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REDACTED – FOR PUBLIC INSPECTION

May 1, 2019

BY HAND DELIVERY

Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: **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:

DISH Network Corporation ("DISH") responds to the April 12, 2019 letter filed by Sprint and T-Mobile (together, the "Applicants"), which once again seeks to discount the sufficiency of porting data in analyzing customer diversion. As DISH has explained, the superiority of porting data is well-established by the Commission and the Applicants themselves.[1] Indeed, there can be no more effective impeachment of the Applicants' latest effort

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[1] Letter from Pantelis Michalopoulos, DISH Counsel, to Marlene Dortch, WT Docket No. 18-197, at 5-9 (Jan. 28, 2019) ("DISH Jan. 28 Letter"); Letter from Pantelis Michalopoulos, DISH Counsel, to Marlene Dortch, WT Docket No. 18-197, at 1-2 (Mar. 25, 2019) ("DISH March 25 Letter"); Applications of AT&T Inc. and Deutsche Telekom AG for Consent to Assign or Transfer Control of Licenses and Authorizations, Order, 26 FCC Rcd. 16184, 16321, Appendix C ¶ 10 (2011) ("We have no evidence that those who port their numbers are systematically different from those who do not, and no evidence that those who port would react differently to a price increase than those who do not"); Cricket License Co. and AT&T Inc., Consent to Transfer Control of Authorizations, Memorandum Opinion and Order, 29 FCC Rcd. 2735, 2765 ¶ 70 (2014) (using porting data to determine that AT&T and Leap were close substitutes in certain markets); Applications of AT&T Inc. and Atlantic Tele-Network, Inc., Memorandum Opinion and Order, 28 FCC Rcd. 13670, 13691 n.121 (2013) (using porting data to determine whether AT&T and ATN were close substitutes).

DISH has denoted with **{{BEGIN HCI END HCI}}** information that is deemed to be Highly Confidential Information pursuant to the *Protective Order*. A public, redacted version of this filing is being filed with the Commission. Applications of T-Mobile US, Inc. and Sprint

(Continued…)

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to distance themselves from porting data and their implications for the proposed merger than more of their own words, from documents they have generated in the ordinary course of business and produced as part of the review of this transaction:

- In connection with porting data, T-Mobile's CEO asked, **{{BEGIN HCI END HCI}}**[2] The COO replied by attributing the porting figures to a rival's strength in prepaid services—**{{BEGIN HCI END HCI}}**,[3] and assuring the CEO that T-Mobile's own pricing would counter that strength.

- In an email dialogue between two T-Mobile executives, one asked **{{BEGIN HCI END HCI}}**[4] T-Mobile's CEO disagreed, not on the grounds that porting data was defective, but because something else was happening on the ground.[5]

- When T-Mobile was trying to impress the company's competitive acumen on a TV personality, the CEO suggested saying that porting **{{BEGIN HCI END HCI}}**[6]

- Porting data changes for the worse or better are the source of lamentation and pride for Sprint's leaders. A poor report caused Sprint's CEO to say, in Spanish: **{{BEGIN HCI END HCI}}**[7] A positive one caused Sprint's Chairman to gush: **{{BEGIN HCI END HCI}}**[8]

Porting data are the *only* information that shows actual diversions from one carrier to another. It is true that the data are limited to people who port their numbers when they move to a new carrier. But, unlike surveys that show what people *say* happened, porting is a record of what

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Corporation for Consent to Transfer Control of Licenses and Authorizations, *Protective Order*, WT Docket No. 18-197, DA 18-624 (June 15, 2018).

[2] TMUS-FCC-01411764 at TMUS-FCC-01411766.

[3] TMUS-FCC-01411764.

[4] TMUS-FCC-00900537 at 00900538.

[5] TMUS-FCC-00900537.

[6] TMUS-FCC-00887495 at 00887497.

[7] SPR-FCC-02748514.

[8] SPR-FCC-03880061.

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actually happened. And, unlike the dataset used by the Applicants' experts at Cornerstone, porting data do not guess what happened based on inferences from the tastes of people who do not switch. Further, as the Applicants' own ordinary-course charts prove, porting data change when prices change. Sure, overlapping promotions make it difficult to isolate the effect of a particular one. But the sensitivity of porting data to successful promotions is impossible to deny.

The Applicants do take other data into account as well. But the foregoing emails and other documents produced by the Applicants show that, when the two companies' top executives worry about competition from the other company (T-Mobile from Sprint, Sprint from T-Mobile), it is primarily to the porting data they turn: it is those data, and those alone, that fuel their worry and inform their subordinates' responses. It is the porting data they invoke to impress the public when they are favorable. And it is porting data that the Applicants interpret as a result of a price change initiated by one or the other company. The correspondence between executives quoted above and in previous submissions, is characterized by two themes: (1) see a porting number change, look for a price-related reason; and (2) see a negative porting change, look to a price measure to counteract it. Porting data show that Sprint and T-Mobile are each other's fiercest competitors: **{{BEGIN HCI   END HCI}}** of the porting customers leaving Sprint go to T-Mobile; **{{BEGIN HCI   END HCI}}** of those leaving T-Mobile go to Sprint.[9] This competition would disappear with the merger, to the detriment of competition and consumers.

The merger is not "good" for the public interest. In their increasingly long-odds effort to understate the competition between the two companies, the Applicants try to show that *any* data, including adjusted Facebook data and the market shares of the carriers, are better than porting data.

The Applicants produce a chart that purports to show that, for each of the years 2019 to 2024, the merger is "good" under any set of estimates *other* than those based on porting. Among many other problems with the chart, it is contradicted by a document straight from their economists' workpapers. That document shows precisely the reverse of the chart for 2019-2020: specifically, it shows that the welfare change from the merger is negative, and thus the merger is bad, if the assumption that prices will be frozen under the Applicants' freeze commitment is released.

For the later years (2021-2024), the claim that the merger is "good" under the Applicants' preferred diversion estimates omits a damning fact: the claim of "goodness" relies on averaging the bad effects of the merger on Sprint customers with the supposedly good effects on T-Mobile customers. The Applicants claim that the merger would be good overall, even as it would have negative implications (in the form of price increases) for the tens of millions of Sprint customers that the Compass Lexecon model predicts will suffer price increases in excess of any network

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[9] Coleman Bazelon, Jeremy Verlinda, William Zarakas, *Response to Applicant Filings on Diversion Ratios*, at Table 13 (Attachment A to DISH Jan. 28 Letter).

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quality improvements. For Sprint customers, the green check marks would be red X marks for *all* of these data sources.

The green checks are also the result of many other distortions, faulty assumptions and substantial omissions. Among other things: (1) the Applicants have not considered the effects of future millimeter wave acquisitions or other possible spectrum acquisitions, roaming agreements or partnerships; (2) have inflated marginal cost saving in yet other, unrebutted respects; (3) have failed to account for the complexities and realistic costs of network integration; (4) have ignored upwards price pressure due to coordinated effects; (5) have disregarded wholesale price increases; and (6) have assumed that the supposed welfare gains would continue to accrue in perpetuity. Correcting just a subset of these errors and accepting all of the Applicants' other figures is enough to turn green into red: these corrections show the merger to decrease consumer welfare under *all* of the Applicants' preferred data sources, even if the effects on Sprint customers are offset with the effects on T-Mobile customers.

The Applicants' "anything but porting" arguments are belied by their own words. The Applicants try to reconcile their disavowal of porting data with the companies' emphatic espousal of them by explaining that, when discussing porting data, the companies' leaders were not performing a diversion analysis. But no one is claiming the companies' CEOs were incorporating porting information in regressions to determine whether a hypothetical merger would increase prices.

The Applicants also criticize porting ratios and net ports for not supplying the information that porting share changes do, and then turn around and criticize porting share changes for the reverse reason—that they do not tell us what porting ratios and net ports do. The Applicants' reasoning is akin to saying that a witness cannot produce effective evidence because his eyes cannot hear and his ears cannot see. The Commission must not accept this circular reasoning. As for Facebook data, which have somehow emerged in the Applicants' telling as a superior method for estimating diversion, the Applicants preemptively admit they are biased. And they likewise have to admit that, in the ordinary course, the companies use share of gross ads ("SOGA") data simply to adjust porting information, not to replace it. When the two companies' executives seek to understand the implications of pricing promotions, they look primarily to porting data, not Facebook or SOGA data.

Porting, Along With the Applicants' Own Data Sources, Shows the Merger Will Harm Consumer Welfare

DISH has shown that porting data—a factual, historical account of the carrier each porting subscriber leaves and the one to which she switches—are the most reliable estimates of diversion.[10] It is the metric on which the highest levels of management of both Sprint and T-

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[10] *See* Letter from Pantelis Michalopoulos, Counsel for DISH, to Marlene Dortch, FCC, WT Docket No. 18-197, at 6-10 (Feb. 19, 2019); DISH March 25 Letter; DISH Jan. 28 Letter.

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Mobile rely to weigh competitive pressure and decide on responses. Porting data show plainly that each of Sprint and T-Mobile is currently the other's primary competitor.

This weight of evidence has forced the Applicants to scour the record for—and even create their own—alternative data sources. The Applicants claim that each of seven data sources provides a better diversion estimate than porting, even as they do not even bother to describe the methodology underlying the collection of each type of data, much less defend their integrity.[11] The Applicants' Table 1 lists these data sources, and purports to show that the use of each results in a positive consumer welfare gain because of the merger.[12] However, as the accompanying declaration from the Brattle Group explains, this table is inaccurate in so many respects that only a small subset of the required corrections is enough to reverse the results and turn the green into red.

For the early years (2019-2020), as Brattle explains in its March 28 declaration, Compass Lexecon's own backup materials show that the proposed merger would lead to aggregate consumer welfare losses if the price freeze is removed.[13] Table 1 below recreates Compass Lexecon's table, augmented only to include the last column to summarize the fact that, in each and every year, regardless of diversion ratio scenario, the welfare change is negative—i.e., the merger is, under the Applicants own criterion, "bad."

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[11] Letter from Nancy Victory, Counsel for T-Mobile, to Marlene Dortch, FCC, WT Docket No. 18-197, at 1 (April 12, 2019) ("TMO April 12 Letter").

[12] *Id.*

[13] Coleman Bazelon, Jeremy Verlinda, and William Zarakas, Response to Compass Lexecon February 20, 2019 Declaration and Mark McDiarmid March 6, 2019 Declaration, at Table 2 (Attachment A to DISH Comments in Response to Public Notice, WT Docket No. 18-197 (Mar. 28, 2019)) ("Brattle March 28 Declaration").

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Table 1: Change in Consumer Welfare (2019-2020, Per-Sub Per-Month) from Compass Lexecon Merger Simulation Model, With Claimed Marginal Cost Savings and Adjusted Nevo WTP Estimates for Quality Efficiencies (Maintain Case)

		2019	2020	Merger Good?
	IKK Merger Simulation Model with ABH Diversion Ratios			
[1.A]	*ABH Diversion Ratios, -0.3 Industry Elasticity, 75% Wholesale Pass-Through Rate, vGUPPI without Input Substitution, TracFone and Sprint Resellers Wholesale Price Constraints*			✗
	Sensitivities			
	T-Mobile/Sprint Diversion Ratio Data Sources			
[1.B]	*Harris Mobile Insight*			✗
[2]	*Sprint Brand IQ Survey*			✗
[3]	*T-Mobile SoGA and SoDA Estimates*			✗
[4]	*Proportional to Subscriber Share (Simple Logit)*			✗
	Alternative Industry Elasticity Assumptions			
[5]	*-0.1*			✗
[6]	*-0.5*			✗
	Alternative Vertical Upward Pricing Pressure Pass-Through Rates			
[7]	*50% Pass-Through of Vertical Upward Pricing Pressure*			✗
[8]	*100% Pass-Through of Vertical Upward Pricing Pressure*			✗
[9]	vGUPPI with Input Substitution			✗
[10]	TracFone-Only Wholesale Price Constraint			✗

HIGHLY CONFIDENTIAL MATERIAL HIGHLIGHTED
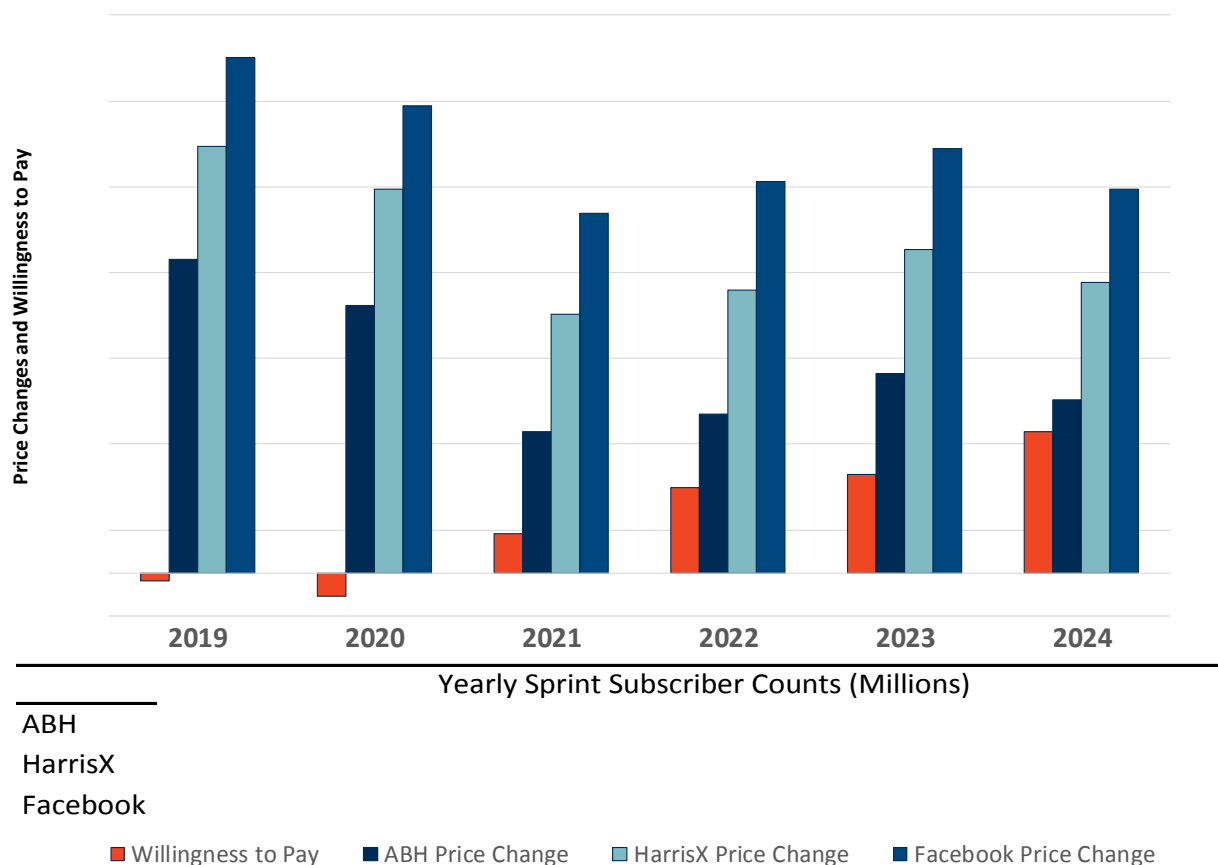
Source: Compass Backup Materials.
Notes: Results are for the adjusted Nevo Model in the Maintain Case.

For the later years, the claim that the merger is "good" under the Applicants' preferred diversion estimates omits a damning fact: the claim of "goodness" relies on averaging the bad effects of the merger on Sprint customers with the supposedly good effects on T-Mobile customers. The Applicants claim that the merger would be good overall even as it would be bad for the tens of millions of customers who would continue to receive service from a Sprint brand. For them, Brattle explains, the price increases faced by Sprint customers exceed their willingness to pay for the claimed network quality improvements across the range of data sources used by the Applicants' to estimate diversion. Thus, for Sprint customers, the green check marks would be red X marks for all of these data sources. The chart that follows shows the increases to prices for Sprint customers under each of the metrics identified by the Applicants.

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**Figure 1: Sprint Subscribers' Merger Price Effects versus WTP for Claimed Quality Improvements
No Price Commitment in 2019-2020, All Claimed Efficiencies, ($ per sub per month)**

HIGHLY CONFIDENTIAL MATERIAL HIGHLIGHTED

Source: IKK Backup Materials.

Notes: Sprint price increases reflect weighted average of Sprint post-paid, Sprint pre-paid, and Boost/Virgin price increases, with weights based on pre- and post-merger subscriber shares in each year. WTP values are for the "maintain, site-specific scaling" scenarios presented in Tables 2 and 17 of IKK February 20 Declaration.

Likewise, Brattle has shown that the merger harms both Sprint and T-Mobile subscribers when porting data are used to estimate diversion, a fact which the Applicants explicitly acknowledge.[14] The chart that follows shows the increases to prices for both Sprint and T-Mobile

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[14] TMO April 12 Letter at 1 ("Porting data are the only one of these many sources that lead to a contrary result…").

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customers under porting data as well as the Cornerstone and HarrisX Survey data diversion estimates.[15]

Table 2: Merger Price Effects in the 5G/LTE Transition Years
mmWave Adjusted Cost Savings, by Diversion Ratio Source, and Nevo Adjusted WTP
(Maintain Usage Scenario)
{{BEGIN HCI

END HCI}}

Sources: Compass Lexecon Revised Model; Brattle Calculations.

Notes: Revised Model under Sprint 41212 congestion threshold assumptions. Quality improvements under adjusted Nevo assumptions.

The Applicants' green checks are also the result of many other distortions beyond their continuing refusal to use porting data. For example, the Applicants have not made required corrections to their marginal cost claims to take account of future access to millimeter wave frequencies.[16] They have disregarded the many other respects in which their marginal cost savings claims are over-inflated. They have ignored coordinated effects and wholesale price increases. They have also assumed gargantuan willingness to pay valuations for speed improvements. Moreover, the Applicants' welfare change calculations move the needle dramatically in their favored direction, for example by assuming the accrual of the supposed welfare gains in perpetuity at an unduly low discount rate of 2%.

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[15] Brattle March 28 Declaration at Table 4.

[16] DISH will separately respond to the Applicants' incredibly belated April 22, 2019 submission regarding millimeter wave frequencies.

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      The following chart makes only the following corrections to the Applicants' Table 1: it assumes no price freeze for 2019-2020; it accounts for future access to millimeter wave frequencies; and, instead of assuming consumer welfare changes accrue in perpetuity, it realistically limits the life span of the calculation to the year 2024.

Table 3: Adjustment of Table 1 in Applicants' April 12, 2019 Filing: Addition of mmWave Holdings, No Price Commitment in 2019-2020, Total Welfare Discounted Based on IKK "Conservative" Scenario: 10% Discount Rate Through 2024

Data Source	2019	2020	2021	2022	2023	2024	Total Welfare Gain	Merger Good?
Baseline Case (ABH)								✕
ABH-Nested Logit								✕
HarrisX Mobile Insights								✕
Sprint Brand IQ Survey								✕
SoGA/SoDA Estimates								✕
Subscriber Shares								✕
Facebook Data								✕

HIGHLY CONFIDENTIAL MATERIAL HIGHLIGHTED

Sources: IKK Backup Materials; Brattle Calculations.

These corrections show that, even under the Applicants' aggregate consumer welfare approach, where the effects on T-Mobile customers inappropriately offset the harm to Sprint customers, the merger is bad under *all* of the Applicants' preferred data sources.

Both Applicants Use Porting Data as the Primary Means of Gauging Competition

      The Applicants' documents show that both T-Mobile and Sprint (at the highest levels of each company) use porting data as the primary means of measuring their competitive position vis-à-vis other carriers. The Applicants of course admit that their "internal documents show that they often look at some porting metrics" and that "these metrics help the Applicants track their performance by providing information on whether the Applicants are winning or losing porting subscribers from a single competitor or from all competitors."[17] But the Applicants' internal discussions go much further. In one email, T-Mobile's CEO asked in connection with porting data, **{{BEGIN HCI**   **END HCI}}**[18] The COO replied by attributing the changes to pricing:

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[17] TMO April 12 Letter at 12; *id.* at 3 ("Despite these deficiencies, T-Mobile and Sprint do look at porting data in running their businesses…").

[18] TMUS-FCC-01411764 at TMUS-FCC-01411766.

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{{BEGIN HCI

END HCI}}[19]

Similarly, another email shows a T-Mobile executive asking **{{BEGIN HCI**

END HCI}}[20]
T-Mobile's CEO disagreed, not on the grounds that porting data was defective, but because
something else was happening on the ground: **{{BEGIN HCI**

END HCI}}[21]

And in another email exchange, here is what T-Mobile's CEO suggested when T-Mobile
was trying to impress the company's competitive acumen on a TV personality:

{{BEGIN HCI

**END
HCI}}**[22]

Few things seem to concern Sprint's CEO more than porting data changes. After
receiving a poor report on Sprint's porting numbers, he wrote in Spanish: **{{BEGIN HCI
END HCI}}**[23] And
again, Sprint's CEO was concerned about a drop in net ports: **{{BEGIN HCI
END HCI}}**[24] Conversely,
following a positive porting report for Sprint, **{{BEGIN HCI**

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[19] TMUS-FCC-01411764. *See also* TMUS-FCC-00445570 **{{BEGIN HCI**

END HCI}}; TMUS-FCC-01436045 **{{BEGIN HCI**

END HCI}}

[20] TMUS-FCC-00900537 at 00900538.

[21] TMUS-FCC-00900537.

[22] TMUS-FCC-00887495 at 00887497.

[23] SPR-FCC-02748514.

[24] SPR-FCC-00839667. Indeed Mr. Claure thought that porting data was so reliable that it could
be used as an indicator of future performance. *See* SPR-FCC-03964156 **{{BEGIN HCI**

END HCI}}

END HCI}}[25] And

Softbank's Chairman {{BEGIN HCI
                              END HCI}}[26]

The Applicants' Opportunistic Attack on Porting Cannot be Reconciled With Their Own Past Statements

The Applicants are attempting to disavow their own past statements—the many documents they have created in the ordinary course of business that rely on porting data, and often on porting data alone, to assess competition. These attempts cannot be credited.

As an initial matter, the Applicants try to distinguish their extensive reliance on porting data by arguing the Applicants' executives did not use porting to perform "anything close to a diversion analysis."[27] No one claimed that the two companies' CEOs and other executives were performing regression calculations based on porting data to evaluate whether a hypothetical merger would result in higher prices. What they were doing is more probative: they were using porting data to assess the effect of, or the need for, price changes.

The Applicants next take a separate look at each of the porting metrics used by the Applicants—porting ratios and net ports, on the one hand and porting shares, on the other. They criticize each metric for not providing the "complete picture of porting," no matter that the other provides the missing ingredient of that picture.[28] The Applicants thus disavow net ports and porting for not showing "by themselves" "the proportion of porting subscribers moving between a single provider and *each* other provider in the market."[29] But *that* is shown by the porting share changes. The Applicants turn around and tarnish porting share changes because they do "not offer insight into where subscribers are switching to or from."[30] But *that* is supplied by the net ports and porting ratios. In any event, the porting data used by DISH's economists do provide the full picture—both the proportion of porting subscribers moving between a single provider and each other and "where subscribers are switching to or from."

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[25] SPR-FCC-03880061.

[26] *See, e.g.*, SPR-FCC-03853728 {{BEGIN HCI
                              END HCI}}; SPR-FCC-03916306 {{BEGIN HCI
                              END HCI}}

[27] TMO April 12 Letter at 20.

[28] *Id.* at 12.

[29] *Id.* at 13.

[30] *Id.* at 14.

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With respect to Facebook's Actionable Insights and Flow Share data, which have now emerged in the Applicants' telling as a superior method for estimating diversions, the Applicants likewise have to contend with their prior criticism of these data, reflected in ordinary course-of-business documents. The Applicants acknowledge, as they must, that the companies themselves have criticized Facebook data for reasons that seem obvious: the data are skewed based on the **{{BEGIN HCI   END HCI}}** as one document puts it,[31] and that **{{BEGIN HCI
          END HCI}}**[32] Why then is this method superior to porting? According to the Applicants, while Facebook data are also biased "because more T-Mobile and Sprint subscribers use Facebook than subscribers of other carriers do," they are "not as badly biased as porting data."[33] But, the assertion that porting data are "even worse" is tellingly free of any footnote or cite to documentary evidence.

Similarly, while the Applicants tout SOGA as another superior metric, that assertion stumbles against the actual use to which their ordinary course documents put SOGA. They do not use SOGA data to replace or discard porting information. Rather, they use it to "adjust" porting information **{{BEGIN HCI
          END HCI}}**[34] But then one would expect the Applicants to apply the SOGA adjustments made by the companies in the ordinary course to porting data, and describe the effects of the merger on prices using the adjusted porting data. They do not, apparently because the adjustments do not move the needle and show the merger to be bad for the public welfare. Instead, they resort to the familiar technique of trying one more time to distance themselves from their own methods: "these documents also note that these corrections may not always be accurate…"[35]

Finally, in Appendix A to their April 12 letter, the Applicants list documents previously cited by DISH and claim that these documents do not show that the Applicants use porting to estimate diversion. Of course, DISH did not cite these documents for that proposition. Below is a list of the documents and the statement that DISH *does* cite them for:

TMUS-FCC-01909049 TMUS-FCC-00211481	DISH's claim remains uncontested. The document identifies the strengths of porting data as well as the strengths and weaknesses of several other switching sources. T-Mobile uses "industry" porting

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[31] SPR-FCC-05680446, cited in TMO April 12 Letter at 11.

[32] TMO April 12 Letter at 11, Figure 5.

[33] *Id.* at 10.

[34] *Id.* at 17.

[35] *Id.* at 19.

	data and finds them a reliable metric, as it closely tracks T-Mobile's internal porting data.[36]
TMUS-FCC-01914010	DISH's claims remain uncontested. The executive states that **{{BEGIN HCI** **END HCI}}** the Applicants see porting data's "shortcoming" instead of the plain meaning of the statement: **{{BEGIN HCI END HCI}}** requires more than one source of data by definition. The executive does not suggest that Nielsen data is better than porting data.
TMUS-FCC-00793401	DISH's claim remains uncontested. DISH stated that T-Mobile uses porting data for MVNO metrics. T-Mobile attempts to move the goalpost by stating that it does not **{{BEGIN HCI END HCI}}** porting data. But it cannot deny that it uses porting data for this purpose, which is why DISH cited the document.
SPR-FCC-00002998	DISH's claim remains uncontested. DISH cited this document as an example of how Sprint uses porting data, in this instance in a daily report.
SPR-FCC-00910278	DISH's claim remains uncontested. The executive states that porting data **{{BEGIN HCI** **END HCI}}**. Nowhere does the executive discuss that porting data "are not precise proxies for switching due to their bias."
SPR-FCC-04246384 SPR-FCC-01616032 SPR-FCC-00882873	DISH's claim remains uncontested. The documents are additional examples of Applicants reviewing porting reports in the ordinary course of business. The Applicants claim that the documents "do not show that porting is used to estimate diversion" but again, this is a strawman.
TMUS-FCC-01648593	DISH's claim remains uncontested. This document shows the alignment between price changes and net port changes, and T-Mobile's awareness of it.
TMUS-FCC-01906347	DISH's claim remains uncontested. The Applicants conflate comments from two different surveys. T-Mobile's executive states that the **{{BEGIN HCI**

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[36] DISH did not "misinterpret" the several documents it cited regarding T-Mobile's use of a commercial supplier for its porting data. DISH noted the fact that T-Mobile uses Comlink, and that it finds Comlink reliable, as Comlink's data were a close a match to T-Mobile's own porting data. *See* DISH Jan. 28 Letter at 8-9.

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	END HCI}}
TMUS-FCC-02338784 TMUS-FCC-00923858	DISH's claim remains uncontested. Both emails illustrate that the Applicants use porting data to understand why consumers switch. The "divergent thread" that the Applicants cite states that one executive **{{BEGIN HCI** **END HCI}}**.
TMUS-FCC-02376783	DISH's claim remains uncontested. The email exchange discusses porting data, including **{{BEGIN HCI** **END HCI}}**. It also discusses how **{{BEGIN HCI** **END HCI}}**.
TMUS-FCC-02464576	DISH's claim remains uncontested. The documents are additional examples of Applicants reviewing porting reports.

Conclusion

In sum, use of porting data, which are shown by the Applicants' own documents to be closely aligned with price movements, shows, by the Applicants' own admission,[37] that this merger would be bad for the public.

Respectfully submitted,

_____/s_____
Pantelis Michalopoulos
Counsel to DISH Network Corporation

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[37] TMO April 12 Letter at 1.

Attachment A

Response to Israel, Katz, and Keating April 12, 2019 Declaration

Coleman Bazelon
Principal, The Brattle Group

Jeremy Verlinda
Principal, The Brattle Group

and

William Zarakas
Principal, The Brattle Group

May 1, 2019

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I.   Introduction

On April 12, 2019, T‑Mobile US, Inc. ("T‑Mobile") and Sprint Corporation ("Sprint") (collectively, the "Applicants") submitted a filing that further discusses the relevance of porting data for understanding diversion ratios among mobile wireless brands, and included a declaration from Mark Israel, Michael Katz, and Bryan Keating ("Compass Lexecon") on the consumer welfare effects of the proposed Sprint/T‑Mobile merger across various assumptions for diversion ratio information.[1] Specifically, Compass Lexecon presents aggregate consumer welfare calculations across market participants for each year from 2019 to 2024, and a final net present value ("NPV") across all years, similar to information that was provided in their February 20, 2019 declaration.[2] A version of this table also appears in the accompanying letter from the Applicants, with additional diversion ratio information sources provided. These tables purport to show that aggregate consumer welfare increases as a result of the proposed merger and that, therefore, the merger should be approved.

We have examined Compass Lexecon's modeling and find that Compass Lexecon's welfare calculations obfuscate the harm to wireless subscribers that is predicted from their own modeling of the proposed Sprint/T‑Mobile merger. This is because:

- Accepting all of Compass Lexecon's assumptions except for the price freeze commitment in 2019‑2020, its own modeling predicts aggregate consumer welfare losses during those years.

- As we have previously shown, both the Compass Lexecon and Asker, Bresnahan, and Hatzitaskos ("Cornerstone") models predict harm to Sprint subscribers, with price increases that exceed any claimed willingness to pay ("WTP") values for claimed merger‑related network quality improvements. That is, even if all of the Applicants' assumptions about diversion ratios, marginal cost efficiencies, and network quality

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[1]   Mark Israel, Michael Katz, and Bryan Keating, "The Proposed Merger of Sprint and T‑Mobile is Procompetitive when Evaluated Using Two Additional Approaches to Estimating Diversion Ratios", *In the Matter of Applications of T‑Mobile US, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations,* WT Docket No. 18‑197, April 12, 2019, (henceforth "Compass Lexecon April 12 Declaration").

[2]   Mark Israel, Michael Katz, and Bryan Keating, "Extension of the Israel, Katz, and Keating Analysis to 2019‑2020", *In the Matter of Applications of T‑Mobile US, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations,* WT Docket No. 18‑197, February 20, 2019, (henceforth "Compass Lexecon February 20 Declaration").

improvements are accepted, the more than {{BEGIN HCI   END HCI}} Sprint subscribers who are predicted to continue to stay with the Sprint brands after the merger will face price increases that exceed the claimed WTP values for network quality improvements.

- Compass Lexecon's welfare calculations are based on several incorrect assumptions. Among other things: (1) the Applicants have not considered the effects of future millimeter wave or other possible spectrum acquisitions, roaming agreements or partnerships; (2) have inflated marginal cost saving in yet other, unrebutted respects; (3) have failed to account for the complexities and realistic costs of network integration; (4) have ignored upwards price pressure due to coordinated effects; and (5) have disregarded wholesale price increases. In addition:

- Aggregating consumer welfare *within a given year* understates the harm to subscribers caused by the merger's price increases.

- Compass Lexecon's aggregation of consumer welfare effects *across years* via discounting cannot be relied upon for assessing the effects of the proposed merger, because:

  - Compass Lexecon's NPV calculations of aggregate consumer welfare use an *infinite time horizon* that accounts for most of the claimed benefits of the merger.

  - Compass Lexecon's calculations of aggregate consumer "benefits" from the merger are further overstated by an inconsistent approach to normalizing the welfare calculations on a per person basis.

  - The inconsistency of information used by Compass Lexecon to estimate the demand parameters across years demonstrates that the aggregate welfare calculations are performed on a different basis each year, and cannot be summed across years (even after discounting).

  - The NPV calculations are predicated on intergenerational transfers, with significant harm to subscribers in early years that require benefits enjoyed by different individuals over several decades to offset the early years' harms. For example, without the 2019-2020 price constraint and after adjusting claimed network marginal cost savings to reflect likely millimeter wave acquisitions, Compass Lexecon's net aggregate consumer welfare would not turn positive *until after 2038* under the HarrisX Survey diversion scenario.

- Correcting the Compass Lexecon modeling for the inappropriate time horizon, 2019-2020 price constraints, and missing millimeter wave spectrum holdings assumptions reverses Compass Lexecon's findings. With just these corrections, Compass Lexecon's own demand modeling shows that, regardless of the assumptions used for diversion ratios and WTP for network quality improvements, aggregate consumer welfare

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decreases both in the early years and cumulatively over time. In addition, when Compass Lexecon's assumptions about the value of network quality improvements are relaxed, aggregate consumer welfare decreases in every year under the HarrisX Survey and Facebook diversion scenarios.

On April 22, 2019, the Applicants submitted a revised network model and accompanying declaration from Compass Lexecon that purports to incorporate potential millimeter wave acquisitions.[3] We will address that model in a subsequent report, but for purposes of this report we focus our analysis on the network model and aggregate consumer welfare analyses presented in the Applicants' February 21 and April 12 filings.

II.   The Compass Lexecon Welfare Calculations Obfuscate the Harm to Wireless Subscribers from the Proposed Merger

Compass Lexecon presents, yet again, a consumer welfare analysis that offsets merger-related harms to specific subsets of subscribers against claimed merger benefits, or even an absence of significant harm, to other market participants. We have previously explained the inappropriateness of the suggested welfare standard,[4] and to date none of the Applicants' experts has provided a response. We explain below how Compass Lexecon's calculations substantially understate the harm to mobile wireless subscribers from the proposed Sprint/T-Mobile merger.

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[3]   Mark Israel, Michael Katz, and Bryan Keating, "The Conclusion that the Proposed Merger of Sprint and T-Mobile will Increase Consumer Welfare Holds Even if the Standalone Companies would Otherwise Obtain Licenses to mmWave Spectrum", *In the Matter of Applications of T-Mobile US, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations,* WT Docket No. 18-197, April 22, 2019, (henceforth "Compass Lexecon April 22 Declaration").

[4]   *See* Further Reply Declaration of Coleman Bazelon, Jeremy Verlinda, and William Zarakas, *In the Matter of Applications of T-Mobile US, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations*, WT Docket No. 18-197, December 4, 2018 (henceforth "Brattle December 4 Declaration"), at p. 31.

Continued on next page

A. The Applicants' own modeling predicts aggregate consumer welfare losses in the "integration period" years 2019-2020

As we explained in our March 28 declaration, when the price constraint assumption is relaxed in Compass Lexecon's merger simulation model, the output from the model shows that aggregate consumer welfare decreases for the integration period (2019-2020).[5] This result, which is directly obtained from the backup materials for their February 20 declaration, occurs despite no other changes to the model besides the removal of the price constraint assumption. That is, it includes all of Compass Lexecon's modeling assumptions, including all diversion ratio information sources considered by the Applicants, all claimed marginal costs savings, all claimed network quality changes, and the assumption that existing wholesale contracts are not yet renegotiated. This table is recreated below and is augmented only to include the last column to summarize the fact that, in each and every year, regardless of diversion ratio scenario, the welfare change is negative—i.e., the merger is, under the Applicants own criterion, "bad."

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[5]   *See* Response to Compass Lexecon and Mark McDiarmid of Coleman Bazelon, Jeremy Verlinda, and William Zarakas*, In the Matter of Applications of T-Mobile US, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations*, WT Docket No. 18-197, March 28, 2019 (henceforth "Brattle March 28 Declaration"), at Table 2.

Table 1: Change in Consumer Welfare (2019-2020, Per-Sub Per-Month) from Compass Lexecon Merger Simulation Model, With Claimed Marginal Cost Savings and Adjusted Nevo WTP Estimates for Quality Efficiencies (Maintain Case)

		2019	2020	Merger Good?
	IKK Merger Simulation Model with ABH Diversion Ratios			
[1.A]	*ABH Diversion Ratios, -0.3 Industry Elasticity, 75% Wholesale Pass-Through Rate, vGUPPI without Input Substitution, TracFone and Sprint Resellers Wholesale Price Constraints*			✘
	Sensitivities			
	<u>T-Mobile/Sprint Diversion Ratio Data Sources</u>			
[1.B]	*Harris Mobile Insight*			✘
[2]	*Sprint Brand IQ Survey*			✘
[3]	*T-Mobile SoGA and SoDA Estimates*			✘
[4]	*Proportional to Subscriber Share (Simple Logit)*			✘
	<u>Alternative Industry Elasticity Assumptions</u>			
[5]	*-0.1*			✘
[6]	*-0.5*			✘
	<u>Alternative Vertical Upward Pricing Pressure Pass-Through Rates</u>			
[7]	*50% Pass-Through of Vertical Upward Pricing Pressure*			✘
[8]	*100% Pass-Through of Vertical Upward Pricing Pressure*			✘
[9]	<u>vGUPPI with Input Substitution</u>			✘
[10]	<u>TracFone-Only Wholesale Price Constraint</u>			✘

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Sources: Compass Lexecon Backup Materials; Brattle Calculations (Brattle March 28 Declaration at Table 2).

As shown in Table 1, above, Compass Lexecon finds that, on average across all modeled consumers in the mobile wireless market, aggregate consumer welfare decreases by {{BEGIN HCI END HCI}} in 2019 and {{BEGIN HCI END HCI}} in 2020. Moreover, as we discuss in further detail below, these aggregate consumer welfare calculations mask the fact that the Applicants' own subscribers' harm from the merger is much greater, with average price increases for the Applicants' brands, inclusive of all efficiencies claims, of approximately {{BEGIN HCI END HCI}} under the Cornerstone diversion ratios and approximately {{BEGIN HCI END HCI}} under the HarrisX Survey diversion ratios.[6]

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[6] See Brattle March 28 Declaration, at Table 1. At an ARPU level of $45, a {{BEGIN HCI END HCI}} increase would translate to {{BEGIN HCI END HCI}} and a {{BEGIN HCI END HCI}} increase would translate to {{BEGIN HCI END HCI}}, or about 2.5 to 6.5 times greater than the average aggregate harm values calculated by Compass Lexecon.

B. Even under all of the Applicants' claimed merger efficiencies, Sprint subscribers will face price increases that exceed the claimed WTP for network quality improvements

The Applicants' welfare calculations inaccurately reflect the harm to subscribers from the proposed merger. As we have previously shown, when the Applicants' marginal cost savings claims are revised to account for millimeter wave spectrum acquisitions, the proposed merger will increase prices for all of the Applicant brands,[7] and these price increases are not offset by improved network quality.[8] This is true under all diversion ratio estimates proposed by the Applicants, and is most pronounced under diversion ratio estimates based on porting data.

Nonetheless, even if, incorrectly, we entertain all of the Applicants' claimed efficiencies and diversion ratio information, subscribers of the Sprint brands face price increases that exceed the claimed values of any network quality improvements, as shown in Figure 1, below.

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[7]   See Brattle March 28 Declaration, at Tables 1 and 4.

[8]   See Reply to Cornerstone "Response to Dish and CWA Comments", *In the Matter of Applications of T-Mobile US, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations*, WT Docket No. 18-197, February 19, 2019 (henceforth "Brattle February 19 Declaration"), at Table 2.

Figure 1: Sprint Subscribers' Merger Price Effects versus WTP for Claimed Quality Improvements No Price Commitment in 2019-2020, All Claimed Efficiencies, ($ per sub per month)
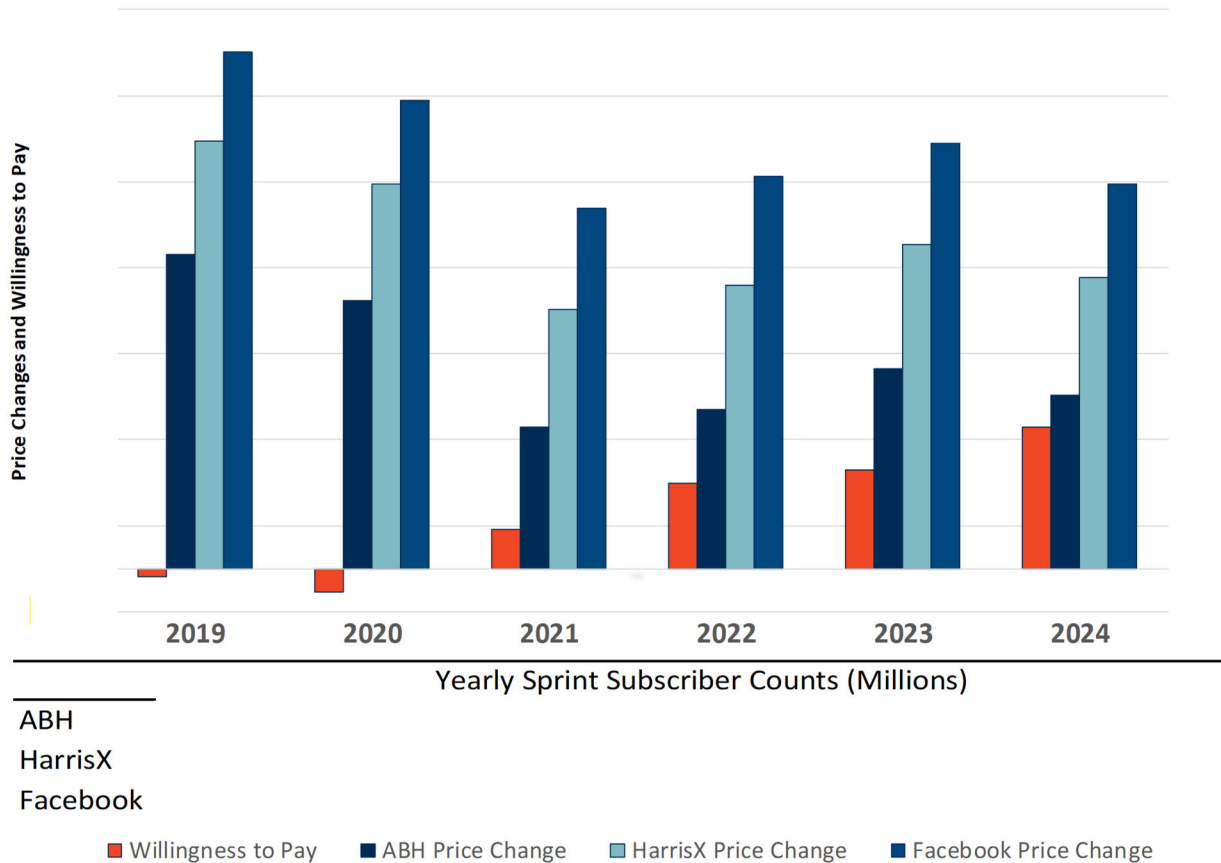
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Source: Compass Lexecon Backup Materials.

Notes: Sprint price increases reflect weighted average of Sprint post-paid, Sprint pre-paid, and Boost/Virgin price increases, with weights based on pre- and post-merger subscriber shares in each year. Willingness to Pay values are for the Sprint "maintain" case and "site-specific scaling" case scenarios presented in Tables 2 and 17 of Compass Lexecon February 20 Declaration. Sprint subscriber counts reflect post-merger counts for all Sprint brands predicted in Compass Lexecon merger simulations.

In addition to the gap in price increases versus WTP for network quality improvements, the figure also reports the number of mobile wireless subscribers that the Compass Lexecon model predicts will continue to remain with one of the Sprint brands after the merger, ranging from {{BEGIN HCI END HCI}} in 2019 to as many as {{BEGIN HCI END HCI}} in 2024. Regardless of the Applicants' claims of consumer welfare increases from the merger, they have failed to address the fact that their own modeling predicts such harms to the more than {{BEGIN HCI END HCI}} subscribers who choose to stay with a Sprint brand after New T-Mobile increases their subscription prices.

C. Aggregate welfare calculations *within a given year* understate the harm to subscribers caused by the merger's price increases

We have shown that both the Compass Lexecon and Cornerstone modeling predict harm to Sprint subscribers, with price increases that exceed any claimed WTP values for claimed merger-related network quality improvements. Compass Lexecon finds aggregate consumer welfare gains by offsetting the harm to Sprint subscribers with supposed welfare gains to T-Mobile subscribers, small price effects among the non-merging party brands, and the absence of any effects on the value of the outside option.[9] And even in modeling scenarios where both Sprint and T-Mobile subscribers bear price increases in excess of any WTP values for quality improvements, the Compass Lexecon and Cornerstone consumer welfare calculations inappropriately attenuate that harm based on the smaller harms predicted for the non-merging party brands and, again, the absence of any effects on the value of the outside option.

Why does this occur in their consumer welfare calculations? Compass Lexecon calculates consumer welfare based on the ex ante option value, across all market participants, of choosing any brand, or no wireless brand at all. That is, in their demand models, someone who was *observed* to choose Sprint might nevertheless have the following brand choice probabilities: Sprint (20%); T-Mobile (10%); Verizon (30%); AT&T (30%); and no wireless plan at all (10%).[10] On an ex ante basis, the demand model treats this Sprint subscriber as if she chooses *all five of these options*: she spends 20% of her budget on Sprint, 10% on T-Mobile, 30% on Verizon, etc. We do not critique here the relevance of probabilistic choice models for merger analysis of differentiated products. Even so, when the model predicts that the merger would cause a $5 Sprint price increase, the ex ante welfare loss would be approximately just $5 x 10% = $0.50.[11] But, for all pre-merger Sprint subscribers that continue to choose Sprint post-merger, the required compensation needed to offset

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[9]   In the Compass Lexecon demand model, consumers can choose among any of the modeled brands (e.g., Sprint postpaid, Boost, MetroPCS, etc.) or an "outside option" that represents choosing none of the brands in the model (and in practical terms means choosing not to buy a mobile wireless subscription).

[10] Discrete choice demand models, such as the logit, only predict that a subscriber will choose a brand with a given probability, no matter how small—in other words they do not predict that the subscriber will choose the brand with the highest brand choice probability.

[11] The value would be lower still, as her post-merger probability of choosing Sprint will decrease.

the harm from the merger's price increase would be \$5, not \$0.50.[12] Ex ante consumer welfare calculations therefore underestimate this harm.

D. Compass Lexecon's calculations are based on several other incorrect assumptions and methods

Compass Lexecon's calculations are based on a number of flawed assumptions, which we have discussed in prior reports. For example, the Applicants have not made required corrections to their marginal cost claims to account for future access to millimeter wave frequencies and have disregarded the other respects in which their marginal cost savings claims are over-inflated. Moreover, the Applicants continue to ignore coordinated effects and wholesale price increases, and both Compass Lexecon and Cornerstone continue to overstate the WTP for claimed network quality improvements.

In addition, notwithstanding their inappropriateness for assessing the proposed merger's harm, even on their own merits the Compass Lexecon consumer welfare NPV calculations are overstated and incorrect. This is because:

- Compass Lexecon's baseline NPV calculations aggregate consumer welfare across an infinite time horizon, which accounts for more than 84% of their estimated aggregate consumer welfare effects.

- Compass Lexecon's calculations of aggregate consumer "benefits" from the merger are further overstated by an inconsistent approach to normalizing the welfare calculations on a per person basis.

- The inconsistency of information used by Compass Lexecon to estimate the demand parameters across years demonstrates that the aggregate welfare calculations are performed on a different basis each year, and cannot be summed across years (even after discounting).

- The NPV calculations are predicated on intergenerational transfers, with harm to subscribers in early years that could require benefits over several decades to offset.

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[12] As we have previously explained, the compensating variation is equal to the value of the price change for someone who chooses a specific brand before and after the price change, potentially adjusted for any changes in quality.

1. Compass Lexecon inappropriately assumes that claimed merger benefits last in perpetuity

First, Compass Lexecon presents baseline net present value ("NPV") figures based on the unsupported assumption that the welfare effects persist forever, with a discount rate of just 2%.[13] Given the pace of technological change in the mobile wireless industry, calculating the effects of the proposed Sprint/T-Mobile merger while assuming that the calculated welfare effects last into perpetuity cannot be defended. Neither can a discount rate over such a time horizon that implies that even as late as 35 years into the future, these welfare effects still retain 50% of value.[14]

Since the 1970s, mobile wireless technology has been transitioning through technology generations (e.g., from 1G to 4G) at a rapid rate. More recently, mobile wireless technology has transitioned from 3G to 4G in roughly 10 years.[15] Past experience thus indicates the folly of calculating welfare beyond the present horizon, let alone decades in the future. Tellingly, current industry reports do not forecast mobile wireless demand beyond 2024,[16] the Applicants' own network model extends only through 2024, and the underlying demand forecasts in the network model's supporting documents only go to {{BEGIN HCI   END HCI}} for Sprint and {{BEGIN HCI   END HCI}} for T-Mobile.[17]

Although not included in the April 12 filing (except in backup materials), in their February 20 declaration, Compass Lexecon presented alternative discounting scenarios for their NPV

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[13]   *See* Compass Lexecon February 21 Declaration pp. 13-14. *See also* Applicants' April 12 Letter at footnote 2.

[14] $\frac{1}{1.02^{35}} = 0.5$

[15]   Exact calculations of the transition time from generation to generation are difficult due to the various wireless standards that fall under each generation. For a more detailed discussion of such standards, *See* Bhalla, Mudit Ratana and Anand Vardhan Bhalla, "Generations of Mobile Wireless Technology: A Survey," *International Journal of Computer Applications,* vol. 5, no. 4, (2010): 26-32.

[16]   *See* "Ericsson Mobility Report", Ericcson, November 2018, accessed April 30, 2019, https://www.ericsson.com/assets/local/mobility-report/documents/2018/ericsson-mobility-report-november-2018.pdf.

[17]   *See* SPR-DOJ-04338918 and TMOPA_04641354, cited in "Figure 9_Sprint and T-Mobile Data Usage Forecasts.xlsx" backup materials for Mark Israel, Michael Katz, and Bryan Keating, "Appendix F: Declaration of Compass Lexecon", *In the Matter of Applications of T-Mobile US, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations,* WT Docket No. 18-197, September 17, 2018.

calculations. These included a scenario that terminates after 2029 and uses a 2% discount rate (Compass Lexecon labels this an "Intermediate" scenario) and a third scenario that terminates after 2024 and uses a 10% discount rate (Compass Lexecon labels this a "conservative" scenario).[18] Table 2, below, extracts these three scenarios from Compass Lexecon's backup materials, separately for each diversion ratio source considered in Table 1 of the Applicants' April 12 letter.

Table 2: Compass Lexecon's NPV Welfare Calculations by Discounting Scenario
{{BEGIN HCI

END HCI}}

Source: Compass Lexecon Backup Materials.

Notes: [4] = 1 − [3]/[1]. 2019 market participants include subscribers and market participants choosing the "outside" option. "Baseline" discounts 2024 consumer welfare into perpetuity with a 2% discount rate. "Intermediate" discounts through 2029 with a 2% discount rate (with 2024-2029 values equal to 2024's consumer welfare). "Conservative" assume no effect on consumer welfare after 2024 and uses a 10% discount rate.

As shown in the table, the "baseline" infinite time horizon assumption (which, again, is the only scenario shown in the Applicants' April 12 filing), accounts for most of the claimed NPV of consumer welfare effects from the proposed merger. For example, in Compass Lexecon's "intermediate" scenario, where welfare effects are only considered over the next 11 years (through 2029), the NPV value declines from {{BEGIN HCI   END HCI}} per 2018 wireless subscriber to {{BEGIN HCI   END HCI}} per 2018 wireless subscriber, indicating that consumer welfare estimates after 2029 account for over 84% of the claimed NPV.

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[18] In their April 22 declaration, Compass Lexecon modifies the "conservative" scenario to use a discount rate of 2% instead of 10%. *See* Compass Lexecon April 22 Declaration at p. 4, footnote 7. The "conservative" scenario in Table 2, below, continues to use Compass Lexecon's original 10% discount rate as it was presented in their February 20 declaration and April 12 backup materials.

2. Normalizing the NPV of aggregate consumer welfare by 2018 wireless subscribers is inappropriate and inconsistent with how Compass Lexecon measures aggregate consumer welfare

Second, Compass Lexecon further overstates the NPV of the welfare calculations through inconsistencies in its approach to normalizing the aggregate values on a per person basis. As we explained above, Compass Lexecon calculates consumer welfare across all market participants, including both the estimated number of wireless subscribers as well as their calculations of the number of market participants choosing the outside option (and not buying a wireless plan). This aggregate consumer welfare across all market participants is used for each year's calculated total (consumer) welfare effect, and is also the value that is discounted back to the present day. In order to normalize this value into a per person consumer welfare effect, Compass Lexecon divides the aggregate NPV by the number of 2018 wireless subscribers. This normalizing choice inflates the consumer welfare effect, as reflected in Table 2, above. If Compass Lexecon had normalized aggregate NPV by its estimated number of 2019 market participants instead,[19] the value per person would be approximately 15% lower. For example, under the HarrisX survey diversion information, the "baseline" NPV per person (where, again, Compass Lexecon assumes that the merger effects persist in perpetuity) would decline from {{BEGIN HCI   END HCI}}.

3. Compass Lexecon's yearly aggregate consumer welfare estimates cannot be summed across years due to inconsistent information used for each year's demand modeling

Third, the welfare calculations, as conducted, aggregate incompatible information. For example, the Compass Lexecon demand model relies upon T-Mobile margin information in order to estimate its parameters, including the price sensitivity and number of total market participants, inclusive of

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[19] We present the 2019 market participants normalization merely to illustrate the inconsistency and inflationary effect of Compass Lexecon's choice of using 2018 wireless subscribers. A more accurate calculation of the merger's per-person consumer welfare calculations would address the fact that a consumer who enters the market in 2029 does not experience the effects before their entry, and that a consumer who exits the market in 2021 does not experience the effects after their exit. Because Compass Lexecon explicitly models market growth of approximately 1.5% each year, normalizing by 2018 market subscribers further inflates their figures by attributing external market growth to the merger's welfare effects.

both actual wireless subscribers and those consumers who select the "outside option" of no wireless plan at all. But, inscrutably, Compass Lexecon's margin information for T-Mobile is distinctly different for the "integration period" of 2019-2020 versus the "5G transition period" of 2021-2024. In the integration period, Compass Lexecon uses T-Mobile margins that are more than 10 percentage points greater than those used in the 5G transition period.[20] Even though Compass Lexecon provides no explanation for using such different margin information, it results in significantly different estimates of the price sensitivity and "outside share" values between the two periods. In the integration period the price sensitivity parameters are approximately {{BEGIN HCI

END HCI}} in each year, while in the 5G transition period these parameters range from {{BEGIN HCI   END HCI}}.[21] And, because the market elasticity is fixed in the model at -0.3 for all years, this (plus changes to the nesting parameters) leads to inconsistent market sizes across years. The share of the outside good drops by about two percentage points between the integration and 5G transition periods,[22] and, while the Applicants have estimated that the number of wireless subscribers will *increase* in every year from 2019 to 2024, Compass Lexecon estimates that the total market size, including both subscribers and those choosing the outside option, *decreases* from 2020 to 2021.[23]

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[20]   *See* Figure 3 in Appendix.

[21]   One implication of this result is that a unit of network quality improvement is valued very differently in each of the two time periods. In the Compass Lexecon model, network quality improvements appear through the brand "quality" parameter, such that a calculated WTP of, for example, $1.00 requires a network quality improvement of $1.00 \times \alpha$, where α denotes the demand model's price sensitivity parameter for that year. WTP values are derived from Compass Lexecon's assessment of the Nevo study of wireline broadband service, and are invariant to Compass Lexecon's demand model parameters. Hence, when {{BEGIN HCI   END HCI}}, the required network quality improvement to achieve $1.00 WTP for network quality improvement is also {{BEGIN HCI   END HCI}}. Compass Lexecon's average estimated (relative) network quality value is {{BEGIN HCI   END HCI}} for T-Mobile in the integration period and {{BEGIN HCI   END HCI}} in the 5G transition period. The corresponding network quality improvements of approximately {{BEGIN HCI   END HCI}} are equivalent to 22% and 117% relative improvements in network quality, *for the same* hypothetical $1.00 WTP for those network quality improvements.

[22]   *See* Figure 3 in Appendix.

[23]   *See* Figure 4 in Appendix.

4. Compass Lexecon's NPV calculations are predicated on intergenerational transfers, with harm to subscribers in early years that could require benefits over several decades to offset

Aggregation of the merger's claimed welfare effects through the NPV of the claimed yearly consumer welfare effects is implicitly predicated on intergenerational welfare transfers.[24] That is, Compass Lexecon allows for harm to subscribers in certain years to be offset through claimed welfare gains in later years. For example, in Compass Lexecon's baseline perpetuity modeling, harm to subscribers in years 2019-2023 can be offset by claimed gains in 2024 and beyond, which, because of the assumed infinite life and low discount rate, can lead to a positive NPV. However, unlike a long-lived public works project such as a dam or an electric plant, the burden on mobile wireless subscribers in the early years that we see in Compass Lexecon's aggregate consumer welfare calculations is not shared with subscribers in later years (see Figure 2, below).[25]

This general concern with trade-offs over time is exacerbated in the current context because of the high churn in the wireless industry. As we have noted, the Compass Lexecon aggregates consumer welfare calculations trade-off harms to some individuals (*e.g.*, Sprint customers) against claimed benefits to others.[26] Implicit in Compass Lexecon's analysis is that from a social perspective the

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[24] There is a vast academic literature on social welfare discounting, with considerable controversy over how to assess intergenerational transfers for long-lived economic projects with disparate impacts on consumers over time. In defense of their discounting methodology, Compass Lexecon cites a report of the Council of Economic Advisors (Compass Lexecon February 21 Filing at p. 14, footnote 41). This report briefly discusses that academic literature, noting

> Special ethical considerations arise when comparing benefits and costs across generations. Although most people demonstrate time preference in their own consumption behavior, it may not be appropriate for society to demonstrate a similar preference when deciding between the well-being of current and future generations.

See Council of Economic Advisors, "Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate", Issue Brief, January 2017, at p. 2.

[25] Many public works projects are debt-financed over decades and therefore effectively resolve the intergenerational transfer problem that would occur if the first generation had to pay the upfront capital costs of the project while future generations enjoyed its benefits. For example, the capital expense of building a nuclear power plant might be amortized over a lifespan of, say, 50 years, with its utility customers sharing the burden of that amortization in their electricity rates across its 50-year lifespan.

[26] After adjusting for overstated marginal cost savings, we have shown that New T-Mobile would likely raise prices for both its Sprint and T-Mobile brands. In Compass Lexecon's demand model, under the

individuals who benefit *could* compensate those that are harmed, though such a transfer system is far outside the scope of ordinary antitrust oversight. That is, Compass Lexecon's welfare calculations mix an infinitely long time horizon with potential compensation of the merger's losers by the merger's winners that never actually occurs. This mix of winners and losers is further compounded by the high churn rates. For example, a churn rate of 2% per month would imply that the average customer leaves their current brand within 4.2 years and, within the context of Compass Lexecon's study period, fewer than 30% of current subscribers will still be with the same brand after 2024. Consequently, the majority of the claimed benefits (over 84%) which will accrue in the out years will be enjoyed by different individuals than the ones in the early years.

E. After correcting the claimed merger efficiencies and removing the price commitment, the proposed Sprint/T-Mobile merger causes aggregate consumer welfare to decrease

For the reasons listed above, Compass Lexecon's NPV calculations of consumer welfare cannot be relied upon to assess the merger. As we explain above, the appropriate assessment of competitive effects of the proposed merger is based on the price effects of the merger, not ex ante consumer welfare. Nevertheless, even when we examine the consumer welfare effects using Compass Lexecon's methodology, we see that consumer welfare falls when corrections are made to the claimed merger efficiencies. Specifically, we have explained in our previous filings that the Applicants' network model fails to address their likely millimeter wave acquisitions, which substantially reduce the claimed marginal cost savings from the merger and also enable 5G throughput speeds for the stand-alone networks.[27] We have also explained that both the Compass Lexecon and Cornerstone estimates of the WTP for network quality improvements are significantly overstated.[28] Figure 2, below, describes the change in consumer welfare per market

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adjusted marginal cost savings all subscribers are harmed in the early years, but Compass Lexecon's aggregate consumer welfare calculations attenuate the harm to Sprint and T-Mobile by averaging with brands that experience significantly smaller price increases (or no change at all for the outside good).

[27] *See* Brattle March 28 Declaration at Table 3.

[28] *See* Reply Declaration of Joseph Harrington, Coleman Bazelon, Jeremy Verlinda, and William Zarakas, Exhibit B to Petition to Deny of DISH Network Corporation, *In the Matter of Applications of T-Mobile US, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations*, WT Docket No. 18-197, October 31, 2018, Appendix IV, (henceforth "Brattle October 31 Declaration"), at pp. 81-92, in which we explain that the Nevo WTP calculations for wirelines

participant for each year from 2019 through 2024, based on Compass Lexecon's methodology and backup materials. The figure considers nine scenarios across three sets of diversion ratio sources and three scenarios for WTP values for network quality improvements: 100% of the "adjusted Nevo" values; 50% of the "adjusted Nevo" values, and none. In each scenario, we adjust the marginal cost savings to reflect millimeter wave acquisitions of 200, 200, 400 MHz of spectrum for Sprint, T-Mobile, and New T-Mobile, respectively, and remove Compass Lexecon's assumed price constraints for 2019-2020.

Figure 2: Compass Lexecon Consumer Welfare Calculations by Year by Diversion Scenario Marginal Cost Savings Adjusted for mmWave Holdings, No Price Commitment in 2019-2020 Claimed Quality Improvements at All, Half, and None of Adjusted Nevo WTP Values
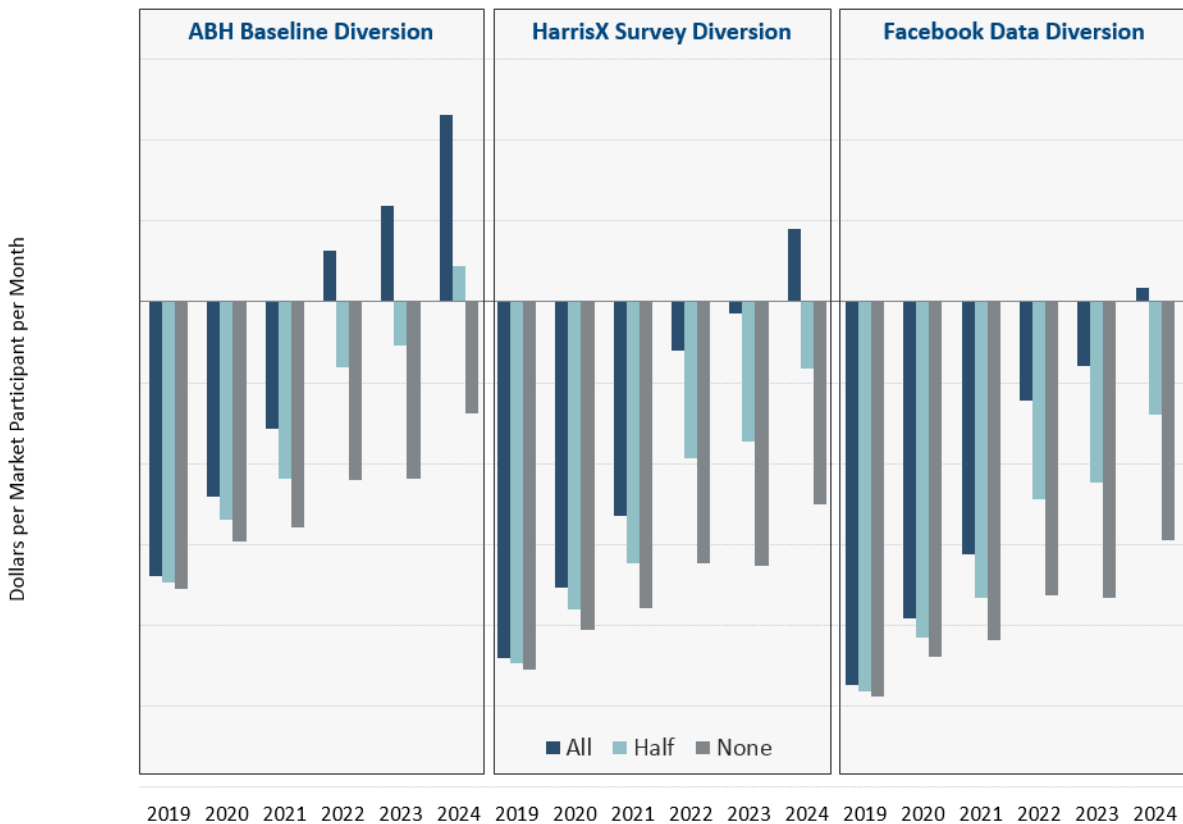
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Source: Compass Lexecon Backup Materials and Brattle Calculations.

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broadband increases in speed are inapplicable for assessing claimed speed improvements in mobile wireless, and that Compass Lexecon's adjustments to the Nevo wireline model are inadequate. *See also* Brattle December 4 Declaration at pp. 16-17, in which we explain that the Cornerstone model overstates WTP for network quality improvements due to omission of important variables such as plan data allowances and localized advertising by brands.

Note: mmWave acquisitions reflect the 200/200/400 Sprint/T-Mobile/New-T-Mobile scenario.

As shown in the figure above, aggregate consumer welfare declines in nearly every year and in nearly every scenario. The chart shows that network quality improvements are essential to Compass Lexecon's conclusions about aggregate consumer welfare increases from the proposed merger. In the scenario where there are no quality improvements, aggregate consumer welfare falls in every year, regardless of the diversion ratio input. And in the scenario where we examine quality improvements at half of the adjusted Nevo WTP values, aggregate consumer welfare decreases in every year for both the HarrisX Survey data and adjusted Facebook data diversion ratio sources, while for the Cornerstone (baseline model with no nesting) diversion ratios, aggregate consumer welfare decreases in every year except 2024. Finally, when the full value of Compass Lexecon's adjusted Nevo WTP calculations is used, aggregate welfare declines in every year except for 2024 under both the HarrisX Survey and adjusted Facebook diversion ratios, and declines in 2019 through 2021 under the Cornerstone diversion ratios.

Figure 2 also demonstrates that the infinite horizon in the NPV calculations is essential to Compass Lexecon's conclusions. Once the likely millimeter wave acquisitions are accounted for in Compass Lexecon's estimated marginal cost savings, it is evident that consumer benefits are only possible through a combination of: (a) offsetting consumer welfare decreases in the early years by extending the 2024 consumer welfare calculations into perpetuity; (b) assuming implausibly low diversion ratios that are contradicted by all of the other information available, including company documents and Compass Lexecon's own initial assessments; and (c) assuming implausibly high WTP values for claimed network quality improvements. In most cases, eliminating any one of these assumptions results in an aggregate consumer welfare loss. Yet, under the infinite horizon NPV calculations, even a small welfare gain in 2024 could be sufficient, according to Compass Lexecon, to overcome harms in earlier years. For example, while the "All" adjusted Nevo WTP with HarrisX Survey diversion scenario shows harm in every year except 2024, at a 2% discount rate for 2024 and beyond this relatively small aggregate consumer welfare increase in 2024 would eventually offset the significantly larger aggregate consumer welfare losses in the preceding years—although the break-even point when net aggregate consumer welfare becomes positive is not until 2038. Removing the infinite horizon assumption, and focusing on the aggregate consumer welfare losses that are shown in each year, reveals the underlying harm that is present in Compass Lexecon's own modeling.

III.   Appendix

Figure 3: Compass Lexecon Input Margins for T-Mobile versus Calculated Outside Share
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Source: Compass Lexecon Backup Materials.

Notes: Based on Cornerstone Baseline Scenario. Outside market share is based on pre-merger calibrated values.

Figure 4: Compass Lexecon Subscriber Count versus Total Market Size (Including Outside Option)

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Source: Compass Lexecon Backup Materials.

Notes: Based on Cornerstone Baseline Scenario. Outside market share is based on pre-merger calibrated values.

**Table 3: NPV of Aggregate Consumer Welfare, per 2018 Wireless Subscriber
by Diversion Scenario, by Compass Lexecon Discounting Scenario
Marginal Cost Savings Adjusted for mmWave Holdings, No Price Commitment in 2019-2020
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Sources: Compass Lexecon Backup Materials; Brattle Calculations.

Notes: Baseline refers to perpetual discounting at a 2% discount rate, using the 2024 consumer surplus level after 2024.

Intermediate refers to discounting at a 2% discount rate, using the 2024 consumer surplus level through 2029.

Conservative refers to discounting until 2024, separately at 10% and 2% discount rates.

**Table 4: Adjustment of Table 1 in Applicants' April 12, 2019 Filing: "Consumer Welfare
Improvement Per Sub Per Month ('19-'24) and Total Discounted Welfare Gain"
Marginal Cost Savings Adjusted for mmWave Holdings, No Price Commitment in 2019-2020
Total Welfare Discounted Based on Compass Lexecon "Conservative" Scenario: 10% Discount Rate
Through 2024**

Data Source	2019	2020	2021	2022	2023	2024	Total Welfare Gain	Merger Good?
Baseline Case (ABH)								✗
ABH-Nested Logit								✗
HarrisX Mobile Insights								✗
Sprint Brand IQ Survey								✗
SoGA/SoDA Estimates								✗
Subscriber Shares								✗
Facebook Data								✗

HIGHLY CONFIDENTIAL MATERIAL HIGHLIGHTED

Sources: Compass Lexecon Backup Materials; Brattle Calculations.