d 1048, 1109 (D. Colo. 2004) (rock radio station).

181. See Frischmann, *supra* note 85, at 11.

182. See Robert Pitofsky, Donna Patterson & Jonathan Hooks, *The Essential Facilities Doctrine Under U.S. Antitrust Law*, 70 ANTITRUST L.J. 443, 446 (2002).

183. *Trinko's* dicta and this Note's response to it will be discussed in Part IV.D.

184. See, e.g., *Aerotec Int'l, Inc. v. Honeywell Int'l, Inc.*, 836 F.3d 1171, 1184 (9th Cir. 2016) (“Although the Supreme Court has never recognized the doctrine, we have continued to treat it as having a basis in § 2 of the Sherman Act.”).

185. See Pitofsky et al., *supra* note 182, at 449.

186. If competitors could easily duplicate it, they would not need access.

187. See, e.g., *MCI Commc'ns Corp. v. Am. Tel. and Tel. Co.*, 708 F.2d 1081, 1132 (7th Cir. 1983) (telephone infrastructure).

188. *Alaska Airlines v. United Airlines*, 948 F.2d 536, 544 (9th Cir. 1991).

189. See Paul D. Marquardt & Mark Leddy, *The Essential Facilities Doctrine and Intellectual Property Rights: A Response to Pitofsky, Patterson, and Hooks*, 70 ANTITRUST L.J. 847, 849–52 (2003) (describing the competitive element as the “leveraging element” of the essential facilities doctrine and noting that judicial opinions sometimes “[take] that element for granted”). *Alaska Airlines v. United Airlines*, 948 F.2d 536, 544 (9th Cir. 1991).

access.¹⁹⁰ *Otter Tail Power* is again illustrative: Otter Tail was the only regional distributor of power, and it also competed in the retail power markets downstream.

Once the plaintiff establishes essentiality and competition, courts will analyze whether access to the facility was actually denied and whether access could have feasibly been given.¹⁹¹ Offering access only on terms that are unreasonable can amount to a practical denial of access.¹⁹² However, it is not necessary to grant access on whatever terms the rival firm would prefer.¹⁹³ Denial of access is also not *per se* unlawful; if the firm can provide a legitimate business reason for the denial, the court may not require it to give access.¹⁹⁴

Though evidence of bad intent or anticompetitive effects can supplement an EFD claim, it is not required. Once a plaintiff has cleared the high bar of proving that access to a facility is truly essential, such that denying access eliminates downstream competition, the danger is clear and there is “little need to engage in the usual lengthy analysis of factors such as intent.”¹⁹⁵

The essential facilities doctrine has been criticized on numerous fronts. Six of these criticisms, and their rejoinders, are worth addressing now.

First, the doctrine has been characterized as overbroad.¹⁹⁶ Critics who take this view posit that essentiality is too easy to allege, such that any successful product could be deemed essential under the EFD. However, “the vast majority of essential facilities claims are rejected by the courts,” suggesting that essentiality is a sufficiently high bar to protect against the EFD’s overuse.¹⁹⁷

Second, some suggest that the doctrine is superfluous, simply recreating a duty to deal analysis.¹⁹⁸ This argument, too, ignores the significance of the essentiality requirement, which not only creates a high barrier to entry but also simplifies the overall analysis once that barrier is cleared. Unlike in a traditional

190. *See id.* Note that this means leverage theory, the idea that a vertically integrated firm can leverage dominance in one market for power in another, is implicit in the EFD.

191. *MCI*, 708 F.2d at 1132–33.

192. *Delaware & Hudson Ry. Co. v. Consol. Rail Corp.*, 902 F.2d 174, 179–80 (2d Cir. 1990) (“[T]here need not be an outright refusal to deal in order to find that denial of an essential facility occurred. It is sufficient if the terms of the offer to deal are unreasonable.”).

193. *MetroNet Servs. Corp. v. Qwest Corp.*, 383 F.3d 1124, 1130 (9th Cir. 2004).

194. *See Areeda*, *supra* note 175, at 852.

195. *See Alaska Airlines v. United Airlines*, 948 F.2d 536, 546 (9th Cir. 1991); *see also* Donahay, *supra* note 177, at 308 (noting that the EFD is more about remedy than conduct).

196. Mark A. Lemley, *Antitrust and the Internet Standardization Problem*, 28 CONN. L. REV. 1041, 1084 (1996).

197. *See id.*; *see, e.g., Aerotec Int’l, Inc. v. Honeywell Int’l, Inc.*, 836 F.3d 1171, 1185 (9th Cir. 2016) (rejecting the claim where the plaintiff failed to prove that the defendant’s repair parts were essential).

198. HOVENKAMP, *PRINCIPLES OF ANTITRUST*, *supra* note 53, at 287.

refusal to deal case, courts need not scrutinize intent or anticompetitive effects to find liability. Thus, the essential facilities doctrine is a twist on duty to deal analysis that almost amounts to strict liability for the denial of access to essential facilities, once essentiality and denial of access are proven.

A third salient concern is that applying the essential facilities doctrine creates harmful incentives such as de-incentivizing incumbents from investing in essential infrastructure and incentivizing latecomers to free-ride.¹⁹⁹ This argument, however, is “overblown.”²⁰⁰ Incumbents still have incentives to develop essential facilities since being first to market generally has significant benefits.²⁰¹ In addition, even if an incumbent is required to give access to its essential facility, this does not preclude it from “continuing to receive a return, even a monopoly return, on that investment.”²⁰² Nothing in the essential facilities doctrine prohibits a firm from charging rivals a monopoly price for access, so long as the monopoly price is reasonable.²⁰³

Fourth, some take the view that requiring access to essential facilities does not improve consumer welfare.²⁰⁴ This critique rests on the premise that access to essential facilities will not affect prices for consumers, since essential facilities owners will just charge their competitors the monopoly price and that price will trickle down to consumers.²⁰⁵ However, even if this occurs, access to essential facilities may have benefits to consumers outside of pricing. Namely, increased access may lead to more competition in downstream markets, which could lead to increased product quality.²⁰⁶

Fifth, some argue that forcing competitor firms to deal with one another poses a risk for collusion, the prime evil of antitrust. These risks are possible, but unlikely: if collusion were desirable, the essential facility owner would likely have granted access of its own accord.²⁰⁷ And in some markets, the benefits of cooperation, such as increased innovation by new entrants and downstream users in the market, may outweigh the risk of potential collusion.²⁰⁸

Lastly, critics of EFD argue that it is not administrable, either because courts will struggle to decide when access should be granted or because courts

199. Frischmann, *supra* note 85, at 31–32.

200. *Id.* at 32.

201. *Id.* at 33.

202. *Id.* at 34.

203. *Id.*

204. *Id.* at 28.

205. *Id.*

206. *Id.* at 29–31.

207. *Id.* at 40.

208. *See id.*

are not well-equipped to monitor the terms of access.²⁰⁹ However, this underestimates the conceptual clarity of the doctrine. “The essential facilities doctrine is one of the circumstances in which plain English and antitrust lingo converge.”²¹⁰ Courts are as well positioned as anyone to ask simply: Was this facility essential and, if so, was access to it denied?²¹¹ The remedy, compulsory access on reasonable and nondiscriminatory terms, can also be straightforward. Courts need not decide whether access standards are “correct in some cosmic sense.”²¹² Moreover, in many cases, antitrust courts may be the only recourse for downstream competitors seeking access to an essential facility.

In sum, the criticisms of the essential facilities doctrine do not persuasively undermine its utility. Accordingly, the doctrine should be recognized as an important analytical tool for antitrust law.

B. EFD AND SEPS

How might the essential facilities doctrine apply to intangible resources? In today’s world, open and easy communication, made possible by technology compatibility standards, is indisputably essential. Yet there is considerable debate about the wisdom of applying the EFD to intellectual property rights and categorizing an IP right as an essential facility. While some strongly support applying essential facilities analysis to these intangible assets,²¹³ others fiercely oppose it, seeing the EFD as too great a threat to intellectual property rights.²¹⁴ When its elements are satisfied, the EFD regime mandates access. Ultimately, the debate over the application of EFD to patent rights reflects the larger conflict between antitrust and patent law—how best to balance exclusion and access to protect innovation and competition. In large part, opposition to using the EFD in the intellectual property context stems from a concern that painting IP rights with too broad a brush (deeming too many

209. *Id.*; Areeda, *supra* note 175, at 853 (“No court should impose a duty to deal that it cannot explain or adequately and reasonably supervise.”).

210. *Aerotec Int’l, Inc. v. Honeywell Int’l, Inc.*, 836 F.3d 1171, 1184 (9th Cir. 2016).

211. *See* Frischmann, *supra* note 85, at 41–42 (“These [essential facilities cases] are dime-a-dozen types of decisions that are a far cry from the polycentric multivariate balancing-type of cases that courts are comparatively poorer at deciding. If one concludes that courts cannot handle this kind of dispute, then most of the federal docket should be discarded . . .”).

212. *Id.* at 44.

213. *See, e.g.*, Donahay, *supra* note 177, at 279 (arguing for applying EFD to software interface standards).

214. *See, e.g.*, Marquardt, *supra* note 189, at 859 (“Casual and unfettered application of essential facilities principles to intellectual property threatens to penalize the most successful innovations for their success, using the antitrust laws to eviscerate core intellectual property protections and incentives.”).

patent rights essential) will cut away at patent law too greatly.²¹⁵ This Note takes the position that the EFD is not too broad a brush and that it is a necessary tool in the standard-essential patent context.

This Section lays the conceptual groundwork for why the EFD can and should apply to SEPs. It argues that an SEP can be an essential facility, confer a monopoly, and constitute a relevant antitrust market. However, though this Note argues that the essential facilities doctrine should always be available as a tool for analyzing SEP holder conduct, it does not suggest that every SEP will qualify as an essential facility under the EFD, or that every denial of an SEP license will qualify for antitrust liability under the EFD.

1. *An SEP is an essential facility. Or, at least, it can be.*

The essential facilities doctrine's threshold inquiry is whether or not the facility at issue is "essential." Courts define "essential" for purposes of the doctrine as an "input without which a firm cannot compete with the monopolist."²¹⁶ Accordingly, the facility must be impractical or unreasonable for competitors to duplicate.²¹⁷ This is a high bar, and courts will dismiss essential facilities claims in which essentiality is not proven.²¹⁸

SEPs can meet this essentiality requirement, though a case-by-case inquiry is necessary since in some circumstances an SEP, despite its name, might not be truly essential.²¹⁹ Courts and parties must analyze the essentiality of a given SEP like they would any other alleged essential facility. Though the standard-essential patent has already been deemed "essential" by its holder and the SSO, further proof beyond SEP status will help screen out non-meritorious EFD cases.

SEPs, like railroad tracks or power lines, are impractical to duplicate. Even assuming that rivals could theoretically develop identical technologies (an endeavor that would cost significant time and resources), doing so without permission from the patent holder would be illegal, leading to patent

215. *See, e.g., id.*

216. Pitofsky et al., *supra* note 182, at 449.

217. *Aerotec Int'l, Inc. v. Honeywell Int'l, Inc.*, 836 F.3d 1171, 1185 (9th Cir. 2016).

218. *See, e.g., id.* (dismissing the claim where the competitor had access to the alleged essential facility from another source); *see also* Pitofsky et al., *supra* note 182, at 449 (noting that courts rarely impose liability under EFD, in part because of the essentiality requirement).

219. It is possible that a declared SEP was improperly disclosed to the SSO (and therefore is not actually necessary to the standard). *See* Contreras, *supra* note 101, at 28. It is also possible that, in some standard-setting industries, multiple standards compete with each other, such that a rival could avoid one SEP by switching to another standard. Or a standard might have been declared but not utilized widely in practice. In short, the context will matter, and courts and parties should be willing to dive into the circumstances to determine whether a particular SEP is essential.

infringement liability. These realities of the patent landscape illustrate that SEPs and the technologies they cover are impractical (and illegal) for rivals to duplicate. In other words, the barriers to entry are insurmountable. Thus, where an SEP's technology is truly essential, an SEP can qualify as an essential facility.

2. *An SEP holder is a monopolist and the market for SEPs is a relevant antitrust market.*

The owner of the essential facility must also be a monopolist in order to incur possible liability under the EFD. In some ways, this requirement restates the essentiality requirement, and the two will often travel together. However, it is a slightly separate inquiry since, in theory, there could be competition and multiple equivalent inputs at the essential facilities level that would make the essential facilities doctrine inapplicable.

There is debate over whether intellectual property rights can properly form the basis of a monopoly in a relevant antitrust market.²²⁰ Those who argue a patent right should not be considered a monopoly for purposes of antitrust take the position that the knowledge that forms the basis of the right is not a product or market, and so it is improper to view it as granting market power.²²¹ However, this argument ignores economic reality. Certainly, not *all* intellectual property rights confer monopolies over a relevant market just because they afford a creator exclusive rights to her idea. Nevertheless, it is possible for the exclusive rights inherent in a patent grant to confer monopoly power.²²² When there are no alternatives to a given patented technology and demand for that patent is consistently high, such that the patent holder can engage in monopoly pricing of royalties, it is appropriate to speak about a patent monopoly over a relevant antitrust market.

Therefore, where an SEP is truly essential and there are no substitutes for the technology covered by the SEP, the market for SEP licenses is also a relevant market for antitrust purposes. Using the hypothetical monopolist test,

220. Bracha & Syed, *supra* note 90, at 1850 (noting that there is a “somewhat misguided debate over whether IP rights create ‘monopoly power’ or are ‘merely’ property”); *see also* HOVENKAMP, PRINCIPLES OF ANTITRUST, *supra* note 53, at 317 (“[I]t would be better not to speak of a patent ‘monopoly’ at all.”).

221. *See, e.g., id.*

222. *See* Bracha & Syed, *supra* note 90, at 1851 (“The reply from commentators . . . is to concede that IP rights do not always create monopolies, but then rejoin that monopoly power is a matter of degree and that in some cases, the exclusionary power created by IP rights does rise to the level of monopoly.”); Hovenkamp, *FRAND*, *supra* note 55, at 1690 (“Once the standard is adopted and implementers have incorporated it into their own technologies, a standard essential patent is likely to be in a much stronger position, approaching monopoly in some cases.”).

a hypothetical SEP monopolist in this scenario would likely be able to impose a small but significant and non-transitory price increase on its royalty rate without losing customers. This is in part because implementers are locked into a particular standard and the SEP technologies that come along with it. These locked-in customers will pay the increased SEP price by necessity. Thus, an SEP right can create both a monopoly and a relevant antitrust market where the SEP is truly essential, evincing the applicability of the EFD to SEPs.

C. APPLYING THE EFD TEST TO QUALCOMM

There is no perfectly settled articulation of the elements of the essential facilities doctrine, but the elements laid out in *MCI v. AT&T*²²³ are often referred to as the leading version of the doctrine.²²⁴ In *MCI*, the Seventh Circuit put forth four elements of the essential facilities doctrine: (1) control of the essential facility by a monopolist, (2) a competitor's inability practically or reasonably to duplicate the essential facility, (3) the denial of the use of the facility to a competitor, and (4) the feasibility of providing the facility.²²⁵

These elements, though useful for guidance, are both incomplete and redundant. The elements are incomplete in large part because they do not make explicit the implicit threshold inquiry: whether the facility at issue is truly essential for competition.²²⁶ Another implicit element of the EFD inquiry that is missing from the *MCI* articulation is that the firm who controls the essential facility generally must be in competition with the firm seeking access.²²⁷ This competition element provides the incentive for the firm to deny access to the essential facility. The second *MCI* element is redundant since in determining whether a facility is truly essential, courts will look to whether it is duplicable.²²⁸

Thus, this Note frames the first two EFD elements in a slightly different way than the *MCI* court. In order for the EFD to apply, (1) the facility at issue must be essential and the facility owner must control access to it, (2) the facility owner must be in competition with the firm seeking access, (3) the facility

223. 708 F.2d 1081 (7th Cir. 1983). In this case, MCI, a new entrant to the telecommunications business, charged that AT&T, the incumbent, did not provide the necessary network interconnection required by the Communications Act. The Seventh Circuit upheld the jury's finding of liability under the essential facilities doctrine. *Id.* at 1133.

224. *See, e.g.*, Frischmann, *supra* note 85, at 6 (describing *MCI* as the modern version of the EFD).

225. *MCI*, 708 F.2d at 1132–33.

226. Marquardt & Leddy, *supra* note 189, at 850.

227. *See id.*

228. *See, e.g.*, *MCI*, 708 F.2d at 1133 (“The facilities in question met the criteria of ‘essential facilities’ in that MCI could not duplicate Bell’s local facilities.”).

owner must have denied access to the essential facility, and (4) it must be feasible for the facility owner to provide access.

1. *Qualcomm's SEPs are essential facilities to which Qualcomm controls access.*

In the telecommunications context of *Qualcomm*, dominant standards like CDMA and LTE are essential components of cellular technology. No chipmaker would be able to sell a chip that was not compatible with a standard. Though there are two standards that are 2G- and 3G-compliant (CDMA and GSM),²²⁹ chips must generally comply with both (in addition to LTE in a 4G chip), since the standards build upon one another in terms of functionality.²³⁰ Although not all SEPs are truly essential to their standard, Qualcomm's SEPs cover truly essential CDMA and LTE technologies.²³¹ Since complying with CDMA and LTE standards is essential for anyone competing in the downstream modem chip market, "implementers have no choice but to use" Qualcomm's "patented technology."²³² Qualcomm's SEPs are therefore essential facilities.

In addition, Qualcomm alone controls access to its SEPs. Unlike in *Trinko* or *Otter Tail*, no federal or state agency has the power to force Qualcomm to license its patents.²³³ Only Qualcomm can choose whether and on what terms to provide or deny access to its property. Though granting a chipmaker access to a patent looks different than granting a train access to a station, the end result is the same: without access, one cannot make productive use of the essential facility.

2. *Qualcomm competes with those who seek access to the essential facility.*

Here, both the district court and Ninth Circuit found that Qualcomm is not only competitive in chips, but also holds a monopoly in two downstream modem chip markets, 3G CDMA and 4G LTE. Like *Otter Tail Power*, Qualcomm dominates two pieces of the market and has every incentive to leverage its upstream power to curtail impending downstream competition.²³⁴ Where this anticompetitive incentive exists, essential facilities analysis is appropriate.

229. Complaint, *supra* note 3, at 6.

230. *Id.* at 7–8.

231. On a brief review of the record, it does not appear that the essentiality of Qualcomm's SEPs was disputed.

232. *See* Melamed & Shapiro, *supra* note 2, at 2113.

233. SSOs, unlike federal agencies, do not have the power to compel Qualcomm to grant patent licenses. SSOs are private parties and can only bring contract litigation to get a court to compel Qualcomm to license its patents.

234. *See* *Otter Tail Power Co. v. United States*, 410 U.S. 366, 383 (1973).

Were Qualcomm to completely deny rival chip manufacturers access to its SEPs, downstream chip competition would be eliminated. This is because, without Qualcomm SEPs, rivals cannot legally make standard-compliant chips. If only Qualcomm's chips were standard-compliant, the competitive market for chips would be eliminated and Qualcomm would become the sole chipmaker in dominant telecommunications markets.²³⁵

3. *Qualcomm denied its rivals access to its SEPs.*

Qualcomm's conduct also meets the third element of the EFD. Qualcomm has historically denied its rivals access to its SEP licenses. Even though it allowed rivals to practice the technology, this "access" was access on unreasonable terms or an effective denial of access.²³⁶ Moreover, Qualcomm's practices explicitly went against its FRAND commitments, and these commitments should be used to define "access" in this instance.

Though the CDMA ASIC Agreements allowed Qualcomm's rivals to practice the technology covered by its patents, the rivals were still denied access to the SEP licenses themselves. The CDMA ASIC Agreements cut off rivals' potential customer bases, restricting their ability to successfully make use of the technology—the ability to practice the patents, then, was not really access at all, but access on unreasonable terms or an effective denial of access.²³⁷

Rivals had no choice but to accept Qualcomm's terms.²³⁸ If a rival rejected the CDMA ASIC Agreement, it would open itself up to patent infringement liability or be forced to make worthless products that did not comply with standards. Rival chipmakers had little negotiating power, if any, since they required Qualcomm's SEP technologies to manufacture standard-compliant chips. Accordingly, Qualcomm was able to extract significant concessions from rivals, in the form of data reporting requirements and limits on rivals' customer bases to licensed OEMs. Because of the "onerous" reporting requirements of the CDMA ASIC Agreements, Qualcomm gained sensitive business information about rival chipmakers' sales and contracts with

235. *Cf.* *Alaska Airlines v. United Airlines*, 948 F.2d 536, 545 (9th Cir. 1991) (airline control of the computer system did not carry with it the ability to eliminate downstream competition, in part because other computer systems existed).

236. *See* *Delaware & Hudson Ry. Co. v. Consol. Rail Corp.*, 902 F.2d 174, 179–80 (2nd Cir. 1990) (“[T]here need not be an outright refusal to deal in order to find that denial of an essential facility occurred. It is sufficient if the terms of the offer to deal are unreasonable.”).

237. *See id.*

238. *See* *Melamed & Shapiro*, *supra* note 2, at 2123–24 (noting the “pressure on implementers to accept offers that they regard as noncompliant [with FRAND], for fear that a court will reach a different conclusion at a later time and expose them to patent holdup”).

OEMs.²³⁹ Moreover, “[w]ithout a license . . . a rival [could not] sell modem chips with any assurance that Qualcomm [would] not sue the rival and its customers for patent infringement.”²⁴⁰ Thus, Qualcomm denying its rivals access to its SEP licenses hampered rival ability to gain traction in the modem chip market, to innovate in chips, or to invest in the development of next-generation standards that might compete with Qualcomm’s. In short, the CDMA ASIC Agreements did not provide adequate SEP access to rivals and thus did not allow rivals to compete on a level playing field.²⁴¹

Qualcomm’s FRAND commitments should be used to help define “access.” Industry terms like FRAND, voluntarily accepted, can and should factor into what “access” means in a given EFD case.²⁴² Where FRAND commitments define “reasonable access” as providing a license, as in *Qualcomm*, that definition should create a strong presumption that refusing to provide a license was an unreasonable form of access for purposes of the essential facilities inquiry. To ignore the presence of FRAND commitments would be to ignore the competitive realities of Qualcomm’s situation, as the Ninth Circuit did.²⁴³

4. *Qualcomm could feasibly have granted access to its SEPs.*

Qualcomm could feasibly have granted rival chipmakers reasonable access (licenses) to its SEPs, and it did not have legitimate justifications supporting its denial of access. Though Qualcomm might have made more money licensing only to OEMs, pure profit-maximizing motives do not defeat an

239. Fed. Trade Comm’n v. Qualcomm, 411 F. Supp. 3d 658, 745 (N.D. Cal. 2019).

240. *Id.* at 744; *see also* Contreras, Amicus Brief, *supra* note 9, at 12 (“[W]ith no license from Qualcomm, the suppliers of chips that embody Qualcomm’s patented technology remain vulnerable to suit, subject only to Qualcomm’s unilateral discretion not to sue them.”).

241. *See* United States v. Am. Tel. and Tel. Co., 524 F. Supp. 1336, 1352–53 (D.D.C. 1981) (“[A]ccess must be afforded ‘upon such just and reasonable terms and regulations as will, in respect of use, character, and cost of services, place every such company upon as nearly as equal plane as may be.’” (citing United States v. Terminal R.R. Ass’n of St. Louis, 224 U.S. 383, 411 (1912))).

242. *See* Hovenkamp, *FRAND*, *supra* note 55, at 1684 (“Antitrust best achieves its purpose when it takes markets as it finds them, and then protects them from threats to competition.”); *id.* at 1695 (describing SSOs and FRAND commitments as joint ventures in which “the purpose of the antitrust laws is not to destroy the venture or undermine its purpose, but rather to evaluate how the challenged restraint operates within the venture”).

243. *See* Moss, *supra* note 20 (arguing that the Ninth Circuit’s framing of Qualcomm’s duty to license “requires ignoring the promises Qualcomm made to license its SEPs on reasonable and non-discriminatory terms—promises that courts in this country and around the world have consistently enforced”).

essential facilities claim.²⁴⁴ This should not change in the patent royalty context.²⁴⁵ In addition, as the district court found, avoiding patent exhaustion was not an adequate justification for Qualcomm's refusal to license.²⁴⁶ Were it to license to rivals, Qualcomm could still charge significant (even monopoly) patent royalties to rivals, making a profit and maintaining its market power. As in *Otter Tail*, where the court rejected Otter Tail's argument that its refusal to deal was justified as a mechanism to maintain the strength of its business, Qualcomm's motive here should not be given much weight.²⁴⁷ It cannot claim that licensing to rivals would prevent it from effectively serving its customers or be impractical.²⁴⁸ Thus, granting access to rivals was feasible for Qualcomm, and it did not have a sufficient justification for denying access.

In conclusion, Qualcomm could have and should have been found liable under the EFD for refusing to license its SEPs to rivals. This would have imposed upon Qualcomm a duty to license its rivals on reasonable and nondiscriminatory terms.

D. ADVANTAGES OF USING THE EFD APPROACH

Using the EFD approach rather than the three-part burden-shifting framework has both conceptual and policy advantages.

1. *Conceptual Advantages*

Using the essential facilities doctrine in *Qualcomm* makes for a simpler analysis than the burden-shifting anticompetitive conduct approach used by the district court and the Ninth Circuit. Rather than a roundabout inquiry into what is anticompetitive and who needs to be harmed for antitrust to kick in (Competitors? Consumers? Competition? But only in the relevant market?), the essential facilities doctrine *supra* consists of a series of clear factual inquiries (in "plain English"²⁴⁹), each one building on the last. The inquiry stops if the

244. See, e.g., *Hecht v. Pro-Football, Inc.*, 570 F.2d 982, 992–93 (D.C. Cir. 1977) (an essential facilities owner can deny access where such sharing would "inhibit the defendant's ability to serve its customers adequately").

245. See Brief of *Amicus Curiae* Mediatek Inc. in Support of Appellee and Affirmance at 16, *Fed. Trade Comm'n v. Qualcomm*, 969 F.3d 974 (9th Cir. 2020) (No. 19-16122) ("Immunitizing unlawful conduct because it is profitable as well as exclusionary would be perverse."); Melamed & Shapiro, *supra* note 2, at 2121 ("The patent laws are intended to limit, not maximize, the royalties to which patent holders are entitled.")

246. See Moss, *supra* note 20 (noting that patent exhaustion is not optional, though the Ninth Circuit's decision made it out to be).

247. See *Otter Tail Power Co. v. United States*, 410 U.S. 366, 380 (1973).

248. See *United States v. Am. Tel. & Tel. Co.*, 524 F. Supp. 1336, 1360 (D.D.C. 1981) (noting that antitrust law does not require an essential facility to be shared if sharing would be impractical or would inhibit the facility owner's ability to serve its customers).

249. *Aerotec Int'l, Inc. v. Honeywell Int'l, Inc.*, 836 F.3d 1171, 1184 (9th Cir. 2016).

answer to any of those questions is no. Instead of hundreds of pages of discussion, the district court could have decided the issue quickly and concisely, without delving into the relevant market analysis, the three-part burden-shifting test, or anticompetitive effects.

The EFD also has substantive advantages as applied to this case, in that it adequately accounts for Qualcomm's dual monopolies—in SEPs and in chips. Though the district court understood that Qualcomm's refusal to deal worked in tandem with its NLNC policy, its refusal to deal analysis suffered because it focused only on the modem chip market. Had the district court imposed, and the Ninth Circuit upheld, a duty to deal under the EFD, Qualcomm's NLNC policy would have naturally been abandoned, at least with regard to those OEMs that purchased rival chips.²⁵⁰

One hurdle for the EFD to overcome is the impression that the Supreme Court has dealt the doctrine “death by dicta.”²⁵¹ This dicta primarily comes from *Trinko*, in which the Court briefly stated that its conclusions about Verizon's liability “would be unchanged even if [it] considered to be established law the ‘essential facilities’ doctrine crafted by some lower courts.”²⁵² It further noted that the “existence of sharing duties under the 1996 [Telecommunications] Act . . . [made] it unnecessary to impose a judicial doctrine of forced access.”²⁵³ The impact of this dicta on the EFD has generated significant scholarly attention.²⁵⁴ There is a general consensus that,

250. In a world where Qualcomm licensed its SEPs to rivals, Qualcomm could not force OEMs to pay royalties or enter into licensing agreements for smartphones using rival chips because of patent exhaustion. It could still pursue NLNC against OEMs who bought Qualcomm chips (which would likely be most, if not all, because of Qualcomm's chip dominance) but these OEMs would have a stronger bargaining chip (pun intended) against Qualcomm. They could possibly negotiate for lower royalties or sue under patent law to determine whether the royalty rates were reasonable since they would have the option of buying rival chips without a royalty. This is of course a speculative argument. More research would need to be done on the operation of the NLNC policy as a tying arrangement and how Qualcomm might still be able to use it to leverage its chip power into licensing royalties, even if it was required to license to rivals. For an interesting look at this issue, see Hovenkamp & Simcoe, *supra* note 113, at 3–6 (discussing the NLNC policy as a tying arrangement in which licenses are the tying good and chips are the tied good).

251. See Frischmann, *supra* note 85, at 3. This precedent is one possible reason the FTC did not utilize the EFD, despite the fact that the Ninth Circuit has endorsed the EFD post-*Trinko*.

252. Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, 540 U.S. 398, 410 (2004).

253. *Id.* at 411. This conclusion largely seems to rest on arguments and assumptions about the administrability of the EFD, since conceptually there is no reason not to have two legal schemes mandating access. Whether *Trinko* was rightly or wrongly decided, however, is beyond the scope of this Note.

254. See, e.g., Frischmann, *supra* note 85, at 24 (“*Trinko* has it precisely backwards in its views on the relationship between the essential facilities doctrine and regulation.”); Weber

to the extent the EFD survives *Trinko*, it applies only where there is no regulatory agency supervising the industry.²⁵⁵ Thus, even if *Trinko* limits the EFD overall, it does not limit its application in the SEP context, where there is no regulatory oversight of SSOs and FRAND commitments.

2. Policy Advantages

Courts should apply the EFD to SEPs because (1) antitrust law, more than patent or contract law, is best suited to address the patent holdup issues in the SEP context and (2) the EFD, more than the three-part burden-shifting framework, is best suited to balance the antitrust and patent law concerns.

Antitrust law is the appropriate forum for addressing SEP disputes like those at issue in *Qualcomm*—it need not be left to contract and patent law, as the Ninth Circuit suggested. As discussed by the district court and several *amici*, because of Qualcomm’s dual monopolies, rivals and OEMs had little incentive to challenge Qualcomm’s practices in contract or in patent law, where the damages are lower and the price of litigation might be a patent infringement suit or the loss of chip supply.²⁵⁶ Contract and patent law are thus not “sufficient to guard against patent holdup” in the SEP context, though they may be important tools factoring into the overall analysis.²⁵⁷ Moreover, the fact that Qualcomm’s conduct *could* be addressed in contract or in patent law does not mean it should be immunized from antitrust liability.²⁵⁸

In addition, the EFD appropriately balances antitrust law’s concern for competition and patent law’s concern for innovation in the SEP context. The complex structure of SSOs, SEPs, and FRAND commitments is an attempt to strike a balance between the severe competitive risks of SEPs and the innovative benefits of standards. An SSO’s establishment of an SEP right carries the risk that the SEP-holder will use its grant of market power to engage in holdup or other harmful practices. SSOs combat those risks not by doing away with beneficial standards, but by imposing FRAND commitments.²⁵⁹

Waller, *supra* note 95, at 159; Hovenkamp, *FRAND*, *supra* note 55, at 1718–19 (distinguishing *Trinko* and *Otter Tail* on the basis of EFD).

255. See, e.g., HOVENKAMP, PRINCIPLES OF ANTITRUST, *supra* note 53, at 284.

256. See Fed. Trade Comm’n v. Qualcomm, 411 F. Supp. 3d 658, 786 (N.D. Cal. 2019); see also Class Plaintiffs’ Brief as *Amicus Curiae* in Support of the Federal Trade Commission’s Petition for Rehearing *En Banc* at 6, Fed. Trade Comm’n v. Qualcomm, 969 F.3d 974 (9th Cir. 2020) (No. 19-16122) (noting that some OEMs were forced to sign away their litigation rights).

257. See Melamed & Shapiro, *supra* note 2, at 2123.

258. See Hovenkamp, *FRAND*, *supra* note 55, at 1727 (“[N]o principle calls for antitrust deference to a private contractual regime.”).

259. See *id.* at 1703 (“The FRAND process ensures that all participating firms have access to a common technology so that they can operate on a network where interconnection is

The EFD is the antitrust law complement to those FRAND commitments—like FRAND, it simply requires reasonable and nondiscriminatory access. When FRAND commitments fail to protect against SEP holdup, the EFD steps in as a necessary (but appropriately measured) check in the SEP context. Where patent rights are at their strongest, and the potential for abuse at its highest, antitrust can use the essential facilities doctrine to provide balance in favor of granting access. Antitrust law should not ignore the reality that, especially in a world where patented technology dominates economies and is essential to consumers, the behavior of powerful patent holders can have widespread impacts on competition, consumers, and the economy as a whole.²⁶⁰

V. CONCLUSION

Qualcomm is over, but the issues it raises are not going anywhere. With the impending rise of self-driving cars and other “smart” inventions, interoperability will continue to be a paramount concern for technology developers. In other words, communications standards are here to stay. This is ultimately a good thing. Technological standards make our lives as consumers easier—they allow us to plug our devices in to any outlet in the country and to call our grandmother’s flip phone from an iPhone across the country. While any one standard might fade with time (e.g., 1G), standard-setting and standards in general are likely fixed features of our dynamic technological landscape. Where standards are accessible to all, competition and innovation thrive.

The essential facilities doctrine plays a key role in protecting this utopic vision of standards because it ensures access, without which innovation would be stifled. SEP holders, when they compete in markets that implement standards technology, have powerful incentives to deny reasonable access to that technology. When they succumb to those incentives, antitrust law must come in to protect competition in standard-implementing industries. Just as patent law seeks to balance exclusion and access, antitrust, too, must balance the patent right to exclude against the competitive benefits of access. In the standards context, the benefits of access generally far outweigh the benefits of exclusion. The essential facilities doctrine, as applied to SEPs, properly

essential. As a result, foreclosure can be much more harmful in a networked industry than elsewhere.”).

260. *See id.* at 1685 (“Other firms will very likely follow Qualcomm’s lead. If that happens the FRAND system will fall apart, doing irreparable injury to the modern wireless telecommunications network or, at the very least, diminishing the leadership role of the United States in preserving effective network competition.”).

balances these concerns. Through the essential facilities doctrine, antitrust law can provide a limited but vital check on patent rights in standardized industries, one that will no doubt be necessary in the years to come.

