Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Applications of T-Mobile US, Inc.,	)	
	)	WT Docket No. 18-197
and	)	
	)	
Sprint Corporation	)	
	)	
For Consent toTransfer Control of the Licenses and Authorizations	)	

Comments of Communications Workers of America

Debbie Goldman
501 Third St., N.W.
Washington, D.C. 20001
(202) 434-1194 (phone)
(202) 434-1201 (fax)
dgoldman@cwa-union.org

Allen P. Grunes
Maurice E. Stucke
The Konkurrenz Group
5335 Wisconsin Ave., N.W.
Suite 440
Washington, D.C. 20015
(202) 644-9760 (phone)
(202) 888-7522 (fax)
allengrunes@konkurrenzgroup.com

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EXECUTIVE SUMMARY

The Commission should not approve the proposed merger between T-Mobile and Sprint as currently structured because it would result in substantial public interest harm and offers no countervailing verifiable, merger-related public interest benefits.

First, the merger would result in the loss of more than 28,000 jobs across the United States and combine two companies with a long history of labor and employment law violations. Contrary to the Applicants' unsubstantiated claims of merger-related job creation, leading Wall Street analysts predict that massive job cuts from the elimination of duplicative retail stores and headquarters functions at the New T-Mobile will contribute significantly to the billions of dollars in projected merger "synergies." Consistent with analysts' predictions, CWA performed a comprehensive analysis based on detailed location data for all the retail locations involved in the proposed transaction. Our analysis finds that the proposed T-Mobile/Sprint merger will result in the loss of more than 28,000 U.S. jobs. Approximately 24,000 jobs would be eliminated as a result of overlapping retail store closures at postpaid and prepaid (e.g. Boost and MetroPCS) locations. Another approximately 4,500 jobs would be eliminated due to duplicative functions at corporate headquarters in Overland Park, KS and Bellevue, WA.

The proposed merger would combine two companies with a long history of violation of employment law and workers' rights. This history speaks volumes about the trustworthiness and corporate character of these companies. T-Mobile has won the dubious distinction as being one of the worst labor law violators in the country. T-Mobile has been found in violation of U.S. labor law six times since 2015 and has been subject to approximately 40 unfair labor practice charges since 2011. Findings of illegal activity include, among other things, T-Mobile surveilling its employees and requiring employees, including one who filed a sexual harassment

complaint, to sign an unlawful confidentiality notice prohibiting employees from discussing with one another information from employer-led investigations, and threatening discipline, up to and including discharge, if they engaged in those discussions.

The Commission should not approve the merger without verifiable and enforceable commitments by the Applicants to ensure that the transaction does not cause a reduction in U.S. employment, that no employees of T-Mobile or Sprint will lose a job as a result of this transaction, that the Applicants will return all overseas customer call center jobs to the U.S., and that the Applicants commit to abide by all labor and employment laws and to maintain neutrality in allowing their employees to form a union of their own choosing, free from any interference by the employer.

Second, the proposed horizontal merger of T-Mobile and Sprint raises serious competitive concerns. The proposed transaction would eliminate the substantial head-to-head competition that currently exists between T-Mobile and Sprint. T-Mobile and Sprint have a long history of targeting each other's customers. Both firms have an equally long history of responding to each other's competitive moves. Because of how closely T-Mobile and Sprint compete for subscribers through their respective product and service offerings, the products and services of these two companies are likely to be close substitutes for a large number of consumers. A merger between firms selling differentiated products may diminish competition by enabling the merged firm to profit by unilaterally raising the price of one or both products above the pre-merger level.

The transaction would significantly increase concentration in the national and numerous local geographic markets for mobile telephony/broadband services and prepaid wireless retail

services, measured using both the standard market concentration screen and the Commission's standard screen for spectrum concentration.

We estimated national HHIs for mobile telephony/broadband services by looking at the number of wireless connections reported as of the second quarter of 2018, as well as by revenue for wireless services in 2017. We estimated national HHIs for prepaid wireless retail services by looking at the number of prepaid wireless subscribers reported by the major facilities-based providers as of the second quarter of 2018. These results show that both the mobile telephony/broadband services market and the prepaid wireless services market are "highly concentrated" under the Department of Justice and Federal Trade Commission's 2010 Horizontal Merger Guidelines and the change in concentration resulting from the merger is large enough to trigger the Guidelines' presumption that the merger is "likely to enhance market power." The results are below.

	Pre-Merger HHI	**Post-Merger HHI**	**Change**
2Q18 Wireless Connections	2,762	3,281	519
2017 Wireless Service Revenues	2,811	3,243	432
2Q18 Prepaid Wireless Subscribers	3,037	4,461	1,424

The Commission has long recognized that spectrum is an important input for wireless service and conducts an initial spectrum screen to determine if a proposed transaction raises competitive concerns regarding this key input. The screen is triggered when a wireless provider would hold approximately one-third or more of the suitable and available spectrum. The "New T-Mobile" would exceed the spectrum screen in almost two thirds of the counties in the United

States, with a full 92 percent of the population of the United States living in counties in which the spectrum screen would be exceeded post-merger.

Third, the Applicants have not come close, by any stretch of the imagination, to providing the kind of evidence that is sufficiently rigorous and well documented to satisfy the Commission's high evidentiary standard to prove verifiable public interest benefits that will result from the merger. As an initial matter, the Applicants fail to prove their assertion that neither Sprint nor T-Mobile can effectively compete as standalone firms, and specifically that neither can "win" the race to deploy a next-generation nationwide 5G network. Upon closer inspection, this rationale falls apart for two key reasons:

- Both companies are viable on a standalone basis and are already in the process of improving their networks, including their ability to provide initial 5G services. Neither company needs the proposed transaction to be an effective competitor in the future.
- While Sprint presently appears to lack the tools to offer 5G in rural parts of the country, the Applicants have made no showing that the merged firm would have either the incentive or ability to provide hallmark 5G services outside of densely-populated areas. The proposed merger does not change that reality for rural America.

Fourth, the merger raises serious national security concerns regarding possible integration of Chinese government-owned Huawei and ZTE equipment in the Sprint and T-Mobile networks. The proposed transaction involves two companies that have a history of vendor relationships with Huawei and ZTE. Both Sprint and its majority owner SoftBank have used Huawei equipment in their networks. Sprint and Boost Mobile continue to sell ZTE devices and Sprint executives have publicly praised them. In 2012, Sprint's then-majority-owned subsidiary Clearwire contracted with Huawei for network equipment. That same year, the CFIUS review of the Japanese-owned SoftBank purchase of Sprint and 100 percent of Clearwire resulted in a National Security Agreement requiring Sprint and Clearwire to remove Huawei

equipment from their networks. However, three years later, Sprint admitted that it still had Huawei equipment on the Clearwire network.

The Commission should also consider the history of collaboration between Sprint's Japanese owner, SoftBank, and Huawei and ZTE. Since 2015, SoftBank has partnered with the two companies to develop and deploy 5G wireless technologies in Japan. Therefore, it is imperative that the Commission weigh the Applicants' claims that the proposed transaction will accelerate U.S. 5G efforts ahead of China against Softbank's and Sprint's ties to Chinese telecommunications firms.

The Commission should not move forward in its review of the instant transaction until after CFIUS has ensured that Sprint fully complied with the 2013 Softbank/Sprint/Clearwire merger NSA agreement, the Applicants make binding commitments to terminate any existing relationships with vendors that pose potential security threats, and remove all equipment from these vendors from their operations. Furthermore, the Commission should require the Applicants to participate in regular national security audits to ensure compliance with Commission standards in addition to any national security agreement required by CFIUS. Such measures are particularly warranted in light of the Applicants' questionable record of complying with previous national security agreements.

The Applicants have failed to demonstrate that the proposed transaction is in the public interest.

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I. INTRODUCTION

The proposed merger between T-Mobile and Sprint would result in considerable harm to the public interest with no countervailing public interest benefits. The merger would substantially lessen competition both upstream, hurting workers, and downstream, hurting consumers. Besides fewer jobs and higher prices, the merger will concentrate valuable spectrum in a combined T-Mobile/Sprint, exceeding the Commission's spectrum screen in almost two thirds of the counties in the United States, and raises serious national security concerns. The Commission should reject the proposed transaction as currently structured.

II. FCC STANDARD OF REVIEW AND PUBLIC INTEREST FRAMEWORK

Pursuant to sections 214(a) and 310(d) of the Communications Act, the Commission must determine whether the Applicants have demonstrated that the proposed transfer of control of Sprint Corporation's ("Sprint") assets, licenses, authorizations, and spectrum leases to T-Mobile US ("T-Mobile," together with T-Mobile, "Applicants") will serve the public interest, convenience, and necessity.[1] After reviewing compliance with the Communications Act and other applicable statutes, the Commission considers whether the transaction could result in public interest harms by substantially frustrating or impairing the objectives or implementation of the Communications Act or related statues.[2] The Commission's public interest evaluation encompasses "the broad aims of the Communications Act," which include, among other things, a

[1] 47 U.S.C. §§ 214(a), 310(d).

[2] *See, e.g.,* Applications of Level 3 Communications, Inc. and CenturyLink Inc. for Consent to Transfer Control of Licenses and Authorizations, *Memorandum Opinion and Order*, WC Docket No. 16-403 (rel. Oct. 30, 2017) ¶ 9 [hereinafter *Level 3/CenturyLink Order*]; Applications of Deutsche Telekom AF, T-Mobile USA, Inc., and MetroPCS Communications Inc. for Consent to Transfer Control of Licenses and Authorizations, *Memorandum Opinion and Order and Declaratory Ruling*, WT Docket No. 12-301 (rel. March 12, 2013) ¶ 14 [hereinafter *T-Mobile/Metro PCS Order*].

deeply rooted preference for preserving and enhancing competition in relevant markets, promoting a diversity of license holdings, and generally managing spectrum in the public interest.[3] As the Commission recently explained, its competitive analysis forms "an important part of the public interest evaluation, and is informed by, but not limited to, traditional antitrust principles."[4] The Commission also considers the impact of the transaction on the quality of communications services[5] and whether the new entity will have the requisite financial, technical, and other qualifications to provide the public interest benefits that the Applicants claim the transaction will provide.[6]

In its evaluation, the Commission uses a "sliding scale approach" to weigh any potential public interest harms against any potential public interest benefits.[7] The Commission requires

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[3] *See, e.g., T-Mobile/MetroPCS Order* ¶ 15; Applications of AT&T Inc. and Centennial Communications Corp. for Consent to Transfer Control of Licenses, Authorizations, and Spectrum Leasing Arrangements, WT Docket No. 08-46, *Memorandum Opinion and Order,* 24 FCC Rcd 13915, 13928 at 28 (2009) [hereinafter *AT&T/Centennial Order*]; Applications of Cellco Partnership d/b/a Verizon Wireless and Atlantis Holdings LLC for Consent to Transfer Control of Licenses, Authorizations, and Spectrum Manager and *De Facto* Transfer of Leasing Arrangements and Petition For Declaratory Ruling that the Transaction is Consistent with Section 310c(4) of the Communications Act, WT Docket No. 08-95, *Memorandum Opinion and Order and Declaratory Ruling,* 23 FCC Rcd 17444, 17461 ¶ 27 (2008) [hereinafter *Verizon Wireless-ALLTEL Order*]; Sprint Nextel Corporation and Clearwire Corporation Applications for Consent to Transfer Control of Licenses, Leases, and Authorizations, WT Docket No. 08-94, *Memorandum Opinion and Order,* 23 FCC Rcd 17570, 17580 ¶ 20 (2008) [hereinafter *Sprint Nextel-Clearwire Order*]; Applications of AT&T Wireless Services, Inc. and Cingular Wireless Corporation for Consent to Transfer Control of Licenses and Authorizations, WT Docket 04-70, *Memorandum Opinion and Order* ¶ 41 (rel. Oct. 26, 2004) [hereinafter *Cingular/AT&T Wireless Order*].

[4] *Level 3/CenturyLink Order* ¶ 9.

[5] *See, e.g., T-Mobile/Metro PCS Order* ¶ 15.

[6] 47 U.S.C. § 308(b); AT&T and BellSouth Corporation Application for Transfer of Control, *Memorandum Opinion and Order,* 22 FCC Rcd at 5756 ¶ 190 (2007) [hereinafter *AT&T/BellSouth Order*]; Ameritech, Corp. Transferor, and SBC Communications, Transferee, for Consent to Transfer Control of Corporations Holding Commission Licenses and Lines Pursuant to Section 214 and 310(d) of the Communications Act, *Memorandum Opinion and Order,* 14 FCC Rcd 14712, 14947-48 ¶ 568 [hereinafter *Ameritech/SBC Order*]; *see also* 47 U.S.C. § 310(d).

[7] *See, e.g., T-Mobile/Metro PCS Order* ¶ 14; Cellco Partnership d/b/a Verizon Wireless and SpectrumCo and Cox TMI for Consent to Assign AWS Licenses et al., *Memorandum Opinion and Order and Declaratory Ruling*, WT Docket No. 12-4 (rel. Aug. 23, 2012) ¶ 28 [hereinafter *Verizon Wireless/SpectrumCo Order*]; Applications of AT&T Mobility Spectrum LLC, New Cingular Wireless PCS, LLC, Comcast Corporation Horizon Wi-Com, LLC, NextWave Wireless, Inc., and San Diego Gas & Electric Company for Consent to Assign and Transfer Licenses, WT Docket No. 12-240, *Memorandum Opinion and Order*, 27 FCC Rcd at 16463-64 ¶ 10 [hereinafter *AT&T/WCS*

that "as the harms to the public interest become greater and more certain, the degree and certainty of the public benefits must also increase commensurately."[8] Where the potential harms are "both substantial and likely, the Applicants' demonstration of claimed benefits also must reveal a higher degree of magnitude and likelihood than we would otherwise demand."[9] Finally, the Applicants bear the burden of proving, by a preponderance of the evidence, that the proposed transaction, on balance, will serve the public interest.[10]

The impact of a merger on U.S. employment is part of the FCC's public interest analysis.[11] Indeed, the FCC has repeatedly confirmed that *verifiable* commitments to grow jobs

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Order]; Applications of AT&T Inc. and Qualcomm Incorporated for Consent to Assign Licenses and Authorizations, *Order*, 26 FCC Rcd at 17598-99 ¶ 23; *AT&T/BellSouth Order* ¶ 203.

[8] In Re Applications of Teleport Commc'ns Grp. Inc., Transferor, & AT&T Corp., Transferee, 13 F.C.C. Rcd. 15236 n. 150 (1998) quoting In re Applications of NYNEX Corp., Transferor, & Bell Atl. Corp., Transferee, 12 F.C.C. Rcd. 20063, ¶ 157 (1997) ("As the harms to the public interest become greater and more certain, the degree and certainty of the public benefits must also increase commensurately in order for us to find that the transaction on balance serves the public interest, convenience and necessity").

[9] *See, e.g.*, Applications of AT&T and Deutsche Telekom AG, WT Docket No. 11-65, *Order and Staff Analysis and Findings*, WT Docket No. 11-65 ¶ 127 [hereinafter *AT&T/T-Mobile Staff Analysis and Findings*]; Applications of Comcast Corporation, General Electric Company, and NBC Universal, Inc. for Consent to Assign Licenses and Transfer Control of Licenses, *Memorandum Opinion and Order*, MB Docket No. 10-56 (rel. Jan. 20, 2011) at ¶¶ 228-9 [hereinafter *Comcast/NBCU Order*]; *Cingular/AT&T Wireless Order* ¶ 91. Where the potential for harms is great, the merging parties must demonstrate "extraordinary efficiencies" and the court must rigorously analyze the claims. Courts generally have found proof of efficiencies to be inadequate to rebut a finding of likely competitive harm. *See, e.g*., FTC v. H.J. Heinz Co., 246 F.3d 708, 720, 721 (D.C. Cir. 2001) (high market concentration levels require "proof of extraordinary efficiencies," the court "must undertake a rigorous analysis of the kinds of efficiencies being urged by the parties in order to ensure that those 'efficiencies' represent more than mere speculation and promises about post-merger behavior" and courts "generally have found inadequate proof of efficiencies to sustain a rebuttal of the government's case"); FTC v. Sysco Corp., 113 F. Supp. 3d 1, 81–82 (D.D.C. 2015) (where the court finds high market concentration levels, the merging parties must present "proof of extraordinary efficiencies" to rebut the presumption of anticompetitive harm); United States v. H & R Block, Inc., 833 F. Supp. 2d 36, 89 (D.D.C. 2011) (same); U.S. Department of Justice & Federal Trade Commission, Horizontal Merger Guidelines § 10 (Aug. 19, 2010) [hereinafter *2010 Merger Guidelines*]. To date, there has never been a case where the merging parties have successfully rebutted the government's prima facie case on the strength of the efficiencies. *See, e.g., Sysco*, 113 F. Supp. 3d at 82 ("The court is not aware of any case, and Defendants have cited none, where the merging parties have successfully rebutted the government's prima facie case on the strength of the efficiencies.").

[10] *See, e.g.*, In re Echo Star Communications Corp., 17 FCC Rcd 20559 (2002).

[11] *See, e.g., AT&T/T-Mobile Staff Analysis and Findings* ¶ 259 ("As part of its public interest analysis, the Commission historically has considered employment-related issues such as job creation [and] commitments to honor union bargaining contracts. . ."); *Comcast/NBCU Order* ¶ 224 ("We also note the Applicants' representations that

in the U.S. represent a public interest benefit to be taken into account in the review of proposed mergers.[12] The FCC considers a merger's impact on service quality as part of its public interest analysis, and has determined that job cuts resulting in reductions in service quality are not in the public interest.[13] In previous merger reviews, Commissioners made clear that job losses do not serve the public interest. In this instant transaction, the Commission must also ensure that workers do not experience any reduction in employment nor anticompetitive downward pressure on wages as a result of this transaction.[14]

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additional investment and innovation that will result from the transaction will in turn promote job creation and preservation."); Applications of Nextel Communications, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations, WT Docket No. 05-63, *Memorandum Opinion and Order*, 20 FCC Rcd 13967, 14029-30, ¶¶ 168-69 (2005) [hereinafter *Sprint/Nextel Order*] (considering job growth claims as part of FCC analysis); Applications of Puerto Rico Telephone Authority and GTE Holdings (Puerto Rico) LLC for Consent to Transfer Control of Licenses and Authorization, File No. 03373-03384-CL-TC-98, *Memorandum Opinion and Order*, 14 FCC Rcd 3122, 3148, at 57-58 (1999) (finding that GTE's pledge not to make any involuntary terminations, except for cause, of PRTC workers employed as of a certain date would benefit the public interest); *T-Mobile/MetroPCS Order* ¶ 80 (rel. March 12, 2013) (considering T-Mobile's job claims as part of FCC analysis).

[12] *See, e.g., AT&T/BellSouth Order*, 22 FCC Rcd 5662, Appendix F (2007) (finding that a commitment to provide high quality employment opportunities in the U.S. by repatriating jobs previously outsourced outside the U.S. would serve the public interest). *See also AT&T/T-Mobile Staff Analysis and Findings* at ¶ 259 (stating that "the Applicants have the burden of proof regarding merger specificity, qualification, and verification" regarding claims of job creation).

[13] *See AT&T/T-Mobile Staff Analysis and Findings* ¶ 231 (lowering the number of representatives per customer and reducing the level of service that customers would experience "are, of course, not a public benefit . . ."); *Ameritech/ SBC Order*, 14 FCC Rcd 14712, 14947 ¶ 567 (1999) ("Evidence in the record reveals that SBC has increased its commitments to improving service quality by hiring more employees . . .").

[14] *See Verizon/Frontier Order*, Statement of FCC Chairman Julius Genachowski ("I take seriously concerns that have been expressed about the risks this transaction poses for consumers, employees, and competitors"); Joint Statement of Commissioner Michael Copps and Mignon Clyburn ("Lastly, we understand—and fully expect—that approving this transaction will maintain and potentially expand much-needed quality jobs in these rural communities. We continue to be hopeful that Frontier will soon reach an equitable agreement with the Communications Workers of America, ensuring that the needs of Frontier's employees are respected"). *See also T-Mobile/MetroPCS Order* (Statement of Commissioner Jessica Rosenworcel: "Nonetheless, I have expressed to the parties my concern that as they move ahead, American workers do not get left behind. Major job losses are not in the public interest.") (Statement of Commissioner Mignon Clyburn: "I hope that the new company, in fact, pursues a course that increases employment opportunities.") (Letter from Chairman Julius Genachowski to Congressman Michael Michaud: "During our review T-Mobile USA told the Commission that they plan to preserve and grow U.S. jobs, and I expect them to live up to these commitments."). *See also WorldCom-MCI Order* ¶ 213 (considering the impact of that merger on employment); *SBC-Ameritech Order* ¶ 567 (citing SBC's commitment to "improving service quality by hiring more employees"); *Puerto Rico-GTE Order* ¶ 57 (noting that employee commitments are a merger-related public interest benefit).

III. COMPETITIVE ANALYSIS

The proposed horizontal merger of T-Mobile and Sprint raises serious competitive concerns.

First, the transaction would significantly increase concentration in the national and numerous local geographic markets for mobile telephony/broadband services and prepaid wireless retail services, measured using both the standard market concentration screen and the Commission's standard screen for spectrum concentration. The concentration levels and increases that would flow from the transaction are "a strong indicator of harm to competition – and in antitrust analysis trigger a presumption of such harm – for good reason."[15]

Second, the proposed transaction would eliminate the substantial head-to-head competition that currently exists between T-Mobile and Sprint. T-Mobile and Sprint have a long history of targeting each other's customers. Both firms have an equally long history of responding to each other's competitive moves. Because of how closely T-Mobile and Sprint compete for subscribers through their respective product and service offerings, the products and services of these two companies are likely to be close substitutes for a large number of consumers. A merger between firms selling differentiated products may diminish competition by enabling the merged firm to profit by unilaterally raising the price of one or both products above the pre-merger level.[16]

Given that this is a horizontal merger between two companies that for many years have waged an intense competitive war with each other, one would expect the parties to provide at least *some* factual support to show that the parties' offerings are not regarded by consumers as

[15] *AT&T/T-Mobile Staff Analysis and Findings* at ¶ 19 (citation omitted).

[16] *2010 Merger Guidelines* § 6.1

particularly close substitutes, that only a small percentage of customers actually switch or would consider switching from Sprint to T-Mobile (or vice versa), or other evidence showing the parties do not often go head-to-head in the marketplace. This, perhaps for obvious reasons, they have failed to do. Their failure is telling.

One also would expect the parties' economists to perform at least *some* of the economic analysis spelled out in the Horizontal Merger Guidelines and provide this analysis in their Application. A gross upward pricing pressure ("GUPPI") analysis is particularly appropriate when unilateral effects are at issue.[17] Merger simulation taking into account the actual closeness of Sprint and T-Mobile product and service characteristics could have been performed using the parties' own data.[18] Sprint's economists did a detailed economic analysis of gross upward pricing pressure as part of Sprint's opposition to the AT&T/T-Mobile transaction in 2011.[19] Sprint's lawyers criticized AT&T and T-Mobile in 2011 for the failure to provide an economic simulation model with their Application and for allegedly "hid[ing] the ball" later on.[20] The absence of *any* quantitative unilateral effects analysis here speaks volumes, and should tell the

[17] *2010 Merger Guidelines* § 6.1; Steven C. Salop, *The Evolution and Vitality of Merger Presumptions: A Decision-Theoretic Approach*, 80 ANTITRUST L.J. 269, 279 (2015) (GUPPI is "important evolutionary change" and "new way to score unilateral effects concerns" that "can be used as evidence at trial or as the basis of either anticompetitive or 'no harm' rebuttable presumptions.").

[18] The parties' accounting data often provide a reasonable indications of price-cost margins for their brands. *See, e.g.*, Gregory J. Werden, *Unilateral Competitive Effects of Horizontal Mergers I: Basic Concepts and Models*, ISSUES IN COMPETITION LAW AND POLICY, 2008, at 1340, *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=939033. In addition, the parties have information about changes in pricing and demand for particular products, the impact of new offers, etc.

[19] *See* Sprint Petition to Deny (May 31, 2011), Attachment A, "Economic Analysis of the Merger of AT&T and T-Mobile, Joint Declaration of Steven C. Salop, Stanley M. Besen, Stephen D. Kletter, Serge X. Moresi, and John R. Woodbury, Charles River Associates," ¶¶ 145-169, https://ecfsapi.fcc.gov/file/7021675883.pdf; *see also* Sprint Reply Comments (June 20, 2011).

[20] *See* Letter from Regina M. Keeney to Marlene H. Dortch, August 22, 2011, WT Docket No. 11-65.

Commission all it needs to know about what the results would show: that the merger of T-Mobile and Sprint would likely lead to serious consumer harm.

a. Market Definition, Market Participants and Concentration

Merger analysis may involve multiple relevant product markets. That is because competitive effects and consumer harm may occur in multiple markets. For a merger to be anticompetitive, it need only cause harm in one relevant market.

Wireless phone service is purchased by various types of customers with different needs. It is a differentiated product. Some examples of the relevant points of product and price differentiation include: payment plans; contract lengths; types of handsets; data features and costs of data services; roaming costs; and family plans.

Because carriers have the ability to set distinct prices for particular service packages, these various differences imply that the merger could be analyzed in any or all of a number of different relevant product markets or sub-markets, or market segments of more broadly defined markets.

In this section of the Comments, we focus on two product markets that may be adversely affected by the merger: the *mobile telephony/broadband services market*, and the narrower market for *prepaid wireless retail services*.[21]

i. Mobile telephony/broadband services is a relevant market

The main downstream product market affected by this transaction is a combined mobile telephony and mobile broadband services market. This market is comprised of mobile voice and data services, including mobile voice and data services provided over advanced broadband

[21] There may be additional product markets affected by the transaction, including service to retail postpaid customers and to corporate and government accounts.

wireless networks. We note that this combined "mobile telephony/broadband services" market is the same product market the Commission has defined in a series of recent transactions, including T-Mobile/MetroPCS and AT&T/T-Mobile.[22] There is, at least as of today, no reason to depart from it.

The rationale for a "mobile telephony/broadband services" product market remains compelling. Mobility is highly valued by customers – perhaps never more so than now. Mobile wireless services that include both voice and data allow customers to make telephone calls, check email, send texts, use popular services like Facebook, make payments, and search the Internet when they are outside of the home or moving between one location and another, without interruption. More than three-quarters of Americans now own a smartphone.[23] Voice and data services are heavily advertised and promoted as a package by wireless providers and are purchased by most consumers in a single wireless plan.

Because neither fixed wireless services nor wireline services are mobile, they are not regarded by consumers of mobile wireless services as reasonable substitutes.[24] In addition, public Wi-Fi is generally regarded as less secure than a cellular network.[25]

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[22] *See T-Mobile/MetroPCS Order* ¶ 25; *AT&T/T-Mobile Staff Analysis and Findings* at ¶ 31.

[23] *See* Pew Research Center Mobile Fact Sheet (Feb. 5, 2018), http://www.pewinternet.org/fact-sheet/mobile/.

[24] Second Amended Complaint at ¶ 12, United States v. AT&T & T-Mobile, Case 1:11-cv-01560-ESH (D.D.C. filed Sept. 30, 2011), https://www.justice.gov/atr/case-document/file/487726/download [hereinafter *DOJ AT&T/TMO Second Amended Complaint*].

[25] *See, e.g.*, Symantec, Press Release, Consumers' Perceived Invincibility on Public Wi-Fi Could Be Placing Their Personal Information at Risk (July 9, 2017), https://www.symantec.com/about/newsroom/press-releases/2017/symantec_0709_01; Ryan Orsi, *Wi-Fi honeypots: Alive and well at RSAC 2018* (Apr. 30, 2018), https://www.helpnetsecurity.com/2018/04/30/wi-fi-honeypots-rsac-2018/.

ii. Prepaid wireless retail services is a relevant market

In addition to the mobile telephony/broadband services market, the parties also compete in a narrower market for prepaid wireless retail services. The mobile wireless marketplace is differentiated between prepaid and postpaid offerings. Prepaid plans are often marketed under a different brand name (such as Boost Mobile, MetroPCS and Cricket Wireless), sold in different stores, have different contractual terms (e.g. do not require a credit check or an annual plan), offer different handset options, and have other features that differentiate these plans from postpaid plans.

iii. Applicants' departure from Commission precedent is unwarranted

In the words of Sprint's Complaint in the AT&T/T-Mobile case, "AT&T, Verizon, Sprint and T-Mobile are distinguished from other wireless carriers by the nationwide service that their networks and spectrum assets allow them to provide to their subscribers."[26]

The Applicants now argue, however, that the Commission should expand its definition of the mobile telephony/broadband services market to include cable companies like Comcast and Charter and satellite providers like DISH on the grounds that these companies "are executing business strategies that exploit their existing consumer reach to provide broadband through wireless technology."[27] They also urge the Commission to include TracFone on the grounds that

[26] Complaint, at ¶ 98, Sprint Nextel Corporation v. AT&T, Inc., AT&T Mobility LLC Glenridge Highland Two, T-Mobile USA, Inc. & Deutsche Telekom AG, Civ. Act. No. 11-cv-01600 (D.D.C. filed September 6, 2011) [hereinafter *Sprint Complaint*].

[27] *T-Mobile US, Inc. and Sprint Corporation Seek FCC Consent to the Transfer of Control of Licenses, Authorizations, and Spectrum Leases held by Sprint Corporation and Its Subsidiaries to T-Mobile US, Inc.*, WT Docket No. 18-197, Description of Transaction, Public Interest Statement, and Related Demonstrations, at 14 (filed June 18, 2018) [hereinafter *PIS* or *Public Interest Statement*].

it is "asserting huge competitive pressure on traditional wireless competitors."[28] And they point to Google's Project Fi as a "non-traditional entrant."[29]

This effort fails for at least two reasons. First, there is no showing that consumers view any of these alternatives as effective substitutes for the Big Four. Second, the parties have presented no evidence that any of these companies operates as a constraint on pricing or other competitive decisions by the Big Four. Market definition is not an abstract exercise. Market definition and the "hypothetical monopolist" test go hand in hand. The purpose of market definition is to identify "which product(s) in which geographic locations significantly constrain the price of the merging firms' products."[30] None of these suggested alternatives do so.

Comcast and Charter

Comcast's Xfinity Mobile is held out by the Applicants as "already having a competitive impact on the leading wireless incumbents" and as "a strong wireless competitor."[31]

However, the facts suggest otherwise. Comcast's Xfinity Mobile is only available as part of a bundle with other Comcast services; its current total wireless subscribership of approximately 780,000 customers makes it less than two percent the size of Sprint; it is dependent on Verizon's network for wireless service; its "unlimited" plan shifts to reduced speeds after 20 GB of cellular data usage; and it offers few handset options.[32]

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[28] *Id*. at 114.

[29] *Id*. at 116.

[30] FTC and DOJ Commentary on the Horizontal Merger Guidelines (2006) at 5.

[31] PIS at 110.

[32] Rob Pegoraro, *The hidden details in Comcast's wireless plan*, USA TODAY (Apr. 7, 2017), https://www.usatoday.com/story/tech/columnist/2017/04/07/hidden-details-comcasts-wireless-plan/100161224/; Mike Dano, *Comcast's Xfinity Mobile begins to accelerate, but analysts remain wary*, FIERCE WIRELESS (July 26, 2018), https://www.fiercewireless.com/wireless/comcast-s-xfinity-mobile-begins-to-accelerate.

It is likely that Comcast is offering a mobile wireless service as part of a bundle in an effort to reduce its own continuing losses of customers for its legacy pay-TV business. According to Comcast executive David Watson, Xfinity Mobile is "designed to support the core cable business."[33]

The parties nonetheless assert that Xfinity Mobile is drawing its (relatively few) subscribers from "the leading wireless incumbents." This is not surprising. Given that the four "leading wireless incumbents" (namely, AT&T, Verizon, T-Mobile, and Sprint) account for approximately 98 percent of the nation's mobile wireless service revenues,[34] there is no other source from which Xfinity Mobile *could* draw subscribers. And the fact that it is drawing from Verizon and AT&T in particular should be even less surprising, as they are rivals to Comcast's pay-TV and ISP businesses in some parts of the country. Comcast's Xfinity Mobile is hardly a sufficient competitive alternative to the Big Four for most mobile wireless customers.

Charter has just begun to offer wireless cell service. Like Comcast, Charter relies on Verizon's network, only offers the service to Charter subscribers, and the service is only sold as part of a bundle with other Charter services. According to its CEO, Charter expects the new wireless service "to drive more sales of our core products and to create longer customer lives."[35]

As one industry observer has suggested,

> The cable companies have found that the more services that a customer purchases from a single company, the less likely that customer is to switch to a different service provider, even if they are unhappy with one or more of the service elements within the bundle. At least for now, Comcast's Xfinity Mobile and the

[33] Julia Boorstin, *Comcast launches new wireless service, Xfinity Mobile*, CNBC (Apr. 6, 2017), https://www.cnbc.com/2017/04/06/comcast-launches-new-wireless-service-xfinity-mobile.html.
[34] Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, Including Commercial Mobile Services, 32 FCC Rcd 8968 ¶ 32 (released Sept. 27, 2017) [hereinafter *20th Wireless Report*].
[35] See Karl Bode, *Charter Wireless Service to Launch in First Half of Next Year*, DSL REPORTS (Oct. 30, 2017).

impending Charter offering is more about preserving their wireline business than competing in the wireless business.[36]

The Applicants offer snippets suggesting that Comcast and Charter have broader ambitions. But there is no evidence in the record that Comcast or Charter are – or in a reasonable period of time will become – constraints on the merging parties' pricing or other competitive decisions. In February 2018, a few months before the proposed merger was announced, T-Mobile's CEO called Comcast's wireless service "very irrelevant" and Charter's wireless service "irrelevant squared."[37] Comcast's and Charter's pay-TV bundles are hardly a good second, third or even fourth choice for T-Mobile or Sprint customers who want mobile voice and data service.

DISH

DISH has amassed significant spectrum over the past decade. But the company faces what has been described as "an uphill climb to wireless relevance."[38] Some of DISH's spectrum is one-way, meaning it can be used only for downloading, but not for uploading data, making calls or sending text messages. DISH also lacks the network infrastructure of the Big Four wireless carriers. In addition, many of DISH's pay-TV customers live in rural areas. It is not at all clear whether DISH would be able to market a competitive wireless service effectively or profitably. Although DISH expects to invest in wireless projects in the next two years, and plans

[36] The Capitol Forum, *Sprint/T-Mobile: Despite Changes in Administration, Competitive Landscape, and Market Dynamics, Clearance Prospects Remain Highly Challenging*, at 5 (May 16, 2017).

[37] Daniel Frankel, *T-Mobile's Legere: Charter's wireless service will be 'irrelevant squared'*, FIERCEVIDEO (Feb. 8, 2018), https://www.fiercevideo.com/cable/t-mobile-s-legere-charter-s-wireless-service-will-be-irrelevant-squared.

[38] The Capitol Forum, *T-Mobile/Sprint: Dish Faces Uphill Climb to Wireless Relevance Even If It Buys Divested Assets, Industry Experts Say* (July 12, 2018).

to deploy a 5G network, its plans at this point appear focused on supporting Internet of Things (IoT) applications.[39]

Google

Google's Project Fi has been in existence for approximately three years. The hallmark of the service is that it switches between cellular networks (Sprint, T-Mobile and U.S. Cellular) and Wi-Fi networks when available, offers a potentially lower-priced service for data usage, and works on a select number of phones. Google does not report subscriber numbers for Project Fi.

Project Fi is a mobile virtual network operator (MVNO). It has been characterized as a "Wi-Fi-first" provider, an MVNO that works to push customers' traffic onto Wi-Fi in order to protect them from the cost of cellular data. However, with the advent of unlimited cellular data plans by the Big Four wireless carriers, its business case has diminished.[40] According to one industry analyst, "[Project] Fi has the challenge of being a product that might appeal to more techie users but commercially is of more interest to price-sensitive lower-use customers. Collectively, those Wi-Fi-first propositions have approximately 3 million users in the US – challenged by that niche pricing position, often limited device support, and marketing spend dwarfed by the big 4."[41] Project Fi is also compatible with a limited list of phones. Apple's iPhones, for example, are not compatible, as are most other major phone brands.[42]

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[39] *Id*.

[40] Mike Dano, *Wireless Editor's Corner—Whatever happened to Google's big MVNO, Project Fi?*, FIERCE WIRELESS (Jan. 12, 2017), https://www.fiercewireless.com/wireless/whatever-happened-to-google-s-big-mvno-project-fi.

[41] *Id*.

[42] Andreas Rivera, *What is Google's Project Fi and How Does it Work?*, What Works for Business (Blog) (March 2, 2018), https://www.business.com/articles/project-fi-phone-system/.

In addition to the fact that Project Fi is a niche product with an uncertain future, there is the question of what impact the proposed transaction would have on a service that relies on both Sprint and T-Mobile networks and pits the network speeds of Sprint and T-Mobile against each other to determine which network to connect to. In other words, Project Fi has been a spur to competition between the parties to create better networks.

Finally, history suggests that Google does not have unlimited resources to throw at unprofitable or marginal businesses. A few years ago Google Fiber was seen as a viable competitive alternative to the incumbent cable companies.[43] No longer.

TracFone

The parties argue that TracFone "is exerting huge competitive pressure on traditional wireless competitors" as it is "the largest MVNO in the United States and the fifth largest wireless carrier by subscribership." But MVNOs depend upon facilities-based carriers' networks, and this relationship can be terminated or altered when it suits the network provider. For this reason, the competitive significance of MVNOs has historically been seen as limited.

There is no inherent virtue in TracFone's relative size in this wholesale relationship. As the Commission staff wrote in *AT&T/T-Mobile*,

> These firms [MVNOs] purchase service at wholesale rates from facilities-based providers. Unless the firms selling wholesale services (often the nationwide providers) have an ability and incentive to expand output after the proposed transaction, as we find unlikely, it is also unlikely that they would set wholesale rates at a level that would allow resellers to create significant new competition in retail services. Commission rules do not require facilities-based providers to offer services for resale.[44]

[43] *See, e.g.*, Henry Blodget, *Here's Why You Will Instantly Dump Your Cable Company To Get Google Fiber*, BUSINESS INSIDER (Nov. 23, 2012), https://www.businessinsider.com/google-fiber-vs-your-cable-company-2012-11.

[44] *AT&T/T-Mobile Staff Analysis and Findings* ¶ 69 n. 202.

Accordingly, the staff concluded, "we would not expect resellers and MVNOs to be able to counteract or deter a competitive problem in retail mobile wireless services through expansion, whether on their own or in conjunction with expansion or new competition by other firms."[45]

Given that the "New T-Mobile's" share of the retail prepaid market would be around 50 percent by various measures following the proposed merger, prepaid business would potentially become a more important part of "New T-Mobile's" overall business, giving it greater incentive to focus on that segment and less incentive to provide wholesale service to a competitor. Indeed, this was one of Sprint's major theories in the *AT&T/T-Mobile* case, where Sprint was both a customer of and a competitor to the merging parties.[46] Any notion that the transaction would allow TracFone to create new competition does not square with the facts.

iv. Geographic markets

Both the Commission and the Department of Justice have in the past defined the relevant geographic markets as local, but have also recognized that there are important national characteristics which make it appropriate to consider also a national market.[47]

From the consumer's perspective, local areas may be considered relevant geographic markets for mobile wireless telecommunications services. The Cellular Market Areas ("CMAs") that the Commission has identified and used to license mobile wireless telecommunications

[45] *Id*. ¶ 69.

[46] *See, e.g.*, Sprint Complaint ¶ 7 ("as a result of the significant increase in market concentration resulting from the merger, AT&T and Verizon, both unilaterally and in coordination, would have the increased ability and incentive to directly raise the costs that their rivals must incur for backhaul and roaming").

[47] *See* T-Mobile/MetroPCS Order ¶ 34; *DOJ AT&T/TMO Second Amended Complaint* ¶¶ 14-20.

services providers often approximate the areas within which customers have the same competitive choices.[48]

At the same time, as DOJ stated in its Complaint in challenging the AT&T/T-Mobile transaction, the four facilities-based mobile wireless service providers in the United States "utilize networks that cover the vast majority of the U.S. population, advertise nationally, have nationally recognized brands, and offer pricing, plans, and devices that are available nationwide."[49]

As a result,

> The national decision-making of the Big Four carriers results in nationwide competition across local markets. Each of the Big Four firms making a competitive choice regarding a pricing plan, or other national competitive attribute, will consider competitive conditions across the United States, as the decision will take effect throughout the United States. Because competitive decisions affecting technology, plans, prices, and device offerings are typically made at a national, rather than a local, level, the rivals that affect those decisions generally are those with sufficient national scale and scope, i.e., the Big Four.[50]

The same set of characteristics led the Commission to characterize these firms as "nationwide" competitors.[51]

v. Concentration

1. Mobile telephony/broadband services

Under any metric, the national market for mobile telephony/broadband services is highly concentrated. In 2016, according to the FCC's *20th Mobile Wireless Competition Report*, total

[48] *DOJ AT&T/TMO Second Amended Complaint* ¶ 17.

[49] *DOJ AT&T/TMO Second Amended Complaint* ¶ 18. *See also AT&T/T-Mobile Staff Analysis and Findings* ¶ 34.

[50] *DOJ AT&T/TMO Second Amended Complaint* ¶ 19. *See also AT&T/T-Mobile Staff Analysis and Findings* ¶ 34.

[51] *20th Wireless Report* ¶ 13.

wireless service revenues were approximately $189 billion, and the four nationwide service providers accounted for approximately 98 percent of that total.[52]

The Applicants have not provided national HHI estimates, claiming that they did not have access to the necessary NRUF data to do so.[53] This is at best disingenuous, as the same economists, then working for Sprint, were able to estimate HHIs as part of Sprint's opposition the AT&T/T-Mobile merger. They calculated HHIs by using revenue data, and in fact asserted that, for purposes of calculating HHIs, "[r]evenues are particularly relevant when the products are differentiated, as they are in this market."[54] We submit that the reason Applicants have not supplied any HHI estimates is that, using *any* available data, the HHIs show that the proposed merger is presumptively anticompetitive under well-established antitrust case law.

We have estimated national HHIs in two ways. First, we looked at the number of wireless connections reported by AT&T, Sprint, T-Mobile, Verizon and U.S. Cellular as of the end of the second quarter of 2018. Second, we looked at revenue for wireless services for the same firms in 2017. The HHI takes into account the relative size distribution of the firms in a market. It increases both as the number of firms in the market decreases and as the disparity in size between those firms increases.[55] Thus, although there may be additional minor facilities-based fringe firms, their omission should not significantly impact the results. Our estimates are below.

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[52] *Id*. at ¶¶ 31-32.

[53] PIS at 135.

[54] Stanley M. Besen, Stephen D. Kletter, Serge X. Moresi, Steven C. Salop & John R. Woodbury, *An Economic Analysis of the AT&T-T-Mobile USA Wireless Merger*, 9 JOURNAL OF COMPETITION LAW & ECONOMICS 23, 30 (2013).

[55] https://www.justice.gov/atr/herfindahl-hirschman-index.

	Pre-Merger HHI	Post-Merger HHI	Change
2Q18 Wireless Connections	2,762	3,281	519
2017 Wireless Service Revenues	2,811	3,243	432

These results show that the national retail wireless market is "highly concentrated" under the 2010 Horizontal Merger Guidelines and the change in concentration resulting from the merger is large enough to trigger the Guidelines' presumption that the merger is "likely to enhance market power."[56]

The Applicants also have failed to provide any information from which to calculate HHIs for individual local markets. However, we do not expect the situation to be materially different on a local level. Many local markets, including major metropolitan markets, are likely to be highly concentrated. The Commission, using NRUF data, has stated in the *20th Mobile Wireless Competition Report* that as of year-end 2016, the weighted average HHI for mobile wireless services was 3,101.[57] Chart II.C.1 in that *Report* shows that in the local markets analyzed by the Commission, including major metropolitan areas and rural areas, the pre-merger HHIs all exceeded 2,000, and all but one appear to have exceeded 2,500.[58] In numerous local markets, the transaction is likely to trigger the 2010 Horizontal Merger Guidelines' presumption that the merger is "likely to enhance market power."

2. Prepaid wireless retail services

For prepaid services, concentration levels and the change in concentration from the merger would be even greater. We estimated national HHIs based on the number of prepaid

[56] *2010 Merger Guidelines* § 5.3. Using the revenue information in Table II.C.1 of the 20th Mobile Wireless Report yields similar results for 2016: Pre-merger HHI is 2,850, post-merger HHI is 3,262 and the change is 412.

[57] *20th Wireless Report* ¶ 33.

[58] *Id*.

wireless subscribers for the branded services of AT&T, Sprint, T-Mobile, Verizon, and U.S. Cellular, all of which are facilities-based providers, as of the end of the second quarter of 2018.[59] The results are below.

	Pre-Merger HHI	Post-Merger HHI	Change
2Q18 Prepaid Subscribers (facilities-based)	3,037	4,461	1,424

Although we recognize that the Commission generally attributes the subscribers of MVNOs to their host facilities-based service providers,[60] we did not have granular enough data that would have allowed us to reliably make this attribution.

Notably, however, even if one were to depart from the Commission's standard approach and *not* attribute MVNO subscribers to a facilities-based provider, the HHI results would not dramatically change. For the sake of argument, we estimated HHIs based on the number of prepaid wireless subscribers for the branded services of AT&T, Sprint, T-Mobile, Verizon, U.S. Cellular, and, in addition, included TracFone subscribers separately, as of the end of the second quarter of 2018. The results are below. They suggest that even if the Commission were to depart from its standard practice of attributing the subscribers of MVNOs to their host facilities-based providers, the transaction would still result in a highly concentrated market and the change in concentration would be high enough to trigger the Guidelines' presumption that the merger is "likely to enhance market power" in the prepaid segment of the market.

[59] Some but not all of these firms also report information about the number of reseller/wholesale wireless subscribers. Because not all of the firms report such information, and to avoid estimating what share of those reseller/wholesale subscribers should be counted as prepaid subscribers, we attempted to estimate shares and HHIs based on the information we could document at this time. Accordingly, we did not use reseller/wholesale subscriber numbers in our calculations.

[60] *20th Wireless Report* ¶ 33 n. 99.

	Pre-Merger HHI	Post-Merger HHI	Change
2018 Prepaid Subscribers (incl. TracFone)	2388	3086	698

To be sure, and as the Commission has pointed out, market shares and HHIs do not necessarily tell the whole story.[61] Industries with few players may be intensely competitive. However, the empirical evidence is stronger today than it was a few years ago that the Horizontal Merger Guidelines' presumption is a valid predictor of post-merger harm. The author of the leading retrospective study of merger price effects, Professor John Kwoka, has shown that a large number of mergers that lie above identifiable HHI thresholds indeed prove to be anticompetitive when analyzed after the fact. The prediction is stronger when a simple HHI measure is supplemented by a change in HHI, and stronger still when couched in terms of the number of significant competitors in the market. These results, according to Kwoka, validate thresholds like those in the 2010 Horizontal Merger Guidelines. "The evidence is, simply put, quite strong."[62]

Other economic scholars also find value in having a structural presumption. Professor Steven Salop recently cast the structural presumption of *Philadelphia National Bank*[63] in decision theoretic terms. Salop quotes approvingly from *Philadelphia National Bank*, noting that the precise effect of a merger is not "susceptible of a ready and precise answer in most cases," that congressional intent should not be subverted by "permitting a too-broad economic investigation" and hence that, where possible, the courts ought to "simplify the test of illegality"

[61] *20th Wireless Report* ¶ 33.

[62] John Kwoka, *The Structural Presumption and the Safe Harbor in Merger Review*, 81 ANTITRUST L.J. 837, 872 (2017).

[63] United States v. Phila. Nat'l Bank, 374 U.S. 321 (1963).

with a presumption.[64] If (and when) the Applicants offer a detailed economic analysis, this cautionary note by one of their economists should be kept in mind.

3. Spectrum

The Commission has long recognized that spectrum is an important input for Commercial Mobile Radio Services and has said that "the state of control over the spectrum input is a relevant factor in its competitive analysis."[65]

Sprint's own economic experts have explained in an article why concentration in spectrum ownership has "significant implications for competition in the provision of wireless service":

> First, spectrum is an essential input for wireless carriers. Carriers with limited spectrum holdings have limited capacities and are, for that reason, handicapped in competing for wireless subscribers. Second, because there are significant scale economies in the provision of wireless services, a carrier with small spectrum holdings, and a commensurately small share of subscribers, can be expected to have higher costs per subscriber than a carrier with large spectrum holdings and a large subscriber share. This cost disadvantage reinforces the effect of the competitive disadvantage that results directly from the carrier's smaller capacity.[66]

Spectrum that is suitable and available in the near term for the provision of mobile telephony/broadband services is counted in the Commission's initial spectrum screen, which the Commission uses when reviewing proposed transfers of control of spectrum to identify local markets in which changes in spectrum holdings resulting from the transaction may be of

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[64] Steven C. Salop, *The Evolution and Vitality of Merger Presumptions: A Decision-Theoretic Approach*, 80 ANTITRUST L.J. 269, 272 (2015).

[65] In re Policies Regarding Mobile Spectrum Holdings Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Report and Order, 29 FCC Rcd 6133, 6143 ¶ 17 (2014).

[66] Stanley M. Besen, Stephen D. Kletter, Serge X. Moresi, Steven C. Salop & John R. Woodbury, *An Economic Analysis of the AT&T-T-Mobile USA Wireless Merger*, 9 JOURNAL OF COMPETITION LAW & ECONOMICS 23, 31 (2013).

particular concern. The screen is triggered when a wireless provider would hold approximately one-third or more of the spectrum.[67]

There is currently a total of up to 715.5 MHz of spectrum that is suitable and available in the near term for the provision of mobile telephony/broadband services.[68] This results in a screen as high as 238.5 MHz. In their Public Interest Statement, the Applicants appear to assume that the screen should be 238.5 everywhere.[69]

The transaction would massively exceed the spectrum screen. Specifically:

- The spectrum holdings of the "New T-Mobile" – almost 300 MHz on an average basis – would vastly exceed the Commission's spectrum screen and the holdings of other wireless carriers. The "New T-Mobile" would hold nearly three times as much spectrum per subscriber as Verizon, and more than twice as much spectrum per subscriber as AT&T.
- Using data provided in Appendix L-1 of the Public Interest Statement, we estimate that the "New T-Mobile" would exceed the spectrum screen in each of the top 100 counties in the United States, based on population. (*See* attached Appendix B1.)
- In total, the "New T-Mobile" would exceed the spectrum screen in almost two-thirds (63.9%) of the counties in the United States. (*See* attached Appendix B2.)

[67] In re Policies Regarding Mobile Spectrum Holdings Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Report and Order, 29 FCC Rcd 6133, 6156 ¶ 44 (2014).

[68] 20th Mobile Wireless Report at ¶ 39, Table II.E.1.

[69] PIS at p. 134.

- On a national basis, 92% of the population of the United States – or more than 284 million people – live in counties in which the spectrum screen would be exceeded post-merger.[70]

The parties fail to explain why they require so much spectrum, even to deploy the promised 5G services, and how they can reconcile such a large aggregation of spectrum with their position that there will be robust competition in both current generation and 5G mobile wireless services.

b. Unilateral Competitive Effects

As one district court recently noted, "[m]ergers that eliminate head-to-head competition between close competitors often result in a lessening of competition."[71] Sprint and T-Mobile have aggressively and successfully targeted each other for years through pricing, promotions, service, handset offerings and other competitive moves. This intense head-to-head competition has spurred both companies to invest in and upgrade their networks in order to attract and retain customers – often, each other's customers. Consumers have benefited from this direct head-to-head competition. The proposed transaction would end it.

The head-to-head competition between the carriers appears to have been robust until the end of 2017, after which the companies seemed to back off on some promotional activity and marketing targeted at each other's customers. This trend aligns with statements by company executives signaling less reliance on discounting as a competitive strategy.

[70] CWA calculation based on data in Public Interest Statement Appendix L-1. Population residing in counties that exceed the FCC spectrum screen of 238.5 MHz (284,945,126) divided by total U.S. population (308,745,538) = 92 percent of U.S. population. Note that we eliminate duplicate entries from Appendix L-1. The duplicates are Baltimore MD, Roanoke VA, St. Louis MO, Richmond VA, Franklin VA. Source for total U.S. population is 2010 U.S. Census.

[71] FTC v. Staples, Inc., 190 F. Supp. 3d 100, 131 (D.D.C. 2016).

i. Head-to-head competition between Sprint and T-Mobile

2015

In June 2015, T-Mobile launched Jump On Demand, a smartphone leasing program that gave customers the ability to upgrade their smartphones up to three times a year. The company advertised Jump as being cheaper than other carrier leasing programs, including Sprint's.[72] In September, Sprint launched an iPhone leasing plan that started at $1 per month, in direct response to T-Mobile's $5-per-month iPhone leasing plan.[73]

In November 2015, Sprint unveiled a limited-time promotion offering 50 percent off to T-Mobile, Verizon, and AT&T customers.[74] In response, T-Mobile's CEO took to Twitter to contrast T-Mobile's offering with Sprint's.[75]

That same month, Sprint flew a promotional banner over T-Mobile's corporate headquarters. T-Mobile had done something similar a month earlier, writing "End Overages Now" above Verizon's headquarters.[76]

2016

In August 2016, T-Mobile and Sprint announced unlimited data plans (T-Mobile One and Unlimited Freedom) within minutes of each other. This triggered a heated Twitter exchange

[72] Dan Seifert, *T-Mobile's new phone leasing program lets you upgrade three times a year, Jump On Demand is the carrier's latest move to sell you smartphones*, THE VERGE (June 25, 2015, 9:26am EDT), https://www.theverge.com/2015/6/25/8844935/t-mobile-jump-on-demand-leasing-program.

[73] *Sprint will launch iPhone 6S leasing plan featuring $1 a month*, KANSAS CITY STAR (Sept. 24, 2015 11:57 AM; Updated Sept. 24, 2015 07:12 PM), https://www.kansascity.com/news/business/technology/article36470874.html.

[74] Tara Donnelly, *Sprint cuts AT&T, Verizon and T-Mobile plans in half to celebrate LTE Plus launch*, WHISTLEOUT (Nov. 19, 2015), https://www.whistleout.com/CellPhones/Guides/sprint-cuts-att-verizon-t-mobile-plans-in-half.

[75] Dan Thorp-Lancaster, *T-Mobile CEO John Legere rails against Sprint over new promotion*, ANDROIDCENTRAL (Nov. 18, 2015), https://www.androidcentral.com/t-mobile-ceo-john-legere-rails-against-sprint-over-new-promotion.

[76] Jacob Demmitt, *T-Mobile cries copycat as Sprint flies banner over its Bellevue headquarters*, GEEKWIRE (Nov. 20, 2015 at 3:30 pm), https://www.geekwire.com/2015/t-mobile-calls-copycat-as-sprint-flies-banner-of-its-bellevue-headquarters/.

between Sprint's then CEO Marcelo Claure and T-Mobile's CEO John Legere,[77] in which they accused each other of mimicry. A week or so later, Sprint launched Unlimited Freedom Premium, which offered unlimited HD streaming in addition to unlimited data; the press release announcing the offering included a graphic comparing the plan to T-Mobile One.[78] Days later, T-Mobile followed with a premium-tier unlimited plan (T-Mobile One Plus), giving customers unlimited HD video streaming, unlimited LTE hotspot use, in addition to unlimited data.[79]

In September 2016, ahead of the iPhone 7 launch, T-Mobile offered a free 32GB iPhone 7 to new and existing customers trading in an iPhone 6.[80] The same day, Sprint launched a nearly identical promotion. It also offered 256 GB iPhone 7s for the price of the 128 GB model online.[81]

2017

In February 2017, on the heels of Verizon's launch of its unlimited data plan, T-Mobile upgraded its basic unlimited plan to include unlimited HD video streaming.[82] In response, Sprint rolled out an unlimited data plan that included unlimited HD video streaming, but priced less

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[77] Mark Davis, *Sprint and T-Mobile launch unlimited data plans, spurring CEO squabble*, KANSAS CITY STAR (Aug. 18, 2016 08:59 AM; Updated Aug. 18, 2016 07:29 PM), https://www.kansascity.com/news/business/technology/article96361492.html.

[78] Sprint, Press Release: Sprint Launches Unlimited Freedom Premium (Aug. 26, 2016), http://newsroom.sprint.com/sprint-launches-unlimited-freedom-premium.htm.

[79] Tara Donnelly, *T-Mobile upgrades unlimited with One Plus, takes on Sprint's Premium plan*, WHISTLEOUT (Aug. 30, 2016), https://www.whistleout.com/CellPhones/News/t-mobile-upgrades-unlimited-with-one-plus.

[80] *T-Mobile offers free iPhone 7 to anyone who trades in an iPhone 6/s, deal starts tomorrow alongside pre-orders*, 9TO5MAC (Sept. 8, 2016 7:41 am PT), https://9to5mac.com/2016/09/08/t-mobile-free-iphone-7-trade-deal/.

[81] Jordan Kahn, *Sprint matches T-Mobile's free 32GB iPhone 7 w/ trade-in deal, offers 256GB for $100 off*, 9TO5MAC (Sept. 8, 2016 11:44 am PT), https://9to5mac.com/2016/09/08/sprint-free-iphone-7-promo-preorder-deal/.

[82] Chris Welch, *T-Mobile responds to Verizon by improving its own unlimited data plan*, THE VERGE (Feb. 13, 2017, 4:18pm EST), https://www.theverge.com/2017/2/13/14601844/t-mobile-unlimited-plan-hd-video-hotspot-verizon.

than its Unlimited Freedom Premium plan.[83] It also began to run a promotion offering five lines of unlimited data, talk and text for $90 a month, which it claimed as a "better value than Verizon, AT&T and T-Mobile."[84]

In June 2017, Sprint began offering a free year of unlimited data to customers of T-Mobile, Verizon, and AT&T.[85]

In August 2017, T-Mobile launched a plan geared toward seniors, called the T-Mobile One Unlimited 55+.[86] COO Mike Sievert claimed the offering was primarily aimed at AT&T and Verizon customers and was seeing success.[87] In February 2018, Verizon rolled out a senior plan.[88] Sprint followed suit in May 2018.[89]

In September 2017, T-Mobile began to give Netflix for free to subscribers of its unlimited family plans.[90] In November, Sprint started to bundle Hulu into its unlimited plans for

[83] Chaim Gartenberg, *Sprint follows Verizon and T-Mobile in offering better unlimited data plans: Five lines for $90 per month until March 31st, 2018*, THE VERGE (Feb. 16, 2017, 11:09am EST), https://www.theverge.com/2017/2/16/14635998/sprint-unlimited-data-plan-new-verizon-t-mobile.

[84] Sprint, Press Release: Sprint Announces FIVE Lines of Unlimited Data, Talk and Text for $90/month (Feb. 10, 2017), http://newsroom.sprint.com/sprint-announces-five-lines-unlimited-data-talk-and-text-for-90month.htm.

[85] Jeff Dunn, *Sprint is offering an aggressive deal: a free year of 'unlimited' data for people who switch from Verizon, AT&T, or T-Mobile*, BUSINESS INSIDER (June 13, 2017, 1:17 PM), https://www.businessinsider.com/sprint-free-unlimited-plan-deal-switch-verizon-att-t-mobile-2017-6.

[86] T-Mobile, Press Release: A New Reason to Get a Fake ID: Introducing T-Mobile ONE Unlimited 55+ (Aug. 6, 2017), https://www.t-mobile.com/news/unlimited-55.

[87] Mike Dano, *Verizon offers response to T-Mobile's unlimited plan for customers over 55 years old*, FIERCEWIRELESS (Feb. 23, 2018 12:32pm), https://www.fiercewireless.com/wireless/verizon-tests-response-to-t-mobile-s-unlimited-plan-for-customers-over-55-years-old.

[88] *Id*.

[89] Martha DeGrasse, *Sprint matches T-Mobile's price plan for seniors*, FIERCEWIRELESS (May 17, 2018 10:55 am), https://www.fiercewireless.com/wireless/sprint-matches-t-mobile-s-price-plan-for-seniors.

[90] Todd Spangler, *T-Mobile Giving Netflix Free to Family-Plan Unlimited Subscribers*, VARIETY (Sept. 6, 2017 8:07 AM PT), https://variety.com/2017/digital/news/t-mobile-netflix-free-family-plans-1202548815/.

free.[91] Analysts read these efforts as competitively-driven attempts to differentiate by providing content.[92]

In October 2017, ahead of the iPhone X launch, Sprint offered to discount iPhone Xs to new and existing customers who traded in eligible smartphones. T-Mobile followed with a similar promotion.[93]

2018

In April 2018, T-Mobile launched T-Mobile One Military, which shaved $15 off plan costs for service members and additional discounts for each line. This undercut Sprint's military plan, which discounted total costs by 15 percent.[94] In July, Sprint rolled out a 50 percent discount on military family phone lines.[95]

[91] Todd Spangler, *Sprint Will Bundle Hulu VOD Service With Unlimited Plans for No Extra Cost*, VARIETY (Nov. 15, 2017 6:00AM PT), https://variety.com/2017/digital/news/sprint-hulu-vod-unlimited-plan-1202614940/.

[92] Anjali Athavaley, *T-Mobile to launch TV service in 2018, buy Layer3 TV*, REUTERS (Dec. 13, 2017 / 10:21 AM), https://www.reuters.com/article/us-layer3-m-a-tmobile/t-mobile-to-launch-tv-service-in-2018-buy-layer3-tv-idUSKBN1E722M.

[93] *Verizon, Sprint, T-Mobile, announce iPhone X discounts ahead of launch*, APPLEINSIDER (Oct. 23, 2017, 04:36 pm PT), https://appleinsider.com/articles/17/10/23/verizon-sprint-t-mobile-announce-iphone-x-discounts-ahead-of-launch.

[94] Edward C. Baig, *T-Mobile launches wireless plan for military: $100 for four lines*, USA TODAY (April 18, 2018), https://www.usatoday.com/story/tech/columnist/baig/2018/04/18/t-mobile-launches-wireless-plan-military-100-four-lines/525541002/.

[95] Karen Jowers, *Sprint rolls out 50 percent military discount on family phone lines*, MILITARY TIMES (July 12, 2018), https://www.militarytimes.com/pay-benefits/2018/07/12/sprint-rolls-out-50-percent-military-discount-on-family-phone-lines/.

ii. Head-to-head competition between Boost Mobile and MetroPCS

2015

In June 2015, Boost Mobile offered to halve the cost of plans for customers that switched from either MetroPCS or Cricket Wireless.[96]

In July 2015, MetroPCS began to promote unlimited plans that enabled unlimited calling, messaging, and data roaming in Mexico. The carrier highlighted the contrast between its plans and Boost Mobile's, which did not offer data roaming services in Mexico.[97]

2016

In January 2016, MetroPCS offered Sprint, Boost Mobile, and Virgin Mobile customers the option to switch for 22 to 50 percent off their current pricing.[98] Both Boost Mobile and Virgin Mobile were owned by Sprint, and the press release announcing the promotion took direct aim at the offerings of Sprint and its prepaid brands.[99]

In March 2016, Boost Mobile launched a limited-time offer: two lines of unlimited talk, text, and data for $60 a month. Advertisements of the offer included statements like: "2X More Data than MetroPCS" and "Save up to 25% compared to MetroPCS."[100]

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[96] Alex Wagner, *Boost Mobile promo offers to halve the plan prices of Cricket and MetroPCS switchers*, ANDROID AND ME (June 19, 2015 at 6:08 PM), https://androidandme.com/2015/06/news/boost-mobile-promo-offers-to-halve-the-plan-prices-of-cricket-and-metropcs-switchers/.

[97] Dan Meyer, *MetroPCS coverage now includes Mexico in battle with Boost, Cricket*, RCR WIRELESS NEWS (July 15, 2015), https://www.rcrwireless.com/20150715/carriers/metropcs-coverage-now-includes-mexico-in-battle-with-boost-cricket-tag2.

[98] T-Mobile, Press Release: MetroPCS Launches 'The Biggest Offer in Sprint's History' (Jan. 19, 2016), https://www.t-mobile.com/news/metropcs-takes-on-sprint.

[99] *Id*.

[100] Tara Donnelly, *Switch to Boost, save 50% (and get a free phone)*, WHISTLEOUT (March 4, 2016), https://www.whistleout.com/CellPhones/News/switch-to-boost-save-50-percent.

2017

In May 2017, Boost Mobile launched its "Project Switch" campaign, an effort to convince wireless customers to switch to Boost.[101] The campaign took aim at MetroPCS. It claimed that customers switching to Boost would receive unlimited high-speed data, while MetroPCS customers were capped at 2 GB of high-speed data.[102]

In August 2017, MetroPCS debuted a two-line unlimited data plan for $75, with the first line priced at $50 and the second at $25.[103] Analysts viewed this as undercutting Boost Mobile's unlimited data plan, which offered $50 for the first line and $30 for the second line.[104] Two weeks later, Boost Mobile dropped the price for additional lines to $25 a month.[105]

In September 2017, Boost Mobile announced plans to bundle in taxes and fees into plan costs. Analysts viewed the change as motivated by T-Mobile, which announced earlier in the year that it would bundle costs for its newest plans.[106] The effort put Boost Mobile on a level playing field with MetroPCS, which had reportedly bundled costs since 2010.[107]

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[101] Alexandra Arici, *Boost Mobile unveils new campaign to encourage customers to switch*, ANDROID GUYS (May 12, 2017), https://www.androidguys.com/news/boost-mobile-unveils-new-campaign-to-encourage-customers-to-switch/.

[102] Sprint, Press Release: *Boost Mobile y su nueva campaña "Project Switch" exhorta a los clientes a que "hagan el switch" de su compañía telefónica actual y comiencen a ahorrar* (May 11, 2017), http://newsroom.sprint.com/boost-mobile-y-su-nueva-campaa-project-switch-exhorta-los-clientes-que-hagan-el-switch-de-su-compaa-telefnica-actual-y-comiencen-ahorrar.htm.

[103] Tara Seals, *MetroPCS undercuts AT&T's Cricket, Boost with $75 2-line unlimited plan*, FIERCEWIRELESS (Aug. 9, 2017 1:08 pm), https://www.fiercewireless.com/metropcs-undercuts-at-t-s-cricket-boost-75-2-line-unlimited-plan.

[104] *Id*.

[105] Adrian Diaconescu, *Boost Mobile fights back at MetroPCS with sweet add a line unlimited deal of its own*, POCKETNOW (Aug. 14, 2017 11:46 am), https://pocketnow.com/boost-mobile-add-line-unlimited-gigs-deal-25-dollars-month.

[106] Jacob Kastrenakes, *Boost Mobile now includes taxes and fees in its plans just like T-Mobile*, THE VERGE (Sept. 8, 2017, 9:47 am EDT), https://www.theverge.com/2017/9/8/16273586/boost-mobile-now-bundles-taxes-fees-in-service-plans.

[107] *Id*.

In October 2017, MetroPCS started offering four lines of unlimited data for $100. That week, Boost Mobile began offering five lines of unlimited data for $100.[108]

2018

In February 2018, Boost Mobile ran a promotion called "Switch Off MetroPCS," which gave 2 months of free service to MetroPCS customers who switched to Boost.[109]

In April 2018, Boost Mobile offered a free month of service for new customers who brought their own device to the carrier. Shortly after, MetroPCS announced new customers would receive two months of free service.[110]

iii. Likelihood that transaction will lead to unilateral competitive effects

When a merger or acquisition involves two of the closest direct competitors (viewed in terms of their product or service offerings), the primary competitive concern is often that it will lead to adverse unilateral competitive effects, and in particular higher prices. In a unilateral effects analysis, the degree to which the products sold by merging parties are viewed as close substitutes is an important factual question. As the 2010 Horizontal Merger Guidelines state, "The extent of direct competition between the products sold by the merging parties is central to the evaluation of unilateral price effects."[111] The closer the competition, the more likely there will be unilateral price effects from a transaction. In the words of the Guidelines, "Unilateral

[108] Chris Mills, *Sprint just one-upped T-Mobile with 5 Unlimited lines for $100*, BGR (Oct. 26, 2017 at 4:54 PM), https://bgr.com/2017/10/26/best-prepaid-unlimited-plan-2017-boost-vs-metropcs/.

[109] Joe Paonessa, *Boost Mobile Giving Away 2 Months Of Free Service When You Switch From MetroPCS*, BESTMVNO (Feb. 9, 2018), https://bestmvno.com/boost-mobile/boost-mobile-switch-off-metropcs/.

[110] Mike Dano, *T-Mobile's MetroPCS gives away 2 free months of service*, FIERCEWIRELESS (April 12, 2018 11:02am), https://www.fiercewireless.com/wireless/t-mobile-gives-away-2-free-months-metropcs-service.

[111] *2010 Merger Guidelines* at § 6.1.

price effects are greater, the more the buyers of products sold by one merging firm consider products sold by the other merging firm to be their next choice."[112]

The Horizontal Merger Guidelines discuss the types of evidence that are useful for assessing the extent of competition when unilateral effects are at issue: "The Agencies consider any reasonably available and reliable information to evaluate the extent of direct competition between the products sold by the merging firms. This includes documentary and testimonial evidence, win/loss reports and evidence from discount approval processes, customer switching patterns, and customer surveys."[113] The Guidelines also discuss three types of economic evidence that are particularly relevant to unilateral effects analysis: diversion ratios (i.e. the percentage of customers who would respond to a price increase by one of the merging parties by switching to the other party), "gross upward pricing pressure," and merger simulation models.[114]

So for the proposed transaction to confer a unilateral incentive on the acquiring entity to raise the prices of its products, "a non-trivial fraction" of either T-Mobile's or Sprint's customers must view the other's products and services as their second choice at pre-merger prices, and view the products and services of AT&T and Verizon as more distant choices.[115] The greater the fraction of Sprint users who view T-Mobile as their second choice (and vice versa), the greater the likely harm.[116]

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[112] *Id*.

[113] *Id*.

[114] *Id*.

[115] *AT&T/T-Mobile Staff Analysis and Findings* at ¶ 54.

[116] *Id*.

As the DOJ found in *AT&T/T-Mobile*, each of the Big Four's offerings differ.[117] Moreover, consumers have differing preferences as well.[118] Because both carriers and consumers are diverse, customers differ as to the firms that are their closest and most desired alternatives. Where there is significant substitution between the merging firms by a substantial share of consumers, anticompetitive effects are likely to result.[119]

The Commission staff in *AT&T/T-Mobile* specifically noted this closeness between Sprint and T-Mobile. While certain T-Mobile customers viewed AT&T as their second choice, the staff found that many Sprint and T-Mobile customers saw the other as their second choice. As the staff found, if AT&T and T-Mobile merged, Sprint would likely accede to raising its price. Why was that? Precisely because Sprint "may have a particular advantage in attracting T-Mobile's customers: retail subscribers view Sprint services as closer substitutes for T-Mobile's services than Verizon and AT&T's services."[120]

Given that this is a merger between two companies that for many years have waged an intense competitive war with each other, and given their burden to show why their transaction is in the public interest, one would expect Sprint and T-Mobile to provide at least *some* factual support to show that the parties' offerings are not regarded by consumers as particularly close substitutes, that only a small percentage of customers actually switch or would consider switching between Sprint and T-Mobile (or vice versa), or other evidence showing the parties do

[117] *DOJ AT&T/TMO Second Amended Complaint* ¶ 37.

[118] *Id*.

[119] *Id*.

[120] *AT&T/T-Mobile Staff Analysis and Findings* at ¶ 83.

not often go head-to-head in the marketplace. This, perhaps for obvious reasons, they have failed to do. Their failure is telling.

One also would expect the parties' economists to perform at least *some* of the economic analysis spelled out in the Merger Guidelines in connection with their Application.[121] A gross upward pricing pressure index ("GUPPI") analysis is particularly appropriate when unilateral effects are at issue.[122] Merger simulation taking into account the actual closeness of Sprint and T-Mobile product characteristics could have been performed using the parties' own data.[123] Sprint's economists did a detailed quantitative analysis of upward pricing pressure in connection with Sprint's opposition to the AT&T/T-Mobile transaction in 2011.[124] Sprint's lawyers criticized AT&T and T-Mobile in 2011 for their failure to provide an economic simulation model with their Public Interest Application and for "hid[ing] the ball" later on.[125] The absence of *any* quantitative unilateral effects analysis here speaks volumes, and should tell the Commission all it needs to know about what the results would show – that the "New T-Mobile" would find it profitable to increase prices post-merger, even though doing so today would not be profitable.

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[121] Charles River Associates, *Scoring Unilateral Effects with the GUPPI: The Approach of the New Horizontal Merger Guidelines* (August 31, 2010), http://www.crai.com/sites/default/files/publications/Commentary-on-the-GUPPI_0.pdf (noting how "CRA has been using the GUPPI and related variants to score unilateral effects concerns in mergers and joint ventures for more than a decade. The analysis has been both practical to implement and extremely useful. CRA has employed various methodologies for estimating the conditional and unconditional diversion ratios that are required to calculate the GUPPI.").

[122] *2010 Merger Guidelines* § 6.1; Salop, *Evolution and Vitality*, *supra* at 299 (GUPPI is "important evolutionary change" and "new way to score unilateral effects concerns" that "can be used as evidence at trial or as the basis of either anticompetitive or 'no harm' rebuttable presumptions.").

[123] The parties' accounting data often provide a reasonable indications of price-cost margins for their brands. *See, e.g.*, Werden, Unilateral Competitive Effects of Horizontal Mergers I, *supra*, at 1340.

[124] See Sprint Petition to Deny (May 31, 2011), Attachment A, "Economic Analysis of the Merger of AT&T and T-Mobile, Joint Declaration of Steven C. Salop, Stanley M. Besen, Stephen D. Kletter, Serge X. Moresi, and John R. Woodbury, Charles River Associates," ¶¶ 145-169, https://ecfsapi.fcc.gov/file/7021675883.pdf; *see also* Sprint Reply Comments (June 20, 2011).

[125] See Letter from Regina M. Keeney to Marlene H. Dortch, August 22, 2011, WT Docket No. 11-65.

iv. Entry or repositioning unlikely to restore competition

The merging parties "carry the burden of showing that the entry or expansion of competitors will be 'timely, likely and sufficient in its magnitude, character, and scope to deter or counteract the competitive effects of concern.'"[126] The relevant time frame for consideration in this forward looking exercise is two to three years.[127]

Both the Commission and DOJ have recognized that there are high barriers to entry and expansion in mobile wireless markets.[128] Sprint, too, in its 2011 complaint against AT&T and T-Mobile, alleged high barriers to entry and expansion. Its allegations, which remain true today, deserve to be quoted in full:

> 141. Substantial barriers to entry and expansion exist in the provision of mobile wireless services due to a number of factors, including the considerable time and expense of acquiring spectrum, building and supporting a network, developing handsets, building brand equity, and investing in new technology and network support. New firms are unlikely to enter the mobile wireless services market in a timely and sufficient manner to overcome the anticompetitive effects of the proposed transaction. The fringe firms, independently or in the aggregate, cannot expand significantly enough in a reasonable period of time to be able to discipline the pricing of the national carriers.[129]

Sprint and T-Mobile now argue that "competitors will take advantage of merger implementation and the post-merger transition period to attempt to take market share, which New T-Mobile will have to offset with aggressive competition."[130] But this is little more than wishful thinking. The parties have not carried their burden.

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[126] *Staples*, 190 F. Supp. 3d at 133 (quoting *H & R Block*, 833 F. Supp. 2d at 73).

[127] *Staples*, 190 F. Supp. 3d at 133.

[128] *See, e.g., AT&T/T-Mobile Staff Analysis and Findings* ¶¶ 60-70; *DOJ AT&T/TMO Second Amended Complaint* ¶ 45 ("Entry by a new mobile wireless telecommunications services provider in the relevant geographic markets would be difficult, time-consuming, and expensive, requiring spectrum licenses and the construction of a network.").

[129] *Sprint Complaint* ¶ 141.

[130] PIS at 128.

IV. APPLICANTS' CLAIMED EFFICIENCIES AND BENEFITS ARE OVERBLOWN AND MISLEADING

The Applicants bear the burden of demonstrating that the proposed transaction would result in public interest benefits that outweigh the competitive and public interest harms of their transaction.[131]

The Commission typically applies several criteria in deciding whether a claimed benefit should be considered:

First, the claimed benefit must be transaction specific. It must not only be likely to occur as a result of the proposed transaction but it must be unlikely to be realized by other practical means having fewer anticompetitive effects. "Efficiencies that can be achieved through means less harmful to competition than the proposed merger . . . cannot be considered to be true pro-competitive benefits of the merger."[132]

Second, the claimed benefit must be verifiable. The Applicants, who possess much of the information relating to the potential benefits of a transaction, are required to provide sufficient supporting evidence to permit verification of the likelihood, timing, and magnitude of each claimed benefit. Benefits expected to occur only in the distant future may be discounted or dismissed because, among other things, predictions about the distant future are inherently more speculative than predictions that are expected to occur closer to the present.[133]

Third, the Commission generally counts benefits only to the extent they will flow through to consumers and accrue to the public interest. In this regard, the Commission will discount or

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[131] *See, e.g., AT&T-Centennial Merger Order* at ¶ 89.

[132] *AT&T/T-Mobile Staff Analysis and Findings* at ¶ 124 (quoting EchoStar-DirecTV HDO, 17 FCC Red at 20630 ¶ 189).

[133] *AT&T/T-Mobile Staff Analysis and Findings* at ¶ 125.

dismiss reductions in costs that arise from an anticompetitive reduction in quality, service or variety that customers value.[134]

Finally, the Commission evaluates the claimed benefits using a sliding-scale approach. As the harms to the public interest become greater and more certain, the degree and certainty of the public benefits must also increase commensurately in order for the Commission to find that the proposed transaction on balance serves the public interest.[135] In these circumstances, the parties need to demonstrate "extraordinarily great cognizable efficiencies" in the words of the 2010 Horizontal Merger Guidelines.[136]

The showing that must be made by the Applicants has been aptly described by their own economists in a published article: "if the merger's acceptability requires a showing of substantial efficiencies, the support for those efficiencies must be rigorous and consistent with past firm practices, well documented, able to survive at least simple and obvious robustness checks, and carefully integrated with the competitive effects analysis."[137]

The Public Interest Statement is long on hyperbole – the merger will give birth to "a supercharged Un-carrier"; it will "shake up the in-home broadband marketplace"; it will "bring real broadband and broadband competition to rural Americans for the first time"; it will "mak[e] American communities safer, healthier, more efficient and generally nicer places to live, visit and work," and so forth. But the Public Interest Statement is remarkably short on detail, despite its impressive length.

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[134] *Id*. at ¶ 126.

[135] *Id*. at ¶ 127.

[136] *2010 Merger Guidelines* § 10.

[137] Stanley M. Besen, Stephen D. Kletter, Serge X. Moresi, Steven C. Salop & John R. Woodbury, *An Economic Analysis of the AT&T-T-Mobile USA Wireless Merger*, 9 JOURNAL OF COMPETITION LAW & ECONOMICS 23, 46 (2013).

Thus, for example, although T-Mobile Executive Vice President for Corporate Strategy Peter Ewens states in his declaration that there would be substantial reduction in non-network costs like retail and advertising,[138] the submission says nothing about how many retail jobs would be eliminated. And although some of the synergies are expected to come from a reduction in subscriber churn,[139] no detail is provided, nor is any effort made to calculate how much of this reduced churn would be due to the elimination of a competitive alternative, leaving consumers worse off. The parties make claims about enhanced service in rural areas[140] but do not provide basic technical information sufficient to allow these claims to be evaluated. And what information they do provide points in the opposite direction – namely, that the proposed transaction will provide no benefits to most of rural America.[141]

These examples easily could be multiplied. The Applicants have not come close, by any stretch of the imagination, to providing the kind of evidence that is sufficiently "rigorous and consistent with past firm practices, well documented, able to survive at least simple and obvious robustness checks, and carefully integrated with the competitive effects analysis" to satisfy the Commission's high evidentiary standard.

The balance of this section addresses the argument that neither Sprint nor T-Mobile can effectively compete as standalone firms, and specifically that neither can "win" the race to deploy a next-generation nationwide 5G network. Upon closer inspection, this rationale falls apart for two key reasons:

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[138] Ewens Decl. ¶ 7.

[139] *Id*.

[140] *See* PIS at 64-68; Ray Decl. ¶¶ 73-77.

[141] *See* Declaration of Dr. Andrew Afflerbach ¶¶ 14-19.

- Both companies are viable on a standalone basis and are already in the process of improving their networks, including their ability to provide initial 5G services. Neither company needs the proposed transaction to be an effective competitor in the future.

- While Sprint presently appears to lack the tools to offer 5G in rural parts of the country, the Applicants have made no showing that the merged firm would have either the incentive or ability to provide hallmark 5G services outside of densely-populated areas. The proposed merger does not change that reality for rural America.

a. T-Mobile and Sprint have been touting their 5G plans for some time and have been making investments in anticipation of its arrival

In 2017, before the entering into the proposed transaction with its arch-rival Sprint, T-Mobile management told investors that it was planning to offer the first nationwide 5G network in the United States.[142] Management claimed that this effort had been underway "for years" and that T-Mobile was making significant operational improvements and investments in order to realize this grand plan. Now, reversing course, T-Mobile claims that it cannot "win the race" to 5G without merging with its closest competitor.

During an analyst call in December 2017 announcing the acquisition of Layer3 TV, T-Mobile Chief Operating Officer G. Michael Sievert emphatically stated:

> Today's move is most certainly in anticipation of T-Mobile's plans to be the first to have nationwide 5G. These new 5G capabilities will bring about a converged marketplace at an even more rapid pace and we will be ready. Because we've been getting ready for this for years.[143]

A few months earlier, Oppenheimer analyst Timothy Horan noted that T-Mobile management "stated the company is deploying some of its 600 MHz with 5G ready equipment so

[142] Adding a new Layer to the Un-Carrier story: Layer 3 deal takeaways, Matthew Niknam, Deutsche Bank Markets Research, Dec. 13, 2017.

[143] Transcript, T-Mobile – Layer3 M&A Call, Dec. 13, 2017, p. 3.

when the time comes, the company can turn on 5G with modest baseband and software upgrades later in the decade."[144]

Sprint has also been aggressively moving toward 5G, and making substantial capital investments to enable 5G deployment. Competition, and in particular competition to provide a better customer experience, is forcing Sprint to do so. Thus, prior to the announcement of the proposed transaction, Citigroup analyst Michael Rollins wrote "Sprint appears to be banking on 5G to drive a better customer experience . . ."[145] Moreover, this was not a new development. It has been part of Sprint's competitive strategy for several years. As an illustration, nearly two years ago, UBS Global Research analyst John C. Hodulik reported after a meeting with Sprint management: "Current investments will provide a bridge to 5G, which mgmt. believes will be standardized in the 2019-20 timeframe."[146]

Particularly relevant is what Sprint's top management has been telling investors. For more than two years, former CEO (and current executive chairman) Marcelo Claure has been asserting on the company's earnings calls how well positioned Sprint is to execute on its 5G plans, given its abundant spectrum and the progress it has been making on its network. Indeed, Claure has been emphatic, stating that Sprint is "very, very well positioned" for 5G. Sprint's CEO has had this to say in earnings calls:

- *July 2016*: "Our densification and optimization plan is also building the foundation for 5G as all carriers more densify their networks to leverage the high-frequency spectrum bands planned for 5G. In fact, we recently provided live over-the-air demonstrations of our 5G capabilities using millimetric band radius

[144] TMUS 3Q17 Follow-Up: Standalone Momentum Intact, Merger Announcement Imminent, Timothy Horan, Oppenheimer, Oct. 25, 2017.

[145] Wireless 1Q/18 Preview: Fear & Loathing in Wireless May Get Unexpected Relief, Michael Rollins, Citigroup, April 11, 2018.

[146] Takeaways from management meeting, John C. Hodulik, UBS Global Research, Dec. 13, 2016.

to deliver 4K streaming of soccer content and virtual reality exhibits at 2 stadiums hosting the Copa America tournament in June."[147]

- *May 2017*: "When we look at what is coming, where 5G is going and based on the latest 3GPP standard, we are certain that we have the right spectrum, right? I mean, having the vast amount of 2.5 spectrum, as we call, the new low-band of 5G, I think we're very, very well positioned in terms of continuing to densify our network. We don't need any more low-band spectrum. We have sufficient national coverage with the low-band spectrum that we have, and we did a lot of studying before we decided not to participate in the auction. So even though prices came wherever they came, we feel that we made the right decision. And we're focused right now in terms of continuing to densify our network and continue to provide our customers with a better experience. So we feel quite good in terms of that we made the right decision. We'd rather invest our money in densifying our network and optimizing our network rather than buying new spectrum that really is not going to be available until 2019 or 2020."[148]

- *August 2018*: "[I]n parallel with the 4G LTE network enhancement, we're actively preparing for 5G. We continue to partner across the global 2.5 gigahertz or Band 41 ecosystem, including SoftBank, Qualcomm, China Mobile and others towards rolling out massive MIMO and rapidly developing the 5G in our standards to make . . . 2.5 gigahertz a key band in the global 5G deployment."[149]

In summary, the Applicants' assertions about how neither alone can "win the race" to 5G cannot be squared with what they have been telling investors for more than two years, or with the investments they are making. As Sprint itself argued in its opposition to *AT&T/T-Mobile*, Applicants' sudden about-face should be "greeted with skepticism."[150]

b. Applicants' rhetoric about poor long-term viability is at odds with reality and what they have been telling investors

In what seems to be a time-honored ritual, the Applicants also seek to paint a bleak picture of their prospects as stand-alone competitors – especially Sprint's prospects – in order to

[147] Sprint, FQ1 2017 Earnings Call Transcript, July 25, 2016, p. 5.

[148] Sprint, FQ4 2017 Earnings Call Transcript, May 3, 2017, p. 11.

[149] Sprint, FQ1 2018 Earnings Call Transcript, Aug. 1, 2018, p. 5.

[150] Sprint Petition to Deny at 97, https://ecfsapi.fcc.gov/file/7021675883.pdf.

justify a merger that is presumptively anticompetitive and will end the intense rivalry between two close competitors. The reality, including recent financial results that postdate the filing of Application, paints a different picture. There is no showing that either company is likely to exit the market if the merger does not take place or that either company is in a downward spiral. Quite the contrary.

Sprint continues to invest significantly in its network. Earlier this month, Raymond James' Ric Prentiss published a research note observing the growth in Sprint's network "capex" while assuring investors that the company plans to continue to make such investments:

> With an ~$400M sequential growth in network capex, Sprint noted it is not slowing down on its network improvement plans even with the pending merger. Sprint now has more than 15K outdoor small cells, including 7K strand mounts with cable companies (i.e., partnership with Altice). Moreover, Sprint's 2.5GHz spectrum is now on 2/3rds of its 35K macro sites, up from just 50% last year, and is expected to reach all of its sites by FYE18.[151]

Other analysts have recently highlighted Sprint's "transformation" and how its revenues have reached an "inflection" point similar to other wireless carriers: "Solid C2Q Results as Focus Stays on Revenue & EBITDA Improvements with Stable Subscribers . . . . Sprint remains focused on driving its network transformation . . . Capex ramped 45% q/q, and Sprint's network transformation continues despite the announced merger with T-Mobile."[152] "Sprint joins wireless carrier service revenue inflection party this Q. . . ."[153] In other words, Sprint's strategy of improving its network has begun to pay dividends.

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[151] Increasing TP to $8 as Guidance Increased and Risk/Reward of Potential Merger Still Attractive, Ric Prentiss, Raymond James & Associates, Aug. 2, 2018.

[152] Solid C2Q Results as Focus Stays on Revenue & EBITDA Improvements with Stable Subscribers, Phil Cusick, J.P. Morgan & Co., Aug. 1, 2018.

[153] Sprint joins wireless carrier service revenue inflection party this Q, David Barden, Bank of America/Merrill Lynch, Aug. 1, 2018.

Analysts are also positive on T-Mobile. For example, Jonathan Atkins from RBS Capital Markets wrote earlier this month: "Strong Standalone Subscriber Momentum: Regardless of the completion of the Sprint merger, we believe near-term subscriber growth prospects for standalone T-Mobile remain strong . . . ."[154] Other analysts are in accord:

- "Importantly, however, we believe 1Q18 results demonstrated TMUS can continue to succeed as a standalone."[155]
- "On a standalone basis, we see the company de-levering to 2.5x by year-end" (absent any spectrum purchases)."[156]
- "Perhaps more importantly, mgmt. clarified drivers of their pro forma forecasts that paint a much rosier picture of the standalone businesses than we (and others) had feared."[157]

These comments by analysts did not materialize out of thin air. Applicants' own executives have painted a different picture for investors than the dismal one the Applicants have put in front of the Commission.

In its August 1, 2018 earnings release, Sprint management was positive about all aspects of its progress and prospects:

> "Sprint continued to deliver solid results this quarter while embarking on our transformative merger with T- Mobile," said Sprint CEO Michel Combes, "By balancing growth and profitability, we were able to grow wireless service revenue

[154] 1Q18 Review and Model Update, RBC Capital Markets, Jonathan Atkin, May 2, 2018.

[155] Better Results Remind Investors of Strong Standalone Prospects, SunTrust Robinson Humphrey, Greg P. Miller, May 1, 2018.

[156] Solid Quarter with Small Beats on Postpaid Adds, EBITDA, J.P. Morgan, Phil Cusick, Aug. 1, 2018.

[157] TMUS: 1Q18 Quick Take: Good Results; Clarity On Pro Forma Forecast; More Juice For Standalone Scenario; New Street Research, Jonathan Chaplin, May 1, 2018.

> sequentially, continue to add retail phone customers, generate net income for the third consecutive quarter, and improve the network."[158]

While CEO Combes made the obligatory nod to Sprint's proposed merger with T-Mobile, the release focused on key stand-alone successes:

> Sprint reported sequential growth in wireless service revenue for the first time in more than four years, when excluding the impact of the new revenue recognition standard, as postpaid and prepaid ARPU grew sequentially. The company continues to expect year- over-year growth in wireless service revenue to occur by the end of fiscal year 2018, excluding the impact of the new revenue recognition standard.[159]

Meanwhile, T-Mobile had the best second quarter in its history, according to its August 1, 2018 press release:

> "T-Mobile just recorded its best Q2 in company history," said John Legere, CEO of T-Mobile. "That means 21 quarters with over one million net adds, record-high service revenues, industry-leading postpaid phone net additions, and record-low postpaid phone churn. Our business is strong, our strategy is working and we won't stop!"[160]

The August 1 press release also highlighted T-Mobile's "advancements in network technology":

> T-Mobile continues to increase and expand the speed and capacity of our network to better serve our customers. Our advancements in network technology and our spectrum resources ensure we can continue to increase the capabilities of our network as the industry moves towards 5G . . .
>
> Introducing 5G across 600 MHz and millimeter wave spectrum. In addition to building out 5G on 600 MHz, T-Mobile intends to bring 5G to 30 cities in 2018 using both 600 MHz and millimeter wave spectrum. The network will harness 4G and 5G bandwidths simultaneously (dual connectivity) and will be ready for the introduction of the first 5G smartphones in 2019.[161]

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[158] Sprint, SEC Form 8K, Aug. 1, 2018.

[159] *Id*.

[160] T-Mobile, SEC Form 8K, Aug. 1, 2018.

[161] *Id*.

In summary, the Applicants have been telling a different story to their investors than to the Commission. Only the story they have been telling investors has been supported with facts. To paraphrase what Sprint asserted several years ago: "The Commission must therefore decide which . . . . story is correct – the story to the Commission . . . or the story to Wall Street . . . . The truth is not hard to discern."[162]

Standard & Poor's Capital IQ reporting on analyst projections

Standard & Poor's Capital IQ maintains an extensive database of a vast range of data on public companies. Among other things, it collects analysts' projections for future company results, including estimates for total revenues, EBITDA[163] (Earnings Before Interest Taxes Depreciation and Amortization). EBITDA is a measure designed to permit comparisons across companies of their relative performance by "normalizing" variable factors including debt service, tax issues, acquisition charges, and other firm-specific issues.

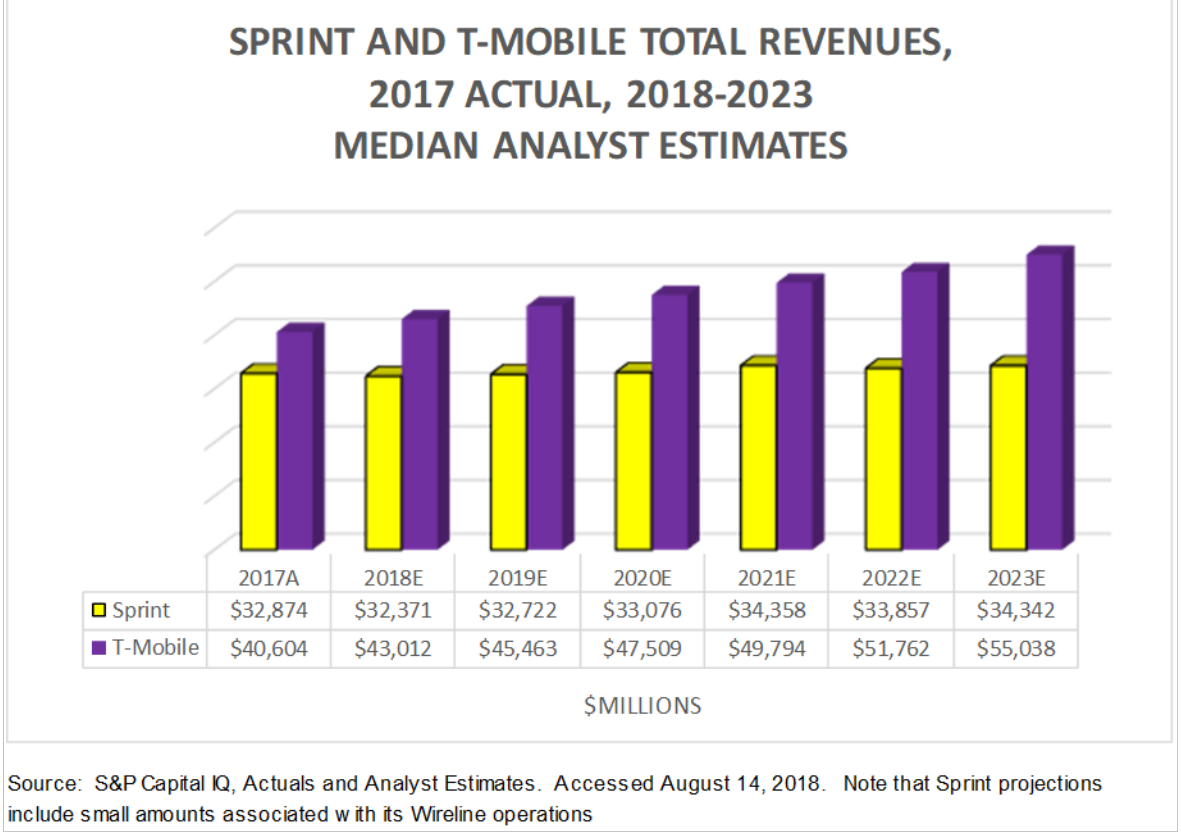
CWA has prepared two charts (below), which compare analysts' ***median estimates*** for future stand-alone T-Mobile and Sprint Total Revenues and EBITDA through 2023 or 2022 (both start with 2017 actual results). As Chart 1 reflects, while T-Mobile is projected to reap steadily increasing total revenues through 2023, Sprint is projected to have essentially flat revenue growth (about 5.9% annually for T-Mobile, but 0.7% for Sprint).

[162] Sprint Petition to Deny at 4.

[163] EBITDA, often referred to as "operating cash flow," is a generally employed measure of corporate financial performance, designed to permit comparisons across companies by "normalizing" variable factors including debt service, tax issues, acquisition charges, and other firm-specific issues.

This shouldn't be surprising since T-Mobile has been on a significant growth spurt while Sprint has been working to stabilize its business and has only just "joined the inflection party" in the words of Bank of America/Merrill Lynch analyst David Barden.[164]

CHART 1

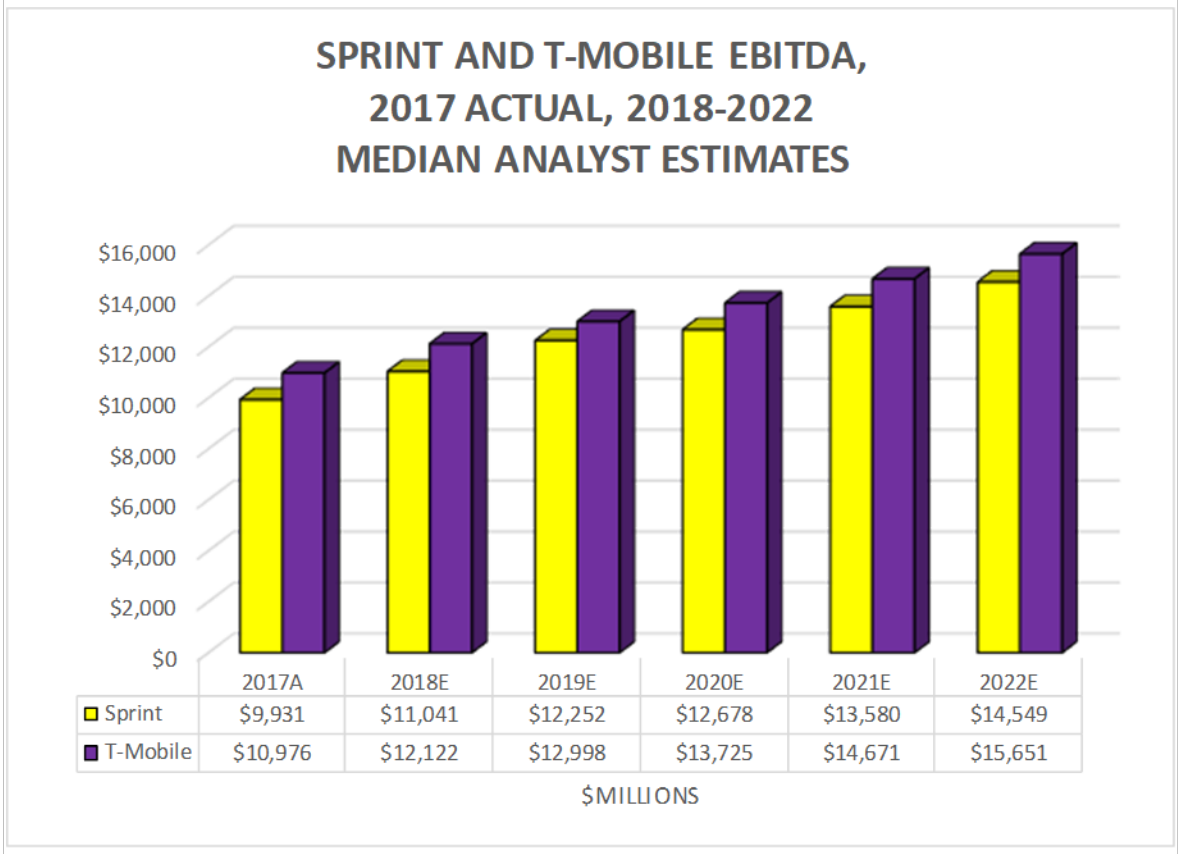


Source: S&P Capital IQ, Actuals and Analyst Estimates. Accessed August 14, 2018. Note that Sprint projections include small amounts associated with its Wireline operations

On the other hand, as can be observed in Chart 2, Sprint's EBITDA is projected to rise steadily, in step with that of T-Mobile. In fact, as a percentage of total revenues (also called "operating margin"), Sprint's margins are projected to be consistently higher than T-Mobile's, as well as rise more quickly – 30.2% for Sprint in 2017 versus 27.8% for T-Mobile in 2017 and 43.0% for Sprint and 30.2% for T-Mobile in 2022.

[164] Sprint Joins the wireless carrier service revenue inflection party this Q, David Barden, Bank of America/Merrill Lynch, Aug. 1, 2018

CHART 2



Source: S&P Capital IQ, Actuals and Analyst Estimates. Accessed August 14, 2018. Note that Sprint projections include small amounts associated w ith its Wireline operations

In terms of capital expenditures, Sprint management "guided" analysts to annual capital investments of between $5 billion and $6 billion through for the company's Fiscal 2019, which runs through the March 2019 quarter (excluding spending on leased handsets). This translates into "capital intensity" (capital spending as a proportion of total revenues) of between 15.3% and 18.3% in 2019, depending on the actual level of investments and based on median analyst revenue projections. The median analyst projections for T-Mobile in 2018 is $5.3 billion yielding a capital intensity calculation of 12.3%.

In other words, compared to T-Mobile, Sprint is expected to invest a significantly greater proportion of its current revenues to prepare the company for a transition to its 5G technology future.

In sum, ***on a standalone basis***, each company is in a position to maximize its resources and remain an effective competitor during and after the transition to 5G.

c. Applicants' claims of vastly improved service in rural areas are speculative and contradicted by their own assessment

As the attached declaration of Dr. Andrew Afflerbach demonstrates, based on the information in the Public Interest Statement, the merged "New T-Mobile" would only provide at most marginally better broadband options than standalone T-Mobile in much of rural America.[165] Indeed, Dr. Afflerbach concludes that "for the great majority of rural Americans, the level of coverage and capacity would be similar for the merged New T-Mobile network as it would be for the standalone T-Mobile network."[166] In short, the merger would have no impact on the vast majority of rural America.

Moreover, the data in the Applicants' Public Interest Statement demonstrates that even six years after a T-Mobile/Sprint merger, "most of New T-Mobile's rural customers would be forced to settle for a service that has significantly lower performance than the urban and suburban parts of the network."[167] The "digital divide" is likely to worsen, not improve, post-merger.

[165] Afflerbach Decl. at ¶ 7. *See* Appendix A.

[166] *Id*. at ¶ 8.

[167] *Id*. at ¶ 9.

Dr. Afflerbach notes, first, that Sprint's network is mostly concentrated in urban and suburban areas and therefore it has relatively few new sites to add to those of T-Mobile in rural America; second, Sprint's "mid-band" spectrum that would become available for use at T-Mobile sites in rural areas will not be activated in many rural areas in the next six years; and third, for technical reasons, this spectrum is less useful in rural areas.[168]

As Dr. Afflerbach notes, the Public Interest Statement acknowledges that much of rural America would be left without mid-band coverage even after the proposed merger. Even under the best case scenario, the Applicants project that if the merger were approved, 84.6 million Americans (26 percent of the population) would still lack New T-Mobile mid-band coverage in 2021, and by 2024, 45.9 million Americans (14 percent of the total population) would continue to lack access to these high-capacity mid-bands. Based on a review of Figures 10 and Table 9 and the technical limitations of the spectrum, the vast majority of this uncovered population would be among the 62 million Americans living in the less dense, rural areas, and not the urban or suburban areas. Assuming that the country's rural population is the least served, and using the numbers above, New T-Mobile will likely provide mid-band coverage to few (if any) rural Americans by 2021, and (under best case projections) only 26 percent of rural Americans by 2024.[169]

Judging by the relatively small change in the low-band-covered population with and without the merger (Table 9 in the parties' Public Interest Statement), New T-Mobile may not be contemplating a large buildout in rural areas of the country. Table 9 provides T-Mobile's

[168] *Id*.

[169] *Id*. at ¶¶ 12, 13.

estimate of the covered population for the merged companies and for T-Mobile and Sprint separately, in 2021 and 2024, for Mid-Band and Low Band.[170]

		T-Mobile	Sprint	New T-Mobile
	Network Coverage Footprint	**Covered Pops (Millions)**	**Covered Pops (Millions)**	**Covered Pops (Millions)**
Year 2021	Mid-band (PCS & 2.5GHz)	74.6 (77% uncovered)	174.7 (47% uncovered)	240.9 (20% uncovered)
	Low-band (600)	317.9 (2.9% uncovered)	0 (100% uncovered)	319.6 (2.4% uncovered)
Year 2024	Mid-band (PCS & 2.5GHz)	173.2 (47% uncovered)	194.0 (41% uncovered)	282.2 (16% uncovered)
	Low-band (600)	323.0 (1.4% uncovered)	0 (100% uncovered)	324.1 (1.0% uncovered)

According to Table 9, the low-band coverage (reflecting the total urban, suburban, and rural coverage) will be relatively constant regardless of whether the merger happens. Without the merger, Table 9 indicates that T-Mobile's low-band network will cover 317.9 million users by 2021 and 323 million by 2024, compared with New T-Mobile's 319.6 million users covered by 2021 and 324.1 million by 2024. Thus, the New T-Mobile's low-band network would only serve an additional 1.7 million users by 2021 and an additional 1.1 million users by 2024 compared to a stand-alone T-Mobile. Since most of the new spectrum that Sprint would bring to New T-Mobile is in the mid-band, the 45.9 million (2024) to 84.6 million (2021) customers discussed above that can only access New T-Mobile's low-band network would not receive large amounts

[170] *Id*. at ¶ 15.

of new spectrum and would receive speeds in the same order of magnitude of what they would receive from a standalone T-Mobile. [171]

Moreover, as Dr. Afflerbach notes, the Public Interest Statement lacks the sort of detailed information that is required from an engineering perspective to evaluate Applicant's claims.

> The Statement refers to enhanced coverage in rural areas driven by increased cell site density but does not quantify the increased number of cell sites for New T-Mobile in rural areas compared to standalone T-Mobile and standalone Sprint. Further quantitative information about the number and locations of additional towers, ideally in high-resolution maps or shapefiles, is necessary to evaluate the magnitude of New T-Mobile's proposed rural buildout.[172]

Since the actual speeds that users of mobile 4G and 5G networks experience are largely dependent on the signal strength they receive, it is also important to note that the user experience will deteriorate for users who are further from the antenna site, who are indoors, or who are obstructed by terrain or foliage. It is not clear from the parties' Public Interest Statement if and how this variation has been taken into account in the capacity and coverage estimates. Rather, the Statement's Figure 10 is a high-level approximation and implies a consistent level of coverage over large areas. For these reasons, higher-resolution maps and model assumptions are required to enable a full understanding of the actual potential capacity and coverage in rural areas.[173]

As Dr. Afflerbach also notes, given the strong emphasis that the Statement places on accelerating the transition to 5G technology as a justification for the merger, it is important to note the considerable uncertainty around emerging 5G standards, equipment, pricing,

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[171] *Id*. at ¶ 16.

[172] *Id*. at ¶ 14.

[173] *Id*. at ¶ 17.

capabilities, and deployment patterns.[174] Predictions about the distant future are inherently more speculative than predictions that are expected to occur closer to the present. As Dr. Afflerbach notes, "there still exist many questions within the network engineering community about the form in which mobile 5G deployment will emerge, and whether it will emerge within five years, 10 years, or at all."[175]

Finally, we note an apparent significant inconsistency in the Public Interest Statement itself regarding the Applicants' plans to serve rural areas. The Applicants glowingly assert on page 66 that they expect to provide "fixed in-home broadband service of at least 25/3 Mbps to 52.2 million rural residents over 2.4 million square miles, approximately 84.2 percent of rural residents."[176] But their own projections elsewhere on page 60 of the document suggest that Applicants "expect . . . to provide" 25/3mbps in-home broadband service to only between 4.9 million and 7.1 million rural residents in 2024 – a far cry from 52.2 million.

To see this, one only needs to do some simple math. On page 60, Applicants state that "[b]y 2024, the Applicants expect New T-Mobile to provide high-speed, in-home broadband service to approximately 9.5 million subscriber households" and estimate that "20-25 percent of these new subscribers for in-home broadband service will be located in rural areas."[177] If one assumes that an average household consists of between 2.6 and 3 residents, and service will be provided to 9.5 million households of which 20-25% are rural, one ends up with a number of individual subscribers that is in a range between 4.9 million and 7.1 million – nowhere remotely close to 52.2 million.

[174] *Id*. at ¶ 19.

[175] *Id*. at ¶ 22.

[176] Public Interest Statement at 66.

[177] Public Interest Statement at 60.

When one does the math and factors in uncertainty, it appears that Applicants' promises about 5G in rural America are essentially hollow.

In summary, the merger "does not by itself provide a meaningful solution to the lack of adequate broadband options in most parts of the country."[178] The "digital divide" would continue to grow. As Dr. Afflerbach concludes, even under the best-case scenarios presented by the Applicants, the merged firm's rural offerings would still fall dramatically short of those in urban and suburban markets and would not be dramatically improved relative to standalone T-Mobile and Sprint.[179]

d. Applicants' claims that they will be more effective competitors with cable broadband are overblown

Finally, we briefly discuss Applicants' arguments that the transaction will enable the merged firm to disrupt cable and bundled video services providers in ways they cannot today. These claims also are not credible.

In July of this year, New Street Research issued an analysis focusing on the likelihood of meaningful fixed wireless broadband substitution for wireline broadband.[180] The thrust of New Street's analysis is that, while fixed wireless substitution is real and will be a "threat" to wireline broadband providers, the amount of data which typical customers consume is far above what can be projected for wireless carriers' data caps. 5G will probably lead to higher data caps, but New Street suggests that this is likely to have only a modest impact on the need for wired connections.

"The public interest statement is what got us thinking about the wireless substitution threat as distinct from the fixed wireless broadband threat," New Street explains. "T-Mobile has

[178] Afflerbach at ¶ 16.

[179] *Id.* at ¶ 35.

[180] The Threat To Broadband From Wireless Substitution, New Street Research, Jonathan Chaplin, July 23, 2018.

been the primary driver of wireless substitution to date. They claim that 12% of their customers have cut the cord already."[181]

As New Street notes, the Public Interest Statement claims that the New T-Mobile would bring new competition to the broadband market with fixed wireless broadband, and the additional capacity that it would gain (if the Commission were to approve the proposed merger with no spectrum divestitures) would enable it to continue driving wireless substitution. New Street eviscerates the Applicants' assertion:

- "Our reading of the disclosure leads us to believe that they are unlikely to gain material share in the broadband market with a fixed wireless broadband product. Simply put, ***this would be a poor use of their newfound capacity. They are far more likely to use their capacity to take share in the mobile market.***"[182]
- "They may well raise data caps as a tool to take share; other carriers will struggle to respond. T-Mobile is likely to capture a larger share of high-usage subs, which will include a larger share of wireless only households. We doubt they will be able to increase data caps sufficiently to materially change the size of the wireless-only market though."[183]

[181] *Id*.

[182] *Id*. (Emphasis added.)

[183] *Id*.

V. THE PROPOSED MERGER WOULD RESULT IN THE LOSS OF MORE THAN 28,000 JOBS

The impact of a merger on U.S. employment is an important part of the Commission's public interest analysis.[184] The Commission has repeatedly confirmed that commitments to expand employment in the U.S. represent a public interest benefit to be taken into account in the review of proposed mergers.[185] As with all claimed benefits, the Applicants have the burden of proving that claimed job creation is merger specific, quantifiable and verifiable.[186] If the positive impact a merger may have on employment is a public interest benefit, an expected reduction in U.S. employment following a merger may be regarded as a public interest harm. CWA has performed a comprehensive analysis based on detailed location data for all the retail locations involved in the proposed transaction. Our analysis finds that the proposed T-Mobile/Sprint merger will result in the loss of more than 28,000 jobs.

a. The Applicants fail to substantiate their claim that the proposed merger will create jobs

The Applicants claim in their Public Interest Statement that the proposed transaction will result in a net increase in employment for "direct internal" employees and "direct external"

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[184] *See, e.g., AT&T/T-Mobile Staff Analysis and Findings* ¶ 259 ("As part of its public interest analysis, the Commission historically has considered employment-related issues such as job creation [and] commitments to honor union bargaining contracts. . ."); *Comcast/NBCU Order* ¶ 224 ("We also note the Applicants' representations that additional investment and innovation that will result from the transaction will in turn promote job creation and preservation."); *Sprint/Nextel Order* ¶¶ 168-69 (considering job growth claims as part of FCC analysis); Applications of Puerto Rico Telephone Authority and GTE Holdings (Puerto Rico) LLC for Consent to Transfer Control of Licenses and Authorization, File No. 03373-03384-CL-TC-98, *Memorandum Opinion and Order*, 14 FCC Rcd 3122, 3148, at 57-58 (1999) (finding that GTE's pledge not to make any involuntary terminations, except for cause, of PRTC workers employed as of a certain date would benefit the public interest); *T-Mobile/MetroPCS Order* ¶ 80 (rel. March 12, 2013) (considering T-Mobile's job claims as part of FCC analysis).

[185] *See, e.g., AT&T/BellSouth Order*, 22 FCC Red 5662, Appendix F (finding that a commitment to provide high quality employment opportunities in the U.S. by repatriating jobs previously outsourced outside the U.S. would serve the public interest).

[186] *See AT&T/T-Mobile Staff Analysis and Findings* ¶ 259.

employees. (The Applicants define "direct external employees" as Sprint and T-Mobile contractors and branded authorized retailers.)[187] The information that the Applicants have submitted to the Commission is insufficient to support these claims.

The Applicants base their assertion that the transaction will result in a net increase in employment on an "internal analysis" of what the standalone companies' "employee base would have been for the foreseeable future."[188] But the Applicants do not include this "internal analysis" in the Public Interest Statement or related Declarations.[189] Therefore, neither the Commission nor the public can evaluate the validity of this black box "internal analysis." The Applicants are effectively saying "trust us" when it comes to the employment effects of the transaction. On its face, this does not satisfy the Commission's evidentiary standard for recognizing job creation as a public interest benefit. There is no way to verify Applicants' claims.

Although the Applicants claim that their plans to increase employment are specific to the proposed transaction,[190] the available evidence in fact suggests that both companies had aggressive growth plans absent the proposed transaction.

In fiscal year 2017, T-Mobile opened a total of 2,800 stores (1,500 T-Mobile stores and 1,300 MetroPCS stores).[191] Since the start of 2018, T-Mobile has focused on its plans to grow

[187] *See* PIS, Appendix C, 8.

[188] *See id.* at 82.

[189] *See id.* at 81.

[190] U.S. Senate, Subcommittee on Antitrust, Competition Policy, and Consumer Rights, Hearing "Game of Phones: Examining the Competitive Impact of the T-Mobile – Sprint Transaction" (June 27, 2018), https://www.judiciary.senate.gov/meetings/game-of-phones-examining-the-competitive-impact-of-the-t-mobile_sprint-transaction.

[191] T-Mobile, Press Release, *T-Mobile Reports Record Financial Results Across the Board for FY 2017, Issues Strong Guidance for 2018 and Beyond* (Feb. 7, 2018).

its store footprint in rural areas and "greenfield markets," places where the company has network coverage but no stores.[192] In May 2018, a T-Mobile representative stated that its future growth would focus on rural and suburban areas.[193] In July 2018, T-Mobile's announcements of six store openings in the Dallas area and 10 in the Orlando area indicated that the company continues its aggressive expansion, even in markets where it already has a significant presence.[194] In March 2018, T-Mobile opened a 1,200-worker call center in South Carolina.[195] In August 2018, T-Mobile announced that its customer call center operations would focus on live representatives and would avoid automation, suggesting that T-Mobile would continue to expand its call center staff.[196]

In fiscal year 2017, Sprint opened 1,300 stores (500 Sprint stores and 800 Boost Mobile stores) and planned to continue its retail expansion.[197] In March 2018, Sprint announced that it planned to open 600 Sprint stores and 850 Boost Mobile stores by the end of year.[198] In May, Sprint's spokesperson stated that merger with T-Mobile would not change its plans to open new

[192] T-Mobile Q4 2017 Earnings Call Transcript (T-Mobile claims its store expansion efforts are "focused on greenfield. It's focused on places where the network's deployed where there is no competition").

[193] T-Mobile Q1 2018 Earnings Call Transcript (T-Mobile claims it plans on building "additional stores in rural areas and areas that neither company reaches").

[194] T-Mobile, Press Release, *T-Mobile opening 6 new stores in Dallas-Fort Worth area and expanding rural network coverage in North Texas* (July 18, 2018); T-Mobile, Press Release, *T-Mobile opening 10 new stores in the Orlando area and expanding rural network coverage in Florida* (July 18, 2018).

[195] T-Mobile, Press Release, *T-Mobile Opens Its Biggest Customer Care Facility Yet and Adds Hundreds of New Jobs* (March 1, 2018).

[196] T-Mobile, Press Release, *T-Mobile's Latest Un-carrier Move: Real People, Not Robots Introducing T-Mobile Team of Experts* (Aug. 15, 2018).

[197] Sprint Q4 2017 Earnings Call Transcript (Sprint claims it "opened over 500 new Sprint company-owned stores in fiscal 2017" and opened nearly 800 new Boost stores. The carrier also claimed it planned "to add hundreds more Sprint and Boost stores" throughout the year).

[198] Mark Davis, *Sprint to lay off 500 from Overland Park headquarters in cost-cutting push*, THE KANSAS CITY STAR (March 9, 2018), https://www.kansascity.com/news/business/technology/article204415764.html.

stores.[199] Sprint had already planned to onshore call center jobs prior to the merger. In December 2016, Sprint CEO Marcelo Claure pledged Sprint would create 5,000 jobs in the U.S. by the end of 2017, primarily by reshoring call center positions.[200] CWA has not identified a reliable assessment about whether these jobs materialized on schedule.

Given the aggressive expansion plans that the Applicants demonstrated as standalone companies, their claims of merger-specific job creation are simply not credible. In several cases, such as retail expansion in rural areas and onshoring of customer care, the Applicants appear to claim that pre-existing U.S. job growth plans were somehow driven by the transaction. The Commission should require the Applicants to submit their "internal analysis" of projected employment growth as part of the record in this proceeding so that the Commission and the public can properly evaluate the job impacts of this transaction.

b. The Applicants' example of past job growth following the T-Mobile/MetroPCS transaction is not relevant to this transaction, nor is it predictive of New T-Mobile merger-related job growth

The Applicants cite T-Mobile's 2013 acquisition of MetroPCS as an example of job growth following a transaction.[201] This example is entirely inappropriate to use as precedent in evaluating the Applicants' jobs claim for the proposed transaction. T-Mobile's January 2018 acquisition of iWireless, a regional carrier in Iowa, resulting in broad-based retail store and call center closings, is a much more relevant case.

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[199] Elise Reuter, *Mapping retail in a Sprint/T-Mobile merger*, KANSAS CITY BUSINESS JOURNAL (May 04, 2018), https://www.bizjournals.com/kansascity/news/2018/05/04/mapping-retail-in-a-sprint-t-mobile-merger.html.

[200] Elise Reuter, *Sprint/T-Mobile merger: Job effect would extend beyond head count*, KANSAS CITY BUSINESS JOURNAL (March 24, 2017), https://www.bizjournals.com/kansascity/news/2017/03/24/sprint-tmobile-merger-effect-on-jobs.html.

[201] Public Interest Statement at 82.

In their Public Interest Statement, the Applicants note that T-Mobile's acquisition of MetroPCS resulted in expansion into new markets and a significant expansion in the number of employees and contractors supporting the MetroPCS brand.[202] When T-Mobile acquired MetroPCS, the prepaid carrier was operating retail stores in only 15 markets.[203] In contrast, T-Mobile and Sprint combined have retail locations in 49 out of 50 U.S. states and their prepaid MetroPCS and Boost Mobile brands operate stores in 46 states.[204] The growth opportunity of expanding into new geographies that was available to MetroPCS is not available to the Applicants following their proposed merger. Therefore, the MetroPCS example is largely irrelevant to assessing the likely employment effects of the proposed transaction.

T-Mobile's January 2018 acquisition of the remaining interest in Iowa Wireless (iWireless) that it did not already own is a much more recent and informative example to assess the job effects of the proposed transaction.[205] At the time of T-Mobile/iWireless transaction, iWireless provided postpaid and prepaid service to 75,000 customers in Iowa, western Illinois,

[202] *Id*.

[203] T-Mobile, Press Release: MetroPCS Opens New Doors in 10 New Markets & Celebrates by Giving Customers More High-Speed Data (Sept. 3, 2014).

[204] CWA analysis of store location data collected from the T-Mobile, Sprint, MetroPCS, and Boost Mobile websites in April and May 2018.

[205] *See* Alex Wagner, *T-Mobile says 600MHz LTE now in 586 cities, confirms completion of Iowa Wireless deal*, TMOSNEWS (Jan. 3, 2018), https://www.tmonews.com/2018/01/t-mobile-600mhz-lte-586-cities-confirms-completion-iowa-wireless-deal. Prior to the transaction, iWireless operated as a partnership between T-Mobile and Aureon, in which T-Mobile provided service to iWireless customers, when their phones roamed outside of iWireless' network, and iWireless provided service to T-Mobile customers in Iowa. *See* T-Mobile website for iWireless customers (August 21, 2018) (under FAQs, T-Mobile claims "T-Mobile customers in Iowa were already roaming on the iWireless network"), https://www.t-mobile.com/customers/iowa-wireless-service; *see also* iWireless website (August 21, 2018), https://www.iwireless.com/why-iwireless/default.aspx (iWireless claims its customers "get nationwide 4G LTE coverage through the T-Mobile network").

and eastern Nebraska.[206] iWireless operated 103 stores – 22 corporate stores and 81 authorized dealers – as well as customer call centers in Cedar Rapids and Des Moines.[207]

After the iWireless acquisition, T-Mobile announced that it would close most iWireless stores and begin opening MetroPCS stores in Iowa.[208] By August 2018, six of the 22 corporate-owned iWireless stores had been rebranded to T-Mobile, while the remaining 16 were closed.[209] Of the iWireless 81 authorized dealers, five were converted to MetroPCS dealers and 76 locations have already closed or are slated to close by August 24, 2018.[210] iWireless' customer call centers in Des Moines and Cedar Rapids, Iowa are slated to close on September 30, 2018.[211]

As a combination of two carriers with overlapping operations, the iWireless example – in which T-Mobile post-acquisition closed more than 72 percent of corporate stores and more than 93 percent of authorized dealer stores – is more analogous to the current transaction than the MetroPCS example.

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[206] T-Mobile, Press Release, T-Mobile to Acquire Remaining Interest in Iowa Wireless from Aureon (Sept. 26, 2017).

[207] Total corporate stores from T-Mobile Press Release (https://www.t-mobile.com/news/t-mobile-iowa-wireless-aureon). Corporate store and authorized dealer breakdown from CWA analysis of list aggregator AggData's list of iWireless retail locations posted on iWireless's website as of October 2, 2017 (Retrieved August 13, 2018), about one week after T-Mobile announced that it would be acquiring the carrier; *see also* WayBack Machine's archive of the iWireless webpage on December 23, 2017 ("Our call centers are based in Cedar Rapids and Des Moines") (https://web.archive.org/web/20171223132951/http://www.iwireless.com:80/why-iwireless/default.aspx).

[208] *See iWireless acquisition Is being finalized*, HOWARDFORUMS (June 04, 2018), https://www.howardforums.com/showthread.php/1907346-iWireless-acquisition-Is-being-finalized; T-Mobile website for iWireless customers (Aug. 21, 2018) (under FAQs, T-Mobile urges customers to be "watching for MetroPCS which will be coming to Iowa in the second half of 2018!"), https://www.t-mobile.com/customers/iowa-wireless-service.

[209] CWA reviewed AggData's list of iWireless stores listed on iWireless' website as of October 2, 2017. From that list, we identified 22 corporate-owned iWireless stores in operation. CWA cross-referenced these 22 locations against a list of T-Mobile, MetroPCS, and iWireless stores in operation in August 2018, collected from the carriers' websites on August 13, 14, and 16, respectively.

[210] CWA reviewed AggData's list of iWireless stores listed on iWireless' website as of October 2, 2017. CWA cross-referenced authorized dealer locations against a list of T-Mobile, MetroPCS, and iWireless stores in operation in August 2018.

[211] Phone conversation with iWireless Call Center Representative in iWireless' Cedar Rapids Call Center, August 18, 2018 via iWireless' customer service number at 1-(888)-550-4497.

c. Both T-Mobile and Sprint have long track records of offshoring U.S. jobs

Both T-Mobile and Sprint have a history of outsourcing key functions and sending U.S. jobs to overseas contractors. In the Public Interest Statement, the Applicants' make *unverified* claims that they will bring some jobs back from overseas. However, the Applicants provide no information regarding the number of jobs each company currently offshores and specifically how many offshore jobs will be repatriated as a result of the proposed transaction.

T-Mobile sends many call center jobs offshore to the Philippines, Guatemala, Honduras, India, Mexico, and Canada. In June 2012, T-Mobile laid off 3,300 workers when it closed seven call centers located in Colorado, Florida, Kansas, Pennsylvania, Oregon, and Texas and sent the work to call centers in Mexico, Honduras, Guatemala, and the Philippines. T-Mobile attempted to deny its displaced workers much-needed federal benefits by denying the offshoring of their jobs. A U.S. Department of Labor investigation concluded that T-Mobile sent the work overseas and approved Trade Adjustment Assistance (TAA) benefits for the 3,300 workers.[212]

Sprint outsources call center work to the Philippines, Mexico, Panama, India, the Dominican Republic, Costa Rica, Guatemala, and Canada.[213] In 2009, Sprint outsourced 6,000

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[212] *See* U.S. Department of Labor's TAA Decision 81520, July 11, 2012, *available at* https://www.doleta.gov/tradeact/taa/taadecisions/taadecision.cfm?taw=81520 (finding that laid-off call center workers previously employed at T-Mobile call centers in Allentown, Pennsylvania, Fort Lauderdale, Florida, Frisco, Texas, Brownsville, Texas, Lenexa, Kansas, Thornton, Colorado, and Redmond, Oregon were eligible to apply for adjustment assistance); *see also* Petition for TAA, https://www.doleta.gov/tradeact/taa/taadecisions/81520.pdf (lists the number of workers as 3,300).

[213] *See* Jaime Lopez, *Sprint Call Center in Costa Rica Enters International Competition*, COSTA RICA STAR (Aug. 6, 2016), https://news.co.cr/sprint-call-center-costa-rica-enters-international-competition/49607/ (finding that Sprint has customer care functions in "Guatemala, Costa Rica, the Philippines"); *see also* Alana Semuels, *Sprint focuses on keeping customers happy so they don't leave*, LA TIMES (March 5, 2009), http://latimesblogs.latimes.com/technology/2009/03/sprint-and-cust.html (finding that Sprint has outsourced customer care to the "Philippines, India and Mexico"); *see also* LinkedIn profiles of Andres Lasso and Ramphis Boniche, employees of third-party call center operators in Panama who service Sprint customers, *available at* https://www.linkedin.com/in/andres-lasso-34ba65a1/ and https://www.linkedin.com/in/ramphis-boniche-81582625/; *See also* LinkedIn profiles of Jose Silva and Claribel Miranda, employees of third-party call center operators in

positions and the management of its wireless network to Sweden-based Ericsson.[214] In 2013, Sprint cut 800 call center jobs.[215] In 2014, Sprint cut more than 1,400 jobs at six call centers, closed 55 retail stores, and shuttered service and repair centers.[216] In 2016, Sprint closed U.S. call centers that employed 2,500 people and sent the work overseas to the Philippines.[217]

The Applicants' well-documented recent history of cutting jobs following a transaction and significant offshoring of U.S. jobs raises questions about the credibility of their future plans to preserve and create jobs in the U.S.

d. The proposed transaction will result in the loss of more than 28,000 jobs

Contrary to the Applicants' unsubstantiated claims, CWA performed an analysis based on detailed location data for all the retail locations involved in the proposed transaction. Our analysis finds that the proposed T-Mobile/Sprint merger will result in the loss of more than 28,000 jobs. Approximately 24,000 jobs would be eliminated as a result of overlapping retail store closures. Another approximately 4,500 jobs would be eliminated due to duplicative functions at corporate headquarters in Overland Park, KS and Bellevue, WA.

Dominican Republic who service Sprint customers, *available at* https://www.linkedin.com/in/jose-silva-2b692813b/ and https://www.linkedin.com/in/claribel-miranda-b2100171/; *see also* LinkedIn profile of Dominic Macwan, employee of a third-party call center operator in Canada who services Sprint customers, *available at* https://www.linkedin.com/in/dominic-macwan-4828b066/.

[214] *See* Larry Dignan, *Sprint outsources network to Ericsson*, CNET (July 10, 2009), https://www.cnet.com/news/sprint-outsources-network-to-ericsson/.

[215] *See* Mark Davis, *Sprint is cutting 800 customer service jobs*, KANSAS CITY STAR (August 27, 2013), *https://www.kansascity.com/news/local/article326121/Sprint-is-cutting-800-customer-service-jobs.html*.

[216] *See* Ina Fried, *Sprint Closing Three Call Centers, 55 Stores in Latest Cuts*, RECODE (March 20, 2014), https://www.recode.net/2014/3/20/11624800/sprint-closing-three-call-centers-55-stores-in-latest-cuts; *see also* Mary Beth Quirk, *Sprint Closing Three Call Centers, Shutting Down 55 Stores Across The Country*, CONSUMERIST (March 21, 2014), https://consumerist.com/2014/03/21/sprint-closing-three-call-centers-shutting-down-55-stores-across-the-country.

[217] *See* Patrick Thibodeau, *Lawmakers try again to stop call center offshoring*, COMPUTER WORLD (March 6, 2017), https://www.computerworld.com/article/3176945/it-industry/lawmakers-try-again-to-stop-call-center-offshoring.html.

Table 1:
Summary of Estimated Job Losses from Proposed Transaction

Type of Work	**Net Job Loss**
Retail – Postpaid (T-Mobile, Sprint)	12,600
Retail – Prepaid (Boost, MetroPCS)	11,800
Headquarters	4,500[218]
Total	**28,900**[219]
CWA calculations of retail job loss. See Appendix D for detailed methodology.	

Postpaid Wireless Retail. Sprint and T-Mobile currently operate a total of 9,101 corporate and authorized retail stores selling postpaid wireless services.[220] This combined retail network is substantially larger than either Verizon's (7,133 stores) or AT&T's (5,208 stores) retail operations and involves a high degree of geographic overlap.[221] A merger between these two companies would involve a significant number of store closures. T-Mobile CEO John Legere referred to a "rationalization" of overlapping urban retail operations and resulting job cuts in a recent U.S. Senate hearing on the proposed transaction.[222]

[218] "Could a Sprint merger with T-Mobile kill more jobs than Sprint has?" *The Kansas City Star*, October 06, 2017 (https://www.kansascity.com/news/business/technology/article177413566.html) (noting that "Moffett, however, said a merged company would be in no position to shed every duplicate employee...There would be enough overlap, he estimated, to eliminate about 5,000 additional jobs"); "Sprint's new CEO promises employees they will have a place after T-Mobile merger" *Kansas City Business Journal*, June 15, 2018, (https://www.bizjournals.com/kansascity/news/2018/06/15/sprint-employee-rally-at-sprint-center.html) (stating that "a month before the T-Mobile merger was announced, Sprint had confirmed it would cut 500 employees from its headquarters. The company announced another, smaller round of cuts in late May, affecting 59 employees").

[219] Our current estimate of net job loss is based on a conservative model that adds back in some job gains at stores that remain open due to volume increases after closure of duplicative retail locations. Appendix C lists the top 50 census-defined urban areas with the largest net change in retail and headquarters employment. See Appendix D for detailed description of methodology.

[220] CWA analysis of store location data collected from Sprint and T-Mobile's websites on April 23, 2018 and April 27, 2018 respectively (https://storelocator.sprint.com/locator/ and https://www.t-mobile.com/store-locator/).

[221] CWA analysis of store location data collected from Verizon's website in June 2018,(https://www.verizonwireless.com/stores/); CWA also reviewed AggData's list of AT&T stores in operation in August 2018.

[222] U.S. Senate, Subcommittee on Antitrust, Competition Policy, and Consumer Rights, Hearing, "Game of Phones: Examining the Competitive Impact of the T-Mobile – Sprint Transaction."

Industry analysts believe that store closures are a key element of the projected cost savings from the proposed merger. In April 2018, New Street Research published an analysis of potential synergies from a T-Mobile/Sprint merger in which the analysts assumed that the resulting company would generate substantial savings from the elimination of excess store locations.[223]

To predict the number of postpaid T-Mobile and Sprint stores likely to close following the merger, CWA created a regression model using the relationship between population and the number of T-Mobile Stores [*see* Appendix D for methodology]. This model predicts that the Applicants will operate 6,153 postpaid retail stores in current T-Mobile/Sprint markets, closing 2,948 corporate and dealer stores in these markets. We project that the Applicants will open 240 postpaid stores in rural areas, bringing the total number of postpaid stores to 6,393.

We project that the initial store closures will eliminate more than 23,000 postpaid retail positions, but that these losses will be somewhat offset by gains at remaining stores and new hiring in rural areas. We project the proposed transaction will cause a net loss of 12,674 postpaid retail jobs.[224]

Prepaid Wireless Retail – MetroPCS and Boost. In addition to robust retail networks targeting postpaid customers, both Sprint and T-Mobile own prepaid brands with their own retail operations.

[223] *See* New Street Research "Sprint / T-Mobile Redux: Refreshing Synergies and Scenarios," April 15, 2018 at 28.
[224] See Appendix D for methodology.

MetroPCS, T-Mobile's prepaid brand, has 9,869 full-service retail locations and Boost, Sprint's primary prepaid brand, has 5,576 locations.[225] Our analysis of the carriers' store locator sites suggests that virtually all of these locations are operated by independent authorized retailers.[226] A combination of these brands would have 15,445 locations, nearly three times as many as its closest competitor, AT&T's Cricket, which has only 5,719 full-service retail locations.[227]

MetroPCS and Boost's retail stores are highly concentrated in similar areas of the country, and are often located very close to each other. Our analysis of Boost Mobile and MetroPCS store locations data finds that half of all Boost Mobile stores are located less than one-third of a mile from the closest MetroPCS store and 75 percent of Boost Mobile stores are within eight-tenths of a mile from the closest MetroPCS.[228] According to the National Wireless Independent Dealer Association (NWIDA), the "new T-Mobile entity will unify their prepaid offerings under a single brand, effectively shuttering thousands of retail outlets."[229]

Using a simple population regression model to predict store closures, CWA estimates that 4,318 of the current MetroPCS and Boost Mobile stores will close as part of the merger, with an

[225] CWA analysis of store location data collected from MetroPCS and Boost Mobile's websites in May 2018 (https://www.metropcs.com/find-store.html and https://www5.boostmobile.com/#!/store).

[226] CWA analysis of store location data collected from MetroPCS and Boost Mobile's websites in May 2018.

[227] CWA analysis of Cricket Wireless store location data collected via Google Places API in May 2018.

[228] CWA analysis of store location data collected from MetroPCS and Boost Mobile's websites in May 2018.

[229] *See* NWIDA, Press Release: NWIDA Joins Founder And Former CEO Of Boost Mobile USA In Joint Statement That Sprint/T-Mobile Merger Will Be Devastating To Prepaid Customers And 30,000 Wireless Dealers In U.S. (May 31, 2018), http://nwida.org/nwida-joins-founder-former-ceo-boost-mobile-usa-joint-statement-sprint-t-mobile-merger-will-devastating-prepaid-customers-30000-wireless-dealers-u-s.

estimated three employees per store.[230] We estimate that the Applicants' planned expansion of rural retail will include 360 new prepaid locations, yielding 1,080 new jobs. Considering both store closures and new stores in rural areas, this consolidation in the prepaid wireless market could cost 11,874 jobs.[231]

Headquarters. In October 2017, Moffett-Nathanson analysts estimated that a prospective T-Mobile/Sprint merger would involve cutting 5,000 jobs between Sprint's headquarters in Overland Park, KS and T-Mobile's headquarters in Bellevue, WA.[232] In 2018, Sprint announced two rounds of layoffs at its headquarters in Kansas affecting 559 employees, just under 10 percent of the 6,000 headquarters employees.[233] Reducing the Moffett-Nathanson merger estimate to account for Sprint's recent layoffs, CWA estimates that 4,500 additional headquarters and back office positions would be lost as a result of the proposed transaction.

e. The proposed transaction could increase concentration in the wireless industry labor market with negative impact on industry-wide wages

Several independent groups of economists have recently published research papers examining the degree of concentration in U.S. labor markets and the impact of concentration on

[230] Employment estimates from press coverage of store openings such as: https://patch.com/florida/newportrichey/talk-time-store-opens-new-tampa-bay-location, http://www.mlive.com/business/west-michigan/index.ssf/2012/07/boost_mobile_to_open_location.html

[231] See store closure prediction methodology in Appendix D.

[232] Mark Davis, *Could a Sprint merger with T-Mobile kill more jobs than Sprint has?*, THE KANSAS CITY STAR (Oct. 6, 2017), https://www.kansascity.com/news/business/technology/article177413566.html.

[233] Elise Reuter, *Sprint's new CEO promises employees they will have a place after T-Mobile merger*, KANSAS CITY BUSINESS JOURNAL (June 15, 2018), https://www.bizjournals.com/kansascity/news/2018/06/15/sprint-employee-rally-at-sprint-center.html.

wages, employment, and output.[234] The key findings of the emerging literature on labor market monopsony power are the following:

- Labor markets in the U.S. are already highly concentrated.[235]
- Otherwise similar workers are paid lower wages in more concentrated labor markets.[236]
- Collective bargaining substantially reduces the negative effect of labor market concentration on wages.[237]

As a result, scholars recommend that any competitive analysis of mergers include identifying the various labor markets affected by the mergers and assessing the effect of the merger on concentration in these labor markets.[238] This includes calculating the pre-merger and post-merger HHI levels of these labor markets, and recognizing "a presumption against a merger if the postmerger absolute level of concentration and/or the increase indicate too high a risk of wage suppression."[239] As the parties have not supplied HHI figures in the downstream markets, they unsurprisingly have not addressed how the merger would improve (or affect) competition

[234] *See, e.g.*, Suresh Naidu, Eric A. Posner & E. Glen Weyl, *Antitrust Remedies for Labor Market Power*, Harvard Law Review, Forthcoming; University of Chicago Coase-Sandor Institute for Law & Economics Research Paper No. 850; U of Chicago, Public Law Working Paper No. 665, https://ssrn.com/abstract=3129221 or http://dx.doi.org/10.2139/ssrn.3129221 ; Efraim Benmelech, Nittai Bergman & Hyunseob Kim, *Strong Employers and Weak Employees: How Does Employer Concentration Affect Wages?*, Working Paper (March 22, 2018), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3146679; José Azar, Ioana Marinescu, & Marshall I. Steinbaum, *Labor Market Concentration*, National Bureau of Economic Research Working Paper No. 24147, December 15, 2017, https://www.nber.org/papers/w24147.

[235] Azar et al., *Labor Market Concentration*, *supra*, at 2.

[236] *See* Azar et al., *Labor Market Concentration*, *supra*, at 19; *see also* Benmelech et al., *Strong Employers and Weak Employees*, *supra*, at 12.

[237] *See* Benmelech et al., *Strong Employers and Weak Employees*, *supra*, at 3.

[238] *See, e.g.*, Alan B. Krueger & Eric A. Posner, *A Proposal for Protecting Low-Income Workers from Monopsony and Collusion*, Hamilton Project, Policy Proposal 2018-05, at 12 (Feb. 2018), http://www.hamiltonproject.org/assets/files/protecting_low_income_workers_from_monopsony_collusion_krueger_posner_pp.pdf.

[239] *Id*.

upstream in the labor markets. This omission is glaring given the parties' anticompetitive labor practices.

We are concerned that the proposed transaction could substantially increase concentration in numerous local wireless industry retail labor markets, increasing the monopsony power of employers in purchasing labor power of retail wireless workers, thereby depressing workers' wages and benefits through reduced competition for labor. Absent collective bargaining as a means to counter employer concentrated power, retail wireless workers will be worse off by reducing the number of national wireless retail employers from four to three.

Certainly, the Commission should require that the Applicants provide additional information and analysis about the impact that reducing the number of wireless employers will have on wages in geographic markets where their operations currently overlap.

f. T-Mobile and Sprint have a long history of violation of workers' rights

The proposed merger would combine two companies with a long history of violation of employment law and workers' rights. This history speaks volumes about the trustworthiness and corporate character of these companies. In 2000, when Deutsche Telekom (DT) sought to enter the U.S. market with its purchase of VoiceStream, Deutsche Telekom management told CWA that its U.S. subsidiary (renamed T-Mobile) would adopt the positive labor-management relationship that DT had with its union ver.di in Germany and would respect the right of its employees to form a union. With this reassurance, CWA supported the acquisition.[240] But CWA soon learned that the new T-Mobile could not be trusted to honor this commitment, as T-Mobile adopted an aggressive policy to deny employees their legal right to form a union.

[240] CWA Comments, VoiceStream Wireless Corporation, Transferor, and Deutsche Telekom AG, Transferee Application for Consent to Transfer Control, IB Docket No. 00-187, Dec. 13, 2000.

T-Mobile has won the dubious distinction as one of the worst labor law violators in the country. T-Mobile has been guilty of violating U.S. labor law six times since 2015 and has been subject to approximately 40 unfair labor practice charges since 2011. Findings of illegal activity by the federal courts, the National Labor Relations Board (NLRB), and an Administrative Law Judge include, among other things:

- Maintaining unlawful rules forbidding workers from speaking to each other and others about wages and working conditions (nationwide violation; U.S. Court of Appeals for the 5th Circuit affirmed the Board's order).[241]
- Creating, maintaining, dominating and assisting an internal organization called T-Voice to try to discourage workers from forming, joining, or supporting an independent union (nationwide violation).[242]
- Refusing to negotiate with CWA over a successor contract for a unit comprising field technicians in Connecticut (the U.S. Court of Appeals for the DC Circuit granted the NLRB's application for enforcement).[243]
- Surveilling and interrogating employees about union activity restricting discussions about working conditions over social media, and prohibiting employees from sending union-related emails.[244]
- Unlawfully prohibiting employees from talking about the union during work time.[245]

[241] T-Mobile USA, Inc., 363 NLRB No. 171 (Apr. 29, 2016), *enf'd in relevant part* T-Mobile USA, Inc. v. Nat'l Labor Relations Bd., 865 F.3d 265 (5th Cir. 2017).

[242] T-Mobile USA, Inc., JD-23-17,2017 WL 1230099 (Apr. 3, 2017).

[243] T-Mobile USA, Inc., 365 NLRB No. 23 (Feb. 2, 2017), *enforcement granted by* T-Mobile USA, Inc. v. Nat'l Labor Relations Bd., 717 F. App'x 1 (D.C. Cir. 2018).

[244] T-Mobile USA, Inc., JD-57-16, 2016 WL 3537770 (June 28, 2016).

[245] T-Mobile USA, Inc., 365 NLRB No. 15 (Jan. 23, 2017).

- Requiring employees, including one who filed a sexual harassment complaint, to sign an unlawful confidentiality notice prohibiting them from discussing with one another information from employer-led investigations, and threatening discipline, up to and including discharge, if they engaged in those discussions.[246]

Sprint's violation of workers' rights dates back to the landmark *La Conexion Familiar* case in which Sprint fired 226 employees and closed the Spanish language telemarketing center in San Francisco to avoid a union election. Sprint was also found to have committed more than 50 labor law violations during the organizing campaign, including interrogating employees about their union activities, requesting that employees distribute anti-union buttons, creating the impression of surveillance of employees' union activities, changing working conditions because of union activities, falsifying financial records, and surveillance of employees. The case was subject to a tri-country labor investigation under terms of the North America Free Trade Agreement.[247]

Moreover, it has been reported that, since 2007, current and former workers employed at Sprint call centers and retail stores have sued the company multiple times due to alleged wage and hour violations affecting thousands of workers. In three recent cases, workers reported that the company failed to pay them overtime wages, reimburse them for mileage, give them adequate meal or rest breaks, and compensate them for all hours worked. Sprint agreed to pay $14.85 million to settle claims in just three recent cases.[248] In 2009, the Department of Labor

[246] T-Mobile USA, Inc., JD(NY)-34-15, 2015 WL 4624356 (Aug. 3, 2015), adopted by NLRB on Sept. 14, 2015.

[247] La Conexion Familiar and Sprint Corp., 322 NLRB No. 137 (1996).

[248] *See* Cara Bayles, *Sprint Inks $1.2M Deal To End Workers' Wage And Hour Suit*, LAW360 (Oct. 4, 2017), https://www.law360.com/articles/970869/sprint-inks-1-2m-deal-to-end-workers-wage-and-hour-suit; *see also* David McAfee, *$4.85M Settlement for Sprint Workers Gets First OK*, BLOOMBERG (Feb. 29, 2016),

fined Sprint $120,000 and ordered the company to pay $260,000 in back wages to more than 1,000 call center employees because the company failed to pay them overtime wages.[249]

As we discussed earlier, the combination of T-Mobile and Sprint would reduce the employment options available to retail wireless employees in an already concentrated retail wireless labor market, exerting downward pressure on wages and other working conditions. Collective bargaining serves to mitigate the negative impacts of labor market monopsony power, but in this instance, both T-Mobile and Sprint have fought aggressively to deny their employees this legal right. Because both companies have unlawfully resisted their employees' attempts to organize a union and collectively bargain for higher wages and other terms of employment, their employees' principal leverage in the employment relationship is the ability to work for another firm in this labor market, should they not be satisfied with the terms offered by their employer.

This merger will eliminate one of those four competing firms, reducing employees' alternative job opportunities and therefore their individual bargaining power. The resulting concentration puts downward pressure on wages and other terms of employment for workers in this market. None of the labor effects of this merger can be considered in the public interest, especially where consensus exists across the political spectrum: wage stagnation is a serious national problem. The Commission, therefore, should not allow the merger of these two companies absent the jobs protections we discuss below. Without such protections, the merger would only serve to further depress labor standards in this industry.

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https://www.bna.com/485m-settlement-sprint-n57982067900/; *Sprint settles overtime pay suits for $8.8M*, KANSAS CITY BUSINESS JOURNAL (Jan. 15, 2009), https://www.bizjournals.com/kansascity/stories/2009/01/12/daily40.html.

[249] *See* Erin Marie Daly, *Sprint Call Center Workers Win Back Wages*, LAW360 (May 21, 2009), https://www.law360.com/texas/articles/102852/sprint-call-center-workers-win-back-wages.

g. The Commission should not approve the proposed transaction without strong, verifiable commitments from the applicants to preserve U.S. employment and respect workers' rights

The Commission should not approve the proposed transaction without clear and enforceable commitments by the Applicants to protect jobs in the U.S. The Commission should require that the Applicants ensure that the transaction does not cause a reduction in U.S. employment and that no employee of T-Mobile or Sprint loses a job as a result of this transaction. Furthermore, the Applicants should commit to return all overseas customer call center jobs to the U.S. Finally, the Applicants should commit to complete neutrality in allowing their employees to form a union of their own choosing, free from any interference by the employer.

VI. THE COMMISSION MUST ENSURE THAT THE PROPOSED MERGER DOES NOT CONSTITUTE A THREAT TO NATIONAL SECURITY

The Committee on Foreign Investment in the United States (CFIUS) is reviewing the proposed merger for national security concerns. As in past transaction reviews, the Commission should not take any action in this proceeding until completion of the CFIUS review, determination that the merging parties are not currently and have not been in violation of past CFIUS National Security Agreements, and the incorporation of any CFIUS-imposed conditions into the Commission's final decision.

In 2012, the House Permanent Select Committee on Intelligence issued a bipartisan study assessing the security threat posed by Chinese-owned telecommunications companies operating in or providing equipment to U.S. customers, with a particular focus on Huawei Telecommunications Company ("Huawei") and ZTE Corporation ("ZTE"). The report

recommended that the U.S. government and its contractors exclude Huawei and ZTE equipment in their networks, and strongly encouraged private companies from using these two vendors in their networks.[250]

More recently, in December 2017, a group of 18 Senators and Representatives reiterated concerns about the national security risks posed by Chinese government ownership of Huawei and ZTE.[251] The FY 2018 National Defense Authorization Act barred the Department of Defense from using telecommunications equipment or services from Huawei or ZTE in several critical programs.[252] The Commission recently opened a proceeding to investigate whether to prohibit companies from using Universal Service Fund monies to purchase equipment or services from companies that pose national security risks, noting that Commission action plays an important role in the protection of U.S. communications networks, particularly as "the supply chain for our nation's communications networks increasingly reaches far beyond U.S. borders."[253]

The proposed transaction involves two companies that have a history of vendor relationships with Huawei and ZTE. Both Sprint and its majority owner SoftBank have used Huawei equipment in their networks. Sprint and Boost Mobile continue to sell ZTE devices and its Sprint executives have publicly praised them.[254] In 2012, Sprint's then-majority-owned

[250] Permanent Select Committee on Intelligence, U.S. House of Representatives Investigative Report on the U.S. National Security Issues Posed by Chinese Telecommunications Companies Huawei and ZTE (Oct. 8, 2012).

[251] Letter from Senator Tom Cotton et al. to Hon. Ajit Pai, Chairman, FCC (Dec. 20, 2017).

[252] Pub. L. 115-91, 131 Stat. 1283, 1762, Sec. 1656.

[253] Protecting Against National Security Threats to the Communications Supply Chain Through FCC Programs, Notice of Proposed Rulemaking, WC Docket No. 18-89 (rel. April 18, 2018) at 1 [hereinafter National Security Risks NPRM].

[254] Sprint sells a ZTE-manufactured device called the Sprint Phone Connect 4, which converts Sprint's cellular service into a landline connection. Ryne Hager, *Sprint just got three new ZTE devices: the MAX XL, Warp Connect,*

subsidiary Clearwire contracted with Huawei for network equipment.[255] That same year, the CFIUS review of the Japanese-owned SoftBank purchase of Sprint and 100 percent of Clearwire resulted in a National Security Agreement requiring Sprint and Clearwire to remove Huawei equipment from their networks.[256] However, three years later, Sprint admitted that it still had Huawei equipment on the Clearwire network.[257]

The Commission should also consider the history of collaboration between Sprint's Japanese owner, SoftBank, and Huawei and ZTE. Since 2015, SoftBank has partnered with the two companies to develop and deploy 5G wireless technologies in Japan.[258] Therefore, it is imperative that the Commission weigh the Applicants' claims that the proposed transaction will accelerate U.S. 5G efforts ahead of China against Softbank and Sprint's ties to Chinese telecommunications firms.

The Commission should not move forward in its review of the instant transaction until after CFIUS has ensured that Sprint fully complied with the 2013 Softbank/Sprint/Clearwire

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and Sprint Phone Connect 4, Android Police (June 10, 2017), https://www.androidpolice.com/2017/06/10/sprint-just-got-three-new-zte-devices-zte-max-xl-zte-warp-connect-sprint-phone-connect-4/. Boost Mobile sells four ZTE phone models (https://www.boostmobile.com/phones/zte-max-xl.html) as well as the ZTE Warp Connect, a wireless hotspot device (https://www.boostmobile.com/hotspots/zte-warp-connect.html?intnav=TopNav:Phones:WiFiHotspots). Moreover, on ZTE's YouTube channel, there is a 2017 video of Sprint's former COO, Günther Ottendorfer, praising the ZTE MAX XL phone (https://www.youtube.com/watch?v=vDcjGNwjYLU).

[255] *See Clearwire to use Huawei equipment in network upgrade*, REUTERS (Oct. 26, 2012), https://www.reuters.com/article/us-clearwire-huawei/clearwire-to-use-huawei-equipment-in-network-upgrade-idUSBRE89P15420121026.

[256] *See* Applications of SoftBank Corp., Starburst II, Inc. Sprint Nextel Corporation and Clearwire Corporation for Consent to Transfer Control of Licenses and Authorizations, Memorandum Opinion and Order, IB Docket No. 12-343 (rel July 5, 2013) at 125-131; *see also* Sprint-Nextel SEC Form 8-K (May 29, 2013); Michael J. de la Merced, *Sprint and SoftBank Pledge to Forego Huawei Equipment, Lawmaker Says*, NEW YORK TIMES (March 28, 2013), https://dealbook.nytimes.com/2013/03/28/sprint-and-softbank-pledge-to-forgo-huawei-equipment-lawmaker-says/.

[257] *See* Dan Jones, *Surprise! Sprint Still Has Huawei in Its Network*, LIGHT READING (Jan. 25, 2016), https://www.lightreading.com/mobile/4g-lte/surprise!-sprint-still-has-huawei-in-its-network/d/d-id/720373).

[258] *See* Guy Daniels, *SoftBank prepares for 5G and signs deals with Chinese vendor ZTE and Huawei*, TELECOMTV (July 25, 2015), https://www.telecomtv.com/content/5g/softbank-prepares-for-5g-and-signs-deals-with-chinese-vendors-zte-and-huawei-12643/.

merger NSA agreement, that the Applicants make binding commitments to terminate any existing relationships with vendors that pose potential security threats, and remove all equipment from these vendors from their operations. Furthermore, the Commission should require the Applicants to participate in regular national security audits to ensure compliance with Commission standards in addition to any national security agreement required by CFIUS. Such measures are particularly warranted in light of the Applicants' questionable record of complying with previous national security agreements.

VII. CONCLUSION

The Commission should not approve the proposed merger between T-Mobile and Sprint as currently structured because it would result in substantial public interest harm and offers no countervailing verifiable, merger-related public interest benefits. Moreover, the Commission should:

- require that the Applicants provide additional information and analysis about the impact the merger would have both downstream on consumers as well as upstream in the labor markets, including the effect that reducing the number of wireless employers will have on wages in geographic markets where their operations currently overlap;
- require the Applicants to submit their "internal analysis" of projected employment growth as part of the record in this proceeding so that the Commission and the public can properly evaluate the job impacts of this transaction;
- not approve the proposed transaction without clear and enforceable commitments by the Applicants to protect jobs in the U.S.;
- require the Applicants to (i) ensure that the transaction does not cause a reduction in U.S. employment and that no employee of T-Mobile or Sprint loses a job as a result of this transaction; (ii) commit to return all overseas customer call center jobs to the U.S.; and (iii) commit to complete neutrality in allowing their employees to form a union of their own choosing, free from any interference by the employer;

- not move forward in its review of the instant transaction until after CFIUS has ensured that Sprint fully complied with the 2013 Softbank/Sprint/Clearwire merger NSA agreement, that the Applicants make binding commitments to terminate any existing relationships with vendors that pose potential security threats, and remove all equipment from these vendors from their operations;
- require the Applicants to participate in regular national security audits to ensure compliance with Commission standards in addition to any national security agreement required by CFIUS. Such measures are particularly warranted in light of the Applicants' questionable record of complying with previous national security agreements.

Respectfully submitted,

/s/ Allen P. Grunes
Allen P. Grunes
Maurice E. Stucke
THE KONKURRENZ GROUP
5335 Wisconsin Ave., NW
Suite 440
Washington, D.C. 20015
Tel. (202) 644-9760
Fax (202) 888-7522
allengrunes@konkurrenzgroup.com

Counsel for COMMUNICATIONS WORKERS OF AMERICA

August 27, 2018

APPENDIX A:
DECLARATION OF ANDREW AFFLERBACH, PH.D., P.E.
Chief Executive Officer and Chief Technology Officer,
CTC Technology & Energy

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C.

WT Docket 18-197	)
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DECLARATION OF ANDREW AFFLERBACH, PH.D., P.E.

1. I have been the Chief Executive Officer and Chief Technology Officer of Columbia Telecommunications Corporation (d/b/a CTC Technology & Energy), a communications engineering consultancy, since 2000, and was Senior Scientist at CTC from 1996 until 2000. I specialize in the planning, design, and implementation of communications infrastructure and networks. My expertise includes fiber and wireless technologies and state-of-the-art networking applications. I have closely observed the development of wireless technology since the advent of the commercial internet in the 1990s.
2. As CTO, I am responsible for all engineering work and technical analysis performed by CTC. I have planned and overseen the implementation of a wide variety of wired and wireless government and public safety networks. I have advised cities, counties, and states about emerging technologies, including successive generations of wireless networks across a range of licensed and unlicensed spectrum bands. I have developed broadband technology strategy for cities including San Francisco, Seattle, Atlanta, Washington, D.C., and New York; for states including Connecticut, Delaware, Kansas,

Kentucky, and New Mexico; and for the government of New Zealand's national broadband project.

3. I have designed wireless networks for large cities, counties, and regions. I lead the CTC team advising the State of Texas Department of Transportation and many local governments on wireless facilities standards and processes. I also lead the CTC technical teams conducting FirstNet planning for the District of Columbia and the State of Delaware.
4. I have prepared extensive technical analyses for submission to the U.S. Federal Communications Commission and U.S. policymakers on broadband expansion to underserved schools, libraries, and other anchor facilities; on due diligence for the IP transition of the U.S. telecommunications infrastructure; and on the relative strengths and weaknesses of various wired and wireless technologies.
5. Under my direction, the technical team at CTC has advised hundreds of public and non-profit clients, primarily in the United States. My technical staff has been engaged on projects encompassing the evaluation or planning of hundreds of miles of fiber optics and hundreds of wireless nodes in rural, suburban, and urban areas across the country. My experience with rural broadband engineering encompasses the full range of geographic typologies in the United States, from the desert and mountains of the West to the plains in the Midwest to the mountain and coastal areas of the East.
6. I am a licensed Professional Engineer in the Commonwealth of Virginia and the states of Delaware, Maryland, and Illinois. I received a Ph.D. in Astronomy in 1996 from the

University of Wisconsin–Madison and an undergraduate degree in Physics from Swarthmore College in 1991. My full CV is included in Attachment A.

New T-Mobile would only marginally improve rural broadband relative to stand-alone T-Mobile and Sprint

7. Based on my review of the redacted public version of T-Mobile and Sprint's Public Interest Statement (hereinafter, "Statement"), one of the justifications T-Mobile and Sprint ("Applicants") emphasize for their merger is the enhanced broadband service that "New T-Mobile" would be able to provide to underserved rural areas. However, based on my review of the information presented in the Applicants' Statement, the merged New T-Mobile would only provide marginally better broadband options than stand-alone T-Mobile in much of rural America.

8. The deployment plan does not appear to harm or reduce the capacity or coverage for rural Americans and may provide benefits for some. However, for the great majority of rural Americans, the level of coverage and capacity would be similar for the merged New T-Mobile network and the stand-alone T-Mobile network.

9. By the Applicants' own admission in Table 9 of the Statement, as discussed in more detail in Paragraph 12 below, most of New T-Mobile's rural customers would be forced to settle for a service that has significantly lower performance than the urban and suburban parts of the network. This is because (a) Sprint's network is mostly concentrated in urban and suburban areas and therefore the New T-Mobile network would gain relatively few new sites in rural areas from Sprint to add to stand-alone T-Mobile's network; (b) Sprint's "mid-band spectrum" (i.e., 2.5 GHz and PCS) that would

become available for use at T-Mobile sites will not be activated in many rural areas in the next six years; and (c) for technical reasons described in more detail below, that mid-band spectrum is only marginally useful in rural areas. Therefore, the merger does not by itself provide a meaningful solution to the lack of adequate broadband options in most rural parts of the country.

New T-Mobile's mid-band spectrum coverage would be insufficient to support rural broadband

10. In his public statement, T-Mobile CTO Neville Ray touts many potential benefits of 5G (described in more detail below), but the full degree of these benefits will largely be limited to customers in urban and suburban areas with adequate mid-band and millimeter-wave (mmWave) spectrum coverage. The wide mid-band and mmWave spectrum bands have more capacity than low-band and therefore are the key underlying factor in potentially providing speeds of hundreds of Mbps (mid-band) or Gbps (mid-band plus mmWave). However, they also have more limited propagation characteristics than the lower bands and, as indicated by Table 9 in the Statement and discussed in more detail in Paragraph 12 below, will not be activated in most of New T-Mobile's rural markets in the coming years. Without the added capacity of the mid-band spectrum, New T-Mobile would be unable to support bandwidth-intensive applications on its networks in most rural parts of the country. In areas with both low- and mid-band coverage, New T-Mobile's network (assuming adequate engineering, construction, and operations) would potentially support bandwidth-intensive applications such as telehealth services, autonomous vehicles, high-definition video streams, virtual reality, and online gaming—

but rural subscribers would have limited or no access to these services without mid-band coverage.

11. Mr. Ray explains that low-band spectrum (below 1 GHz) can support cell site operating radii of up to 18 miles, while mid-band spectrum (from 1 GHz to 6 GHz) can support cell site operating radii of up to approximately 4 miles around cell sites.[1] T-Mobile has aggressively extended its coverage in rural areas using its 600 MHz and 700 MHz spectrum in the past few years. Sprint also has licenses for 14 MHz of 800 MHz spectrum in most of the United States, but Sprint's narrow holdings in the 800 MHz spectrum band will only contribute a small amount of additional spectrum, relative to the hundreds of MHz in the mid-band spectrum (see table below). Moreover, Sprint service is limited in rural areas away from major roadways, where it relies mostly on service from its roaming partners;[2] adding its relatively few rural towers will not add much to the coverage already provided by T-Mobile in the rural areas. Therefore, even if New T-Mobile were to add Sprint's mid-band spectrum assets to all its rural towers, only a fraction of the total covered area would be within range of the mid-band signal and able to provide hundreds of Mbps to customers of the merged network. The T-Mobile and Sprint spectrum holdings are summarized in the following table.[3]

[1] Declaration of Neville R. Ray, Executive Vice President and Chief Technology Officer, T-Mobile, US, Inc., Appendix B, at ¶36.

[2] Sprint roaming coverage, https://coverage.sprint.com/roamingmap.jsp (accessed August 23, 2018).

[3] *See T-Mobile US, Inc. and Sprint Corporation Seek FCC Consent to the Transfer of Control of Licenses, Authorizations, and Spectrum Leases held by Sprint Corporation and Its Subsidiaries to T-Mobile US, Inc.*, WT Docket No. 18-197, Description of Transaction, Public Interest Statement, and Related Demonstrations, at Appendix L, Spectrum Holdings and Aggregation Data (filed June 18, 2018).

T-Mobile and Sprint Spectrum Holdings

Carrier	Band	Amount	Rural Propagation
T-Mobile	600 MHz	20–50 MHz	Good
T-Mobile	700 MHz	0–36 MHz	Good
T-Mobile	AWS-1	10-50 MHz	Limited
T-Mobile	AWS-3	0–30 MHz	Limited
T-Mobile	PCS	0–50 MHz	Limited
T-Mobile	28 GHz	0–850 MHz	Very limited
T-Mobile	39 GHz	0–200 MHz	Very limited
Sprint	800 MHz	4.9–14 MHz	Good
Sprint	PCS	20–60 MHz	Limited
Sprint	2.5 GHz	0–156.5 MHz	Limited

12. In fact, the Statement acknowledges that much of rural America would be left without mid-band coverage after the proposed merger. Even under the best-case scenario presented in the Statement, T-Mobile projects that if the merger were approved, 84.6 million Americans (26 percent of the 325.5 million total population assumed by the Statement)[4] would still lack New T-Mobile mid-band coverage in 2021, and by 2024, 45.9 million Americans (14 percent of the 328.1 million total population assumed by the Statement) would continue to lack access to these high-capacity mid-bands.[5] These numbers are calculated based on the data provided by T-Mobile in Table 9 of its Statement (reproduced below), subtracting the projected New T-Mobile mid-band covered population for those years from the total population (as calculated based on the table's estimate of the corresponding percentage of uncovered Americans).

[4] The U.S. population was derived from the Statement's numbers by taking the Covered Pops in Table 9 and dividing by the percent served for 2021 and 2024. For example, dividing the Covered Pops in 2021 mid-band (240.9 million) by one minus the 26 percent unserved number provides a total population for 2021 of 325.5 million. Dividing the Covered Pops in 2024 mid-band (282.2 million) by one minus the 14 percent unserved number provides a total population for 2024 of 328.1 million.

[5] Description of Transaction, Public Interest Statement, and Related Demonstrations at p. 47.

Table 9 from T-Mobile's Statement

		T-Mobile	Sprint	New T-Mobile
	Network Coverage Footprint	Covered Pops (Millions)	Covered Pops (Millions)	Covered Pops (Millions)
Year 2021	Mid-band (PCS & 2.5GHz)	74.6 (77% uncovered)	174.7 (47% uncovered)	240.9 (20% uncovered)
	Low-band (600)	317.9 (2.9% uncovered)	0 (100% uncovered)	319.6 (2.4% uncovered)
Year 2024	Mid-band (PCS & 2.5GHz)	173.2 (47% uncovered)	194.0 (41% uncovered)	282.2 (14% uncovered)
	Low-band (600)	323.0 (1.4% uncovered)	0 (100% uncovered)	324.1 (1.0% uncovered)

13. Additionally, Figure 10 of the Statement shows New T-Mobile's predicted low-band and mid-band coverage. The dark red areas depicting the mid-band coverage indicates that the Americans unserved by the mid-band are outside metropolitan areas. Because Figure 10 is a low-resolution map of the entire U.S., it does not precisely resolve the mid-band service areas, which are a few miles across; a higher-resolution map would likely indicate many additional uncovered areas within the dark area. Therefore, assuming that the country's rural population is the least served by mid-band, and using the numbers above, New T-Mobile will likely provide mid-band coverage to few or no rural Americans by 2021, and, under best-case projections, only 26 percent of rural Americans by 2024.

T-Mobile and Sprint's claims of enhanced rural broadband for New T-Mobile are not supported by their stated reliance on the same low-band coverage as the unmerged company

14. The Statement refers to enhanced coverage in rural areas driven by increased cell site density but does not quantify the increased number of cell sites for New T-Mobile in

rural areas compared to stand-alone T-Mobile and stand-alone Sprint. Further quantitative information about the number and locations of additional towers, ideally in high-resolution maps or shapefiles, is necessary to evaluate the magnitude of New T-Mobile's proposed rural buildout.

15. Judging by the relatively small change in the low-band-covered population with and without the merger (Table 9 in the Statement), New T-Mobile may not be contemplating a large buildout in rural areas of the country. Table 9 provides T-Mobile's estimate of the covered population for the merged companies and for T-Mobile and Sprint separately, in 2021 and 2024, for mid-band and low-band.

16. According to Table 9, the low-band coverage (reflecting the total urban, suburban, and rural coverage) will be relatively constant regardless of whether the merger happens. Without the merger, Table 9 indicates that T-Mobile's low-band network will cover 317.9 million users by 2021 and 323 million by 2024, compared with New T-Mobile's 319.6 million users covered by 2021 and 324.1 million by 2024.[6] Thus, the New T-Mobile's low-band network would only serve an additional 1.7 million users by 2021 and an additional 1.1 million users by 2024 compared to stand-alone T-Mobile. Since most of the new spectrum that Sprint would bring to New T-Mobile is in the mid-band, the 45.9 million (2024) to 84.6 million (2021) customers discussed above that can only access New T-Mobile's low-band network would not receive large amounts of new spectrum and would receive speeds similar to what they would receive from stand-alone T-Mobile.

[6] Description of Transaction, Public Interest Statement, and Related Demonstrations at p. 47.

17. Since the actual speeds that users of mobile 4G and 5G networks experience are largely dependent on the signal strength they receive, it is also important to note that the user experience will deteriorate for users who are farther from the antenna site, who are indoors, or who are obstructed by terrain or foliage. It is not clear from the Statement whether and how this variation has been taken into account in the capacity and coverage estimates. As mentioned in Paragraph 13 above, the Statement's Figure 10 is a high-level approximation and implies a consistent level of mid-band coverage over large areas. For these reasons, higher-resolution maps and model assumptions are required to enable a full understanding of the potential capacity and coverage in rural areas.

18. Even according to the projections offered in the Statement, of the 59.4 million rural Americans that New T-Mobile expects to serve with outdoor mobile coverage by 2024, 13.5 million will still receive speeds below 10 Mbps.[7] To put these speeds in perspective, the Statement claims that New T-Mobile will provide average data rates above 500 Mbps to 208.7 million Americans, mostly in urban and suburban areas, by 2024.[8]

T-Mobile states that the merger will improve the path to 5G, but 5G is still in conceptual phases

19. Given the strong emphasis that the Statement places on accelerating the transition to 5G technology as a justification for the merger, it is important to note the considerable uncertainty around emerging 5G standards, equipment, pricing, capabilities, and deployment patterns. As a starting point, the Statement is centered around projections for

[7] Declaration of Neville R. Ray, Executive Vice President and Chief Technology Officer, T-Mobile, US, Inc., Appendix B, at ¶ 36.

[8] Declaration of Neville R. Ray, Executive Vice President and Chief Technology Officer, T-Mobile, US, Inc., Appendix B, at ¶ 20.

2021 and 2024. Three to six years is a significant amount of time in technological evolution. For example, six years ago, mobile broadband was in the early days of 4G LTE and much of the current mobile application environment and industry development could not have been easily foreseen.

20. The standards for both mobile and fixed 5G are still in development, which means that equipment is not yet being built to standards and is thus neither interoperable nor at scale. This is true not only for networking equipment but also for 5G-capable devices such as smartphones, laptops, tablets, and other consumer electronics. None of these equipment categories is yet being mass-manufactured, let alone adopted by consumers; the timeline, deployment, and uptake patterns are still uncertain.

21. 5G mobile standards are being developed by participants in the 3GPP standards development process.[9] 3GPP approaches standardization in stages, and in December 2017 announced completion of phases 1 and 2 of the mobile 5G standard.[10] These stages include a system architecture, the services to be provided in 5G, and coexistence with and evolution from 4G. Work in progress includes specifications for the radio access network (RAN), including the switching and service node descriptions to implement the 5G

[9] The cellular communications standards process is overseen by the International Telecommunication Union (ITU) and by 3GPP, the organization of global standards bodies that were responsible for developing earlier GSM and LTE standards.

[10] Frank Mademann, "System architecture milestone of 5G Phase 1 is achieved," 3GPP, News Release, Dec. 21, 2017, http://www.3gpp.org/news-events/3gpp-news/1930-sys_architecture (accessed August 22, 2018).

services.[11] In other words, the standards are in a conceptual stage, with significant detailed work yet to be completed.

22. Given that 5G equipment has not yet been built or tested in its final form, and is still years away from mass production, the exact performance characteristics of operational 5G equipment are not known. Therefore, the increases in capacity and the deployment schedules presented by T-Mobile based on 5G equipment are necessarily estimates. The cost and complexity of upgrading a network to 5G, both of which are critical inputs into a buildout schedule, also are not yet well known. In my experience, there still exist many questions within the network engineering community about the form in which mobile 5G deployment will emerge, and whether it will emerge within five years, 10 years, or at all.

23. Indeed, the Statement notes that Verizon and AT&T are pursuing a different approach than New T-Mobile with respect to 5G, with an initial focus on urban mmWave and fixed deployments rather than mobile. The different approach by the two industry leaders, described as "tepid" by Dr. David Evans in the Statement, may also indicate a broader industry-wide reluctance toward 5G and a more cautious walk to the technology (including by investors). Indeed, there is precedent for widely heralded wireless technologies never reaching maturity; WiMAX, for example, was anticipated as a wireless response to fixed broadband nationwide but only played a niche role.

[11] "Method for the Characterization of Telecommunications Services Supported by an ISDN and Network Capabilities of an ISDN," ITU-T I.130, International Telecommunications Union, https://www.itu.int/rec/T-REC-I.130/en (accessed August 22, 2018).

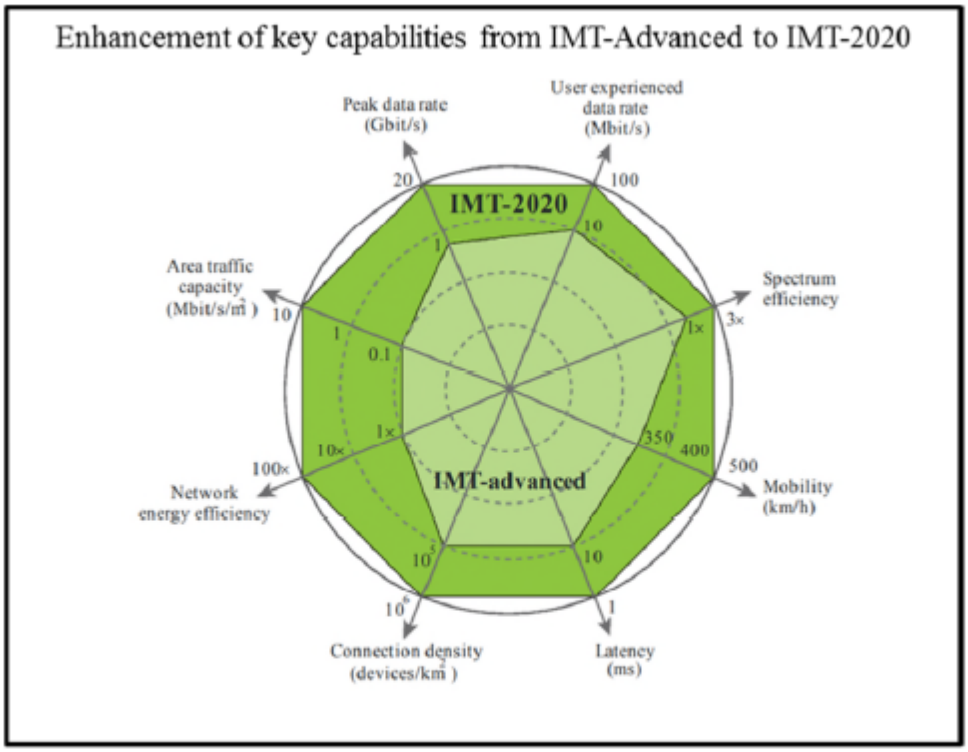
T-Mobile's claims for 5G depend on spectrum that will not be useful in rural areas

24. Despite T-Mobile's advocacy for a 5G that goes beyond mmWave spectrum, the Statement's sweeping technical claims about the capabilities of 5G only apply when the technology is used with mmWave spectrum—spectrum that has not been widely used, is limited to short distances (and therefore not useful in rural areas), and would only be available to New T-Mobile in relatively small quantities in most of the United States.

25. For example, Mr. Ray, in his statement, implies by inclusion of Figure 2 (reproduced below), a diagram created by the International Telecommunications Union, depicting eight key performance parameters for 5G as part of the standards development process, that New T-Mobile "expect[s] from 5G": 20 Gbps per site, 1 ms latency, and triple the spectrum efficiency of LTE. However, as noted in the source document,[12] attaining this level of performance requires (a) use of mmWave bands at short range distance with good line of sight and (b) a large amount of spectrum within the mmWave band.

[12] Mr. Ray's Figure 2 is excerpted from p. 14 of ITU's "Recommendation ITU-R M.2083-0 (09/2015), IMT Vision – Framework and overall objectives of the future development of IMT for 2020 and beyond, M Series, Mobile, radiodetermination, amateur and related satellite services," http://www.itu.int/rec/R-REC-M.2083-0-201509-I (accessed August 22, 2018). This "Recommendation" indicates that the sought-after performance in this Figure requires spectrum above the low-band and mid-band: "In particular, bandwidths to support the different usage scenarios in § 4 (e.g. enhanced mobile broadband, ultra-reliable and low-latency communications, and massive machine type communications) would vary. For those scenarios requiring several hundred MHz up to at least 1 GHz, there would be a need to consider wideband contiguous spectrum above 6 GHz" (p. 9). Additionally, the "Recommendation" indicates a need for "network densification" [i.e., placement of antennas close to the user] to attain the specified level of performance (p. 8). Neither mmWave spectrum nor densification is feasible in most rural areas, therefore Mr. Ray's Figure 2 is not relevant in most rural areas, nor is it relevant in any other area where a dense mmWave network is not available.

Figure 2 from T-Mobile's Statement



Source: ITU Recommendation ITU-R M.2083-0

Figure 2: 5G Network Improvements

26. In fact, New T-Mobile will have a relatively small amount of mmWave spectrum. As of early this year, T-Mobile had 200 MHz in most markets in which it has publicly shared plans for 5G buildout (except in most of Ohio, where it owns 1150 MHz). Though the majority of these bands have not yet been auctioned, Verizon already owns 23 percent, AT&T owns 7 percent, and T-Mobile owns just 2 percent. Because of the limitations of mmWave technology (discussed in more detail below), its usefulness is limited to dense urban and suburban areas.

27. The mmWave bands—for example, the 28 GHz band where a portion is held by T-Mobile—provide broad spectrum channels. Furthermore, because mmWave

communications are physically more like light beams than a shared wave, mmWave networks can theoretically set up individual paths to each device, reusing the same spectrum for many users simultaneously. This is what makes it possible for an antenna site to have enormous aggregate capacity, and for individual users to have very-high-speed connections.

28. However, mmWave requires proximity and/or line of sight to function well. If there are obstructions in the line of sight, the mmWave signal scatters and bounces. If the user and the device are close together, they may still be able to connect using scattered signals. Using the 28 GHz band, for example, if the device is more than one-third to one-half of a mile away, without a line of sight, the performance of mmWave will begin to deteriorate,[13] and high-speed connections must be made with the mid-band and low-band spectrum (i.e., 3.5 GHz and below).

29. With New T-Mobile's 2.5 GHz spectrum, as provided in Table 2 of the Statement, the increase in spectrum efficiency that will potentially be created through use of future 5G radios, taking into account advances in MIMO and new radio technology, will be only 52 percent relative to LTE. For 600 MHz—the band that will carry most of the New T-Mobile's rural broadband—there will be an increase of only 19 percent.

[13] "The Power of Millimeter Wave," Video, Verizon, May 23, 2018, https://www.youtube.com/watch?v=jnyG2bliKCs (accessed August 22, 2018), illustrating an upper limit of one-third to one-half mile for gigabit performance based on field trials.

30. As a result, my engineering judgment is that Mr. Ray's sweeping, optimistic claims of increased benefit from 5G (p. 6-7) are based on limited, best-case scenarios for very limited parts of the T-Mobile footprint (if any) and are not relevant to rural communities.

31. Because the filing makes broad-brush overstatements of network performance when many rural areas clearly will not receive this performance, it is also necessary to closely examine and question the availability of new applications and services in rural areas. It is not clear from the Statement whether the rural users who (a) will obtain service only on low-band and (b) live in a wide range of signal quality conditions will have access to the 4K video and online gaming applications Mr. Ray describes on p. 7, not to mention access to "unlimited" data packages without throttling of bandwidth.

32. Similarly, it is doubtful that the "virtual and augmented reality, connected vehicles and highways, real-time translation, and drone control/monitoring services" Mr. Ray describes on p. 8 will be available in rural areas if T-Mobile is not able to deliver very-low-latency services in those areas.

33. In terms of latency, the design specification for 5G calls for less than 10 ms in general, and less than 1 ms for ultra-reliable, critical machine-to-machine communications.[14] However, latency of this level may not be attainable in the version of 5G that is deployable in rural areas without mmWave. The reduction in latency in 5G is enabled in part by rapid assignment of resource blocks (i.e., the combinations of spectrum and time blocks that constitute the LTE signal) to intersperse highly time-critical blocks within

[14] Andreas Maeder et. al, "A Scalable and Flexible Radio Access Network Architecture for Fifth Generation Mobile Networks," IEEE Communications Magazine, Volume: 54, Issue: 11, November 15, 2016, p. 17, http://ieeexplore.ieee.org/document/7744804/?reload=true (accessed August 22, 2018).

other communications streams. Other key technical requirements for reducing latency are optimization of backhaul and caching of content close to the access point.[15] Therefore, a rural deployment, with long backhaul distances, limited or no use of mmWave spectrum, and less likelihood of data being cached close to the user, will likely have significantly higher latency than an urban or suburban 5G network, with the actual latency potentially similar to that of current 4G networks.

34. So far, the design latency has not been attained consistently in 5G tests. For example, AT&T has only reported latencies around 10 ms in its testing.[16]

Conclusion

35. Although I do not see a situation where New T-Mobile will result in worse technical performance than T-Mobile without the merger, most rural broadband users will experience similar availability of capacity and coverage from New T-Mobile as they would from old T-Mobile, regardless of whether the merger happens. Even under the best-case scenarios presented by the Statement, New T-Mobile's rural offerings will still

[15] I. Parvez, A. Rahmati, I. Guvenc, A.I. Sarwat, H. Dai, "A Survey on Low Latency Towards 5G: RAN, Core Network and Caching Solutions," accepted in *IEEE Communications Surveys and Tutorials*, arXiv:1708.02562v2 [cs.NI], May 29, 2018, https://arxiv.org/pdf/1708.02562.pdf (accessed August 22, 2018).

[16] Dave Burstein, "AT&T Shocker: 5G mmWave Latency 9-12 Milliseconds, Not 1-5 Ms.," *Wireless One*, April 10, 2018, http://wirelessone.news/10-r/1020-at-t-shocker-5g-mmwave-latency-9-12-milliseconds-not-1-5-ms (accessed August 22, 2018).

fall dramatically short of those in urban and suburban markets and will not be dramatically improved relative to stand-alone T-Mobile and Sprint.

DATED: Kensington, Maryland
August 23, 2018

Andrew Afflerbach, Ph.D., P.E.

ATTACHMENT A: CV

Andrew Afflerbach, Ph.D., P.E.
CEO and Chief Technical Officer | CTC Technology & Energy

Dr. Andrew Afflerbach specializes in planning, designing, and estimating the capital and operating costs of broadband communications networks. His expertise includes state-of-the-art fiber and wireless technologies, as well as the unique requirements of public safety networks.

Andrew has designed robust and resilient networks for dozens of clients, including state and local governments and public safety users. He has delivered strategic technical guidance on wired and wireless communications issues to hundreds of clients nationwide over more than 20 years. He also served as a senior adviser to Crown Fibre Holdings, the public entity directing New Zealand's national fiber-to-the-home project.

In addition to designing networks, Andrew testifies as an expert witness on wireless communications issues. And he contributes to the national discussion on critical communications policy issues through the preparation of technical analyses for submission to the Federal Communications Commission (FCC) and policymakers. He has prepared white papers on:

- Estimating the cost to expand fiber to underserved schools and libraries nationwide
- Conducting due diligence for the IP transition of the country's telecommunications infrastructure
- Developing technical frameworks for wireless network neutrality
- Streamlining deployment of small cell infrastructure by improving wireless facilities siting policies
- Limiting interference from LTE-U networks in unlicensed spectrum.

As CTC's Chief Technical Officer, Andrew oversees all technical analysis and engineering work performed by the firm. He is a licensed Professional Engineer in multiple states.

Fiber Network Planning and Engineering

Andrew has architected and designed middle- and last-mile fiber broadband networks for the District of Columbia (Washington, D.C.); the city of San Francisco; the Delaware Department of Transportation; the Maryland Transportation Authority; and many large counties.

He oversaw the development of system-level broadband designs and construction cost estimates for the cities of Atlanta, Boston, Boulder, Palo Alto, Madison, and Seattle; the states of Connecticut and Kentucky; and many municipal electric providers and rural communities. He is overseeing the detailed design of the city-built fiber-to-the-premises (FTTP) networks in Westminster, Maryland; Alford, Massachusetts; and Holly Springs and Wake Forest, North Carolina.

In Boston, Andrew led the CTC team that developed a detailed RFP, evaluated responses, and

participated in negotiations to acquire an Indefeasible Right of Use (IRU) agreement with a fiber vendor to connect schools, libraries, public housing, and public safety throughout the City. This approach was designed to allow the City to oversee and control access and content among these facilities.

Wireless Network Planning and Engineering
Applying the current state of the art—and considering the attributes of anticipated future technological advancements such as "5G"— Andrew has developed candidate wireless network designs to meet the requirements of clients including the cities of Atlanta, San Francisco, and Seattle. In a major American city, Andrew led the team that evaluated wireless broadband solutions, including a wireless spectrum roadmap, to complement potential wired solutions.

In rural, mountainous Garrett County, Maryland, Andrew designed and oversaw the deployment of an innovative wireless broadband network that used TV white space spectrum to reach previously unserved residents. To enhance public internet connectivity, Andrew provides technical oversight on CTC's Wi-Fi-related projects, including the design and deployment of Wi-Fi networks in several parks in Montgomery County, Maryland.

Andrew also advises local and state government agencies on issues related to wireless attachments in the public rights-of-way; he leads the CTC team that supports the Texas Department of Transportation (TxDOT) and many large counties on wireless attachment policies and procedures.

Public Safety Networking
Andrew leads the CTC team providing strategic and tactical guidance on FirstNet (including agency adoption and other critical decision-making) for the State of Delaware and Onondaga County, New York. In the District of Columbia, he and his team evaluated the financial, technical, and operational impact of building the District's own public safety broadband network, including the design of an LTE system that provided public-safety-level coverage and capacity citywide. This due diligence allowed the District to make an informed decision regarding opting in or out of the National Public Safety Broadband Network.

Andrew currently is working with the State of Delaware to evaluate LTE coverage gaps throughout the state to assist agencies in their choice of public safety broadband networks. On the state's behalf, he and his team are also conducting outreach to AT&T and other carriers to evaluate their public safety offerings. He is performing similar work as part of CTC's engagement with El Paso County, Colorado.

Earlier, Andrew led the CTC team that identified communications gaps and evaluated potential technical solutions for the Baltimore Urban Area Security Initiative (UASI), a regional emergency preparedness planning effort funded by the U.S. Department of Homeland Security (DHS).

He previously served as lead engineer and technical architect for planning and development of NCRnet, a regional fiber optic and microwave network that links public safety and emergency support users throughout the 19 jurisdictions of the National Capital Region (Washington, D.C. and surrounding jurisdictions), under a DHS grant. He wrote the initial feasibility studies that led to this project for regional network interconnection.

Smart Grid

Andrew and the CTC team provided expert testimony and advisory services to the Public Service Commission of Maryland regarding Advanced Metering Infrastructure (AMI). CTC provided objective guidance to the staff as it evaluated AMI applications submitted by three of the state's investor-owned utilities (IOUs). This contract represented the first time the PSC staff had asked a consultant to advise them on technology—a reflection of the lack of standards in the Smart Grid arena.

Broadband Communications Policy Advisory Services

Andrew advises public sector clients and a range of policy think tanks, U.S. federal agencies, and non-profits regarding the engineering issues underlying key communications issues. For example, he:

- Provided expert testimony to the FCC in the matter of the preparation of the **national broadband plan** as a representative of the National Association of Counties (NACo) and the National Association of Telecommunications Officers & Advisors (NATOA).
- Served as expert advisor regarding broadband deployment to the U.S. Conference of Mayors, NACo, National League of Cities, Public Knowledge, New America Foundation Open Technology Institute, and NATOA in those organizations' filings before the FCC in the matter of determination of the deployment of a **national, interoperable wireless network in the 700 MHz spectrum**.
- In connection with the FCC's ongoing **Open Internet proceeding**, advised the New America Foundation regarding the technical pathways by which "any device" and "any application" regimes could be achieved in the wireless broadband arena as they have been in the wireline area.
- Provided expert technical advice on the **700 MHz broadband and AWS-3 proceedings** at the FCC for the Public Interest Spectrum Coalition (including Free Press, the New America Foundation, Consumers Union, and the Media Access Project).
- Served as technical advisor to the **U.S. Naval Exchange** in its evaluation of vendors' broadband communications services on U.S. Navy bases worldwide.
- Advised the **U.S. Internal Revenue Service** regarding the history of broadband and cable deployment and related technical issues in that agency's evaluation of appropriate regulations for those industries.
- Advised the Stanford Law School Center for Internet and Society on the technical issues for their briefs in the ***Brand X*** **Supreme Court appeal** regarding cable broadband.

Broadband Communications Instruction

Andrew has served as an instructor for the U.S. Federal Highway Association/National Highway Institute, the George Washington University Continuing Education Program, the University of Maryland Instructional TV Program, ITS America, Law Seminars International, and the COMNET Exposition. He developed curricula for the United States Department of Transportation.

He taught and helped develop an online graduate-level course for the University of Maryland. He developed and taught communications courses and curricula for ITS America, COMNET, and the University of Maryland. His analysis of cable open access is used in the curriculum of the International Training Program on Utility Regulation and Strategy at the University of Florida.

Andrew has also prepared client tutorials and presented papers on emerging telecommunications technologies to the National Fire Protection Association (NFPA), NATOA, the National League of Cities (NLC), the International City/County Management Association (ICMA), and the American Association of Community Colleges (AACC). He taught college-level astrophysics at the University of Wisconsin.

EMPLOYMENT HISTORY

1995–Present	CEO/Chief Technical Officer, CTC Previous positions: Director of Engineering, Principal Engineer, Senior Scientist
1990–1996	Astronomer/Instructor/Researcher University of Wisconsin–Madison, NASA, and Swarthmore College

EDUCATION

Ph.D., Astronomy, University of Wisconsin–Madison, 1996
Master of Science, Astronomy, University of Wisconsin–Madison, 1993
Bachelor of Arts, Physics, Swarthmore College, 1991

PROFESSIONAL CERTIFICATIONS/LICENSES

Professional Engineer, Commonwealth of Virginia and states of Delaware, Maryland, and Illinois

HONORS/ORGANIZATIONS

- Association of Public-Safety Communications Officials (APCO)
- Board of Visitors, University of Wisconsin Department of Astronomy
- National Association of Telecommunications Officers and Advisors (NATOA) Technology and Public Safety Committees
- Armed Forces Communications and Electronics Association (AFCEA)
- Society of Cable and Telecommunications Engineers (SCTE)
- Institute of Electrical and Electronic Engineers (IEEE)
- Charleston Defense Contractors Association (CDCA)

- NASA Graduate Fellow, 1993–1996. Research fellowship in astrophysics
- Elected Member, Sigma Xi Scientific Research Honor Society
- Eugene M. Lang Scholar, 1987–1991, Swarthmore College

SELECTED PUBLICATIONS, PRESENTATIONS, and COURSES

- "A Model for Understanding the Cost to Connect Anchor Institutions with Fiber Optics" (co-author), prepared for the Schools, Health & Libraries Broadband Coalition, Feb. 2018
- "How Localities Can Prepare for—and Capitalize on—the Coming Wave of Public Safety Network Construction," Feb. 2018
- "Network Resiliency and Security Playbook" (co-author), prepared for the National Institute of Hometown Security, Nov. 2017
- "Mobile Broadband Service Is Not an Adequate Substitute for Wirelines" (co-author; addressing the limitations of 5G), prepared for the Communications Workers of America, Oct. 2017
- "Technical Guide to Dig Once Policies," April 2017
- "Streamlining Deployment of Small Cell Infrastructure by Improving Wireless Facilities Siting Policies," prepared for the Smart Communities Siting Coalition, filed with the FCC, March 2017
- "How Localities Can Improve Wireless Service for the Public While Addressing Citizen Concerns," Nov. 2016
- "LTE-U Interference in Unlicensed Spectrum: The Impact on Local Communities and Recommended Solutions," prepared for WifiForward, Feb. 2016
- "Mobile Broadband Networks Can Manage Congestion While Abiding by Open Internet Principles," prepared for the New America Foundation's Open Technology Institute – Wireless Future Project, filed with the FCC, Nov. 2014
- "The State of the Art and Evolution of Cable Television and Broadband Technology," prepared for Public Knowledge, filed with the FCC, Nov. 2014
- "A Model for Understanding the Cost to Connect Schools and Libraries with Fiber Optics," prepared for the Schools, Health & Libraries Broadband Coalition, filed with the FCC, Oct. 2014
- "The Art of the Possible: An Overview of Public Broadband Options," prepared jointly with the New America Foundation's Open Technology Institute, May 2014
- "Understanding Broadband Performance Factors," with Tom Asp, *Broadband Communities* magazine, March/April 2014
- "Engineering Analysis of Technical Issues Raised in the FCC's Proceeding on Wireless Facilities Siting," filed with the FCC (http://apps.fcc.gov/ecfs/document/view?id=7521070994), Feb. 2014
- "A Brief Assessment of Engineering Issues Related to Trial Testing for IP Transition," prepared for Public Knowledge and sent to the FCC as part of its proceedings on Advancing Technology Transitions While Protecting Network Values, Jan. 2014
- "Gigabit Communities: Technical Strategies for Facilitating Public or Private Broadband Construction in Your Community," prepared as a guide for local government leaders and

planners (sponsored by Google), Jan. 2014

- "Critical Partners in Data Driven Science: Homeland Security and Public Safety," submitted to the *Workshop on Advanced Regional & State Networks (ARNs)*, Internet2 workshop, Washington, D.C., April 2013

APPENDIX B-1:
LOW- AND MID- BAND SPECTRUM AGGREGATION BY COUNTY
(Top 100 Counties)

APPENDIX B1. LOW- AND MID- BAND SPECTRUM AGGREGATION							
Applicants' Public Interest Statement Appendix L-1							
LOCATION (COUNTY, CITY, STATE)			**CALCULATIONS**			**POPULATION**	**POP RANK**
County	Selected Cities	State	NTM MHz	Maximum	Difference	County Population	Rank
Los Angeles	Los Angeles	CA	311.8	238.5	**73.30**	9,818,605	1
Cook	Chicago	IL	300.0	238.5	**61.50**	5,194,675	2
Harris	Houston	TX	312.5	238.5	**74.00**	4,092,459	3
Maricopa	Phoenix	AZ	322.5	238.5	**84.00**	3,817,117	4
San Diego	San Diego	CA	313.0	238.5	**74.50**	3,095,313	5
Orange	Santa Ana, Anaheim	CA	316.5	238.5	**78.00**	3,010,232	6
Kings	Brooklyn	NY	290.0	238.5	**51.50**	2,504,700	7
Miami-Dade	Miami	FL	337.0	238.5	**98.50**	2,496,435	8
Dallas	Dallas	TX	332.5	238.5	**94.00**	2,368,139	9
Queens	Queens	NY	290.0	238.5	**51.50**	2,230,722	10
Riverside	Riverside	CA	322.5	238.5	**84.00**	2,189,641	11
San Bernardino	San Bernardino	CA	322.5	238.5	**84.00**	2,035,210	12
Clark	Las Vegas	NV	310.5	238.5	**72.00**	1,951,269	13
King	Seattle	WA	332.5	238.5	**94.00**	1,931,249	14
Wayne	Detroit	MI	332.5	238.5	**94.00**	1,820,584	15
Tarrant	Fort Worth	TX	314.7	238.5	**76.20**	1,809,034	16
Santa Clara	San Jose	CA	322.5	238.5	**84.00**	1,781,642	17
Broward	Fort Lauderdale	FL	342.5	238.5	**104.00**	1,748,066	18
Bexar	San Antonio	TX	310.0	238.5	**71.50**	1,714,773	19
New York	Manhattan	NY	290.0	238.5	**51.50**	1,585,873	20
Philadelphia	Philadelphia	PA	322.5	238.5	**84.00**	1,526,006	21
Alameda	Berkeley, Oakland	CA	312.5	238.5	**74.00**	1,510,271	22
Middlesex	Cambridge, Newton	MA	303.0	238.5	**64.50**	1,503,085	23
Suffolk	Long Island	NY	312.5	238.5	**74.00**	1,493,350	24
Sacramento	Sacramento	CA	303.0	238.5	**64.50**	1,418,788	25
Bronx	Bronx	NY	290.0	238.5	**51.50**	1,385,108	26
Nassau	Hempstead, Garden City	NY	299.5	238.5	**61.00**	1,339,532	27
Palm Beach	Palm Beach, Boca Raton	FL	342.5	238.5	**104.00**	1,320,134	28
Cuyahoga	Cleveland	OH	327.8	238.5	**89.30**	1,280,122	29
Hillsborough	Tampa	FL	322.5	238.5	**84.00**	1,229,226	30
Allegheny	Pittsburgh	PA	302.5	238.5	**64.00**	1,223,348	31
Oakland	Pontiac, Farmington Hills	MI	332.5	238.5	**94.00**	1,202,362	32
Franklin	Columbus	OH	332.5	238.5	**94.00**	1,163,414	33
Hennepin	Minneapolis	MN	317.0	238.5	**78.50**	1,152,425	34
Orange	Orlando	FL	327.8	238.5	**89.30**	1,145,956	35
Fairfax	Alexandria, Arlington	VA	312.5	238.5	**74.00**	1,081,726	36
Contra Costa	Concord, Walnut Creek	CA	312.5	238.5	**74.00**	1,049,025	37
Salt Lake	Salt Lake City	UT	312.5	238.5	**74.00**	1,029,655	38
Travis	Austin	TX	332.5	238.5	**94.00**	1,024,266	39
St. Louis	St. Louis	MO	310.5	238.5	**72.00**	998,954	40
Pima	Tucson	AZ	332.5	238.5	**94.00**	980,263	41
Montgomery	Silver Spring, Rockville	MD	312.5	238.5	**74.00**	971,777	42
Honolulu	Honolulu	HI	330.0	238.5	**91.50**	953,207	43

APPENDIX B1. LOW- AND MID- BAND SPECTRUM AGGREGATION							
Applicants' Public Interest Statement Appendix L-1							
LOCATION (COUNTY, CITY, STATE)			**CALCULATIONS**			**POPULATION**	**POP RANK**
County	Selected Cities	State	NTM MHz	Maximum	Difference	County Population	Rank
Westchester	New Rochelle, White Plains	NY	272.2	238.5	**33.70**	949,113	44
Milwaukee	Milwaukee	WI	270.5	238.5	**32.00**	947,735	45
Fresno	Fresno	CA	302.5	238.5	**64.00**	930,450	46
Shelby	Memphis	TN	310.5	238.5	**72.00**	927,644	47
Fulton	Atlanta	GA	321.7	238.5	**83.20**	920,581	48
Mecklenburg	Charlotte	NC	295.8	238.5	**57.30**	919,628	49
Erie	Buffalo	NY	332.5	238.5	**94.00**	919,040	50
DuPage	Wheaton, Naperville	IL	300.0	238.5	**61.50**	916,924	51
Fairfield	Stamford, Bridgeport	CT	312.5	238.5	**74.00**	916,829	52
Pinellas	St. Petersburg	FL	322.5	238.5	**84.00**	916,542	53
Bergen	Paramus, Hackensack	NJ	290.0	238.5	**51.50**	905,116	54
Marion	Indianapolis	IN	305.0	238.5	**66.50**	903,393	55
Wake	Raleigh	NC	291.0	238.5	**52.50**	900,993	56
Hartford	Hartford	CT	303.4	238.5	**64.90**	894,014	57
Duval	Jacksonville	FL	332.5	238.5	**94.00**	864,263	58
Prince George's	College Park, Bowie	MD	312.5	238.5	**74.00**	863,420	59
New Haven	New Haven	CT	322.5	238.5	**84.00**	862,477	60
Macomb	Warren, Clinton Twp.	MI	332.5	238.5	**94.00**	840,978	61
Kern	Bakersfield	CA	332.5	238.5	**94.00**	839,631	62
Ventura	Oxnard, Thousand Oaks	CA	314.7	238.5	**76.20**	823,318	63
Middlesex	New Brunswick, Perth Amboy	NJ	290.0	238.5	**51.50**	809,858	64
Gwinnett	Norcross, Lawrenceville	GA	321.7	238.5	**83.20**	805,321	65
San Francisco	San Francisco	CA	292.3	238.5	**53.80**	805,235	66
Baltimore	Baltimore	MD	280.0	238.5	**41.50**	805,029	67
Hamilton	Cincinnati	OH	302.5	238.5	**64.00**	802,374	68
El Paso	El Paso	TX	313.9	238.5	**75.40**	800,647	69
Montgomery	King of Prussia, Plymouth Meeting	PA	313.8	238.5	**75.30**	799,874	70
Worcester	Worcester	MA	313.4	238.5	**74.90**	798,552	71
Pierce	Tacoma	WA	322.5	238.5	**84.00**	795,225	72
Essex	Newark	NJ	290.0	238.5	**51.50**	783,969	73
Collin	Plano, McKinney	TX	332.5	238.5	**94.00**	782,341	74
Hidalgo	McAllen, Edinburg	TX	359.5	238.5	**121.00**	774,769	75
Monroe	Rochester	NY	332.5	238.5	**94.00**	744,344	76
Essex	Lawrence	MA	303.0	238.5	**64.50**	743,159	77
Jefferson	Louisville	KY	322.5	238.5	**84.00**	741,096	78
Multnomah	Portland	OR	312.5	238.5	**74.00**	735,334	79
Suffolk	Boston	MA	303.0	238.5	**64.50**	722,023	80
Oklahoma	Oklahoma City	OK	300.5	238.5	**62.00**	718,633	81
San Mateo	San Mateo, Redwood City	CA	312.5	238.5	**74.00**	718,451	82
Snohomish	Everett	WA	332.5	238.5	**94.00**	713,335	83
Lake	Waukegan	IL	322.5	238.5	**84.00**	703,462	84
DeKalb	Decatur	GA	321.7	238.5	**83.20**	691,893	85
Cobb	Marietta	GA	321.7	238.5	**83.20**	688,078	86

APPENDIX B1. LOW- AND MID- BAND SPECTRUM AGGREGATION							
Applicants' Public Interest Statement Appendix L-1							
LOCATION (COUNTY, CITY, STATE)			**CALCULATIONS**			**POPULATION**	**POP RANK**
County	Selected Cities	State	NTM MHz	Maximum	Difference	County Population	Rank
San Joaquin	Stockton	CA	322.5	238.5	**84.00**	685,306	87
Will	Joliet, Bolingbrook	IL	322.5	238.5	**84.00**	677,560	88
Jackson	Kansas City	MO	332.5	238.5	**94.00**	674,158	89
Norfolk	Quincy, Weymouth	MA	307.8	238.5	**69.30**	670,850	90
Denton	Denton	TX	332.5	238.5	**94.00**	662,614	91
Bernalillo	Albuquerque	NM	291.5	238.5	**53.00**	662,564	92
Jefferson	Birmingham	AL	291.4	238.5	**52.90**	658,466	93
Hudson	Jersey City	NJ	290.0	238.5	**51.50**	634,266	94
Monmouth	Middletown	NJ	290.0	238.5	**51.50**	630,380	95
Davidson	Nashville	TN	287.5	238.5	**49.00**	626,681	96
Providence	Providence	RI	310.0	238.5	**71.50**	626,667	97
Bucks	Levittown	PA	322.5	238.5	**84.00**	625,249	98
El Paso	Colorado Springs	CO	342.5	238.5	**104.00**	622,263	99
Lee	Fort Myers, Cape Coral	FL	342.5	238.5	**104.00**	618,754	100

APPENDIX B-2:
PERCENT OF COUNTIES THAT EXCEED
FCC 238.5 MHz SPECTRUM SCREEN
(By State)

APPENDIX B2. PERCENT OF COUNTIES IN THE STATE THAT EXCEED FCC 238.5 MHz SPECTRUM SCREEN			
CWA Calculations from Applicants' Public Interest Statement Appendix L-1			
State	**Counties >0**	**County Count**	**Percent >0**
AK	0	29	0.0%
AL	65	67	97.0%
AR	59	75	78.7%
AZ	10	15	66.7%
CA	52	58	89.7%
CO	26	64	40.6%
CT	8	8	100.0%
DC	1	1	100.0%
DE	3	3	100.0%
FL	63	67	94.0%
GA	132	159	83.0%
GU	0	1	0.0%
HI	4	5	80.0%
IA	36	99	36.4%
ID	23	44	52.3%
IL	87	102	85.3%
IN	91	92	98.9%
KS	40	105	38.1%
KY	73	120	60.8%
LA	61	64	95.3%
MA	11	14	78.6%
MD	19	24	79.2%
ME	0	16	0.0%
MI	43	83	51.8%
MN	65	87	74.7%
MO	61	115	53.0%
MS	63	82	76.8%
MT	0	56	0.0%
NC	82	100	82.0%
ND	10	53	18.9%
NE	10	93	10.8%
NH	5	10	50.0%
NJ	21	21	100.0%

APPENDIX B2. PERCENT OF COUNTIES IN THE STATE THAT EXCEED FCC 238.5 MHz SPECTRUM SCREEN			
CWA Calculations from Applicants' Public Interest Statement Appendix L-1			
NM	10	33	30.3%
NV	11	17	64.7%
NY	54	62	87.1%
OH	70	88	79.5%
OK	60	77	77.9%
OR	18	36	50.0%
PA	55	67	82.1%
PR	78	78	100.0%
RI	5	5	100.0%
SC	45	46	97.8%
SD	0	66	0.0%
TN	77	95	81.1%
TX	162	254	63.8%
UT	11	29	37.9%
VA	105	133	78.9%
VI	0	3	0.0%
VT	2	14	14.3%
WA	33	39	84.6%
WI	29	72	40.3%
WV	13	55	23.6%
WY	4	23	17.4%
Grand Total	**2066**	**3234**	**63.9%**

APPENDIX C:
TOP 50 CENSUS-DEFINED URBAN AREAS WITH LARGEST NET CHANGE IN RETAIL AND HEADQUARTERS EMPLOYMENT FOLLOWING THE PROPOSED T-MOBILE/SPRINT TRANSACTION

APPENDIX C: TOP 50 CENSUS-DEFINED URBAN AREAS WITH LARGEST NET CHANGE IN RETAIL AND HEADQUARTERS EMPLOYMENT FOLLOWING THE PROPOSED T-MOBILE/SPRINT TRANSACTION

Rank	Urban area	Net change in retail postpaid employment	Net change in retail prepaid employment	Net change in headquarters employment[1]	Total
1	Kansas City, MO-KS	-131	-107	-4,000	-4,238
2	New York-Newark, NY-NJ-CT	-1,233	-870		-2,103
3	Chicago, IL-IN	-814	-837		-1,651
4	Los Angeles-Long Beach-Anaheim, CA	-912	-733		-1,645
5	Miami, FL	-607	-480		-1,087
6	Houston, TX	-298	-696		-994
7	Dallas-Fort Worth-Arlington, TX	-475	-411		-886
8	Atlanta, GA	-459	-300		-759
9	Seattle, WA	-205	0	-500	-705
10	Detroit, MI	-391	-282		-673
11	Phoenix-Mesa, AZ	-223	-222		-445
12	Tampa-St. Petersburg, FL	-192	-192		-384
13	Denver-Aurora, CO	-269	-103		-372
14	San Antonio, TX	-240	-132		-372
15	Orlando, FL	-197	-144		-341
16	Philadelphia, PA-NJ-DE-MD	-124	-161		-285
17	Washington, DC-VA-MD	-239	-41		-280
18	Riverside-San Bernardino, CA	-117	-156		-273
19	St. Louis, MO-IL	-133	-131		-264
20	Baltimore, MD	-84	-174		-258
21	San Diego, CA	-162	-85		-247
22	Columbus, OH	-127	-116		-243

[1] Out of the 4,500 positions that CWA estimates will be eliminated from headquarters, we estimate that 4,000 will come from Sprint's headquarters in the Kansas City urban area, and only 500 will come from T-Mobile's headquarters in the Seattle urban area. Our assumptions are supported by reports that T-Mobile has renewed leases on its entire HQ facility and is undertaking major renovations. *See* Anthony Bolante, *T-Mobile renews lease of 882,000 square feet in Bellevue for HQ overhaul*, PUGET SOUND BUSINESS JOURNAL (April 11, 2018), https://www.bizjournals.com/seattle/news/2018/04/11/t-mobile-renews-lease-headquarters-renovation.html. The Applicants plan to keep a second headquarters in Kansas City. After the companies announced their plans to merge, neither T-Mobile's CEO John Legere nor Sprint's CEO Marcelo Claure provided assurances to Sprint's headquarters employees regarding their jobs. *See* Mark Davis, Steve Vockrodt & Lynn Horsely, *T-Mobile to take charge in Sprint merger, throwing Overland Park jobs into question*, KANSAS CITY STAR (April 29, 2018), https://www.kansascity.com/news/business/technology/article210106129.html.

23	Milwaukee, WI	-78	-148	-226
24	Minneapolis-St. Paul, MN-WI	-204	0	-204
25	Austin, TX	-145	-57	-202
26	New Orleans, LA	-47	-153	-200
27	Cleveland, OH	-84	-112	-196
28	Grand Rapids, MI	-91	-105	-196
29	Jacksonville, FL	-83	-108	-191
30	Portland, OR-WA	-184	-3	-187
31	Cincinnati, OH-KY-IN	-63	-121	-184
32	McAllen, TX	-64	-117	-181
33	Las Vegas-Henderson, NV	-99	-76	-175
34	Charlotte, NC-SC	-41	-131	-172
35	Tucson, AZ	-98	-50	-148
36	Richmond, VA	-60	-87	-147
37	Virginia Beach, VA	-67	-78	-145
38	Providence, RI-MA	-99	-45	-144
39	Salt Lake City-West Valley City, UT	-96	-40	-136
40	Oklahoma City, OK	-79	-39	-118
41	Memphis, TN-MS-AR	-1	-117	-118
42	Cape Coral, FL	-59	-54	-113
43	Sarasota-Bradenton, FL	-30	-81	-111
44	Indianapolis, IN	-29	-81	-110
45	Nashville-Davidson, TN	-24	-84	-108
46	Pittsburgh, PA	-58	-49	-107
47	Columbia, SC	-44	-61	-105
48	Flint, MI	-38	-54	-92
49	Lubbock, TX	-47	-45	-92
50	Tulsa, OK	-47	-42	-89

APPENDIX D:
Methodology for Estimating Store Closures and Retail Job Losses Following the Proposed Transaction

APPENDIX D:
METHODOLOGY FOR ESTIMATING STORE CLOSURES AND RETAIL JOB LOSSES FOLLOWING THE PROPOSED TRANSACTION

a. Estimating store closures

i. Overview

In order to predict how the Applicants' retail footprint would change if they operated a single postpaid brand and a single prepaid brand, CWA developed a store closure model based on the relationship between urban area population and the existing numbers of T-Mobile and MetroPCS stores.

This model predicts that in Census-defined urban areas where T-Mobile or Sprint currently operate at least one store, the number of T-Mobile/Sprint stores will go from 8,871 stores to 5,923 stores operated under a single postpaid brand, a decrease of 2,948 stores or 33 percent.

In urban areas where MetroPCS and Boost Mobile operate at least one store, the number of MetroPCS/Boost Mobile stores will go from 15,340 to 11,022 stores operated a single prepaid brand, a decrease of 4,318 stores or 28 percent.

ii. Scope of our model

Our model is limited only to U.S. Census-defined urban areas where T-Mobile, Sprint, or their pre-paid carriers (MetroPCS and Boost) operate at least one store. These urban areas account for 97 percent of Sprint/T-Mobile stores, and 99 percent of MetroPCS/Boost stores.

Our model predicts store closures but not store openings. The Applicants claim that they will open over 600 new stores to serve small towns and rural areas after the merger.[1] As explained below, we estimate that of those 600 new stores, only 240 will be postpaid stores. These 240 stores, plus the 230 Sprint/T-Mobile stores that fall outside Census-defined urban areas brings our forecast of the single postpaid brand store count to 6,393.

iii. Store closure methodology

CWA's model uses a regression analysis to predict the number of stores that will remain open after the merger. The model uses urban area population figures as the independent variable and T-Mobile's store count to predict the number of postpaid stores that will remain open after the merger and MetroPCS store count to predict the number of prepaid stores. The model uses T-Mobile and MetroPCS' store counts to predict each urban area's post-merger store count because store counts from these two chains are highly correlated to urban area population figures.[2] All indications suggest that the merged company will follow T-Mobile's retail growth strategy, meaning that the T-Mobile/MetroPCS patterns of store distribution will inform the future retail footprint of a merged operation.

To calculate the number of stores that will remain in operation after the merger, we developed two different regressions, one for postpaid stores and one for prepaid stores. Each regression only includes urban areas where T-Mobile and MetroPCS operate at least one store. The formulas for these regressions are:

*Number of stores = Urban area population * x + b*

[1] *See* Description of Transaction at Appendix C, 8.

[2] The postpaid linear regression has an R-squared of 0.98, while the prepaid model has an R-squared of 0.92.

If the number of stores predicted by the regression was greater than the combined number of stores currently operated by the two postpaid brands or the two prepaid brands, then we assumed that the post-merger number of stores would be equal to the number of stores predicted by the model. For example, the baseline number of prepaid stores predicted for Los Angeles is 529. Since there are 773 prepaid locations in Los Angeles (510 MetroPCS and 263 Boost Mobile), we assumed that the post-merger store count will be reduced to 529 locations, resulting in 244 store closures.

In urban areas where the number of stores predicted by the model is less than or equal to the actual number of stores currently operated by T-Mobile (postpaid model) or MetroPCS (prepaid model), we assumed that the post-merger number of stores will be equal to the number of T-Mobile or MetroPCS stores, depending on the model. For example, the baseline number of postpaid stores predicted for Chicago is 217. Since there are 241 T-Mobile stores and 147 Sprint stores, we assumed that Chicago's post-merger store count will be 241, resulting in about 147 store closures.

Likewise, in urban areas where the number of stores predicted by the model is less than or equal to the number of Sprint stores, we assumed that the post-merger store count will be equal to the number of current Sprint or Boost Mobile store counts, depending on the model. For example, since there are seven Boost Mobile stores in Honolulu and no MetroPCS stores, we assumed that the post-merger number of prepaid stores will remain at seven.

Our model predicts store closures but not store openings. In cases when the baseline number predicted by the regression is greater than the total number of existing stores in an urban area, then we assumed that the post-merger number of stores will be equal to the current number

of stores. For example, the baseline number of postpaid stores predicted by the regression for Worcester, MA was 12. Since the current Sprint/T-Mobile store count is only 10, then we assumed that the post-merger store count will remain at 10 stores.

iv. Store closure model sources

Population

Population data is from 2016 American Community Survey 5-Year Estimates.[3]

Urban Area Geographies

Urban area geographic boundary data is from the Urban Area National Shapefile (2010 Census) published by the U.S. Census.[4]

Store Data

We retrieved each carrier's store location data directly from their website. Data retrieved in April and May 2018.[5]

B. Estimating job losses following the proposed transaction

i. Postpaid Methodology

Step 1: Calculate pre-merger employment level

[3] *See* U.S. Census Bureau's 2012-2016 American Community Survey 5-Year Estimates Table 01003, American FactFinder, *available at* https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

[4] *See* Urban Area National Shapefile (2010 Census), U.S Census Bureau, *available at* https://www.census.gov/geo/maps-data/data/tiger-line.html.

[5] CWA analysis of store location data collected from T-Mobile, Sprint, MetroPCS, and Boost Mobile's websites in April and May 2018.

Sprint and T-Mobile operate 9,101 corporate and authorized dealer postpaid locations combined, which we multiplied by an estimated average of eight employees per store to generate a pre-merger employment estimate of 72,808.

Step 2: Calculate job losses from projected store closures

As described above, our population-based model predicts that the merged company will rationalize its retail footprint by closing 2,948 locations in census-defined urban areas. We multiplied this by the estimated average of eight employees per store to generate an initial job loss estimate of 23,584.

Step 3: Calculate post-merger employment level of remaining stores

We predict that the post-merger company will operate 6,153 postpaid retail stores in census-defined urban areas. If the staffing level remained at eight per store, these remaining stores would employ an estimated 49,224 people. New Street Research predicts that stores that remain open after the transaction will have an increase of 25 percent in volume per store.[6] We think that not all of this projected volume will translate into increased staffing needs in the remaining stores, as consumers are increasingly shopping for smartphones online and keeping their phones for longer periods of time.[7] We think that given these trends, remaining stores will need to

[6] *See* "Sprint / T-Mobile Redux: Refreshing Synergies and Scenarios" at 30.

[7] *See* Maurice Klaehne, *Amazon Leads the Online Smartphone Sales Channel in the US in Q1 2018*, COUNTERPOINT RESEARCH (June 6, 2018), https://www.counterpointresearch.com/amazon-leads-online-smartphone-sales-channel-us-q1-2018/; Timothy W. Martin & Drew FitzGerald, *Your Love of Your Old Smartphone Is a Problem for Apple and Samsung*, WALL STREET JOURNAL (Feb. 28, 2018), https://www.wsj.com/articles/your-love-of-your-old-smartphone-is-a-problem-for-apple-and-samsung-1519822801.

expand their staff by 20% on average, or one and a half additional employees per store on average, for a total of 9,230 additional employees.

Step 4: Project the impact of new jobs at the claimed 600 new rural stores

The Applicants claim that their planned expansion into rural markets will involve six hundred new retail stores and 5,000 new retail jobs, or an average of 8.3 employees per rural store.[8] The Applicants do not specify whether these rural stores will be postpaid or prepaid locations, but imply that they will be postpaid by using the average of more than eight jobs per store.

Our analysis of the Applicants current retail operations finds that approximately sixty percent of their retail locations in markets with populations of less than fifty thousand are prepaid stores.[9] Given the low income levels and low volume of customers we would expect to see in rural areas, we do not believe that it is plausible for the combined company to open six hundred new postpaid locations in rural areas. Therefore, we project that forty percent of the 600 stores, or 240 stores, will be postpaid locations. We multiply these rural postpaid locations by an average of 7 jobs per store to yield an estimated total of 1,680 new rural postpaid retail jobs.[10]

[8] See Description of Transaction at Appendix C, 8.

[9] CWA analysis of T-Mobile, Sprint, MetroPCS and Boost Mobile store locations in U.S. Census-defined areas with populations of less than 50,000.

[10] Based on the press coverage of T-Mobile stores opening in rural areas, such as Great Falls, MT. David Sherman, *T-Mobile opens store in Great Falls*, MTN News (Posted: Mar 23, 2018 1:10 PM, Updated: Mar 23, 2018 7:10 PM EDT), http://www.krtv.com/story/37796747/t-mobile-opens-store-in-great-falls.

Table 1: Summary of Post-Merger Postpaid Employment Calculations

Item	Estimate
Pre-merger postpaid retail employment	72,808
Job Loss from 2,948 stores closing	-23,584
Expansion of staff at remaining stores	+9,230
Rural postpaid expansion	+1,680
Projected post-merger postpaid retail employment	60,134
Net change in postpaid retail employment	**-12,674**

ii. Prepaid Methodology

Step 1: Calculate pre-merger employment

MetroPCS and Boost Mobile operate 15,445 prepaid locations combined, which we multiplied by an estimated average of three employees per store to generate a pre-merger employment estimate of 46,335.

Step 2: Estimate job losses from projected store closures

Our model predicts that 4,318 MetroPCS and Boost Mobile stores will close as a result of the transaction. Multiplying this by the estimated average of three employees per store generates an estimated job loss of 12,954.

Step 3: Estimate the impact of rural store expansion

We estimate in the postpaid employment estimate methodology above that forty percent (240) of the Applicants' planned 600 rural expansion stores will be postpaid locations and sixty percent (360) will be prepaid locations. Multiplying 360 projected new rural prepaid stores by an estimated average of three workers per prepaid stores yields an estimated 1,080 additional prepaid retail jobs in rural areas.

Table 2: Summary of Post-Merger Prepaid Employment Calculations

Item	Estimate
Pre-merger prepaid retail employment	46,335
Job Loss from 4,213 stores closing	-12,954
Rural prepaid expansion	+1,080
Projected post-merger prepaid retail employment	34,461
Net change in prepaid retail employment	**-11,874**