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REDACTED FOR PUBLIC INSPECTION

March 28, 2019

BY ECFS

Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington, D.C. 20554

RE: Consolidated Applications of T-Mobile US, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations, WT Docket No. 18-197

Dear Ms. Dortch:

In accordance with Protective Order (DA 18-624) in the above-captioned proceeding, the Communications Workers of America (“CWA”) submits the attached public, redacted version of CWA’s Comments on Applicants’ Revised Network Combination Plan and Economic Analysis and “New T-Mobile In-Home Internet.”

A Highly Confidential version of this filing is being filed with the Commission on this date and will be made available pursuant to the terms of the Protective Order. Please contact me with any questions.

Sincerely,



Allen P. Grunes
Counsel to Communications Workers of America

Attachment

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HIGHLY CONFIDENTIAL INFORMATION – SUBJECT TO PROTECTIVE ORDER IN WT
DOCKET NO. 18-197 BEFORE THE FEDERAL COMMUNICATIONS COMMISSION

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

In the Matter of)
)
Applications of T-Mobile US, Inc.,)
)
and)
)
Sprint Corporation)
)
For Consent to Transfer Control of the Licenses)
and Authorizations)

WT Docket No. 18-197

**Comments of Communications Workers of America
On Applicants’ Revised Network Combination Plan and Economic Analysis
And “New T-Mobile In-Home Internet”**

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March 28, 2019

The Communications Workers of America (“CWA”) submits these comments in response to the additional information filed by Applicants on February 21, 2019, and March 6, 2019, regarding their network integration plans for 2019-2021, an extension of their previously filed merger simulation analysis to cover the years 2019-2021, and additional information regarding their claims related to fixed wireless broadband services. As discussed below, CWA respectfully submits that Applicants continue to fall far short of demonstrating that the proposed merger of T-Mobile and Sprint, as currently structured, is in the public interest. The harms of the proposed transaction are demonstrable and real, while the alleged benefits are speculative and uncertain.

1. Applicants’ “New Network Combination Plan” Offers Nothing New For Rural Americans

CWA has previously shown that for the great majority of rural Americans, the level of coverage and capacity would be similar for the post-merger “New T-Mobile” network and the standalone T-Mobile network if no merger occurs.¹ As Dr. Andrew Afflerbach discusses in his Third Supplemental Declaration (attached hereto as Appendix A), Applicants’ new network combination plan, contained in their February 21 filing, does not change that reality for rural America.

Based on an in-depth analysis of Table 9 and other information in the Applicants’ Public Interest Statement (PIS),² New T-Mobile will serve the rural US mostly with the low-band 600

¹ See Comments of CWA (August 27, 2018) at 47-52; Reply Comments of CWA (October 31, 2018) at 31-32.

MHz spectrum³ and with tower sites that exist or are already planned to be built by T-Mobile.⁴

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)⁵ 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.⁶ 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).

The February 21 filing describes changes that the Applicants propose to perform in 2019 if the merger is approved. These changes include the addition of Sprint PCS and 2.5 GHz spectrum at T-Mobile sites, beginning the upgrade of PCS and AWS spectrum to 5G (and an accompanying increase in spectral efficiency and functionality), and the addition of [REDACTED] [REDACTED] as part of the original T-Mobile rollout. With the exception of the [REDACTED], these are all related to mid-band and *not relevant to the more*

³ See CWA Comments, Appendix A: Declaration of Andrew Afflerbach, at 4-7. See also *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, 47, June 18, 2018, [hereinafter PIS].

⁴ CWA Comments, Appendix A: Declaration of Andrew Afflerbach, at 5.

⁵ See PIS at 47. 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.

⁶ *Id.*

than 84.6 million customers (the majority of rural areas) who will not receive mid-band service prior to 2021. And the [REDACTED], as stated by McDiarmid, is part of the planned T-Mobile expansion absent the merger, and therefore is not an incremental benefit of the merger. See Third Supplemental Declaration of Andrew Afflerbach (March 28, 2019) (hereinafter “March 28, 2019 Afflerbach Dec.”) ¶10.

The filing also describes changes that the Applicants propose to perform in 2020 and 2021. Again, these are the same changes as described for 2019, with one addition, the upgrade of both low-band and mid-band Sprint sites for T-Mobile technology, both to accelerate the conversion of Sprint customers to T-Mobile and to improve the functionality of those sites.⁷ Unfortunately, this change, too, is of limited value to rural Americans, given that Sprint’s sites are mostly in urban and suburban areas.⁸ Taken together, the only net gain for rural America is the ongoing [REDACTED], which, again, would have taken place anyway, absent the merger. See March 28, 2019 Afflerbach Dec. ¶11.

As a result, Dr. Afflerbach concludes that “the information in the February 21 Ex Parte regarding network integration in the first three years after the merger fails to demonstrate merger-related benefits for the 84.6 million Americans (26 percent of the 325.5 million total population assumed by the Public Interest Statement) who would still lack New T-Mobile mid-band coverage in 2021, and the 45.9 million Americans (14 percent of the 328.1 million total population assumed by the Statement) who would continue to lack access to these high-capacity

⁷ Statement of Mark McDiarmid, p. 6-9.

⁸ Public Interest Statement Figure 3, p. 24. While this figure indicates the 5G service, the 5G service footprint is centered on its antenna sites and therefore also indicates the distribution of its antenna sites for other services.

mid-bands in 2024. The Applicants’ claims that the combination of Sprint’s mid-band spectrum with T-Mobile’s low-band spectrum will improve throughput and capacity does not apply to most of rural America, since Sprint’s mid-band spectrum is not well-suited to rural America.”

March 28, 2019 Afflerbach Dec.¶ 12.

In summary, the new network combination plan does not move the needle for rural America.

2. The Commission Should Approach Applicants’ Latest Economic Model With a High Degree of Skepticism

Applicants’ eleventh hour submission of a new economic model that covers the 2019-2021 timeframe should be viewed very skeptically.

Applicants and Compass Lexecon consciously decided not to include the three year integration period in the merger simulation they submitted to the Commission six months ago. Back in September, Applicants claimed that they “used the financial model presented to T-Mobile’s board in approving the transaction and an engineering model built by T-Mobile’s engineers in ordinary course principles” to generate a merger simulation.⁹ T-Mobile’s Chief Technology Officer Neville Ray explained at the time that the engineering model did not include the years prior to 2021 “because the integration efforts would not be complete nationally until 2021 (assuming the transaction closes in 2019).”¹⁰ Mr. Ray also stated that the goal during the integration period would be to avoid disruption and degradation of service, and even that goal was aspirational: “Our company goal is to fund and mitigate congestion in the network

⁹ Joint Opposition (Sept. 17, 2018) at 11.

¹⁰ Ray Reply Decl. 15.

completely; however, absolute congestion avoidance is impractical due to issues with timely access to infrastructure, stochastic nature of traffic, and challenges with deploying congestion solutions.”¹¹ At the time, Compass Lexecon provided the following explanation of its decision to begin its analysis in 2021:

The initial evolution of the New T-Mobile network will be driven by integration needs, as opposed to responding to changes in output levels. Consequently, our merger assessment commences in 2021, by which time the integration of the Parties’ wireless networks is anticipated to be largely complete, meaning that the available tools can be used to model the endogenous evolution of the New T-Mobile network.¹²

Six months ago, the Applicants had every reason to quantify any and all claimed efficiencies as part of their competitive analysis. Their failure to do so did not reflect lack of time, opportunity or resources. With at least five economic consulting firms and more than 60 economists working for them, it is not as if the Applicants lacked the resources to go through the exercise of quantifying possible marginal cost savings and alleged network improvements they believed would take place during the integration period.

It is possible that the Compass Lexecon economists did not wish to be on record as asserting that marginal costs were zero during the integration period. Or perhaps Applicants worried about making claims that customers would reap benefits during the network integration period because such claims would be met with stares of disbelief. In any event, we respectfully suggest that the Commission should regard this new economic analysis with an appropriately high degree of skepticism.

¹¹ Ray Reply Decl. at 10. See also Ray Reply Decl. at 58, 60.

¹² IKK Reply Decl. 4 (footnote omitted).

Like T-Mobile’s recent three year price freeze promise, the newly claimed consumer welfare benefits during the integration period only appear to have been “discovered” after the Commission raised questions about the competitive effects of the merger during that three year period. What’s more, the price freeze promise and the newly discovered efficiencies actually may be in tension. One of the loopholes in T-Mobile’s price promise is that the company reserves the right to raise prices in the event it offers a “better” post-merger plan, and that could easily include a plan which offers, among other things, small quality improvements.¹³ Meanwhile, the new economic analysis posits that there may be small quality improvements during the integration period. This opens the door to one of the loopholes in the price freeze commitment. In short, the new economic analysis also illustrates why a promise to freeze prices is likely to be ineffective.

Ultimately, however, one does not have to be an economist to understand why the Applicants consciously decided not to try to quantify alleged near term marginal cost savings and quality improvements in their original merger simulation. The real answer is that these benefits, even if they could be quantified, would be small. They would be swamped by the merger’s competitive effects. Compass Lexecon offers only the smallest fig leaf to cover this fairly obvious conclusion which is apparent even in its own new analysis.¹⁴

The bottom line is that if, as CWA and many others have suggested, the Applicants have not met their burden of demonstrating merger-specific, quantifiable and verifiable public interest

¹³ See Letter from Nancy Victory to Marlene Dortch at 2-3 WT Docket No. 18-187 (Feb. 4, 2019). We also note that there are far more toll booths on two lane roads than on one lane roads.

¹⁴ See IKK Extension Table 3 and Table 4.

benefits, the merger is not saved by this latest economic exercise. The new analysis does not move the needle.

One final comment. In its new analysis, Compass Lexecon adopts Cornerstone's diversion ratios. As we have previously pointed out, the Cornerstone Report is problematic in that it directionally overstates the alleged merger benefits through various modeling assumptions and omissions. In particular, it appears that the Cornerstone model assumes that prices enter utility for all consumers in exactly the same way: independently of location, demographics, type of use (low/moderate/high), and type of service. This is particularly problematic as the measure of price is so highly aggregated in the model: a single price is assigned to each of the brands. As Professor Bar-Isaac has previously noted, this approach is likely to lead to results that would make consumers relatively insensitive to prices, and thereby to overestimate the benefits of the proposed merger.¹⁵

Some of the results of the model bear this out. For instance, the Cornerstone model suggests that a high value is placed on a very small improvement in quality and that prepaid customers would leapfrog other prepaid alternatives for a much more expensive alternative.¹⁶

Cornerstone's results on sensitivity to quality arise from individualized measures of quality, but do not take into account that individual consumers differ in other respects which may be correlated with these measures of quality. Different consumers have different commuting patterns (for example) which will determine both the network quality that they experience and

¹⁵ See Heski Bar-Isaac Comments on T-Mobile/Sprint Cornerstone Study, attached to Comments of Communications Workers of America on Applicants' New Econometric Study (December 4, 2018) as Appendix A.

¹⁶ See CWA December 4, 2018 Comments on Cornerstone Study at 11-13.

exposure to advertising, convenience of retail stores, etc. While it is true that it may not be standard practice to think of individualized advertising exposure, neither is it standard practice to work with individualized quality measures. Assuming that people's exposure to network quality is highly individualized but has nothing to do with where they spend time (and so the extent to which they may be exposed to ads, stores, promotions, etc.) is neither standard economic practice, nor reasonable, and it is likely to over-estimate how much consumers value quality.

Taking income as constant within a zip code, as Cornerstone does, also appears to be problematic. CWA agrees with DISH that porting data – a factual, historical account of the carrier each porting subscriber leaves and the one to which he or she switches – are the most reliable estimates of diversion. It is the metric on which the highest levels of management of both Sprint and T-Mobile rely on to weigh competitive pressure and decide on responses. Porting data show plainly that Sprint and T-Mobile are each other's primary competitor.

3. Applicants' In-Home Broadband Claims Are Overstated

On March 6, Applicants submitted a "more detailed description" of an in-home broadband service called "New T-Mobile Home Internet." The submission included "an update on network and business planning for the offering."

While couched as an "update," the March 6 filing more accurately could be described as an elaboration on previously disclosed underlying numbers and metrics which appear in the Joint Applicants' Public Interest Statement.¹⁷ The basic "model" for expanding in-home wireless broadband appears to be identical to the one Applicants deployed in the Public Interest

¹⁷ Joint Applicants' Public Interest Statement, June 18, 2018, p. 60, and Sievert Declaration, p. 16.

Statement. The only new element is the additional hyperbole about the proposed merger’s purported “enormous impact on closing the digital divide by bringing rural Americans the in-home broadband service they need and want.”¹⁸

As Dr. Afflerbach notes in the attached Declaration, there is no new or persuasive information in this filing. Rather, he concludes that the proposed in-home service is significantly technically inferior and less flexible than the broadband services with which it purportedly would compete and is focused on areas where broadband service already exists. According to the Applicants’ own numbers, the in-home broadband service would only be available to [REDACTED] [REDACTED] households by 2024, representing [REDACTED] of the approximately 122.8 million US households, a small fraction of US households. Even in 2024, according to the Applicants’ rose-colored calculations, almost [REDACTED] % of the households passed will be in areas where there are already two or more competing services.¹⁹ Regarding rural areas, T-Mobile states that only [REDACTED] [REDACTED] rural households will be supported with its In-Home Broadband, representing [REDACTED] of the approximately 23.7 million US rural households, leaving the overwhelming majority of rural households unserved by the In-Home Broadband service.²⁰

One of the technical limits in addition to signal coverage noted by T-Mobile is the company’s desire “not to have a material adverse impact on the mobile network experience by reducing either throughput or user experience quality for mobile subscribers more broadly.”²¹ The network is tightly technically limited, because T-Mobile is only going to take a slice out of

¹⁸ Letter from Nancy Victory, Counsel for T-Mobile US, Inc., WT Docket No. 18-197 (filed March 6, 2019) at 3.

¹⁹ Id. at 13, Table 5.

²⁰ Id. at 3.

²¹ March 6 Ex Parte, Declaration of Mark McDiarmid, at 4.

its mobile network capacity to operate the network, and therefore the constraints relative to the wired networks will permanently be in place. There are significantly more Eligible Households ([REDACTED] million who could get this signal) than households that “could be supported” ([REDACTED] million)²² or households that it optimistically claims “in its business plan” will become In-Home Broadband subscribers (9.5 million).²³ CWA notes that this optimistic forecast of subscribers far exceeds the market penetration of Verizon’s fiber-to-the-home (FiOS) service today, even in markets that Verizon entered more than 15 years ago. The lack of scalability of T-Mobile’s In-Home Broadband promise makes the proposed service even less capable to be an effective alternative to wireline broadband, which by then will be available at speeds way beyond 1 Gbps.

Of the [REDACTED] supported households that the Applicants estimate they will serve, the vast majority are in urban or suburban areas. Only [REDACTED] of the total supported households are in rural areas, representing [REDACTED] of all households the Applicants claim will be supported with the in-home broadband service.

According to T-Mobile, the proposed future 5G home service will have a peak speed of 100 Mbps or more, with a minimum speed of 25 Mbps downlink and 3 Mbps uplink.²⁴ However, speeds in the 100 Mbps range are significantly less than the speed of currently existing home cable and fiber broadband services in 2019, which have their highest speed services

²² March 6 Ex Parte at 11.

²³ March 6 Ex Parte at 14.

²⁴ March 6 Ex Parte at 7.

approaching 1 Gbps,²⁵ and likely growth in those speeds with continuing upgrades in coming years.

One of the advantages that the Applicants claim for their in-home service is the lack of an installed antenna. While not having an outdoor antenna installation may reduce the time and cost of adding service, choosing not to take advantage of the significant speed and coverage boost from an outdoor antenna, even as an option for difficult-to-serve customers, means that T-Mobile 1) is likely not seeking to provide the in-home service to users who are further from its antenna sites or obstructed by terrain or foliage, and 2) is not trying to improve signal levels to get more speed to the users.

Because the in-home service appears to require mid-band service, and New T-Mobile's mid-band service will not be available to most rural Americans in 2021 and only available to fewer than half of rural Americans in 2024,²⁶ most rural Americans will not technically be able to receive the service. Figure 3 from the McDiarmid Declaration²⁷ shows the Eligible Areas, mostly [REDACTED], are significantly [REDACTED] than the T-Mobile total coverage area, and [REDACTED] than the mid-band footprint,²⁸ implying that a user needs both to [REDACTED]

[REDACTED]

[REDACTED]

²⁵ "Spectrum Internet Gig With Speeds up to 940 Mbps," <https://www.spectrum.net/support/internet/gig-speed-support/>; "Comcast offering 1 gigabit per second service to its entire territory," <https://www.cnet.com/news/comcast-offering-1-gigabit-per-second-service-to-its-entire-territory/>.

²⁶ CWA Comments, Appendix A, Declaration of Andrew Afflerbach, at 6.

²⁷ March 6 Ex Parte, Declaration of Mark McDiarmid, at 5, Fig. 3.

²⁸ *Id.* at 3, Fig. 1.

Finally, we question whether these alleged out-of-market merger “benefits” should be considered at all by the Commission as part of this proceeding. They are not “inextricably linked” to the proposed transaction.

Sprint and T-Mobile have expanded and embellished upon an existing sales pitch about the possibilities for wireless in-home broadband to be a new competitor to cable, allegedly enabled by the proposed merger. A recent article in PC Magazine aptly labeled this as yet another “carrot” the Applicants are dangling in front of the Commission in their effort to secure merger approval.²⁹

Respectfully submitted,

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WORKERS OF AMERICA*

March 28, 2019

²⁹ See Sascha Segan, “T-Mobile’s Home Broadband Plan Is Just a Sprint Merger Carrot,” PC Magazine (March 21, 2019), available at <https://www.pcmag.com/commentary/367320/t-mobiles-home-broadband-plan-is-just-a-sprint-merger-carro>.

**APPENDIX A:
THIRD SUPPLEMENTAL 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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THIRD SUPPLEMENTAL 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 and municipal utilities 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.

7. I have reviewed Applicants’ February 21 Ex Parte filing regarding their network integration plans for 2019-2021.¹ My review of the network integration plan (2019-2021) focuses on the level of technical benefit of the proposed merger for rural Americans.
8. I previously reviewed the potential technical benefit of the proposed T-Mobile/Sprint for rural Americans in CWA’s Comments and Reply Comments, and concluded that for the majority of rural Americans, the proposed New T-Mobile service will be the same as what would be provided by T-Mobile absent the merger.² In this Declaration, I update that review to incorporate the new information provided in the Applicants’ February 21 Ex Parte on network integration for the period 2019 to 2021. In summary, I again find that, despite the Applicants’ claims of post-merger improved throughput and total offered capacity, ***little or none of the incremental benefits will reach the majority of rural Americans***, because the majority of rural households will not receive the benefits of Sprint’s mid-band spectrum. Therefore, the vast majority of rural Americans will obtain throughput and total offered capacity similar to what they would receive from a stand-alone T-Mobile, absent the merger. I note that the information in the February 21 Ex Parte on the short term (2019-2021) post-merger plans of the New T-Mobile does not

¹ Letter from Nancy Victory, Counsel for T-Mobile US, Inc., WT Docket No. 18-197, Feb. 21, 2019 [hereinafter February 21 Ex Parte].

² See Declaration of Andrew Afflerbach, Appendix A, Comments of Communications Workers of America, WT Docket No. 18-197, Aug. 27, 2018 (concluding that “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”) [hereinafter CWA Comments] and Supplemental Declaration of Andrew Afflerbach submitted as Appendix A to Reply Comments of Communications Workers of America, WT Docket No. 18-197, Oct. 31, 2018 (concluding that the areas with similar capacity and coverage to old T-Mobile include many areas with population density between [REDACTED] per square mile and some with between [REDACTED] per square mile) [hereinafter CWA Reply Comments].

discuss any new benefits for the rural population. For example, there is no discussion of buildout to unserved areas, beyond what is already planned by stand-alone T-Mobile.

9. As I explained in my Declaration attached to CWA’s Comments, based on an in-depth analysis of Table 9 and other information in the Applicants’ Public Interest Statement (PIS),³ New T-Mobile will serve the rural US mostly with the low-band 600 MHz spectrum⁴ and with tower sites that exist or are already planned to be built by T-Mobile.⁵ 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)⁶ 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.⁷ 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 See CWA Comments, Appendix A: Declaration of Andrew Afflerbach, at 4-7. See also *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, 47, June 18, 2018, [hereinafter PIS].

⁵ CWA Comments, Appendix A: Declaration of Andrew Afflerbach, at 5.

⁶ See PIS at 47. 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.

⁷ *Id.*

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)

10. Therefore, the merger will not significantly change rural service compared to what is already planned by stand-alone T-Mobile. The February 21 Ex Parte filing describes changes that the Applicants propose to perform in 2019 if the merger is approved. These changes include the addition of Sprint PCS and 2.5 GHz spectrum at T-Mobile sites, beginning the upgrade of PCS and AWS spectrum to 5G (and an accompanying increase in spectral efficiency and functionality), and the addition of [REDACTED] [REDACTED] as part of the original T-Mobile rollout.⁸ With the exception of the [REDACTED] [REDACTED], these are all related to mid-band and *not relevant to the more than 84.6 million customers described in paragraph 9 above (the majority of rural areas) who will not receive mid-band service prior to 2021.* And the [REDACTED], as

⁸ February 21 Ex Parte, Declaration of Mark McDiarmid, at 5-6.

stated by Mark McDiarmid, is part of the planned T-Mobile expansion absent the merger, and therefore is not an incremental benefit of the merger.⁹

11. The February 21 filing also describes changes that the Applicants propose to perform in 2020 and 2021. These are the same changes described for 2019, with one addition, the upgrade of both low-band and mid-band Sprint sites for T-Mobile technology, both to accelerate the conversion of Sprint customers to T-Mobile and to improve the functionality of those sites.¹⁰ Unfortunately, this change, too, is of limited value to rural Americans, given that Sprint's sites are mostly in urban and suburban areas.¹¹ Taken together, again, the only net gain for rural Americans is the ongoing [REDACTED], which, again, would have taken place anyway, absent the merger.
12. I conclude that the information in the February 21 Ex Parte regarding network integration in the first three years after the merger fails to demonstrate merger-related benefits for the 84.6 million Americans (26 percent of the 325.5 million total population assumed by the Public Interest Statement) who would still lack New T-Mobile mid-band coverage in 2021, and the 45.9 million Americans (14 percent of the 328.1 million total population assumed by the Statement) who would continue to lack access to these high-capacity mid-bands in 2024. The Applicants' claims that the combination of Sprint's mid-band spectrum with T-Mobile's low-band spectrum will improve throughput and capacity does not apply to most of rural America, since Sprint's mid-band spectrum is not well-suited to rural America.

⁹ *Id.* at 5, n 22.

¹⁰ *Id.* at 6-9.

¹¹ PIS, at 24, Fig. 3. While this figure indicates the 5G service, the 5G service footprint is centered on its antenna sites and therefore also indicates the distribution of its antenna sites for other services.

13. I have also reviewed the March 6 Ex Parte filing, “New T-Mobile In-Home Broadband,”¹² with particular focus on the needs of rural Americans. As an initial matter, I note that there is no new or persuasive information in this Ex Parte beyond what was previously filed by the Applicants more than eight months ago in their Public Interest Statement. In summary, I find that the proposed in-home service 1) is significantly technically inferior and less flexible compared to the wireline broadband services with which it proposes to compete; and 2) is focused on areas where broadband service already exists. Even in 2024, almost [REDACTED] of the households passed will be in areas where there are already two or more competing services.¹³
14. One of the technical limits in addition to signal coverage noted by T-Mobile is the desire to “not have a material adverse impact on the mobile network experience by reducing either throughput or user experience quality for mobile subscribers more broadly.”¹⁴ The network is tightly technically limited, because T-Mobile is only going to take a slice out of its mobile network capacity to operate the network, and therefore the constraints relative to the wired networks will permanently be in place. There are significantly more Eligible Households ([REDACTED] million who could get this signal) than households that “could be supported” ([REDACTED] million)¹⁵ or households that are “in its business plan” (9.5 million).¹⁶ This lack of scalability makes the proposed service even less capable to be an

¹² Letter from Nancy Victory, Counsel for T-Mobile US, Inc., WT Docket No. 18-197, March 6, 2019 [hereinafter March 6 Ex Parte].

¹³ Id. at 13, Table 5.

¹⁴ March 6 Ex Parte, Declaration of Mark McDiarmid, at 4.

¹⁵ March 6 Ex Parte at 11.

¹⁶ March 6 Ex Parte at 14.

effective alternative to wireline broadband, which by then will be available at speeds way beyond 1 Gbps.

15. Despite the Applicants’ claim that the March 6 Ex Parte “updates” the Applicant’s prior description of its in-home broadband service,¹⁷ this filing could more accurately be described as an elaboration on previously disclosed underlying numbers and metrics which appear in the Applicants’ Public Interest Statement.¹⁸ The basic “model” for expanding in-home wireless broadband appears to be identical to the one described by the Applicants in the Public Interest Statement, The only new element is the additional hyperbole about the proposed merger’s purported “enormous impact on closing the digital divide by bringing rural Americans the in-home broadband service they need and want.”¹⁹
16. The Applicants elaborate on the *process* they have employed to identify households they intend to support, but the underlying number of households in their in-home broadband plans remain the same: The New T-Mobile’s business plan claims to have 9.5 million subscribing households by 2024.²⁰
17. The Applicants’ definitions of In-Home Broadband Coverage, Eligible, and Supported areas, while somewhat confusing, does not add any coverage to their underlying plan.²¹

¹⁷ March 6 Ex Parte at 1.

¹⁸ See PIS at 60. See also PIS, Declaration of Michael Sievert at 16.

¹⁹ March 6 Ex Parte at 3.

²⁰ *Id.*

²¹ While the Applicants disclose that there are ██████ Eligible Households, representing over half of the country’s households by 2024, the New T-Mobile will only have capacity to serve ██████ of these Eligible Households (defined as Supported Households) by the same year. However, the New T-Mobile business plan (Build 9) projects only 9.5 million subscribers by 2024.

18. According to T-Mobile, the proposed future 5G home service will have a peak speed of 100 Mbps or more, with a minimum speed of 25 Mbps downlink and 3 Mbps uplink.²² However, speeds in the 100 Mbps range are significantly less than the speed of currently existing home cable and fiber broadband services in 2019, which have their highest speed services approaching 1 Gbps,²³ and likely growth in those speeds with continuing upgrades in coming years.
19. One of the advantages that the Applicants claim for their in-home service is the lack of an installed antenna. While not having an outdoor antenna installation may reduce the time and cost of adding service, choosing not to take advantage of the significant speed and coverage boost from an outdoor antenna, even as an option for difficult-to-serve customers, means that T-Mobile 1) is likely not seeking to provide the in-home service to users who are further from its antenna sites or obstructed by terrain or foliage, and 2) is not trying to improve signal levels to get more speed to the users.
20. Because the in-home service appears to require mid-band service, and New T-Mobile's mid-band service will not be available to most rural Americans in 2021 and only available to fewer than half of rural Americans in 2024,²⁴ most rural Americans will not technically be able to receive the service. Figure 3 from the McDiarmid Declaration²⁵ shows the Eligible Areas, mostly [REDACTED], are significantly [REDACTED] than the T-Mobile total coverage area, and [REDACTED] than the mid-band footprint,²⁶ implying that a user needs

²² March 6 Ex Parte at 7.

²³ "Spectrum Internet Gig With Speeds up to 940 Mbps," <https://www.spectrum.net/support/internet/gig-speed-support/>; "Comcast offering 1 gigabit per second service to its entire territory," <https://www.cnet.com/news/comcast-offering-1-gigabit-per-second-service-to-its-entire-territory/>.

²⁴ CWA Comments, Appendix A, Declaration of Andrew Afflerbach, at 6.

²⁵ March 6 Ex Parte, Declaration of Mark McDiarmid, at 5, Fig. 3.

²⁶ *Id.* at 3, Fig. 1.

both to [REDACTED]
[REDACTED].

21. Finally, of the [REDACTED] Eligible Households, [REDACTED] have one or no options for in-home broadband (since these are in [REDACTED], almost all likely have one option). [REDACTED] ([REDACTED]%) therefore have two or more other options for in-home broadband. The service is meant to be a third or fourth option, a lower-cost and lower-value choice, and not an alternative for areas that are altogether underserved by broadband.

DATED: Kensington, Maryland

March 28, 2019



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).

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- 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

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- “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