BROADCASTING AND TELECOMMUNICATIONS LEGISLATIVE REVIEW

APPENDIX 4

TO

SUBMISSION OF CANADIAN NETWORK OPERATORS CONSORTIUM INC. TO THE BROADCASTING AND TELECOMMUNICATIONS LEGISLATIVE REVIEW PANEL

11 JANUARY 2019

BEFORE THE CANADIAN RADIO-TELEVISION AND TELECOMMUNICATIONS COMMISSION

IN THE MATTER OF

RECONSIDERATION OF TELECOM DECISION 2017-56 REGARDING FINAL TERMS AND CONDITIONS FOR WHOLESALE MOBILE WIRELESS ROAMING SERVICE, **TELECOM NOTICE OF CONSULTATION CRTC 2017-259, 20 JULY 2017**

SUPPLEMENTAL INTERVENTION OF ICE WIRELESS INC.

27 OCTOBER 2017

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EXECUTIVE SUMMARY

ES-1. This supplemental intervention is being submitted by Ice Wireless on behalf of itself and its affiliated Wi-Fi first service provider Sugar Mobile. Any capitalized or shorthand terms not defined in this Executive Summary are defined in the balance of the Supplemental Intervention.

ES-2. Ice Wireless has had the opportunity to review the initial interventions of other parties to this proceeding and continues to stand by the positions set out in its initial intervention. As Ice Wireless expected, the incumbent wireless carriers have uniformly lined up against the proposal to expand the definition of home network to encompass Wi-Fi.

ES-3. Generally speaking the incumbent wireless carriers have taken four different approaches towards trying to stop the expansion of the definition of home network to include Wi-Fi and thus prevent innovative service providers such as Sugar Mobile from being able to compete nationwide.

ES-4. Firstly, the incumbent wireless carriers argue that Canada's mobile wireless market is already sufficiently competitive with plenty of affordable options for end-users.

ES-5. Secondly, the incumbent wireless carriers argue that investment in mobile wireless network infrastructure will be catastrophically harmed if the definition of home network is expanded.

ES-6. Thirdly, in the event that the Commission does choose to expand the definition of home network the incumbent wireless carriers have proposed the imposition of such onerous conditions on Wi-Fi first service providers that none of these innovative competitors will ever be able to enter the marketplace.

ES-7. Fourthly, some of the incumbent wireless carriers have tried to engage in fear-mongering by making unsubstantiated claims about safety and security issues with Wi-Fi first service providers.

ES-8. Ice Wireless urges the Commission to see through these arguments for what they really are: desperate attempts by Canada's incumbent wireless carriers to hold onto their oligopoly and continue to subject Canadians to supra-competitive pricing for their mobile wireless services.

ES-9. Ice Wireless has retained Dr. von Wartburg of the Analysis Group to provide expert evidence regarding the economic issues related to investment and competition in the mobile wireless telecommunications market raised in TNC 2017-259.

ES-10. Dr. von Wartburg's report demonstrates the following:

a. Canada's mobile wireless market is highly concentrated in the hands of the national wireless carriers. The level of market concentration in every province and territory except for Quebec is above that of European countries where MVNO access has been mandated.
b. The national wireless carriers are engaged in coordinated behavior.
c. Mobile wireless data usage and penetration rates in Canada are well below average compared to other industrialized countries
d. Canadians pay high rates for mobile wireless data compared to end-users in other industrialized countries.
e. Wi-Fi first service providers offer disruptive innovation that will appeal to some consumers and act as a constraint on the market power of the national carriers.
f. Due to the lack of sufficient competition in the mobile wireless market in Canada, relying solely on commercially negotiated agreements is unlikely to lead to the entry of Wi-Fi first service providers in Canada.
g. Mandated wholesale access for Wi-Fi first service providers is unlikely to reduce investment in mobile wireless network infrastructure by the national carriers. In fact, given the unique economic characteristics of Canada's mobile wireless market, increasing the level of competition through the introduction of Wi-Fi first service providers may actually lead to greater levels of investment by the national wireless carriers.

ES-11. Dr. von Wartburg also rebuts the expert evidence filed by the national wireless carriers by highlighting several flaws in the arguments presented by these experts, including, for example, the

inappropriate application of the Herfindahl-Hirschman Index for measuring market concentration and a heavy reliance upon outdated and highly selective academic research.

ES-12. With regard to the issue of the level of competition in Canada's mobile wireless market, a simple review of the market shares of the national wireless carriers demonstrates that the market is not sufficiently competitive. Despite the best efforts of the Commission and the federal government, since at least 2008, to introduce greater competition in Canada's mobile wireless market, the market shares of the three national wireless cares are essentially unchanged from where they were a decade ago. Each national wireless carrier continues to hold around 30% of Canada's mobile wireless market.

ES-13. Dr. von Wartburg's report also demonstrates that, properly applying the Herfindahl-Hirschman Index, the Canadian mobile wireless market is extremely concentrated in every province and territory except Quebec. In fact, the market concentration levels in every province and territory except Quebec are higher than in many European countries where MVNO access has been mandated.

ES-14. The lack of competition in Canada's mobile wireless market results in Canadians paying amongst the highest rates in the industrialized world for mobile wireless data. This fact becomes particularly obvious when looking at the astronomical data overage charges of the national wireless carriers, $70.00 per GB in the case of Bell Mobility and Rogers. These inflated data overage rates are perhaps the reasons that mobile wireless data penetration levels are comparably low in Canada relative to other industrialized countries and Canadians use extremely small amounts of mobile wireless data.

ES-15. The existence of a growing black market in Canada for mobile wireless services is a further indication that the market is not sufficiently competitive and that a market failure has occurred. There is well-document evidence that Canadians who live in parts of the country without sufficient competition, and thus inflated mobile wireless service prices, are engaging in questionable tactics to obtain black market mobile wireless plans from areas with a greater degree of competition, such as Saskatchewan. In fact, despite the unfavourable currency exchange rate, the cost of mobile

wireless services in Canada has become so inflated that some Canadians are turning to black market plans from the United States, which has a far more competitive mobile wireless market with more affordable options for consumers.

ES-16. The arguments of the incumbent wireless carriers that they already offer a plethora of affordable options for consumers, and that this is evidence of a sufficiently competitive market, must be rejected. A close analysis of the so-called affordable plans of the incumbent wireless carriers indicates that the plans available from Wi-Fi first service providers, such as Sugar Mobile, are still superior in almost every respect to the plans of the incumbent wireless carriers and will appeal to cost-conscious consumers without the need for large amounts of cellular data. In addition, the so-called affordable plans of the incumbent wireless carriers are often so difficult to find due to promotions that emphasize the incumbent wireless carriers' higher margin plans, that they may as well not exist.

ES-17. Wi-Fi first service providers will not appeal to every usage profile, but by expanding the definition of home network to include Wi-Fi, and thus allowing service providers such as Sugar Mobile to operate nationwide, the Commission will be enabling many new competitors to enter the mobile wireless market for the first time. Dr. von Wartburg's report indicates that even by competing for just a segment of the overall market, Wi-Fi first service providers have the potential to exert competitive pressure on the incumbent wireless carriers and drive prices down for all Canadian end-users.

ES-18. The incumbent wireless carriers argue, in response to the clear benefits for competition and affordability that will result from the introduction of Wi-Fi first service providers across the country, that the expansion of the definition of home network to include Wi-Fi will result in catastrophic negative impacts on investments in mobile wireless infrastructure, particularly in rural and remote areas. Threatening negative impacts on investment from any mandated access to their networks is a tired refrain of the incumbent telecommunications companies in Canada that has never materialized and the Commission should not be dissuaded now by this empty threat from introducing real competition to Canada's mobile wireless market.

ES-19. Far from having a negative impact on investment in mobile wireless infrastructure, the expansion of the definition of home network to include Wi-Fi will likely have a positive impact on investment. Mobile wireless carriers that primarily operate in rural and remote areas, carriers such as Ice Wireless, will be able to use the revenues from affiliated Wi-Fi first service providers to reinvest in these rural and remote areas and connect the final 1% that are not currently connected to advanced mobile wireless networks to those networks. Ice Wireless notes that the incumbent wireless carriers, despite quarterly profits that measure in the billions, have shown little interest in connecting this final 1% of Canadians.

ES-20. However, Ice Wireless is not suggesting that all Wi-Fi first service providers will invest in mobile wireless infrastructure, and this is not an issue. All Wi-Fi first service providers will be required to pay cost-based wholesale roaming rates set by the Commission. These cost-based wholesale roaming rates will ensure that the national carriers receive a fair return on their investment in mobile wireless infrastructure.

ES-21. The shareholders' reports of all the publicly traded incumbent mobile wireless carriers also indicate that none of them perceive any threats to their investment plans from the expansion of the definition of home network to include Wi-Fi.

ES-22. Dr. von Wartburg's report demonstrates that the expert evidence relied upon by the incumbent wireless carriers to argue that the expansion of the definition of home network to include Wi-Fi will result in negative impacts on investment is deeply flawed. For example, several of the reports prepared by the incumbents' experts rely upon a single study that is now outdated and has had its conclusions called into question by more recent research. Dr. von Wartburg's report indicates that given the extremely high EBIDTAs of the national wireless carriers, economic theory would suggest that the introduction of greater competition into Canada's mobile wireless market would actually help to stimulate greater investment, not reduce investment.

ES-23. In preparation for the possibility that they may actually face real competition for the first time in their history, the incumbent wireless carriers have proposed, should the Commission choose to expand the definition of home network to include Wi-Fi, a series of limitations that

should be imposed upon Wi-Fi first service providers before they are allowed to operate. Rogers proposed the most comprehensive set of limitations, which included:

a. Restricting access to Wi-Fi first service providers to low income Canadians.
b. A cellular data usage limit of 50 MB per month.
c. Arbitrary and inflated wholesale roaming rates for Wi-Fi first service providers.
d. Restricting Wi-Fi first service providers to accessing the 3G networks of the national wireless carriers.
e. Requiring Wi-Fi first service providers to own and operate their own mobile wireless networks.

ES-24. Other incumbent wireless carriers proposed limitations of a similar nature to those proposed by Rogers. Ice Wireless urges the Commission to see through these proposed limitations, which are merely an anti-competitive attempt to prevent any Wi-Fi first service provider from being able to enter the market. The conditions proposed by Rogers and other incumbent wireless carriers will prevent Wi-Fi first service providers from being able to enter the Canadian market and would render any expansion of the definition of home network to include Wi-Fi completely impotent.

ES-25. In any event, the limitations proposed by Rogers and other incumbent wireless carriers cannot be enacted because they clearly are in contradiction with the policy objectives contained in section 7 of the *Telecommunications Act* and the Policy Direction related to reliance upon market forces to the greatest extent possible, efficient and proportionate regulation, and technological and competitive neutrality.

ES-26. Perhaps as a final stand against the introduction of real competition into Canada's mobile wireless market, some of the incumbent wireless carriers made unsubstantiated allegations regarding the safety and security of Wi-Fi first service providers. In particular, some of the incumbent wireless carriers suggested that access to 9-1-1 by the end-users of Wi-Fi first service providers would be jeopardized or that telecommunications delivered over Wi-Fi would be vulnerable to security threats. These claims are without any merit. Indeed, no party was able to

point to any real-life examples of safety or security issues materializing with Wi-Fi first service providers. Ice Wireless also does not doubt, based on the number of Wi-Fi first service providers that operate successfully in the United States without any apparent safety or security issues, as well as Sugar Mobile's own experience in Canada, that any potential safety or security issues can be easily addressed by Commission, to the extent necessary.

ES-27. The experience of Wi-Fi first service providers in the United States is key for the Commission to keep in mind. Any issues or obstacles raised by the incumbent wireless carriers regarding Wi-Fi first service providers can clearly be overcome, as demonstrated by the fact that hundreds of Wi-Fi first service providers operate without issue in the United States. In contrast, Sugar Mobile, which is currently limited to providing service in Ice Wireless' northern operating territory, is the only Wi-Fi first service provider in the whole of Canada. Canadians deserve to have the same level of choice for mobile wireless service as their American neighbours. Unfortunately, given the highly concentrated and anti-competitive nature of Canada's mobile wireless market, that will not happen unless the Commission acts boldly to expand the definition of home network to include Wi-Fi.

ES-28. Overall, Ice Wireless urges the Commission to introduce real competition in Canada's mobile wireless market for the first time in its history by expanding the definition of home network to include Wi-Fi and thus allowing Wi-Fi first service providers such as Sugar Mobile to operate nationwide.

1.0 INTRODUCTION

1. Ice Wireless Inc. ("Ice Wireless") is hereby submitting its supplemental intervention in the proceeding initiated by Telecom Notice of Consultation 2017-259[1] ("TNC 2017-259"), and modified by Telecom Notice of Consultation 2017-259-1[2] ("TNC 2017-259-1") on behalf of itself and its affiliated[3] mobile virtual network operator ("MVNO") Sugar Mobile Inc. ("Sugar Mobile").

2. Ice Wireless has reviewed the initial interventions of other parties to this proceeding and continues to maintain the positions it set out in its initial intervention. Ice Wireless continues to believe that the Commission should expand the definition of home network to include other forms of connectivity including, most importantly, public Wi-Fi. Such an expansion of the definition of home network will enable innovative alternative wireless service providers such as Sugar Mobile to proliferate across Canada and bring real competition to Canada's mobile wireless market for the first time in its history.

3. Ice Wireless has retained Dr. Markus von Wartburg of Analysis Group Inc. ("Analysis Group") to provide expert evidence regarding the economic issues related to investment and competition in the mobiles wireless telecommunications raised in TNC 2017-259. Dr. von Wartburg's report, is attached to this supplemental intervention as Appendix A.

4. The failure of Ice Wireless to address any argument of another party to this proceeding does not indicate Ice Wireless' acceptance of the validity of that argument where the argument in question is contrary to Ice Wireless' position, as set out in its submissions to this proceeding.

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1 Telecom Notice of Consultation CRTC 2017-259, *Reconsideration of Telecom Decision 2017-56 regarding final terms and conditions for wholesale mobile wireless roaming service*, 20 July 2017. ["TNC 2017-259"].

2 Telecom Notice of Consultation CRTC 2017-259-1, *Reconsideration of Telecom Decision 2017-56 regarding final terms and conditions for wholesale mobile wireless roaming service*, 5 October 2017. ["TNC 2017-259-1"].

3 In this intervention "affiliated" and various variants of the word, such as "affiliate" have the meaning corresponding to the definition of "affiliated" in subsection 2(2) of the *Canada Business Corporations Act*, R.S.C. 1985, c. C-44.

1.1 A note on terminology

5. In previous regulatory proceedings examining Sugar Mobile's Wi-Fi first operating model, Ice Wireless, and the Commission, have referred to Sugar Mobile as an MVNO of Ice Wireless.[4] This definition remains accurate under the Commission's current regulatory framework as Sugar Mobile does not have a Radio Access Network ("RAN") of its own, and instead relies upon Ice Wireless' RAN, or the RAN of another mobile network operator (hereinafter called "MNO"), to provide connectivity to Sugar Mobile's end-users when they are not connected to Wi-Fi.

6. However, to avoid any confusion regarding the type of operating model to which Ice Wireless is referring, and to be consistent with the language used in TNC 2017-259, in the balance of this supplemental intervention, Ice Wireless will refer to Sugar Mobile, and other service providers that operate using a Wi-Fi first model, as 'Wi-Fi first service providers', or, depending on the context, as 'alternative service providers'.[5]

7. In addition, when Ice Wireless refers to Wi-Fi in this intervention, unless the context indicates otherwise, it is referring to "public Wi-Fi", as that term was defined in Telecom Decision 2017-57 ("TD 2017-57").[6]

8. References to mobile wireless networks and infrastructure in this submission refer to cellular wireless networks and infrastructure unless otherwise indicated.

9. References to the "national wireless carriers" refer to the Bell Group[7] ("Bell Mobility"), TELUS Communications Company ("TELUS"), Rogers Communications Canada Inc. ("Rogers"), and where applicable, their respective parent companies.

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4 Telecom Decision CRTC 2017-57, *Ice Wireless Inc. – Application regarding roaming on Rogers Communications Canada Inc.'s network by customers of Ice Wireless Inc. and Sugar Mobile Inc.* at para 1 ["TD 2017-57"].

5 Indeed, if the Commission expands the definition of home network to include Wi-Fi, it is an open question whether Sugar Mobile would still choose to operate as an MVNO of Ice Wireless as it could have its own home network at that point, which would be Wi-Fi.

6 "Public Wi-Fi, such as that provided in coffee shops, libraries, and residences [….]" TD 2017-57, *supra* note 4, at paras 24-26.

7 Canadian Radio-television and Telecommunications Commission, *Communications Monitoring Report 2016*, at pg 286 ["2016 Communications Monitoring Report"]. The 2016 Communications Monitoring Report, at pg 286, defines the "Bell Group" as consisting of "Bell Canada; Bell Mobility; Latitude Wireless; NorthernTel, Limited Partnership; Northwestel Mobility; Télébec, Limited Partnership; and KMTS."

10. References to the "incumbent wireless carriers" refer to the three national wireless carriers, as well as any mobile wireless carrier owned or operated by a large incumbent cable or telephone company, including, for greater certainty, Saskatchewan Telecommunications ("SaskTel"), Freedom Mobile Inc. ("Freedom Mobile"), Bragg Communications Inc. carrying on business as Eastlink ("Eastlink"), and Québecor Média inc on behalf of its affiliate Videotron Ltd. ("Videotron").

2.0 SUMMARY OF DR. VON WARTBURG'S REPORT

11. Dr. von Wartburg's expert economic evidence is focused on the current state of Canadian markets for retail mobile wireless services and the impact that mandated access for Wi-Fi first service providers will have on investment and competition in the mobile wireless telecommunications industry in Canada. Dr. von Wartburg's findings rebut the expert evidence filed by the national wireless carriers.

12. Briefly, Dr. von Wartburg's report demonstrates the following:

a. The Canadian mobile wireless market is not competitive and is in fact characterized by a high degree of concentration in the hands of the national mobile wireless carriers and coordinated behavior amongst them.[8] The expert evidence of the national wireless carriers showing a low degree of concentration in the Canadian mobile wireless index relied upon a flawed usage of the Herfindahl-Hirschman Index ("HHI").[9] When a proper HHI analysis is conducted on each provincial and territorial market as opposed to on the Canadian market as a whole, it becomes apparent that every provincial or territorial market except for Quebec has an HHI level significantly above those of other jurisdictions where MVNO access has been mandated.[10]

b. Compared to other industrialized countries Canadians pay higher rates for, and consume less of, mobile wireless services.[11] In addition, the 70% of Canadians who live in parts of the country without a strong fourth mobile wireless carrier pay

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8 Markus von Wartburg, Ph.D., *Economic Review of Mandated Wholesale Access for Wi-Fi First Service Providers, Investment and Competition in the Mobile Wireless Telecommunications Industry in Canada*, 25 October 2017 at para 15 ["von Wartburg Report"].

9 *Id.* at para 14.

10 *Id*. at para 21.

11 *Id*.at paras 31-42.

significantly higher rates for mobile wireless services than those Canadians who do live in parts of the country with greater competition.[12] The conclusion that Canadians pay high rates for mobile wireless services holds true even accounting for quality and cost differences.[13]

c. Wi-Fi first service providers are a disruptive technology that will appeal to cost conscious Canadians and those with small cellular network consumption needs.[14] Wi-Fi first service providers have significant potential to expand mobile wireless penetration rates in Canada by catering to the end-users described above.[15] In addition, through increased competition Wi-Fi first service providers have the potential to maintain downward pressure on the costs of mobile subscription plans both from traditional wireless carries and Wi-Fi first service providers.[16]

d. In the United States, Wi-Fi first service providers can negotiate commercial arrangements for network access.[17] However, due to the coordinated behavior of the national wireless carriers in Canada, it is unlikely that any Wi-Fi first service provider will be able to negotiate a commercial arrangement for access to the networks of the national wireless carriers.[18] The inability of Wi-Fi first service providers, or MVNOs, to negotiate commercial arrangements with Canadian carriers is aggravated by the extent of network sharing in Canada, which reduces excess capacity and incentives to sell capacity to MVNOs or to price aggressively at the retail level.[19]

e. The limited research cited by the national wireless carriers showing that an expansion of the definition of home network to include public Wi-Fi will result in reduced investment by the national wireless carriers is flawed.[20] Notably, the national carriers relied heavily upon studies regarding the fixed broadband market as opposed to the mobile wireless market.[21] The key study that the national carriers relied upon that actually looked at the mobile wireless market, Kim et al. (2011) is significantly out of date and its conclusions have been roundly criticized by more recent research.[22] The most recent academic research available that examines the mobile wireless market suggests that given the EBIDTAs of the national wireless carriers, greater competition through the introduction of Wi-Fi first service providers may actually increase their levels of investment in mobile wireless infrastructure.[23]

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12 *Id*. at paras 43-50.
13 *Id*. at para 48.
14 *Id*. at para 53.
15 *Ibid.*
16 *Id*. at para 55.
17 *Id*. at para 66.
18 *Id*. at paras 68-72.
19 *Id*. at paras 70-71.
20 *Id*. at paras 73-86.
21 *Id*. at para 85.
22 *Id*. at paras 76-79.
23 *Id*. at paras 80-84.

13. Dr. von Wartburg's conclusions are explored in greater detail in the balance of this supplemental intervention and, of course, in his report.

14. Ice Wireless notes that while Dr. von Wartburg focused on the expert evidence filed by the national wireless carriers, his conclusions form an equally strong rebuttal to the expert evidence filed by Shaw Communications Inc. ("Shaw") and its affiliated mobile wireless carrier, Freedom Mobile.[24]

15. Shaw's expert evidence canvasses the same issues as that of the national wireless carriers and essentially argues that there is too much "risk" of a negative impact on investment by facilities-based carriers for the Commission to consider expanding the definition of home network to include Wi-Fi.[25] Importantly, in reaching this conclusion, Shaw's expert evidence relies heavily upon the same flawed study, Kim et al. (2011), as the national wireless carriers.[26] In addition, as with the other incumbent wireless carriers, Shaw's expert evidence also relies heavily upon outdated research that deals with wireline technologies as opposed to the reality of mobile wireless markets in the twenty-first century.[27]

16. Ice Wireless will further address why expanding the definition of home network to include Wi-Fi will not negatively impact investment by incumbent wireless carriers such as Freedom Mobile further below. Ice Wireless notes that of the incumbent wireless carriers that are not also national wireless carriers, only Shaw and its affiliated mobile wireless carrier Freedom Mobile filed expert evidence.

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[24] Shaw Communications Inc., *Intervention of Shaw Communications Inc.*, CRTC File No. 1011-NOC2017-0259, 8 September 2017, at Appendix B. ["Shaw Intervention"].

[25] *Id.* at paras 39-43.

[26] *Id.* at paras 33, 39-40,

[27] See, for example, Shaw Intervention, *supra* note 24, at Appendix B, paras 44-53.

3.0 CANADA'S MOBILE WIRELESS MARKET IS NOT COMPETITIVE

17. Ice Wireless' initial intervention demonstrated why Canada's mobile wireless market is not sufficiently competitive and why expanding the definition of home network to include public Wi-Fi, and thus allow Wi-Fi first service providers such as Sugar Mobile to operate nationwide, will introduce a sufficient level of competition to Canada's mobile wireless market for the first time in its history.[28]

18. However, despite all the evidence to the contrary, the three national wireless carriers have taken the position in this proceeding that Canada's mobile wireless market is intensely competitive.[29]

19. Ice Wireless submits that Canada's mobile wireless market is in fact an oligopoly highly concentrated in the hands of Rogers, Bell Mobility, and TELUS that lacks sufficient competition. The result of this lack of competition is that Canadian consumers and businesses pay far more for mobile wireless services than they otherwise would in a market that was characterized by a sufficient degree of competition amongst wireless service providers. As the 2016 Price Comparison Report[30], and Dr. von Wartburg's evidence demonstrates, Canadians pay amongst the highest prices for mobile wireless services in the industrialized world.[31] This is true even accounting for factors such as the quality of Canada's mobile wireless networks.[32]

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28 Ice Wireless Inc., *Intervention of Ice Wireless Inc.*, 8 September 2017, CRTC File No. 1011-NOC2017-0259 at paras 81-96, 133-138 ["Ice Wireless Intervention"].

29 TELUS Communications Company, *Intervention of TELUS Communications Company*, 8 September 2017, CRTC File No. 1011-NOC2017-0259, at para 40 ["TELUS Intervention"]; Rogers Communications Canada Inc., *Intervention*, 8 September 2017, CRTC File No. 1011-NOC2017-0259, at para 172 ["Rogers Intervention"]; Bell Mobility, *Intervention of Bell Mobility*, 8 September 2017, CRTC File No. 1011-NOC2017-0259, at para 27 ["Bell Mobility Intervention"].

30 NGL Nordicity Group Ltd., 2016 Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions, ["2016 Price Comparison Report"]. The Commission commissioned NGL Nordicity Group Ltd. to prepare a report, which was released on 22 March 2016, comparing the prices of telecommunications services between various parts of Canada, and between Canada and select foreign jurisdictions.

31 NGL Nordicity Group Ltd., *2016 Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions*, at pg 38. ["2016 Price Comparison Report"]; von Wartburg Report, *supra* note 8, at paras 31-42.

32 von Wartburg Report, *supra* note 8, at para 48.

20. The high prices that Canadians pay for mobile wireless services as a result of this lack of competition negatively impacts all Canadian consumers and businesses. Low income Canadians are, of course, particularly affected, which is perhaps why which is perhaps why one third of low income Canadians do not have a mobile wireless subscription.[33]

21. Ice Wireless continues to stand by the evidence it presented in its initial intervention as to why Canada's mobile wireless market lacks sufficient competition. Below, Ice Wireless provides further evidence as to why the mobile wireless market is insufficiently competitive and that Canadian consumers and businesses are suffering as a result.

3.1 Canada's mobile wireless market is extremely concentrated in the hands of the three national wireless carriers

22. One of the most significant indicators of a lack of sufficient competition in Canada's mobile wireless market is the fact that the market is extremely concentrated in the hands of Rogers, TELUS, and Bell Mobility, and it has been for years, with practically no change in market share amongst the three national wireless carriers.

23. Ice Wireless highlighted in its initial intervention that the 2016 Communications Monitoring Report indicates that in 2014, Bell Mobility, Rogers, and TELUS collectively held 90% of all wireless subscribers and that this percentage of market share was completely unchanged in 2015.[34]

24. However, as highlighted by the Public Interest Advocacy Centre ("PIAC") in its intervention, the situation is far worse than Ice Wireless initially described in its intervention. PIAC points out that the market share of the three national wireless carriers has remained unchanged since at least 2007, which was when the Communications Monitoring Report was first published.[35] This is particularly disheartening as the federal government and the Commission have been trying, since at least 2008, to disrupt the market share of the three national carriers through

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33 2016 Communications Monitoring Report, *supra* note 7, at pg 60.

34 *Id.* at pg 286.

35 Public Interest Advocacy Centre, *Intervention of the Public Interest Advocacy Centre*, 8 September 2017, CRTC File No. 1011-NOC2017-0259, at para 109 ["PIAC Intervention"].

the promotion of a mythical fourth carrier in every part of Canada. Unfortunately, despite nearly a decade of well-meaning effort, no viable fourth carrier has emerged in many parts of Canada.

25. In fact, the market is perhaps even more concentrated than it may appear on its face as Bell Mobility and TELUS share a nation-wide mobile wireless network. As a result, there are only two, not three, nation-wide networks in all of Canada: the network shared by the Bell Mobility and TELUS and Rogers' network.

26. Recent events in Canada's mobile wireless market also suggest that the trend is towards greater concentration, including the recent acquisition of WIND[36] by Shaw, one of Canada's five largest vertically and horizontally integrated broadcasting and telecommunications groups.[37] In addition, Videotron appears to have given up any hope of expanding outside its traditional serving territory in Quebec, as demonstrated by its recent decision to sell its mobile wireless spectrum in southern Ontario, Toronto, Alberta, and British Columbia to Rogers and Shaw.[38] Finally, Manitoba Telecom Services Inc. ("MTS") was recently acquired by BCE Inc. ("BCE").[39]

27. TELUS attempts to whitewash the extremely concentrated nature of Canada's mobile wireless market through the misapplication of the Herfindahl-Hirschman Index.[40] TELUS argues that when this index for measuring market concentration is used, Canada compares very favourably with European countries and is slightly less concentrated than the United States.[41]

28. Dr. von Wartburg agrees that the HHI "is a commonly used and accepted measure of market concentration."[42] However, as Dr. von Wartburg demonstrates, TELUS' use of the Herfindahl-Hirschmamn Index is flawed as it looks at the entire Canadian market instead of using a more granular approach that looks at the level of concentration in each province and territory.[43]

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36 Globalive Communications Corporation ("WIND"), now operating as Freedom Mobile.
37 2016 Communications Monitoring Report, *supra* note 7, at pg 288.
38 Quebecor Inc., *Management Discussion and Analysis*, 10 August 2017 ["Quebecor Inc. Q2 2017 Shareholders' Report"].
39 BCE Inc., *Shareholder Report 2017 Second Quarter*, 2 August 2017 at pg 15 ["BCE Q2 2017 Shareholders' Report"].
40 TELUS Intervention, *supra* note 29, at paras 40, 74.
41 *Id.* at para 74.
42 von Wartburg Report, *supra* note 8, at para 16.
43 *Id.* at paras 16-23.

This more granular approach is required because "Canada has a regional spectrum licensing regime and smaller carriers operate only in certain regions of the country."[44] When a more granular approach is used, it becomes apparent that in every province or territory except Quebec, the Canadian mobile wireless market is extremely concentrated in the hands of either the three national wireless carriers or, in the case of Saskatchewan, a regional incumbent wireless carrier.[45] In fact, Dr. von Wartburg shows that every province or territory, except Quebec, has an HHI that significantly exceeds that of the majority of countries examined by TELUS' experts.[46] Interestingly, Dr. von Wartburg demonstrates that the HHI for all Canadian provinces and territories, including Quebec, exceeds the HHI in several countries where MVNO access has been mandated.[47]

29. While Quebec is certainly a less concentrated market than the other provinces and territories of Canada, there is no reason to think that Quebecers should be cut-off from being able to enjoy the benefits that Wi-Fi first wireless service providers can bring through increased competition. In any event, Dr. von Wartburg highlights that Quebec's HHI of 2,698 is still above 2,500 points, which is the threshold that the United States Department of Justice uses to indicate that a market is highly concentrated.[48] In addition, Quebec's HHI of 2,698 is still above that of several countries where MVNO access has been mandated, such as Germany, Malaysia, Brazil, and Hong Kong.[49] Moreover, Videotron's long-term viability as a fourth carrier in Quebec remains to be seen. Videotron has already indicated that it is scaling back its mobile wireless plans through the sale of its spectrum holdings outside of Quebec to Rogers and Shaw.[50] In addition, the recent acquisition of MTS by BCE is indicative of the fact that regional fourth carriers such as Videotron are vulnerable to being swallowed by the national wireless carriers.

30. Overall, a simple examination of the market shares of the national carriers as reported in the Communications Monitoring Report, which have remained unchanged throughout a decade of

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44 *Id.* at para 17.
45 *Id.* at para 18.
46 *Id.* at Appendix A, Table 3 TELUS Intervention, *supra* note 29, at para 74.
47 von Wartburg Report, supra note 8, at Appendix A, Table 3.
48 *Id.* at Footnote 17.
49 *Id.* at Appendix A, Table 3.
50 Ice Wireless Intervention, *supra* note 28, at para 86.

effort on the part of the Commission and the federal government to introduce greater competition into Canada's mobile wireless market, is a clear indicator that the market is highly concentrated and insufficiently competitive. This conclusion is supported by a proper HHI analysis, which shows that in every province or territory the level of mobile wireless market concentration is above that of other industrialized countries where MVNO access has been mandated.[51]

31. In the present proceeding, the Commission can start to address the extremely high level of market concentration in Canada's market for retail mobile wireless services without going nearly so far as to mandate MVNO access. Although it will not be a panacea to all of the ills that afflict Canada's highly concentrated and uncompetitive mobile wireless market, by expanding the definition of home network to include Wi-Fi, and thus allow innovative service providers like Sugar Mobile to operate nationwide, the Commission will be taking a large step towards restraining the market power of the incumbent wireless carriers.

3.2 Mobile wireless penetration rates and mobile data usage indicate that the mobile wireless market is not sufficiently competitive

32. Bell Mobility argues that "Canada has achieved effectively 100% wireless penetration in the largest urban areas."[52] However, as discussed by Dr. von Wartburg, the Organization for Economic Co-operation and Development ("OECD") indicates that as of 2016, Canada only had 68.8 mobile broadband subscriptions per 100 inhabitants, which places it in the bottom third of OECD countries.[53]

33. Bell Mobility also attempts to explain away Canada's low mobile penetration rate by arguing that the statistics are distorted by the fact that subscribers in Europe and elsewhere sometimes hold multiple mobile subscriptions, in the form of multiple subscriber identification module (SIM) cards. [54] Dr. von Wartburg states that this explanation is suspect for the following reasons:

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51 von Wartburg Report, supra note 8, at Appendix A, Table 3.
52 Bell Mobility Intervention, *supra* note 29, at para 67.
53 von Wartburg Report, supra note 8, at para 36.
54 Bell Mobility Intervention, *supra* note 29, at paras 65-66.

> First, three of the top four countries in terms of mobile wireless subscriptions per 100 inhabitants—Japan, Australia, and the United States—are non-European. [That is to say, non-European countries where there is no indication that subscribers routinely use multiple SIM cards, certainly this is not the case in the United States.] Canada with 68.8 mobile subscriptions per 100 inhabitants considerably lags mobile subscriptions in Japan (152.4), Australia (128.8), and the United States (126.3). Second, to the extent that subscriptions *per 100 inhabitants* might bias a comparison of mobile adoption rates against Canada, it would simply exacerbate Canada's already substantial gap in usage *per subscription*.[55]

34. However, even if Bell Mobility is correct, which Ice Wireless rejects, and penetration rates in Canada are higher than they appear on their face due to some sort of statistical bias, there still remains a fundamental problem in that Canadians are making very little use of mobile data compared to their OECD counterparts. The OECD's analysis indicates that Canadians use an average of 1.49 GB of mobile data per month per mobile broadband subscription.[56] This is significantly below the OECD average of 2.30 GB of mobile data per month per mobile broadband subscription and more than seven times below the leader of the OECD, Finland, whose mobile broadband subscribers use an average of 11 GB of mobile data per month per mobile broadband subscription.[57]

35. The OECD also highlights the fact that all mobile network operators in Finland offer unlimited data plans.[58] Ice Wireless notes that it is pleased to be able to offer northern Canadians an unlimited data plan on its home network despite the challenging environment in which it operates.[59]

36. It is no wonder that Canadians feel unable to use more than 1.49 GB of mobile data per month. Shockingly, despite the fact that the Governor-in-Council issued its direction to the Commission to review TD 2017-56 on 1 June 2017, a direction that expressed concern with the

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55 von Wartburg Report, *supra* note 8 , at para 37.
56 *Id.* at para 36
57 *Ibid.*
58 Organization for Economic Co-operation and Development, *OECD Digital Economy Outlook 2017*, http://www.keepeek.com/Digital-Asset-Management/oecd/science-and-technology/oecd-digital-economy-outlook-2017_9789264276284-en#.WfEDx2hSyUk, at pg 145 ["OECD Digital Economy Outlook 2017"].
59 Ice Wireless Inc., "Welcome to Ice Wireless", https://www.icewireless.com/en/unlimited-89.

affordability of mobile wireless telecommunications services in Canada[60], in July of this year Rogers nevertheless dramatically increase its data overage fees by over 40%.[61] Rogers' end-users now pay $70.00 per extra GB of data.[62] Rogers' move follows on the heels of Bell Mobility, which also increased its data overage charges to approximately $70.00 per GB in April 2017, representing a 40% increase over two years.[63] TELUS also has extremely high data overage fees, charging $5.00 per 0.1 GB for the first GB of data overage, and then increasing by 100% to $100.00 per GB for subsequent GBs of data overage.[64]

37. Ice Wireless notes that the application of these punitive overage fees to consumers is not merely speculative. A survey prepared for the Commission in fall 2016 found that 46% of Canadians had paid data overage fees in the past 12 months.[65]

38. In contrast, Ice Wireless notes that, despite its extremely high costs operating in northern Canada, its data overage fees range from $10.00 to $20.00 per GB, depending on the plan.[66] In addition, as noted above, Ice Wireless offers a plan with unlimited data on its home network.[67]

39. Ice Wireless submits that increases in data overage fees of this magnitude could only exist in a mobile wireless market that is characterized by a lack of competition. In addition, the fact that Rogers increased its data overage rates to exactly mirror those of Bell Mobility, despite being aware that the Commission was examining the issue of the affordability of mobile wireless telecommunications services, is compelling evidence of coordinated behavior between the national wireless carriers.

40. Ice Wireless submits that the data referenced above is indicative of the fact that Canada is lagging behind other industrialized nations both with respect to mobile data subscriptions and the

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60 Order of the Governor in Council, PC 2017-05557, 1 June 2017 ["Order in Council"].

61 Sophia Harris, "Rogers, Bell hike overage fees at time when customers thirst for wireless data", *CBC News*, http://www.cbc.ca/news/business/bell-rogers-wireless-data-overage-fee-1.4195410, 9 July 2017 ["CBC Overage Fees Investigation"].

62 *Ibid*.

63 *Ibid*.

64 *Ibid*.

65 TNS Canada, *Wireless Code Public Opinion Research Fall 2016*, 18 November 2016, http://epe.lac-bac.gc.ca/100/200/301/pwgsc-tpsgc/por-ef/crtc/2016/027-16-e/report.pdf, at pg 23.

66 Ice Wireless Inc., "Wireless Onboard", https://www.icewireless.com/en/wireless/plans.

67 Ice Wireless Inc., "Welcome to Ice Wireless", https://www.icewireless.com/en/unlimited-89.

use of mobile data by subscribers. Although it is difficult to demonstrate causality, Ice Wireless suspects that one of the primary reasons that Canadians are unable to make full use of mobile data is due to the extremely high data overage charges of the national wireless carriers, which are, in turn, the result of coordinated behavior that can only exist in a market with insufficient competition.

41. The subscribers of Wi-Fi first service providers will, as a result of the pricing of Wi-Fi first services, not make predominant use of cellular networks and instead will rely primarily upon Wi-Fi networks for their connectivity needs. Nonetheless, Wi-Fi first carriers will have a positive impact on improving mobile wireless data penetration in Canada as well as encouraging Canadians to make greater use of mobile wireless data by improving competition in the market for mobile wireless telecommunications services more generally.

42. As Dr. von Wartburg notes, and as Ice Wireless' own experience with Sugar Mobile demonstrates, Wi-Fi first service providers represent disruptive innovation that will appeal to many, but by no means all consumers.[68] However, by being able to offer affordable and easy to understand service packages, Ice Wireless has no doubt that Wi-Fi first service providers such as Sugar Mobile will encourage many Canadians (who did not previously feel that the mobile data plans offered by incumbent wireless carriers met their unique needs) to subscribe to mobile data plans.

43. Moreover, as the Competition Bureau noted in its statement regarding BCE's acquisition of MTS, the presence of strong competitors can disrupt the effects of coordination amongst the national carriers.[69] Therefore the presence of Wi-Fi first service providers in the market will help prevent the coordinated rise of data overage charges described above. Furthermore, the introduction of more players into the mobile wireless market will require all traditional carriers, including Ice Wireless itself, to work harder and offer better value propositions to their customers to retain and gain market share.

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[68] von Wartburg Report, supra note 8, at para 61.

[69] Competition Bureau, "Competition Bureau statement regarding Bell's acquisition of MTS, 15 February 2017, <http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/04200.html>.

44. Therefore, despite Bell Mobility's claims that mobile wireless penetration rates are high in Canada, the reality is far murkier when looking at the OECD's analysis of subscriptions to mobile data, which is the most important indicator that the Commission should be concerned with as all telecommunications can increasingly be provided over data. In addition, as already noted, Canadians use only a fraction of the mobile data of other OECD countries, such as Finland[70], and there is evidence to suggest that this is because of sky-high data overage fees that, on their face, appear to be an example of coordinated behavior. Coordinated behavior can be checked by greater competition, which can be brought about through the introduction of Wi-Fi first service providers into the market.

45. Overall, contrary to the claims of Bell Mobility, an analysis of mobile wireless penetration rates and mobile data usage in Canada does not lead to the conclusion that the mobile wireless market in Canada is sufficiently competitive. In fact, quite the opposite. Such an analysis leads inexorably to the conclusion that the mobile wireless market needs a serious jolt of competition before Canada falls further behind the rest of the industrialized world. Wi-Fi first service providers will provide such a jolt.

3.3 Alternative wireless service providers can offer Canadians affordable choices for their mobile wireless service

46. Several of the incumbent wireless carriers claimed that they already offer a plethora of affordable mobile wireless service options to Canadians that are equally affordable, or even more affordable, than what a Wi-Fi first service provider could offer end-users.[71] There are several problems with this claim by the incumbent wireless carriers.

47. First and foremost, the arguments of the incumbent wireless carriers that there is no need for further competition as they already offer affordable plans that are comparable or superior to what Wi-Fi first service providers could offer suffer from a fatal logical reasoning error. The

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70 OECD Digital Economy Outlook 2017, *supra* note 58, at pg 146.

71 Bell Mobility Intervention, *supra* note 29, at para 99; TELUS Intervention, *supra* note 29 at paras 75-77; Rogers Intervention, *supra* note 29, at paras 16, 20; Bragg Communications Inc. carrying on business as "Eastlink", *Eastlink Abridged Comments*, CRTC File No. 1011-NOC2017-0259, 8 September 2017, at para 41, ["Eastlink Intervention"].

incumbent wireless carriers cannot argue, on the one hand, that they offer plans equal to or superior to those of Wi-Fi first service providers, and on the other, argue that Wi-Fi first service providers will capture such significant market share that the ability of traditional carriers to continue to invest in network infrastructure will be jeopardized.[72] This simply does not make sense.

48. If the incumbent wireless carriers are truly already offering plans that are superior to or comparable to those that Wi-Fi first service providers would be capable of offering, then presumably Wi-Fi first service providers would be incapable of gaining any market share at all from the incumbent wireless carriers, and thus their investment levels would not be affected negatively in the slightest. Although, as explained further below, and in Ice Wireless' initial intervention[73], the introduction of Wi-Fi first service providers into the Canadian market and their subsequent capture of a portion of the market will not negatively impact investment levels. Overall, when it comes to their arguments on affordability and competition versus negative impacts on investment, the incumbent wireless carriers cannot have it both ways.

49. However, Ice Wireless does not agree that the traditional carriers are currently offering mobile wireless plans that are superior or comparable to what Wi-Fi first service providers can offer to Canadians. Bell Mobility compares the plans offered by Republic Wireless in the United States to plans offered by Bell Mobility, Freedom Mobile, Videotron, and Rogers in Canada and attempts to argue that these traditional carriers offer plans that "are better than or comparable to those available from Republic Wireless."[74] Ice Wireless urges the Commission not to be misled by this flawed comparison.

50. Bell Mobility compares the $19.00 (all prices in Canadian dollars unless otherwise indicated) per month plan offered by Republic Wireless to its own basic plan for $25.00 per month.[75] Bell Mobility's basic $25.00 per month plan (which is similar to the most basic plans of all the incumbent carriers) is not superior to Republic Wireless' $19.00 per month plan. Bell Mobility offers the subscribers of its $25.00 per month plan a mere 50 Canada-wide minutes on

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72 See, for example, Bell Mobility Intervention, supra note 29, at paras 90-93, Rogers Intervention, supra note 29, at para 6, TELUS Intervention, *supra* note 29, at para 96.
73 Ice Wireless Intervention, *supra* note 28, at paras 50-80.
74 Bell Mobility Intervention, supra note 29, at paras 99-100.
75 *Id.* at para 99.

weekdays, unlimited evening and weekend talk, 100 text messages, and 100 MB of cellular data, after which an end-user would presumably need to use a third-party application such as WhatsApp or Facebook Messenger on Wi-Fi to continue communicating.[76] In contrast, Republic Wireless' $19.00 per month plan offer its subscribers unlimited text and talk over Wi-Fi, without requiring the use of a third-party application.

51. The real difference between Bell Mobility and Republic Wireless, however, occurs when looking at Republic Wireless' $25.00 per month plan compared to Bell Mobility's $25.00 per month plan. As noted above, Bell Mobility's $25.00 per month plan offers a paltry 100 MB of cellular data to its end-users, 50 Canada-wide minutes on weekdays, unlimited evening and weekend talk, and 100 text messages.[77] Republic Wireless, on the other hand, offers its end-users 1 GB of cellular data, or more than ten times as much as Bell Mobility, as well as unlimited talk and text.[78] The superiority of Republic Wireless' plans become even clearer when looking at data overage charges. As discussed above, an end-user subscribing to Bell Mobility's $25.00 per month plan will need to pay $70.00 per extra GB of data.[79] Republic Wireless, on the other hand, does not have any data overage fees.[80]

52. Bell Mobility further attempts to explain away the miserly nature of its plans compared to those of Republic Wireless by pointing out that its $25.00 per month plan includes a device subsidy, whereas Republic Wireless' does not.[81] Undeniably, this is true, and adding a device subsidy would increase the cost of Republic Wireless' plans.[82] However, Bell Mobility's argument ignores the fact that many consumers, both in the United States and Canada, do not need or want a device subsidy. Consumers can obtain mobile wireless devices in a variety of ways. For example, a mobile wireless device may be handed down within a family, it may be gifted, it may be transferred from a departing employee of a business to a new employee, or Canadians may purchase them second-hand online from resale sites such as Craigslist or kijiji.ca for a fraction of

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76 *Ibid.*
77 *Ibid.*
78 *Ibid.*
79 CBC Overage Fees Investigation, *supra* note 61.
80 Republic Wireless Inc., "Affordable, No-Contract Cell Phone Plans", https://republicwireless.com/cell-phone-plans/.
81 Bell Mobility Intervention, supra note 29, at para 99.
82 Republic Wireless Inc., "Shop Android phones and connected home devices", https://republicwireless.com/shop/.

their original retail value. For these consumers, the plans offered by Wi-Fi first service providers without a device subsidy are often far superior to those offered by traditional wireless carriers with a device subsidy.

53. Perhaps recognizing that delving deep into a comparison of its own plans with Republic Wireless would not end favourably, Bell Mobility also attempts to compare the plans of Republic Wireless with those of Freedom Mobile.[83] While the gap between the cost of Freedom Mobile's plans and those of Republic Wireless is narrower, Republic Wireless still generally comes out ahead, particularly regarding its popular $25.00 per month plan which provides its end-users with 1 GB of cellular data, with, as mentioned above, no data overage fees.[84] In contrast, subscribers to Freedom Mobile must pay $30.00 per month to obtain 250 MB of data, unlimited talk in Canada, and unlimited text in Canada and the United States.[85]

54. Looking at the only Canadian Wi-Fi first service provider in the market today, the presence of Sugar Mobile also bolsters the argument that Wi-Fi first service providers will be able to offer many consumers more affordable options that better suit their usage patterns. For example, as noted above, a subscriber to Bell Mobility's $25.00 per month plan receives 50 minutes of Canada-wide calling, unlimited evening and weekend calling, 100 text messages, and 100 MB of data.[86] A subscriber to Freedom Mobile's $30.00 per month plan receives unlimited Canada wide talk, unlimited Canada and United States text, and 250 MB of data.[87] However, a subscriber to Sugar Mobile's $19.99 per month plan receives unlimited Canada and United States talk and text and 400 MB of data.[88] As with Republic Wireless, Sugar Mobile also does not charge data overage fees. Sugar Mobile clearly offers the most value in this comparison.

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83 Bell Mobility Intervention, supra note 29, at para 99.

84 Republic Wireless Inc., "Affordable, No-Contract Cell Phone Plans", https://republicwireless.com/cell-phone-plans/.

85 Freedom Mobile Inc., "Plans | Affordable Cell Phone Plans | Freedom Mobile", https://www.freedommobile.ca/plans-and-devices/plans.

86 Bell Mobility Intervention, supra note 29, at para 99.

87 Freedom Mobile Inc., "Plans | Affordable Cell Phone Plans | Freedom Mobile", https://www.freedommobile.ca/plans-and-devices/plans.

88 Sugar Mobile Inc., "Sugar Mobile", https://www.sugarmobile.ca.

55. Another issue with the traditional carriers' claims that they already offer sufficiently affordable plans is that they are very difficult for ordinary consumers to find. For example, to learn about Sugar Mobile's plan, an end-user simply needs to go to Sugar Mobile's homepage and scroll down, where the pricing system is explained in a tidy table in clear and easy to understand language.[89] In contrast, to find the true cost of Bell Mobility's $25.00 per month plan, an end-user must do the following:

- Go to Bell Mobility's homepage.
- Find the link that says, "Rate Plans".
- Scroll to near the bottom of the page, past the three "Most Popular Plans" that Bell Mobility was promoting in Ontario as of October 22, 2017 and which cost $72.50, $80.00 and $115.00 per month respectively to the link that reads "Basic Phone plans".
- Select one of the three "Basic Phone plans".
- Read the "Additional plan information" disclaimer, which includes additional fees.
- Select a phone to purchase.
- Once again select a plan to purchase, which Ice Wireless notes defaults to the $35.00 per month plan as opposed to the $25.00 per month plan.
- Read the 15 different bullet points explaining the $25.00 per month plan.
- Unsubscribe to Bell Mobile TV, which is automatically included as a default option.
- Click "Continue".
- Review total fees and proceed to provide payment information.[90]

56. Similarly, as of October 22, 2017 finding Freedom Mobile's $30.00 per month plan was quite difficult as the entire portion of its website dealing with rate plans has been overtaken by advertisements for their "Big Gig Plans".[91] Confusingly, one must click on "I'm looking for a plan with Big Gig Data" to find Freedom Mobile's more basic plans, and then click on "The Basics" to find the $30.00 per month plan.[92]

57. As with Sugar Mobile, both Project Fi and Republic Wireless offer extremely easy to understand plans that can be found with one or two mouse clicks.[93]

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89 *Ibid.*

90 Bell Mobility, "Cell phone rate plans, mobile plans, iPhone plans | Bell Canada", https://www.bell.ca/Mobility/Cell_phone_plans.

91 Freedom Mobile Inc., "Plans | Affordable Cell Phone Plans | Freedom Mobile", https://www.freedommobile.ca/plans-and-devices/plans.

92 *Ibid.*

93 Republic Wireless Inc., "Affordable, No-Contract Cell Phone Plans", https://republicwireless.com/cell-phone-plans/; Google Inc., "Phone plans & prices – Project Fi", https://fi.google.com/about/plan/.

58. There is an old philosophical question that asks if a tree falls in the forest, but no one is around to hear it, does it make a sound? A similar question could be asked about the so-called affordable plans of the incumbent wireless carriers. If an incumbent wireless carrier offers a so-called affordable plan, but it is impossible to find as it is buried under promotions for other plans, does it really exist? Ice Wireless is proud of the fact that its plans are easy to understand and that they can all be found on its website without navigating a maze of links.[94]

59. Wi-Fi first service providers such as Sugar Mobile, and others, will no doubt compete partially based on customer service, including through easy to understand and find plans. By allowing Wi-Fi first service operators to operate nationwide in Canada, the Commission will, through the introduction of competitive pressures, effectively be requiring all service providers to do better in making their plans easy to understand and discoverable by Canadians.

60. It is important to remember, as Ice Wireless highlighted in its initial intervention, that Wi-Fi first service providers will not appeal to every usage profile. Those who continue to require significant amounts of cellular data will probably be better served by the traditional carriers, including by Ice Wireless. However, for many Canadians, Wi-Fi first service providers will provide them with exactly what they need. The introduction of new competitive players into the mobile wireless market will also force all providers, whether they operate on a Wi-Fi first model or as a traditional carrier, to work harder to retain market share by lowering prices, innovating, and improving customer service. Ice Wireless submits that a need to compete harder is good for both Canadian consumers and service providers and will advance the policy objective contained in subsection 7(c) of the *Telecommunications Act*[95] "to enhance the efficiency and competitiveness, at the national and international levels, of Canadian telecommunications".

61. Consequently, despite the claims of incumbent carriers such as Bell Mobility, Wi-Fi first service providers can offer more affordable options to many end-users.

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94 Ice Wireless Inc., "Wireless Onboard", https://www.icewireless.com/en/wireless/plans.
95 SC 1993, c 38. ["*Telecommunications Act*"].

3.4 The black market for mobile wireless services indicates that something is deeply wrong with Canada's mobile wireless telecommunications market

62. Media outlets have recently confirmed the existence of a roaring black market in Canada's mobile wireless market whereby some Canadian consumers engage in questionable tactics to obtain subscriptions from areas of the country with more competition, and thus lower prices, than in their own provinces or territories.[96]

63. The black market seems to be particularly strong for plans based in Saskatchewan or Manitoba, although Ice Wireless suspects that the black market in Manitoba will dry up soon following BCE's acquisition of MTS. [97]

64. Although it is not reported in the media stories cited by Ice Wireless, there is also likely a black market for mobile wireless plans in Quebec. This price differential between Quebec and other provinces is also borne out by Dr. von Wartburg's report, which shows that not only are mobile wireless rates charged by all the incumbent wireless carriers lower in Quebec, but data allowances are significantly higher.[98] Furthermore, a review of Rogers' retail website on October 27, 2017 indicates that its "Premium + Tab" plan cost $95.00 per month for 1 GB of data in Ontario, while the same plan in Quebec, although still costing $95.00 per month, included 6 GB of data.[99] Clearly, depending on the province that they live in and the level of competition in that province, Canadians can expect to pay wildly divergent rates for mobile wireless services.

65. A quick Google search also indicated that Canadians are not just obtaining black market cell phone plans from outside their own provinces or territories, but that there are numerous how-to guides for obtaining cheaper plans from the United States. For example, Ice Wireless easily

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96 Sophia Harris, "Black market dealers reveal secret to super cheap cellphone plans", *CBC News*, http://www.cbc.ca/news/business/black-market-cell-phone-plan-1.3774387, 23 September 2016.

97 *Ibid*.

98 von Wartburg Report, supra note 8, at paras 44-45.

99 Rogers Communications Inc., "Smartphone Plans | Choose Your Cell Phone Plan | Rogers", https://www.rogers.com/consumer/wireless/smartphone-plans?ipn=1.

found, in under 30 seconds, an article from *Vice* detailing how to obtain an unlimited T-Mobile plan in Canada[100] and a guide on how to get Project Fi in Canada.[101]

66. Ice Wireless submits that this is truly astounding. Even though as of October 23, 2017 the Canadian dollar was worth about 0.79 USD, Canadians are still seeking out black market mobile wireless plans from the United States because they are more affordable than Canadian plans.

67. The existence of a black market is an inherent sign of a market failure. The fact that Canadians are willing to engage in behavior that is technically a violation of the terms and conditions of Canadian mobile wireless carriers is a clear indication that the market is not sufficiently competitive and that mobile wireless service providers are not sufficiently affordable.

68. Although they can result in cheaper plans for consumers, black markets are harmful for Canadian society as sales tax revenues become misapplied throughout the country, and in the case of plans purchased in the United States, do not benefit Canada at all.

69. It is also unacceptable that in a national federation such as Canada, the incumbent wireless carriers can get away with charging excessively differential rates to different groups of Canadians. Unfortunately, despite over a decade of effort to introduce meaningful competition in every province, it has only take hold in a handful of provinces and more than 70% of Canadians still do not have access to a strong fourth mobile wireless carrier.[102] The emergence of a black market for mobile wireless services indicates that many Canadians are done waiting for competition to come to them, and are instead going to where there is competition, regardless of the strict legalities of their actions.

70. Ice Wireless submits that expanding the definition of home network to include other forms of connectivity and thus allow new companies to proliferate and offer affordable mobile wireless services will go a long way towards stamping out the black market for mobile wireless services by

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[100] Ashely Renders, "Bills, bills, bills", *Vice*, https://news.vice.com/story/why-i-opted-for-an-american-cell-phone-plan, 28 February 2017.

[101] Canadian Kilometres, "Google Project Fi Review", *Canadian Kilometres*, http://canadiankilometers.boardingarea.com/2017/06/30/google-project-fi-canada-review/, 30 June 2017.

[102] von Wartburg Report, supra note 8, at para 48.

ensuring that all Canadians, from coast to coast to coast, have access to competitive choices for their mobile wireless services.

3.5 Conclusion on competition in Canada's mobile wireless market

71. Overall, despite the claims of the incumbent carriers to the contrary, Canada's mobile wireless market is insufficiently competitive. Indeed, perhaps the best evidence of this is that a restricted version of Sugar Mobile is the only alternative wireless service provider in the entire country, whereas just across the border, hundreds of alternative wireless service providers have proliferated in the United States without any need for regulatory support. Clearly, Canada's mobile wireless market has evolved in such a fashion that it is too highly concentrated for the incumbent carriers to see any advantage in negotiating in good faith with alternative wireless service providers. Commission intervention is required and by taking the relatively modest step of expanding the definition of home network to include public Wi-Fi, and thus allowing Wi-Fi first service providers such as Sugar Mobile to operate nationwide, the market power of the national wireless carriers will finally be restrained, and Canadians will get to enjoy the benefits of a competitive mobile wireless marketplace for the first time in their history.

4.0 INVESTMENT WILL BE STIMULATED, NOT HARMED, BY EXPANDING THE DEFINITION OF HOME NETWORK

72. It was predictable that the incumbent wireless carriers would make their traditional argument in this proceeding that allowing even incidental access to their networks would result in catastrophic negative impacts on investment in mobile wireless infrastructure, particularly in rural areas.

73. For the reasons set out below, and in its initial intervention,[103] Ice Wireless urges the Commission not to be persuaded by this fear-mongering of the incumbent wireless carriers and, instead, to boldly proceed to bring real competition to Canada's mobile wireless market by expanding the definition of home network to include Wi-Fi and other forms of connectivity.

[103] Ice Wireless Intervention, *supra* note 28, at paras 50-80.

4.1 Expanding the definition of home network will help to reduce the urban-rural divide

74. Many of the incumbent wireless carriers have made the tired old argument that making it easier for competitors to gain access to their networks, in this case through the relatively restricted mechanism of expanding the definition of home network to include Wi-Fi, will result in reduced investment in mobile wireless infrastructure in rural areas of Canada, thus exacerbating the well-known urban-rural divide regarding access to telecommunications services.[104]

75. Ice Wireless submits that this worn out argument is without any merit and must be rejected. There is no risk to investment in mobile wireless infrastructure in rural areas from expanding the definition of home network to include Wi-Fi. In fact, expanding the definition of home network will likely stimulate investment in mobile wireless infrastructure in rural areas.

76. Firstly, as the national wireless carriers point out in their investor reports, 99% of the Canadian population is already served by LTE networks, and 84% of the Canadian population is served by LTE-A networks.[105] Less than 1% of the Canadian population remains to be connected to LTE networks. Ice Wireless expects that most of these Canadians are in areas that are not just considered rural, but also remote, such as the far North and various Indigenous communities.

77. Ice Wireless notes that in its third quarter shareholders' report released on 19 October 2017, Rogers Communications Inc. ("RCI") reported a quarterly adjusted operating profit of $1.463 billion.[106] Given these vast profits, if the national wireless carriers were truly serious about reaching this final 1% of Canadians it would be a relatively simple matter that could be accomplished in a short period of time.

78. However, the truth of the matter is that the incumbent wireless carriers have little interest in serving the most remote parts of Canada and probably have no plans to connect this final 1% of Canadians, regardless of whether the Commission chooses to expand the definition of home

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104 Eastlink Intervention, *supra* note 71, at paras 3, 17, 20, 26; Rogers Intervention, *supra* note 29, at para 49; TELUS Intervention, *supra* note 29, at para 96; Canadian Wireless Telecommunications Association, *Intervention*, CRTC File No. 1011-NOC2017-0259, 8 September 2017, at para 24 ["CWTA Intervention"].

105 TELUS Corporation, Management's discussion and analysis 2017 Q2, 11 August 2017 at pg 18 ["TELUS Q2 2017 Shareholders' Report"].

106 Rogers Communications Inc., Management's discussion and analysis 2017 Q3, 19 October 2017, at pg 4 ["Rogers Q3 2017 Shareholders' Report"].

network to encompass Wi-Fi. For example, TELUS has shown no inclination to compete vigorously as a facilities-based provider in the North and is instead relying upon the network that Bell Mobility has already constructed. It is Ice Wireless that is providing facilities-based competition in the North and working to connect the remaining communities that do not have access to a competitive provider, or any advanced mobile wireless service at all.

79. The incumbent wireless carriers undeniably would prefer to focus their efforts on Canada's largest urban centres. Ice Wireless does not deny that it is far easier and faster to make a million dollars providing mobile wireless services in downtown Montreal than it is in downtown Iqaluit.

80. This leads to the fundamental point, it is not the incumbent operators, but smaller carriers who specialize in serving rural areas, carriers such as Ice Wireless and Execulink, who are going to connect the final 1% of Canadians to advanced mobile wireless technologies. Expanding the definition of home network to include Wi-Fi will allow carriers such as Ice Wireless and Execulink to use affiliated Wi-Fi first service providers such as Sugar Mobile to offer nationwide service and thus redirect their revenues back into the rural and remote communities that they serve. Other Wi-Fi first service providers may choose to start carriers for the first time that specialize in serving isolated Indigenous communities, for example.

81. This is not merely a hypothetical example, as Tucows Inc. ("Tucows") demonstrates. Tucows used revenues from its affiliated Wi-Fi first service provider, Ting, which offers nationwide service in the United States, to deploy fibre-to-the-home ("FTTH") in five American cities.[107]

82. Therefore, far from exacerbating the urban-rural divide from reducing the incentives of the incumbent wireless carriers to invest in rural areas, expanding the definition of home network to include Wi-Fi will allow carriers such as Ice Wireless to increase their level of investment in network infrastructure in Canada's most rural and remote areas. In short, expanding the definition

[107] Tucows Inc., *Intervention of Tucows Inc.*, CRTC File No 1011-NOC2017-0259, 8 September 2017, at para 8. ["Tucows Intervention"].

of home network to include Wi-Fi will help get that final 1% of Canadians connected to advanced mobile wireless networks.

83. Ice Wireless hastens to add that it is not suggesting that every Wi-Fi first service provider will invest its revenues in rural and remote areas or that this would be an economically efficient outcome for the Commission to seek. Undoubtedly, many Wi-Fi first service providers will never invest in traditional mobile wireless network infrastructure, such as towers, backhaul, and spectrum, at all, and this fact should not be viewed as a negative. As Ice Wireless, and others who are in favour of expanding the definition of home network have demonstrated, such Wi-Fi first service providers will bring many benefits to the Canadian market including, most importantly, a drastic increase in the level of competition such that the market power of the incumbents is constrained and Canadians are finally able to access affordable mobile wireless services. However, some carriers, including Ice Wireless, will no doubt use their revenues from affiliated Wi-Fi first service providers to reinvest in rural and remote serving areas.

84. Overall, the expansion of the definition of home network to include public Wi-Fi will stimulate investments in mobile wireless network infrastructure in Canada's most rural and remote areas, including in Ice Wireless' traditional operating territory in Canada's North.

4.2 No party has provided convincing evidence demonstrating that investments in mobile wireless network infrastructure will be negatively impacted by expanding the definition of home network

85. Several of the incumbent wireless carriers have attempted to argue that by expanding the definition of home network their investments in mobile wireless network infrastructure will be negatively affected.[108] However, Dr. von Wartburg demonstrates that the evidence provided by the traditional carriers in support of this argument is inconclusive and that more recent research demonstrates that the expansion of the definition of home network to include Wi-Fi will likely not have any negative impact on investment given the unique situation of Canada's mobile wireless market.[109] In fact, Dr. von Wartburg's report suggests, using the most recent evidence and

[108] Eastlink Intervention, *supra* note 71, at paras 3, 17, 20, 26; Rogers Intervention, *supra* note 29, at para 49; TELUS Intervention, *supra* note 29, at para 96; CWTA Intervention, *supra* note 104 at para 24.

[109] von Wartburg Report, supra note 8, at paras 73-86.

academic research, that increasing the level of competition in Canada will likely stimulate the national wireless carriers to increase their level of investments.[110]

86. Dr. von Wartburg's report identifies the following issues, amongst others, with the economic evidence provided by the national wireless carriers that undermine their arguments that expanding mandated access to the national wireless carriers' networks will negatively impact investment:

- The academic research cited by the national wireless carriers predominantly refers to the fixed telecommunications industry, not the mobile wireless telecommunications industry.[111]

- The national wireless carriers present a biased and selective view of the academic literature and exclude the most recent and most advanced research on competition in the mobile wireless telecommunications industry.[112]

- With regard to the fixed telecommunications industry, despite citing research that claims that mandated access causes a reduction in investment, the national wireless carriers have recently made and are continuing to make announcements, including in their investor reports, of sizeable investments in next generation broadband infrastructure.[113] Ice Wireless notes that these announcements about continued investment in next generation broadband infrastructure are being made more than two years after the Commission mandated competitor access to this infrastructure.[114]

- The academic research on the empirical relationship between competition and investment in the mobile wireless market is still in its early stages. For example, the Sanderson and Dippon reports rely solely upon an early study by Kim et al. (2011).[115]

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110 *Id.* at paras 80-84.
111 *Id.* at para 85.
112 *Ibid.*
113 *Id.* at para 75.
114 Telecom Regulatory Policy CRTC 2015-326, *Review of wholesale wireline services and associated policies*, 22 July 2015.
115 von Wartburg Report, supra note 8, at para 76.

- The study by Kim et al. (2011), which the national wireless carriers rely upon heavily, lacks statistically significant evidence and has additional shortcomings that have been identified by other researchers.[116]

- More recent research, by Houngbonon and Jeanjean (2016), for example, suggests that given the profit margins of the national carriers, investment intensity will increase as competition increases. Moreover, the research of Houngbonon and Jeanjean (2016) suggests that wireless carriers that host an MVNO invest more than their rivals.[117]

87. Ice Wireless also notes that the expert evidence provided by Shaw also exhibits many of the flaws noted above including relying heavily upon the Kim et al. (2011) report to argue that there is a risk that expanding the definition of home network will remove incentives for the incumbent wireless carriers to continue to invest in infrastructure.[118] In addition, as with the other incumbent wireless carriers, Shaw's expert evidence also primarily relies upon outdated research, including studies from the 1970s and 1980s that deal with wireline technologies or economic theory more generally as opposed to the reality of mobile wireless markets in the twenty-first century.[119] As noted above, Dr. von Wartburg highlighted these issues with the expert evidence of the national wireless carriers in his report.[120]

88. Furthermore, the expert evidence provided by the incumbent wireless carriers focused on the impact on investment of mandating MVNO access[121], however, mandating MVNO access is not what is at stake in the current proceeding. Although Ice Wireless does not believe that there would be any negative impact from either mandating MVNO access or expanding the definition of home network to include Wi-Fi, it is important to remember that only the latter is at stake in the present proceeding. Therefore, even if the expert evidence provided by the incumbent wireless carriers is correct, which Ice Wireless rejects, and mandating MVNO access does result in a negative impact on investment, such a negative impact would presumably be significantly

116 *Id*. at paras 76-79.
117 *Id*. at paras 80-84.
118 See, for example, Shaw Intervention, *supra* note 24, at Appendix B, paras 33, 39-40,
119 See, for example, Shaw Intervention, *supra* note 24, at Appendix B, paras 44-53.
120 von Wartburg Report, supra note 8, at paras 80-85.
121 See, for example, Shaw Intervention, *supra* note 24, at Appendix B, paras 55; Bell Mobility Intervention, *supra* note 29, at Appendix 2, Rogers Intervention, *supra* note 29, at Appendix 2, paras 4-5; TELUS Intervention, *supra* note 29, at Serentschy Report, pg 15.

attenuated in a scenario where instead of getting full wholesale access to the networks of the national carriers, as they would in a mandated MVNO scenario, Wi-Fi first service providers will only access those networks, at cost based wholesale roaming rates, as a fallback when Wi-Fi connectivity is unavailable. As explained more fully in its initial intervention, Ice Wireless submits that this attenuated negative impact on investment would be more than offset by the gains in competition and affordability.[122] After all, the utility of the best networks in the world is significantly reduced if the average Canadian cannot afford to use them to their full potential.

89. Finally, Ice Wireless notes that the best evidence that there will be no negative impact on investment from expanding the definition of "home network" to include Wi-Fi comes from the shareholders' reports of the publicly traded MNOs themselves. Ice Wireless reviewed these reports as part of its initial intervention and concluded that none of them indicated any risk to their investment plans from the current proceeding.[123] Since that time, on October 19, 2017, RCI released its third quarter shareholders' report for 2017. RCI merely mentioned that the present proceeding was occurring and failed to flag any risk to its revenues or investment plans that could stem from the expansion of the definition of home network to include Wi-Fi.[124]

90. Consequently, pursuant to their own shareholders' reports, the incumbent wireless carriers do not appear to be concerned in the slightest about the impact that the expansion of the definition of home network will have on their revenues or investment plans. This makes sense because if the definition of home network is expanded to encompass a WiFi first approach, the national wireless carriers will still make a healthy profit from greater usage of their networks at roaming rates that are set above retail cost by the Commission to ensure a fair return on investment. The investment plans of the other incumbent wireless carriers, such as SaskTel, Videotron, and Eastlink, will also not be affected negatively as they will be more than capable of competing for the business of Wi-Fi first service providers and/or creating their own affiliated Wi-Fi first service providers.

91. Ice Wireless urges the Commission to carefully test and probe the claims of the incumbent wireless carriers about the impact that expanding the definition of home network will have on

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122 Ice Wireless Intervention, *supra* note 28, at paras 97-110.
123 *Id.* at paras 58-80.
124 Rogers Q3 2017 Shareholders' Report, *supra* note 106, at pg 26.

investment. Ice Wireless submits that the evidence does not support the conclusion that there will be any negative impact and that, in fact, the most recent academic research suggests that there is likely to be a positive impact on investment by expanding the definition of home network and improving the level of competition in Canada's mobile wireless market.

5.0 THE CONDITIONS PROPOSED BY SOME PARTIES FOR ALTERNATIVE WIRELESS SERVICE PROVIDERS ARE ANTI-COMPETITIVE, DISCRIMINATORY, AND UNNECESSARY

92. Some parties proposed various conditions that the Commission should impose on Wi-Fi first service providers if the Commission chooses to expand the definition of home network to encompass other forms of connectivity. Rogers proposed the most comprehensive set of conditions, including limits on the cellular data usage of a Wi-Fi first service provider's end-users, substantially higher wholesale roaming rates than those that apply to Canadian carriers, a limitation on the type of network protocols that Wi-Fi first service providers can access, a requirement that Wi-Fi first service providers be Canadian carriers, and proposals that access to Wi-Fi first service providers be limited to low income Canadians.[125] Other incumbent wireless carriers also proposed conditions similar to those proposed by Rogers.[126]

93. Ice Wireless is aware that the Commission has posed a Request for Information to parties in the present proceeding regarding some of Rogers proposed conditions, but Ice Wireless will proceed to address why the conditions proposed by Rogers, and others, for Wi-Fi first service providers are anti-competitive, discriminatory, and unnecessary.

5.1 Alternative service providers cannot be restricted to selling their services to low-income Canadians

94. Firstly, with regard to the proposal that access to Wi-Fi first service providers should be limited to low income Canadians, this is absurd, discriminatory, anti-competitive, and would set Canada even further behind the United States and other countries when it comes to mobile wireless innovation. Limiting access to Wi-Fi first service providers to low income Canadians is

[125] Rogers Intervention, *supra* note 29, at paras 76-105.

[126] See, for example, Quebecor Media Inc., *Intervention de Québecor Média inc. (Québecor Média) au nom de sa filiale Vidéotron s.e.n.c. (Vidéotron)*, CRTC File No. 1011-NOC2017-0259, 8 September 2017, at paras 45-46 ["Videotron Intervention"].

discriminatory both towards low income Canadians themselves and to other cost-conscious Canadians who seek a means to better control their mobile wireless bills.

95. Rogers has clearly not thought through the impact that its proposal would have on low-income Canadians. If this proposal were adopted, low-income Canadians everywhere could be publicly identified simply by their choice of mobile wireless service provider. Did Rogers consider the impact that its proposal may have on a high school student for example whose family is outed as being low-income simply by the fact that the student is 'permitted' to subscribe to a Wi-Fi first service provider? Ice Wireless suspects that many students, and their families, would prefer to keep their low-income status confidential and not have it broadcast to the world by their choice of mobile wireless service provider. No low-income Canadian should be identified as such simply by reference to their mobile wireless service provider.

96. The proposal to limit access to Wi-Fi first service providers to low income Canadians is also discriminatory against other Canadians who equally deserve an opportunity to be able to control their mobile wireless service costs. Ice Wireless notes that many members of the middle class and small businesses may find the service offerings of Wi-Fi first service providers an appealing way to better manage their costs. One does not need to be a low-income Canadian to find Bell Mobility's $70.00 per GB of data overage charge unaffordable and being a 'cost-conscious' consumer does not necessarily equate with being a low-income Canadian.

97. Limiting the availability of Wi-Fi first service providers to low income Canadians will make it very difficult for any Wi-Fi first service provider to enter the market, and those who support this proposal are aware of this fact. Wi-Fi first service providers need to be able to compete for market share in all areas of the mobile wireless market to be able to compete against the incumbency advantages held by the incumbent wireless carriers. For greater certainty, there should be no restrictions on the ability of Wi-Fi first service providers to compete for machine-to-machine and Internet of Things business either. Any such restrictions would be anti-competitive and only designed to prevent Wi-Fi first service providers from reaching their full potential.

98. It is true that the Order of the Governor-in-Council that initiated the present proceeding noted that "Canadians with low household income in particular face challenges related to the affordability of telecommunications services" and "the Governor in Council considers that innovative business models and technological solutions can result in more meaningful choices for Canadian consumers, especially those with low incomes who are not well served by current market offerings".[127] However, by no means did the Order of the Governor-in-Council suggest that the purpose of the proceeding was limited to finding better solutions for mobile wireless services for low income Canadians. In fact, the Order of the Governor-in-Council noted that "Canadians continue to pay high rates for mobile wireless telecommunications services;" and "Canada has among the lowest adoption rates for mobile wireless telecommunications services among industrialized countries".[128] Clearly, the Governor-in-Council is concerned with improving affordability and mobile wireless adoption amongst all Canadians, not just low-income Canadians. Of course, low-income Canadians are going to be particularly interested in lowering their mobile wireless service bills, but the fact is that if Wi-Fi first service providers are restricted to serving low-income Canadians, there will be no Wi-Fi first service providers in Canada.

99. Once again, Ice Wireless is compelled to point to the example of our innovative American neighbours just south of the border. There are no requirements in the United States that Wi-Fi first service providers such as Ting, Project Fi, Republic Wireless, or others limit their service to low-income Canadians. Such a proposal would seem absurd in the United States, which regrettably, continues to outpace Canada by a significant degree in terms of the competitiveness of its mobile wireless market.

100. Finally, such a proposal, as with all the proposed conditions that parties are seeking to place on Wi-Fi first service providers cannot be implemented as it blatantly violates the policy objectives contained in subsection 7(f) of the *Telecommunications Act* and subsection 1(a)(i) of the Policy Direction[129] that require the Commission to rely upon market forces to the greatest extent possible. A requirement limiting Wi-Fi first service providers to only selling their service to low-income

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127 Order in Council, *supra* note 60.

128 *Ibid*.

129 *Order Issuing a Direction to the CRTC on Implementing the Canadian Telecommunications Policy Objectives*, SOR/2006-355 ["Policy Direction"].

Canadians is a significant restraint on trade that is completely inconsistent with Canada's telecommunications policy objectives. In any event, if such a condition is implemented, as noted above, there simply will be no Wi-Fi first service providers as no company will survive under such a condition.

5.2 There is no justification for alternative wireless service providers or their end-users to be subject to data usage limits

101. With regard to data usage limits by the end-users of Wi-Fi first service providers, Ice Wireless explained why this was an unnecessary limitation in its initial intervention.[130] Most importantly, Ice Wireless noted that:

> In the rare cases where an end-user of an alternative wireless service provider does decide to roam excessively on a national wireless carrier's network, all that will happen is that the national wireless carrier will make a substantial profit from that end-user via wholesale roaming rates, which Ice Wireless notes are set by the Commission so as to fully compensate and provide a fair return on investment to the national wireless carriers.[131]

102. There is compelling evidence to suggest that the current wholesale roaming rates of the national wireless carriers for mobile wireless data are set above their retail rates. For example, Rogers' interim wholesale roaming rate for mobile wireless data is currently $0.0252 per MB, or approximately $26.00 per GB of mobile wireless data.[132] At the same time, Rogers is selling data only plans, at the same rate nationwide, with additional data available at $5.00 per GB after an end-user consumes more than 10 GB of data, which suggests that Rogers' actual cost per GB of data must be below $5.00.[133] A retail consumer subscribing to one of Rogers' data only plans can purchase 10 GB of from Rogers for $85.00 per month. In contrast, each GB of mobile wireless data for a wholesale roaming customer of Rogers cost $26.00, which is clearly above Rogers' retail rates.

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130 Ice Wireless Intervention, *supra* note 28, at paras 111-115.

131 *Id.* at para 114.

132 Rogers Communication Partnership, *Tariff Notice (TN) 42*, at 2nd Revised Page 103, 23 November 2015, interim approval granted in Telecom Order CRTC 2015-537, *Various companies – Interim approval of tariff applications*, 3 December 2015 at para 1 ["TO 2015-537"].

133 Rogers Communications Inc., "Mobile Internet Plans | Rogers", http://www.rogers.com/consumer/wireless/mobile-internet-plans?ipn=1

103. Similarly, Bell Mobility's mobile data-only plans are nearly identical to those of Rogers, with additional data available at $5.00 per GB after an end-user consumes more than 10 GB of mobile wireless data, which, as with Rogers, can be purchased for $85.00 per month.[134] This rate appears to apply in all provinces except Manitoba and Saskatchewan, where Bell Mobility charges $10.00 per GB after 20 GB of usage.[135] Bell Mobility's interim wholesale roaming rate for mobile wireless data is $0.033 per MB, or approximately $33.79 per GB.[136]

104. TELUS' mobile data-only plans are also nearly identical to those of Rogers and Bell Mobility, with additional data available at $0.05 per MB after an end-user consumes more than 10 GB of mobile wireless data, which, as with Rogers and Bell Mobility, can be purchased for $85.00 per month.[137] This rate applies nationwide.[138] TELUS' interim wholesale roaming rate for mobile wireless data is $0.037730 per MB, or approximately $38.63 per GB.[139]

105. Ice Wireless notes that the plans referenced above are data-only plans that do not include talk or text, and only are available to be used with certain devices such as mobile hotspots and Internet keys.[140]

106. Therefore, looking at the retail rates that the national wireless carriers charge their end-users for mobile wireless data, versus their wholesale roaming rates for mobile wireless data, it becomes apparent that the wholesale roaming rates appear to be set well above retail rates. Given

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134 Bell Mobility Inc., "Mobile Internet plans from Bell Mobility", https://www.bell.ca/Mobility/Cell_phone_plans/Turbo-Stick-and-Turbo-Hub-data-plans.

135 *Ibid*.

136 Bell Mobility Inc., *Bell Mobility Tariff Notice 1B,* at 3rd Revised Page 38, 23 November 2015, interim approval granted in TO 2015-537, *supra* note 132, at para 1.

137 TELUS Communications Company, "Mobile Internet | 4G high speed wireless Internet | Mobility | TELUS.com", http://www.telus.com/en/on/mobility/mobile-internet/#combo.

138 *Ibid*.

139 TELUS Communications Company., *TELUS Tariff Notice 501,* at 3rd Revised Page 233-19, 23 November 2015, interim approval granted in TO 2015-537, *supra* note 132, at para 1.

140 Rogers Communications Inc., "Mobile Internet Plans | Rogers", http://www.rogers.com/consumer/wireless/mobile-internet-plans?ipn=1; TELUS Communications Company, "Mobile Internet | 4G high speed wireless Internet | Mobility | TELUS.com", http://www.telus.com/en/on/mobility/mobile-internet/#combo; Bell Mobility Inc., "Mobile Internet plans from Bell Mobility", https://www.bell.ca/Mobility/Cell_phone_plans/Turbo-Stick-and-Turbo-Hub-data-plans.

this situation, in a properly functioning competitive market, the national wireless carriers would actually want the end-users of Wi-Fi first service providers to engage in excessive roaming as the National Wireless Carriers would then earn profits above what they would earn from their own end-users.

107. However, even if the National Wireless Carriers' final mobile wireless roaming rates are not set above the national wireless' carriers retail rates, they will still be set by the Commission to be cost based and ensure a fair return on investment. Therefore, when the end-user of a Wi-Fi first service provider engages in excessive roaming on a national wireless carrier's network, that national wireless carrier will continue to receive a healthy return on its investments through the wholesale roaming rates, even though the end-user is not subscribed to the services of the national wireless carrier.

108. Incidentally, the fact that all the national wireless carriers have almost identical rates for mobile wireless data-only plans, down to the dollar, is further compelling evidence of coordinated behavior by the national wireless carriers in Canada's market for mobile wireless services.

109. It is an indication of the fact that competitive forces are not working as they should in Canada's market for mobile wireless services that the incumbent wireless carriers are seeking to impose data usage limits on Wi-Fi first service providers. It is also somewhat ironic. The incumbent wireless carriers like to talk about relying on market forces to the greatest extent possible when discussing their own businesses, but when it comes to the businesses of their competitors, they are perfectly prepared to engage in heavy-handed regulatory constraints on market forces.

110. The proposals of Rogers and others to impose data usage caps would distort the market and the behavior of end-users and require the imposition of enforcement mechanisms such as terminating end-users' service when they exceeded a data usage cap. In contrast, Ice Wireless' proposal, as set out in its initial intervention, to simply rely upon the price of cellular data such that excessive roaming becomes uneconomical is an elegant market-based solution that requires

minimal enforcement effort.[141] Adopting data caps over Ice Wireless' market based solution would not be consistent with the policy objectives contained in subsection 7(f) of the *Telecommunications Act* and subsection 1(a)(i) of the Policy Direction that require the Commission to rely upon market forces to the greatest extent possible.

111. Ice Wireless notes PIAC's proposal that a "sliding scale of tariffed rates" could be used whereby as data usage increases, the rate charged to the Wi-Fi first service provider for cellular data also increases.[142] While somewhat less crippling than the proposal to institute a hard cap on data usage, PIAC's proposal is unnecessary and would complicate the regulatory framework as well as potentially adding more process to the ongoing review of wholesale roaming rates, which prolongs the regulatory uncertainty that reduces competition.

112. The final wholesale roaming rates will be set to provide a fair return to the national wireless carriers as well as prevent any incentive to engage in permanent roaming. Relying on one set of wholesale roaming rates is a market-based solution that is in accordance with subsection 7(f) of the *Telecommunications Act* and subsection 1(a)(i) of the Policy Direction that require the Commission to rely upon market forces to the greatest extent possible. Moreover, relying on one set of wholesale roaming rates, as opposed to a sliding scale, is more in conformity with subsection 1(a)(ii) of the Policy Direction which directs the Commission to implement the policy objectives contained in section 7 of the *Telecommunications Act* through regulatory measures that are efficient and proportionate to their purpose. The most efficient mechanism for dealing with excessive usage of the national carriers' networks is simply to rely upon the existing wholesale roaming rates.

113. Relying on one set of wholesale roaming rates is also in conformity with subsection 1(b)(iv) of the Policy Direction, which requires the Commission to, when making regulations related to network access, ensure the competitive and technological neutrality of those regulations to the greatest extent possible. Applying a sliding scale of tariffed rates to Wi-Fi first service providers, but not facilities-based wholesale roaming customers, would represent a deviation from

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[141] *Id.* at paras 111-115.
[142] PIAC Intervention, *supra* note 35, at para 85.

competitive and technological neutrality for no apparent reason. Therefore, PIAC's proposed sliding scale of tariffed rates also should not be implemented because it is inconsistent with the principles of technological and competitive neutrality enshrined in the Policy Direction.

114. Ice Wireless agrees with PIAC that there is a safety issue in imposing data usage caps on the end-users of Wi-Fi first service providers in that these end-users may be cut off from the ability to contact important agencies or individuals during a crisis.[143] While it is true that 9-1-1 would, presumably, continue to be accessible even if a data cap were reached, the individuals or agencies that an end-user may need to reach in a crisis extend far beyond 9-1-1.

115. Finally, Ice Wireless notes that it is not aware of any data usage caps being imposed on Wi-Fi first service providers in the United States such as Ting, Republic Wireless, or Project Fi. In the United States the competitive market simply operates such that excessive usage of cellular by the end-users of Wi-Fi first service providers is rendered unaffordable. There is no reason that the same market based forces cannot operate in Canada to restrain excessive usage through tariffed wholesale roaming rates.

116. Overall, there is no policy justification for data usage limits and such limits would be contrary to the policy objectives contained in subsection 7(f) of the *Telecommunications Act* and subsections 1(a)(i), 1(a)(ii) and 1(b)(iv) of the Policy Direction.

5.3 There is no justification for charging alternative wireless service providers different wholesale roaming rates

117. Various incumbent wireless carriers have suggested that Wi-Fi first service providers should have to pay a different wholesale roaming rate than facilities-based carriers. As with data caps, there is no justification for this restriction and it is a thinly veiled attempt to prevent Wi-Fi first service providers from being able to launch in the first place. For example, Rogers wants the Commission to impose a rate of $3.75 per 50 MB of wholesale roaming data.[144] Similarly,

[143] *Id.* at para 91.
[144] Rogers Intervention, *supra* note 29, at paras 109-11.

Videotron believes that Wi-Fi first service providers should pay twice the wholesale roaming rate charged to facilities-based carriers.[145]

118. These proposals would crush the Wi-Fi first market before it got off the ground. To put the proposals in context, Sugar Mobile currently offers its end-users unlimited Canada and United States talk and text as well as 400 MB of cellular data for $19.99 per month.[146] Under Rogers' proposal, just obtaining 400 MB of cellular data on a wholesale basis would cost Sugar Mobile $30.00 per month. The Commission should reject this anti-competitive tactic as it will quite simply prevent any Wi-Fi first service provider from being able to compete.

119. Videotron's proposal to simply double the wholesale rate charged to Wi-Fi first service providers is arbitrary and punitive and has no basis in actual costing information. It is also clearly designed to prevent Wi-Fi first service providers from having any hope of competing against the incumbent wireless carriers.

120. The proposals of Rogers and Videotron must therefore be rejected as they are inconsistent with the policy objectives contained in subsection 7(c) of the *Telecommunications Act* which requires the Commission to work to enhance the competitiveness, at the national and international level of Canadian telecommunications. Clearly, if no Wi-Fi first service providers can enter the market at all, Canada's competitiveness will continue to stagnate, both within the country and in relation to other countries, such as the United States, which already has a plethora of Wi-Fi first service offerings. The proposals of Rogers and Videotron would also be inconsistent with subsection 1(b)(ii) of the Policy Direction which requires the Commission not to deter economically efficient competitive entry into the market. If wholesale rates are set such that Wi-Fi first service providers are unable to enter the market at all, clearly the Commission is deterring economically efficient entry.

121. The Commission is in the process of setting cost-based wholesale roaming rates that will allow the national carriers to obtain a fair return on their investments in their networks. No party

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[145] Videotron Intervention *supra* note 126, at paras 45-46.
[146] Sugar Mobile Inc., "Sugar Mobile", https://www.sugarmobile.ca.

has explained why anything else is required. In addition, the Commission's approach to setting wholesale rates is to use Phase II costing principles to ensure costs are recovered and the wholesale provider receives a fair return on investment. Arbitrarily increasing rates for a particular type of access technology simply to discourage usage would be, as far as Ice Wireless is aware, unprecedented.

122. Overall, there is no justification for differential wholesale roaming rates for Wi-Fi first service providers and any proposals to the contrary are simply trying to prevent innovative operators such as Sugar Mobile from entering the market in the first place.

5.4 There is no justification for restricting the network technologies that Wi-Fi first service providers can access

123. Rogers has proposed restricting mandated access for Wi-Fi first service providers to the national carriers' 3G networks.[147] Ice Wireless submits that this proposal is unjustified.

124. With regard to limiting Wi-Fi first service providers to the national carriers' 3G networks, Ice Wireless dealt with this proposal extensively, and why it could not be justified, in its initial intervention.[148]

125. To briefly recapitulate, this proposal would be in direct violation of the Commission's long-standing speed-matching principle. Wi-Fi first service providers will, in many cases, be providing service over Wi-Fi networks that vastly exceed the capabilities of the most advanced cellular networks. An end-user of a Wi-Fi first service provider connected to an FTTH network via Wi-Fi will undoubtedly have access to greater bandwidth than any end-user connected to an LTE-A or 5G network. Therefore, there is no basis for Wi-Fi first service providers to be limited to the capabilities of 3G networks, which Ice Wireless notes are fast being replaced across Canada with newer protocols.

147 Rogers Intervention, *supra* note 29, at paras 91-93.
148 Ice Wireless Intervention, *supra* note 28, at paras 116-121.

126. The Commission must see through this proposal for what it is, along with all of Rogers' other proposals: an anti-competitive attempt to prevent Wi-Fi first service providers from being able to compete in the marketplace. Ice Wireless notes that Project Fi, Republic Wireless, and Ting offer their end-users access to the latest network technologies. If the Commission wants to give Wi-Fi first service providers a chance, it cannot limit them to a form of technology that is nearly two generations old.

127. More generally, Rogers' proposals to limit the types of network technologies that Wi-Fi first service providers can access run afoul of the Policy Direction. Subsection 1(b)(iv) of the Policy Direction encourages the Commission to, when making regulations related to network access, ensure the competitive and technological neutrality of those regulations to the greatest extent possible. In accordance with the goal of achieving technological and competitive neutrality, there is no basis for treating Wi-Fi first service providers differently from any other wholesale roaming customer of the national wireless carriers. Ice Wireless notes that pursuant to TD 2017-56, the end-users of a facilities-based wholesale roaming customer are entitled to the same quality of service when roaming on a national wireless carrier's network as they are when connected to their home network.[149] Wi-Fi first service providers will be capable of offering their end-users bandwidth delivered over Wi-Fi, which will be their home network, equal to or greater than that available on the national carriers' cellular networks. Therefore, Wi-Fi first service providers should be permitted to access the national wireless carriers' most advanced network protocols.

128. Overall, there is no justification for restricting the network technologies that Wi-Fi first service providers can access.

5.5 There is no justification for a requirement that alternative wireless service providers have their own mobile wireless network

129. Rogers believes that there should be a requirement for Wi-Fi first service providers to be Canadians carriers and thus own and operate a mobile wireless network.[150]

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[149] Telecom Decision CRTC 2017-56, *Wholesale mobile wireless roaming service tariffs – Final terms and conditions*, 1 March 2017, at paras 153-156.

[150] *Id.* at paras 98-103.

130. Ice Wireless explained why this requirement was unnecessary, and counter-productive, despite owning a mobile wireless network itself, in its initial intervention.[151]

131. To briefly recapitulate, the proposal should be rejected for the following reasons:

- Any such requirement would inherently involve setting an arbitrary threshold for how large the 'home network' must be and potentially lead to regulatory gaming whereby, for example, entities deploy a single tower simply for the purpose of accessing the national carriers' networks.

- The benefits from increased affordability and competition will be maximized with as many new players in the marketplace as possible. Imposing a requirement to own or operate a home network would be counter-productive. Ice Wireless notes that the need to acquire scarce amounts of spectrum to launch a mobile wireless network would act as an artificial cap on the number of new providers.

- There is no such requirement in the United States imposed on Wi-Fi first service providers such as Ting or Republic Wireless. The United States' mobile wireless market appears to be operating smoothly despite the lack of this requirement.

132. Overall, there is no valid justification for requiring Wi-Fi first service providers to own or operate a home network.

5.6 Conclusion on the conditions that some parties have suggested be imposed on alternative wireless service providers

133. The conditions suggested by Rogers, and others, are anti-competitive, discriminatory, and/or unnecessary. Ice Wireless urges the Commission to see these conditions for what they are: thinly veiled attempts to prevent Wi-Fi first service providers from having any hope of operating in the first place.

[151] Ice Wireless Intervention, *supra* note 28, at paras 126-130.

134. To allow Wi-Fi first service operators to have a fair chance at competing, and bringing the benefits of competition to Canadians, the Commission must ensure that they are able to operate on at least the same footing as Wi-Fi first service operators in the United States.

6.0 THERE ARE NO SAFETY OR SECURITY ISSUES WITH WI-FI FIRST SERVICE PROVIDERS

135. Ice Wireless already extensively demonstrated in its initial intervention that there are no issues with the availability, quality, or reliability of public Wi-Fi networks that should dissuade the Commission from expanding the definition of home network to include public Wi-Fi.[152]

136. However, some of the incumbent wireless carriers have stated that Wi-Fi first service providers will not be able to provide their end-users with the same level of security as traditional cellular carriers.[153] Shaw also stated that Canadian PSAPs have expressed concern with the reliability of 9-1-1 services on Wi-Fi calling.[154]

137. These allegations are unfounded and Ice Wireless notes that no party could point to any real-life examples of safety or security issues materializing regarding Wi-Fi first service providers. Ice Wireless notes that dozens, if not hundreds, of Wi-Fi first service providers operate successfully in the United States without any apparent safety or security issues. Republic Wireless has actually published a guide as to how its end-users can take basic steps to improve the security of their telecommunications when using public Wi-Fi networks, including with VPNs.[155]

138. Wi-Fi first service providers are perfectly capable of securing the telecommunications of their end-users and thus advancing the policy objective contained in subsection 7(i) of the *Telecommunications Act* regarding the protection of privacy of persons.

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[152] Ice Wireless Intervention, *supra* note 28, at paras 139-146.
[153] CWTA Intervention, *supra* note 104 at para 28; TELUS Intervention, *supra* note 29, at para 91.
[154] Shaw Intervention, *supra* note 24, at Appendix A, para 34 ["Shaw Intervention"].
[155] Republic Wireless Inc., "Staying Safe with WiFi Security | Republic Blog", 11 May 2017, https://pwk.republicwireless.com/staying-safe-with-wifi-security/.

139. To the extent that any party can put forward any evidence demonstrating any actual, real-life, instances of safety or security issues occurring with Wi-Fi first service providers, Ice Wireless has no doubt that the Commission can ensure the safety and security of end-users. This is exactly what the Commission has done with VoIP services and 9-1-1, where the Commission imposed a series of requirements on VoIP providers to ensure that end-users were aware of certain differences that currently exist regarding calling 9-1-1 on a VoIP connection versus over the plain old telephone system.

140. The only safety issue that could possibly arise with Wi-Fi first service providers is if the Commission imposed arbitrary usage limits on Wi-Fi first service providers such that an end-user may be unable to reach an emergency contact or important agency in a crisis. As PIAC pointed out, while 9-1-1 would still function even if the end-user of a Wi-Fi first service provider had exceeded their usage limit, the individuals or organizations that an end-user may need to contact in an emergency go far beyond just 9-1-1.[156]

141. Overall, Ice Wireless urges the Commission not to be put off introducing real competition into Canada's mobile wireless market based on unsubstantiated allegations by a handful of incumbent wireless carriers. At the end of the day, the best proof that there are no safety or security issues with Wi-Fi first service providers that cannot be overcome is the fact that hundreds of these providers operate successfully in the United States with no apparent issues.

7.0 CONCLUSION

142. As Ice Wireless expected, the present proceeding has led to a significant amount of unjustified fear mongering from Canada's incumbent wireless carriers. The incumbents are running with their tired refrain that any mandated access to their networks will have catastrophic impacts on their ability to investment in telecommunications facilities and turn Canada into a telecommunications backwater that is unprepared for the twenty-first century. Nothing could be further from the truth.

[156] PIAC Intervention, *supra* note 35, at para 90.

143. Far from having a negative impact on investment in telecommunications facilities, the evidence provided by Ice Wireless in this supplemental intervention demonstrates that expanding the definition of home network to include other forms of connectivity will have a positive impact overall on investment in telecommunications facilities, particularly in rural and remote areas. In addition, expanding the definition of home network will finally introduce real competition into Canada's mobile wireless market and thus improve the affordability of mobile wireless services for all Canadians. Canadians deserve to have the same options for mobile wireless service as their American counterparts and will not settle for anything less, as demonstrated by the unfortunate emergence of a black market for mobile wireless services in this country.

144. If it is permitted to operate nationwide, Sugar Mobile, and other alternative service providers like Sugar Mobile, will aid the Commission in its ongoing goal of implementing the policy objectives contained in section 7 of the *Telecommunications Act*. All that is required is for the Commission to expand the definition of home network to include public Wi-Fi, and other forms of connectivity, and to avoid falling into the trap set by the incumbent wireless carriers of imposing such onerous terms and conditions on alternative wireless service providers that they are unable to enter Canada's mobile wireless market.

145. Ice Wireless urges the Commission to seize the historic opportunity presented by this proceeding and introduce real competition into Canada's mobile wireless market for the first time in its history by expanding the definition of home network to include other forms of connectivity, and in particular public Wi-Fi.

Appendix A

Economic Review of Mandated Wholesale Access for Wi-Fi First Service Providers, Investment and Competition in the Mobile Wireless Telecommunications Industry in Canada

Prepared for Ice Wireless Inc.

By

Markus von Wartburg, Ph.D.
Vice-President, Analysis Group

27 October 2017

ANALYSIS GROUP
ECONOMIC, FINANCIAL and STRATEGY CONSULTANTS

Economic Review of Mandated Wholesale Access for Wi-Fi First Service Providers, Investment and Competition in the Mobile Wireless Telecommunications Industry in Canada

Rebuttal of expert evidence filed in *Reconsideration of Telecom Decision 2017-56 Regarding Final Terms and Conditions for Wholesale Mobile Wireless Roaming Service, CRTC 217-259*

Prepared for Ice Wireless, Inc.

Markus von Wartburg, Ph.D.
Vice-President, Analysis Group

October 27, 2017

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I. Introduction

1. In Telecom Regulatory Policy 2015-177, *Regulatory framework for wholesale mobile wireless services*, the Canadian Radio-television and Telecommunications Commission (the "CRTC" or "Commission") determined that it is necessary to regulate the wholesale mobile wireless roaming rates that Bell Mobility Inc. ("Bell"), Rogers Communications Canada Inc. ("Rogers"), and TELUS Communications Company ("TELUS") charge other wireless carriers.[1] Wholesale roaming enables customers of a wireless carrier (the "home network") to access voice, text, and data services by using a visited wireless carrier's network (the "host network") when they are outside their home carrier's network footprint. The CRTC determined that such regulation was necessary because wholesale roaming by National Wireless Carriers was not subject to a sufficient level of competition.[2]

2. While TRP 2015-177 provided mandated wholesale roaming access for other Canadian wireless carriers,[3] the Commission determined that it was not appropriate to mandate wholesale access for mobile virtual network operators ("MVNOs")[4] because the Commission considered that doing so would discourage investments in wireless network infrastructure made (or planned) by National Wireless Carriers and new entrants.[5] However, the National Wireless Carriers must provide wholesale roaming to all subscribers served by their wholesale roaming partners, which includes the subscribers of any MVNO operating on a wholesale roaming partner's network.[6]

3. Sugar Mobile Inc. ("Sugar Mobile") is a Wi-Fi First service provider affiliated with Ice Wireless Inc. ("Ice Wireless"), a Canadian wireless carrier operating a network in Yukon, the Northwest Territories, Nunavut, and Northern Quebec. Sugar Mobile targets cost-conscious consumers that exhibit a consumption profile with limited cellular usage by offering its end-users unlimited voice and text messaging in Canada and the United States when they are connected to a Wi-Fi network and 400 MB of cellular data for just $19 per month.[7]

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1 Bell, Rogers, and TELUS are collectively referred to as the "National Wireless Carriers".

2 Telecom Regulatory Policy CRTC 2015-177, *Regulatory framework for wholesale mobile wireless services*, 5 May 2015 ("TRP 2015-177"), https://www.crtc.gc.ca/eng/archive/2015/2015-177.htm.

3 Other Canadian wireless carriers include among others Bragg Communications Inc. cob Eastlink ("Eastlink"), Videotron Ltd. ("Videotron"), Saskatchewan Telecommunications ("SaskTel"), Freedom Mobile Inc. ("Freedom Mobile") which is owned by Shaw Communications Inc. ("Shaw"), and Ice Wireless.

4 An MVNO is a wireless service provider that does not own spectrum or operate its own radio access network ("RAN"), but instead relies on the spectrum and RAN of a wireless carrier (and possibly other facilities/services) to provide mobile wireless services to consumers.

5 TRP 2015-177, *supra* note 2, ¶¶121-125.

6 TRP 2015-177, *supra* note 2, ¶167.

7 400MB of non-Wi-Fi data is roughly equivalent to 1,200 minutes, 40,000 text messages, or 2,000 webpages. Additional increments of 500MB of permanent/roll-over non-Wi-Fi data can be purchased for $19; https://www.sugarmobile.ca.

4. In Telecom Decision 2017-56, *Wholesale mobile wireless roaming service tariffs – Final terms and conditions*, the Commission confirmed that mandated wholesale roaming is intended to provide incidental, and not permanent, access to the National Wireless Carriers' networks, and clarified that public Wi-Fi does not form part of a wireless carrier's home network for the purpose of establishing incidental use. Furthermore, the wholesale roaming customer must ensure that any access to the National Wireless Carrier's network on behalf of its MVNO customers occurs on the same basis, and with the same limitations, as it obtains roaming services.[8]

5. In its decision, the Commission stated that wireless service providers cannot meaningfully ensure the availability, quality, and reliability of public Wi-Fi facilities since there are no contractual or other arrangements between operators of public Wi-Fi facilities and the wireless service provider.[9] Moreover, according to the Commission, including public Wi-Fi in the definition of a home network would discourage wholesale roaming customers from pursuing investments in their network infrastructure.[10]

6. On June 1, 2017, the Governor in Council, on the recommendation of the Minister of Industry, referred TD 2017-56 back to the CRTC for reconsideration. The Governor in Council determined that the Commission must consider whether:[11]

    a. including Wi-Fi connectivity in the definition of "home network" would improve affordability of mobile wireless services for Canadian consumers;
    b. the evidence demonstrates that the potential negative impact on investment from the inclusion of Wi-Fi connectivity in the definition of "home network" outweighs the positive impact on the affordability; and
    c. the potential impact on investment could be mitigated by imposing conditions on mandated wholesale roaming services.

    The CRTC initiated the current proceeding, Telecom Notice of Consultation 2017-259, *Reconsideration of Telecom Decision 2017-56 regarding final terms and conditions for wholesale*

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8 Telecom Decision CRTC 2017-56, *Wholesale mobile wireless roaming service tariffs – Final terms and conditions*, 1 March 2017 ("TD 2017-56"), ¶31, https://www.crtc.gc.ca/eng/archive/2017/2017-56.htm.

9 TD 2017-56, *supra* note 8, ¶28.

10 TD 2017-56, *supra* note 8, ¶¶29-30.

11 *Order of the Governor in Council*, P.C. 2017-0557, 1 June 2017, http://www.pco-bcp.gc.ca/oic-ddc.asp?lang=eng&Page=secretariats&txtOICID=2017-0557&txtFromDate=&txtToDate=&txtPrecis=&txtDepartment=&txtAct=&txtChapterNo=&txtChapterYear=&txtBillNo=&rdoComingIntoForce=&DoSearch=Search+%2F+List&viewattach=34464&blnDisplayFlg=1.

mobile wireless roaming service, in response to the Order of the Governor in Council.[12] The CRTC has invited parties to comment on how an expanded definition of "home network" would impact the affordability of retail mobile wireless services, investment in mobile telecommunications infrastructure, and competition in the market for retail mobile wireless services.

7. Ice Wireless has asked me to comment on the economic issues related to investment and competition in the mobile wireless telecommunications industry raised in TNC CRTC 2017-259. In particular, Ice Wireless asked me to review, and rebut as needed, economic evidence submitted on behalf of the three National Wireless Carriers and Shaw Communications Inc. ("Shaw") related to the impact of including public Wi-Fi in the definition of a "home network" on investment and competition in the mobile wireless telecommunications industry in Canada.

8. I am a Vice-President at the economic consulting firm Analysis Group, Inc., and have previously (co-)authored expert reports on competition and investment in the Canadian telecommunications industry in CRTC proceedings and Cabinet reviews of telecom regulatory policy. I have a Ph.D. in economics from the Vancouver School of Economics at the University of British Columbia and specialize in industrial organization, antitrust and competition economics, and applied microeconomics. My curriculum vitae is attached as Appendix B.

9. The report is organized as follows: Section II provides an executive summary, Section III reviews the evidence on industry concentration and the nature of competition in the Canadian wireless telecommunications sector, and Section IV analyses how rates for mobile wireless telecommunications services vary internationally and within Canada. Section V describes the business model of Wi-Fi First service providers and how they can provide a competitive option for some consumers, and Section VI reviews the academic literature on investment in the mobile wireless telecommunications sector and its implications related to Wi-Fi First service providers in Canada.

II. Executive Summary

10. The economic evidence presented in this report demonstrates that relevant Canadian mobile wireless telecommunications markets are highly concentrated. Economic theory has shown that highly concentrated industries with significant barriers to entry (and certain other characteristics) are prone to coordinated behaviour among competitors that leads to higher, non-competitive pricing. A recent investigation by the Competition Bureau found that "as a result of coordinated behaviour among Bell, TELUS and Rogers, mobile wireless service prices in Canada are higher in

[12] Telecom Notice of Consultation CRTC 2017-259, *Reconsideration of Telecom Decision 2017-56 regarding final terms and conditions for wholesale mobile wireless roaming service*, 20 July 2017 ("TNC 2017-259"), https://www.crtc.gc.ca/eng/archive/2017/2017-259.htm.

regions where Bell, TELUS and Rogers do not face competition from a strong regional competitor."[13]

11. Because of a concentrated industry characterized by coordinated behaviour among the National Wireless Carriers, Canadian consumers pay some of the highest prices and consume less mobile wireless services relative to many other developed countries. A plethora of evidence from various studies using different data sources and methodologies corroborate these findings.

12. Expanding the definition of a "home" network to include Wi-Fi connectivity would result in Wi-Fi First service providers entering the market. Wi-Fi service providers offer an innovative product likely to appeal to consumers with limited need for cellular usage, thereby providing a competitive option that is likely to constrain the pricing of National Wireless Carriers for at least some segments of consumers.

13. The most recent academic research on competition and investment in the wireless telecommunications industry finds an inverted-U relationship between the intensity of competition and investment. More specifically, it finds that there is no trade-off between competition and investment as long as profits are above a certain threshold, above which a wireless carrier's investment increases with the intensity of competition. Furthermore, this empirical research also shows that wireless operators which host an MVNO invest more than their rivals, directly contradicting the assertions of experts for the National Wireless Carriers. Given the low intensity of competition in Canadian mobile wireless telecommunications markets (and corresponding high profitability levels of the National Wireless Carriers), any increase in competition from mandating access to Wi-Fi First service providers is unlikely to depress investment in wireless network infrastructure.

III. The Canadian Mobile Wireless Telecommunications Sector is Highly Concentrated and Characterized by Coordinated Behaviour among National Wireless Carriers

14. Economic evidence submitted on behalf of the National Wireless Carriers severely mischaracterizes the level of concentration in the Canadian mobile wireless telecommunications industry and then draws erroneous comparisons to the level of concentration in countries that

[13] Competition Bureau, "Competition Bureau statement regarding Bell's acquisition of MTS," February 15, 2017; http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/04200.html. Areas with a strong regional competitor are Saskatchewan, Manitoba, Thunder Bay, and Quebec.

mandated MVNO access either as a condition for merger approval or in response to a review of market conditions. For example, the Sanderson Report states:[14]

> *"Comparing Canada to countries that have regulated mandated access for MVNOs, in nearly every instance, market concentration was higher than industry concentration in Canada is today. […] Out of 17 countries with mandated MVNO access, the HHI [Herfindahl-Hirschman Index] was higher at the time of mandating MVNO access compared to the current HHI in Canada in 14 countries. If the Commission were to change the definition of "home network", it would be mandating MVNO access in a market that is less concentrated compared to the concentration levels that existed in most any other country where mandated MVNO access has been imposed by regulators. Moreover, currently the HHI in Canada is one of the lowest among countries that do not mandate MVNO access."*

Similarly, the Eisenach Report states:[15]

> *"[T]he Canadian market is among the least concentrated in the world, as measured by the Herfindahl-Hirschman Index (HHI), and that concentration is declining."*
>
> *"[M]ost EU markets are more concentrated than either the US or Canada."*

15. Contrary to the economic evidence submitted on behalf of the National Wireless Carriers, proper analysis of the Canadian mobile wireless telecommunications sector shows that the relevant markets are highly concentrated. Highly concentrated industries are prone to coordinated actions by dominant firms in the form of parallel accommodating behaviour or through multi-market conduct across geographies and business lines that can lead to tacit collusion. Coordinated behaviour among the National Wireless Carriers is not simply an abstract potential risk with a low likelihood of occurring. In its recent investigation of BCE Inc.'s ("Bell") acquisition of Manitoba Telecom Services Inc. ("MTS"), the Competition Bureau found that – due to coordinated behaviour among Bell, TELUS, and Rogers – Canadian consumers living in areas without a strong regional competitor pay substantially higher mobile wireless prices and use substantially less data compared to areas with a strong regional competitor.[16]

A. Proper Market Concentration Analysis Reveals that the Mobile Wireless Telecommunications Sector in Canada is Highly Concentrated

16. Both the Sanderson and Eisenach Reports rely on the Herfindahl-Hirschman Index ("HHI") to assess the level of concentration in Canada. The HHI is a commonly used and accepted measure of market concentration, calculated by summing the squared share of each firm competing in a

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[14] Sanderson Report (*Investment and Competition Effects from Creating Mandated MVNO Access to Wireless Networks in Canada by Redefining MVNO Networks to Include Public Wi-Fi*), submitted on behalf of Bell Mobility, pp. 16-17.

[15] Eisenach Report (*Expert Report of Jeffrey A. Eisenach, Ph.D.*), submitted on behalf of TELUS, pp. 4 and 37.

[16] *Supra* note 13.

market.[17] For a market concentration statistic like the HHI to be meaningful, it must be calculated based on a relevant antitrust market.

17. Relevant geographic markets for mobile wireless telecommunications services (at the retail level) are much smaller than the entire Canadian market. Canada has a regional spectrum licensing regime and smaller carriers operate only in certain regions of the country. National mobile wireless carriers can, and do, set different prices for mobile wireless plans in different Canadian provinces. The Competition Bureau's analyses is consistent with this finding: For example, in its investigation of Bell's acquisition of MTS, the Competition Bureau determined that the relevant geographic market was no broader than the province of Manitoba.[18] As further shown in Section IV, actual pricing by the National Wireless Carriers (including flanker brands) reveals that the competitive conditions are substantially different across provinces and territories and aggregating provincial markets – even for convenience – is unsound.[19] Hence, the national HHI relied upon by the Sanderson and the Eisenach Report is a critically flawed measure of market concentration and obfuscates actual market concentration in the mobile wireless sector in Canada.

18. The concentration index calculated at the provincial level, based on relevant geographic markets, reveals that actual market concentration in the mobile wireless industry in Canada is much higher than the flawed national HHI statistic would suggest.[20] The provincial HHI index substantially exceeds the national HHI index except for the province of Quebec as shown in Table 1:

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[17] US Department of Justice, *Herfindahl-Hirschman Index*, https://www.justice.gov/atr/herfindahl-hirschman-index. The Department of Justice considers markets in which the HHI is in excess of 2,500 points to be highly concentrated.

[18] *Supra* note 13. In 2004, the Competition Bureau in its review of the Rogers-Microcell merger similarly found that pricing and the set of mobile wireless carriers tends to differ by location, which supports defining relevant geographic markets at the provincial level. *See* Competition Bureau, "Acquisition of Microcell Telecommunications Inc. by Rogers Wireless Communications Inc., Technical Backgrounder," April 2005; http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/00257.html).

[19] The folly of calculating a national concentration measure when relevant geographic markets are smaller crystalizes when considering the hypothetical scenario in which a separate monopoly operates in each province: the national HHI measure treating each firm separately would – nonsensically – suggest only a moderate level of industry concentration simply because Canadians are living in different provinces.

[20] While relevant geographic markets may be narrower than a province, the CRTC reports consistent and reliable market share data only at the provincial level.

Table 1: Wireless Service Subscriber Market Share and Concentration, by Province and Territory (2015)

Province	Bell	TELUS	Rogers	Other	HHI
British Columbia	20	42	37	0	3,533
Alberta	25	53	23	0	3,963
Saskatchewan	15	13	5	66	4,775
Manitoba	8	7	36	49	3,810
Ontario	30	22	47	1	3,594
Quebec	31	28	28	13	2,698
New Brunswick	57	26	17	0	4,214
Nova Scotia	54	33	12	0	4,149
Prince Edward Island	57	31	12	0	4,354
Newfoundland and Labrador	71	27	1	0	5,771
Northern Territories	99	0	0	1	9,802
Canada (National)	29	28	33	10	2,814

Source:
CRTC, *Communications Monitoring Report 2016*, Table 5.5.8.

19. The statistics shown in Table 1 reveal that the Sanderson and Eisenach Reports rely on an erroneous concentration measure and consequently underestimate, by a substantial amount, the actual level of market concentration in the Canadian mobile wireless telecommunications sector.

20. As noted above, the Sanderson Report then goes further and compares the national HHI, which substantially underestimates actual concentration level in the Canadian mobile wireless telecommunications sector, to market concentration in countries with and without mandated MVNO access. The report concludes that most countries with mandated MVNO access have higher concentration than Canada, and the national HHI in Canada is one of the lowest among countries that do not mandate MVNO access.[21]

21. Table 3 and Table 4 in Appendix A reproduce the tables shown in the Sanderson Report replacing the national HHI with the provincial HHI that more accurately reflects relevant geographic markets and the level of market concentration in the Canadian mobile wireless telecommunications sector. Contrary to what the Sanderson Report would suggest, actual market concentration for all Canadian provinces and territories (with the exception of Quebec) exceeds the market concentration of most countries in which MVNO access has been mandated. Furthermore, almost all countries that do

[21] Sanderson Report, pp. 16-18 and Tables 2 and 3.

not mandate MVNO access have market concentration levels that are substantially lower than market concentration in Canadian provinces and territories (but for Quebec).

22. In Austria and Germany, MVNO access was mandated as a condition of merger approval. Table 5 in Appendix A reveals that the post-merger HHI in Austria and Germany—the level of market concentration at which the regulatory agencies decided to impose mandated MVNO access—is substantially lower than market concentration in the large majority of Canadian provinces and territories.[22]

23. It is crucial to accurately account for market concentration based on relevant geographic markets. Using province-level market concentration measures, an approach consistent with the Competition Bureau's analysis of mergers of mobile wireless carriers, shows that the conclusions drawn by the Sanderson and Eisenach Report on the level of market concentration in the Canadian wireless telecommunications sector are erroneous.

B. The Canadian Mobile Wireless Telecommunications Market Is Characterized by Coordinated Behaviour among National Wireless Carriers

24. As noted above, highly concentrated industries can be prone to coordinated behaviour among dominant firms. Such coordinated behaviour involves interactions among a group of firms that is profitable because of the accommodating response from other firms. While the coordinating firms may not explicitly collude or even communicate with each other, they may develop a tacit understanding that each firm will respond cooperatively to the behaviour of other firms. Coordinated behaviour may relate to price, service levels, or any other dimension of competition (e.g., wholesale markets). For example, a wireless service provider may decide to raise its price for a smartphone plan (or cost of a SIM card, activation/connection fee, etc.) if it expects other carriers to follow suit, even if it would not have been profitable to do so independently. That is, the price increase is profitable only as a result of the accommodating response of other market participants.

25. Firms operating in concentrated markets characterized by high barriers to entry generally find it easier (and less costly) to engage in coordinated behaviour because it is easier for a small group of firms to independently recognize mutually beneficial terms of coordination, monitor each other's

[22] The Sanderson Report contains conflicting information on mandated MVNO access. It states that "wireless carriers were required to provide MVNO access as a condition of approval of a merger or acquisition. This has occurred in Austria, Denmark, Finland, Germany, Ireland, Italy, and Norway." (p.16) Yet only Austria, Finland, and Germany are identified in Tables 2 and 3 or shown on Figure 2 as countries with mandated MVNO access as a condition of merger approval. Furthermore, the merger in Finland in the fall of 2015 that apparently led to mandated access as a condition of the merger approval did not materially change the concentration in the Finnish wireless market (Viestintävirasto (Finnish Communications Regulatory Authority), "Market Shares of Mobile Subscriptions," https://www.viestintavirasto.fi/en/statisticsandreports/statistics/2013/marketsharesofmobilesubscriptions.html).

conduct, and detect (and respond to) deviations. Wireless telecommunications markets exhibit high barriers to entry: First, a mobile wireless carrier must obtain scarce spectrum through either an auction or a resale. Second, the carrier then must deploy a network of towers, antenna and transceivers, and secure backhaul infrastructure. Finally, the carrier must obtain access to popular smartphones, get a retail distribution network, and build operational and customer support systems. Other factors that make Canadian mobile wireless markets susceptible to coordination are transparent pricing that is closely monitored by competitors, and the ability to signal future pricing intentions using promotional pricing with pre-specified end dates.

26. Coordinated behaviour can include a variety of conduct. When a multi-product firm (or a single-product firm operating in a number of distinct geographic markets) competes with another similar firm, they overlap and compete in multiple markets. The multiplicity of contact has a tendency to soften competition because it relaxes the incentive constraints that limit the extent of (tacit) collusion. In essence, firms compete less aggressively out of fear that the competitor can retaliate ('punish') in many markets.[23] Previous studies, including one on the US mobile wireless industry, have shown that multimarket conduct can lead to tacit collusion and non-competitive prices.[24] An alternative form of coordinated behaviour is parallel accommodating conduct, which includes situations in which a competitor's response is individually rational and not motivated by the possibility of being subjected to retaliation or deterrence, yet the response weakens competition by facilitating prices increases above competition levels.[25]

27. In its nine-month investigation of Bell's acquisition of MTS, the Competition Bureau conducted a thorough analysis of mobile wireless prices in Canada and found that "as a result of coordinated behaviour among Bell, TELUS and Rogers, mobile wireless service prices in Canada are higher in

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[23] Bernheim, B.D., and M.D. Whinston (1990): "Multimarket Contact and Collusive Behavior," RAND Journal of Economics, 21(1), pp. 1-26.

[24] Parker and Röller (1997) demonstrate that cross-ownership and multi-market conduct are important factors explaining non-competitive prices in the US mobile wireless industry following deregulation (Parker, P.M., and L.-H. Röller (1997): "Collusive Conduct in Duopolies: Multimarket Contact and Cross-Ownership in the Mobile Telephone Industry," *RAND Journal of Economics*, 28(2), pp. 304-322). Ciliberto and Williams (2014) show that multimarket contact facilitates tacit collusions in the SU airline industry (Ciliberto, F. and J.W. Williams (2014): "Does Multi-Market Conduct Facilitate Collusion? Inference on Conduct Parameters in the Airline Industry," *RAND Journal of Economics*, 45(4), pp. 764-791.

[25] Parallel accommodating behaviour is a type of coordinated conduct that does not require monitoring and punishing for non-compliance (Harrington, J.E. (2013): Evaluating Mergers for Coordinated Effects and the Role of Parallel Accommodating Conduct," *Antitrust Law Journal*, 78(3), pp. 651-668). U.S. Department of Justice and Federal Trade Commission, *Horizontal Merger Guidelines*, August 19, 2010, pp. 24-25, https://www.justice.gov/atr/public/guidelines/hmg-2010.pdf. Accommodating responses blunt a firm's incentive to lower the price and steal customers from its competitors. It also enhances a firm's incentive to raise price by mitigating the risk of losing customers to a rival.

regions where Bell, TELUS and Rogers do not face competition from a strong regional competitor."[26]

28. The Competition Bureau (the "Bureau") found that one of the key features driving the coordinated behaviour among Bell, TELUS and Rogers is their multi-market exposure. As described above, fear of retaliation results in a form of tacit collusion in which firms do not offer competitive prices:

> *"Multi market exposure among Bell, TELUS and Rogers is significant, and encompasses a number of geographies and business lines at both the wholesale and retail level. Information collected during the inquiry supported the likelihood that Bell, Rogers and TELUS weigh the advantages from vigorous competition in one area against the danger of retaliation in other areas. Ultimately, the Bureau found that multi market exposure softens competition among Bell, TELUS and Rogers."*[27]

29. The presence of a strong regional competitor can disrupt the effects of coordination among the National Wireless Carriers.[28] Yet, close to 70% of Canadian consumers live in areas without effective competition from a strong regional competitor.[29]

30. This section showed that the Canadian mobile wireless telecommunications industry in Canada is highly concentrated. Economic theory and evidence demonstrates that highly concentrated markets can be prone to coordinated actions among dominant firms. In the context of the Canadian wireless industry, this is not a remote theoretical possibility unlikely to occur. The Competition Bureau's recent in-depth investigation in the context of Bell's acquisition of MTS concluded, based on confidential internal company data, that many Canadian consumers (close to 70% living in areas without effective competition) pay significantly higher prices for wireless telecommunications services as a result of coordinated behaviour among Bell, TELUS, and Rogers.

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[26] *Supra* note 13. The Bureau's investigation revealed that the threat of retaliation from competitors is a significant factor in pricing decisions.

[27] *Supra* note 13.

[28] Effective coordination among firms may be constrained in the presence of a firm that is structurally different since the asymmetry is an obstacle to behaviour that is profitable for each firm; or by a vigorous and effective competitor (a "maverick") who plays a disruptive role and stimulates competition (Competition Bureau, *Merger Enforcement Guidelines*, October 6, 2011, ¶6.37-6.38).

[29] "The results of this analysis showed that mobile wireless pricing in Saskatchewan, Thunder Bay, Quebec and Manitoba is substantially lower than in the rest of Canada. These are all areas that have a strong regional competitor" (*Supra* note 13). According to the 2016 census, 69.7% of Canadians live in areas the Competition Bureau determined lack a strong regional competitor (Statistics Canada, "Population size and growth in Canada: Key results from the 2016 Census," https://www.statcan.gc.ca/daily-quotidien/170208/dq170208a-eng.htm).

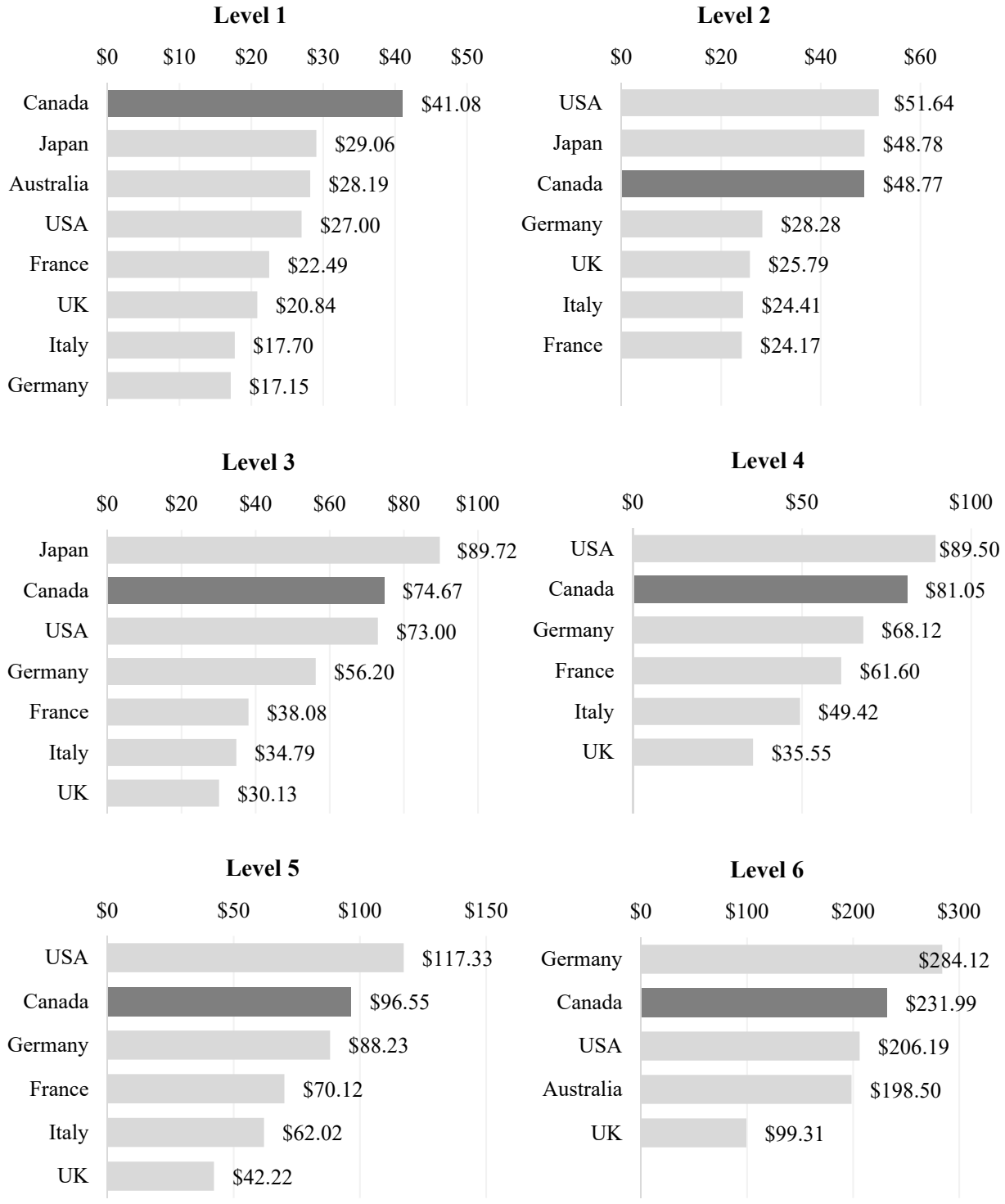
IV. Canadian Consumers Pay High Rates and Consume Less Wireless Telecommunications Services

A. International Comparisons

31. The CRTC commissioned an international price comparison study prepared by NGL Nordicity Group Ltd. ("Nordicity") that found, based on a detailed comparative price analysis, that Canada ranked among the highest in pricing of mobile wireless telecommunications services across all levels of service baskets.[30] For example, among the eight jurisdictions selected for comparison, Canadians paid the highest prices for an entry-level or low volume usage service basket (Level 1), the third-highest prices for service basket Level 2, and the second-highest prices for service baskets Level 3 to Level 6 as shown in Table 2:

[30] NGL Nordicity Group Ltd., "2016 Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions," March 22, 2016 ("Nordicity Study"), https://www.crtc.gc.ca/eng/publications/reports/compar/compar2016.pdf. The Globe and Mail, "How Canada's Internet, wireless rates compare with international prices," August 11, 2016, https://theglobeandmail.com/report-on-business/how-canadas-internet-wireless-rates-compare-with-international-prices/article31379589/. Financial Post, "Canadian mobile phone bills still rank among the most expensive in G7: CRTC report," http://business.financialpost.com/technology/canadian-mobile-phone-bills-still-rank-among-most-expensive-in-g7-crtc-report.

Table 2: International Price Comparison for Mobile Wireless Telecommunications Services (Nordicity Study)



Source:
Nordicity Study, 2016.

32. These findings in the 2016 Nordicity Study are consistent with earlier reports prepared by Wall Communications:

> *"Relative to the seven foreign jurisdictions included for this study, Canada's average Level 1 basket price is the highest of the group. For the Level 2 and 3 baskets, Canada ranks on the high side of the group, with lower average prices than only Japan and the U.S. Similarly, Canada's ranks on the high side of the group for both the Level 4 and 5 baskets, with a lower average price than only the U.S."*
>
> (Wall Communications Report, 2015)[31]

> *"Relative to the seven foreign jurisdictions surveyed for this study, Canada's Level 1 mobile wireless service basket price is the highest of the group. In the case of the Level 2 and 3 baskets as well as the new Level 4 service basket, Canada ranks on the high side of the average for the group of surveyed countries. Canada's mobile wireless service price ranking this year is similar to previous years' studies."*
>
> (Wall Communications Report, 2014)[32]

33. While each one of these annual CRTC-commissioned studies is, by its nature, a snapshot, the collection of evidence reveals that Canadian consumers persistently pay some of the highest rates for mobile wireless communications services.

34. The basket methodology used in the Nordicity Study and previous CRTC-commissioned studies is unable to capture all elements of consumer surplus.[33] Prices determine the volume of transactions chosen by consumers, and this volume effect of prices is not captured by the basket methodology.[34] High prices and a lack of competition in wireless telecommunications markets are most often associated with volume effects and restrictions on output.[35] Volume effects can be assessed via adoption and usage measures.

35. When the market for mobile wireless telecommunications services is growing, the speed and level of market penetration (i.e., diffusion and adoption) is often viewed as an important summary measure of how well the market is performing for potential consumers. As market penetration

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[31] Wall Communications Inc., "Price Comparisons of Wireline, Wireless and Internet Services in Canada and with Foreign Jurisdictions," 2015 Edition, March 30, 2015, http://www.crtc.gc.ca/eng/publications/reports/wall2015/rp1506wall.pdf.

[32] Wall Communications Inc., "Price Comparisons of Wireline, Wireless and Internet Services in Canada and with Foreign Jurisdictions," 2014 Update, March 31, 2014, https://www.crtc.gc.ca/eng/publications/reports/rp140714.pdf.

[33] Consumer surplus is the difference between the amount consumers are willing and able to pay and the amount they actually pay.

[34] Consumers choose different quantities based on the price.

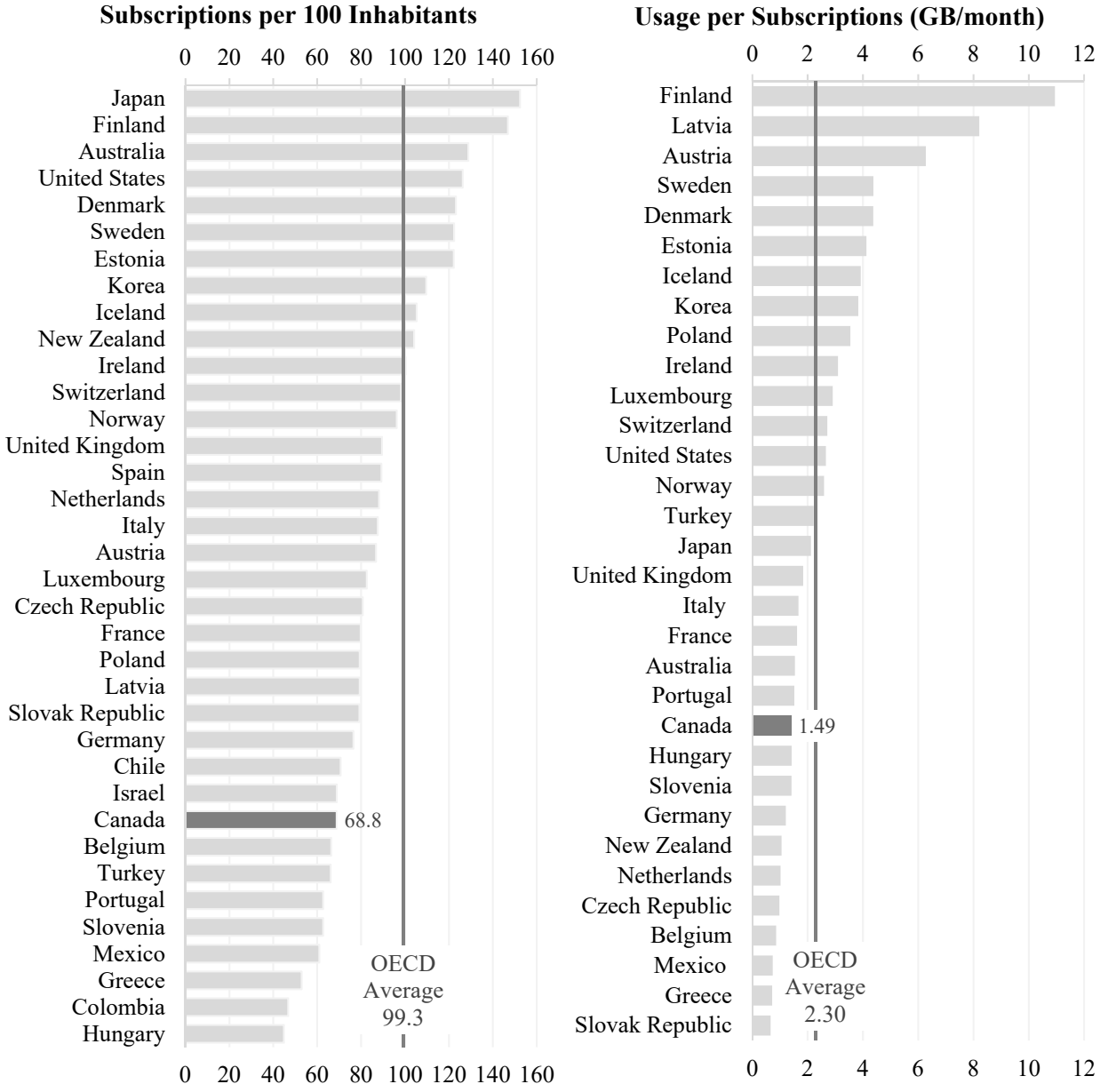
[35] See for example Eisenach Report, ¶ 60.

approaches saturation, mobile wireless usage becomes the more relevant indicator.[36] Canada lags substantially behind other OECD countries in both mobile adoption and mobile usage.

36. According to the *OECD Digital Economy Outlook 2017*, Canada has one of the lowest rates of mobile broadband subscriptions among OECD countries. Moreover, as Figure 1 shows, Canadian mobile data usage is substantially below the OECD average; usage in many leading developed countries is more than double mobile usage in Canada.

[36] Li, Y. and B. Lyons (2012): "Market structure, regulation, and the speed of mobile network penetration," *International Journal of Industrial Organization*, 30(6), pp. 697-707.

Figure 1: Mobile Broadband Subscriptions and Usage (OECD)



Source:
OECD Digital Economy Outlook 2017.

37. Admitting that low mobile wireless adoption rates in Canada are "factually correct," the Eisenach Report dismisses this evidence as "economically uninformative" since in Dr. Eisenach's view, the comparatively low mobile wireless adoption in Canada is due to European consumers owning multiple SIM cards to avoid international roaming fees when traveling across borders.[37] There are two obvious flaws in this explanation: First, three of the top four countries in terms of mobile

[37] Eisenach Report, ¶ 79.

wireless subscriptions per 100 inhabitants—Japan, Australia, and the United States—are non-European. Canada with 68.8 mobile subscriptions per 100 inhabitants considerably lags mobile subscriptions in Japan (152.4), Australia (128.8), and the United States (126.3). Second, to the extent that subscriptions *per 100 inhabitants* might bias a comparison of mobile adoption rates against Canada, it would simply exacerbate Canada's already substantial gap in usage *per subscription*.[38] When comparing the ranking of countries on mobile subscriptions per 100 inhabitants with mobile usage per subscriptions, it is apparent that countries with higher mobile subscriptions rates also tend to have higher mobile usage. Canada lags substantially behind in both mobile adoption and mobile usage.

38. The Sanderson Report instead reports a "smartphone adoption" measure defined as smartphone connections as a percentage of all device connections to show that Canada is "leading" most other countries.[39] Such a measure is problematic since the remaining connections in this statistic (i.e., connections other than smartphone) do not only include basic/feature phones but, particularly in advanced mobile markets, also include portable access devices such as hubs, sticks, and dongles, as well as built-in access devices such as tablets, laptops, and other smart devices (e.g., watches). Advanced mobile countries may well have a lower "smartphone adoption" only because the adoption of tablets, laptops, and other smart devices is higher relative to Canada. Furthermore, since this smartphone measure is a *percentage of all connections*, it cannot possibly measure the extent to which Canadians in general are adopting smart devices, and hence, participating in the digital economy.

39. Other international price and usage comparisons corroborate the findings from the Nordicity Study and the OECD Digital Economy Outlook. For example, an alternative measure of comparing mobile wireless telecommunications prices is to analyze the data allowances offered with smartphone plans. The Rewheel / Digital Fuel Monitor research study measures the (maximum) number of gigabytes that are included in smartphone plans that can be purchased for 30 Euros or less. Compared to other OECD countries, many of which offer unlimited data allowances, gigabyte allowances in Canada are much smaller and among the lowest in the OECD, as shown in Figure 2:

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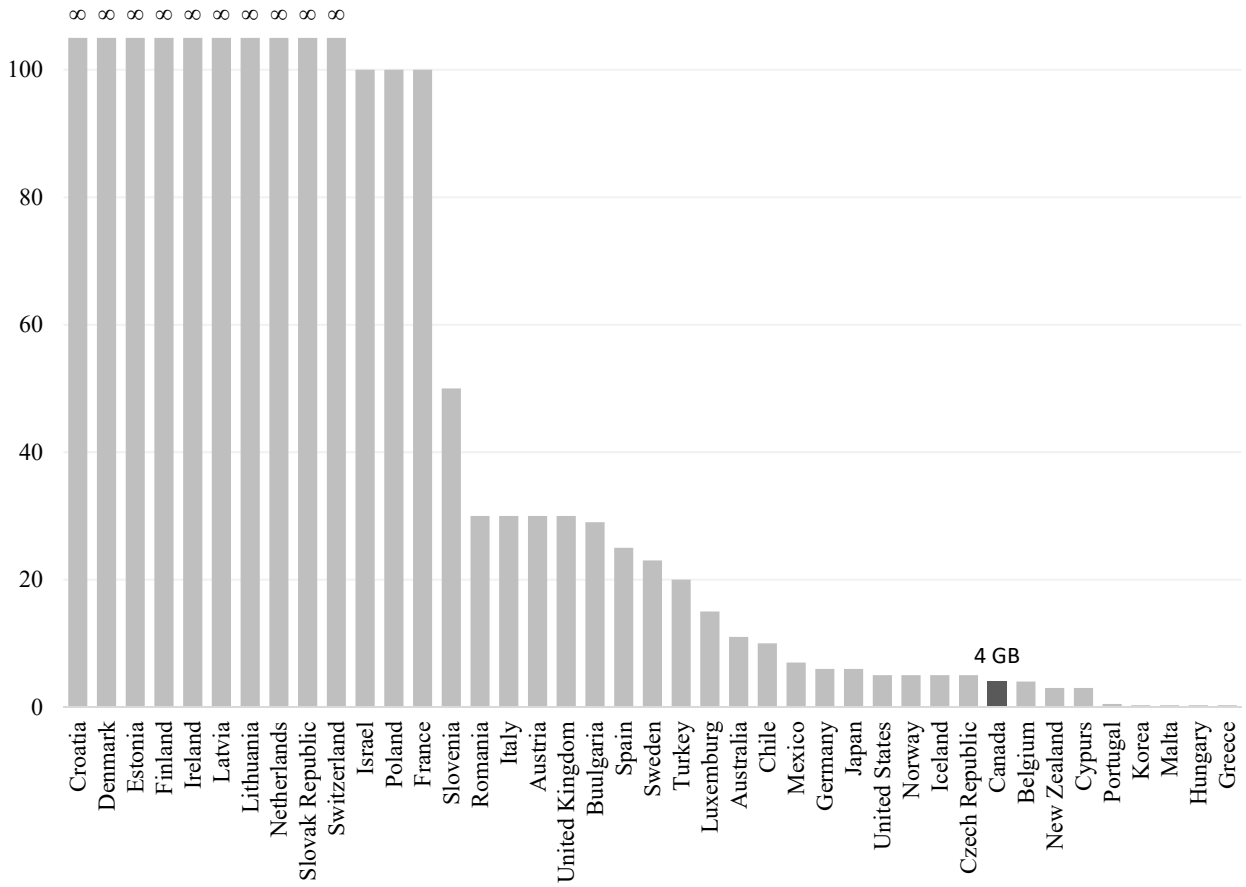
[38] To compare usage per 100 inhabitants, one would need to scale usage per subscription by a factor reflecting the number of subscriptions per inhabitant. If the number of subscriptions per inhabitant is comparatively lower in Canada, then the usage per subscription gap observed for Canada is even larger when measured as usage per 100 inhabitants.

[39] Sanderson Report, pp. 11-12. ("Cisco reports that in Canada in 2016, smartphones account for 59.2% of all device connections, lagging only China in the G20.[25]" Footnote 25: "[…] Cisco uses a broad definition of device connections, which include smartphones, non-smartphones, tablets, laptops, gaming consoles, entertainment systems, and other smart devices.") ("As shown in Table 1 below, Canada's smartphone adoption rate is currently ranked 6th in the G20 country groups.[26]" Footnote 26: "Smartphone adoption rate is smartphone connections expressed as a percentage share of total connections (excluding machine-to-machine)").

Figure 2: Maximum Data Allowance in 4G Smartphone Plans for 30 Euros

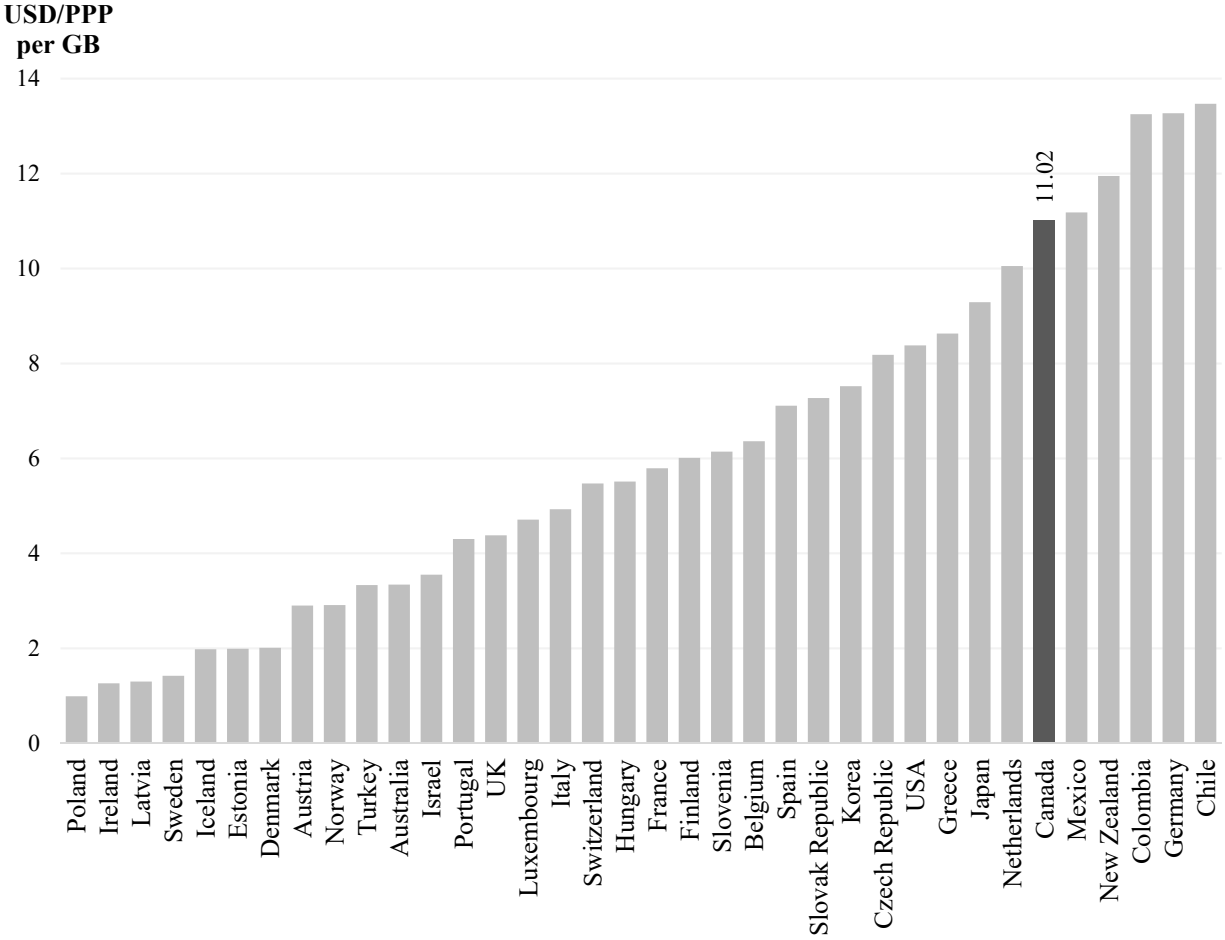


Note:
The data include 4G smartphone plans with at least 1,000 minutes included for 137 operators (main and sub-brands) and 65 MVNOs in April-May 2017.

Source:
Rewheel/Digital Fuel Monitor, 1H2017.

40. Strategy Analytics compiles tariff data for the OECD Mobile Broadband Price Benchmarking system and tracks the average price per gigabyte for post-paid mobile broadband offered from the three most prominent wireless service providers in each of 36 countries: Figure 3 reveals that the average price per gigabyte in Canada is among the highest among the 36 countries.

Figure 3: Average Price per GB for Post-paid Mobile Broadband (OECD, Q4 2016)

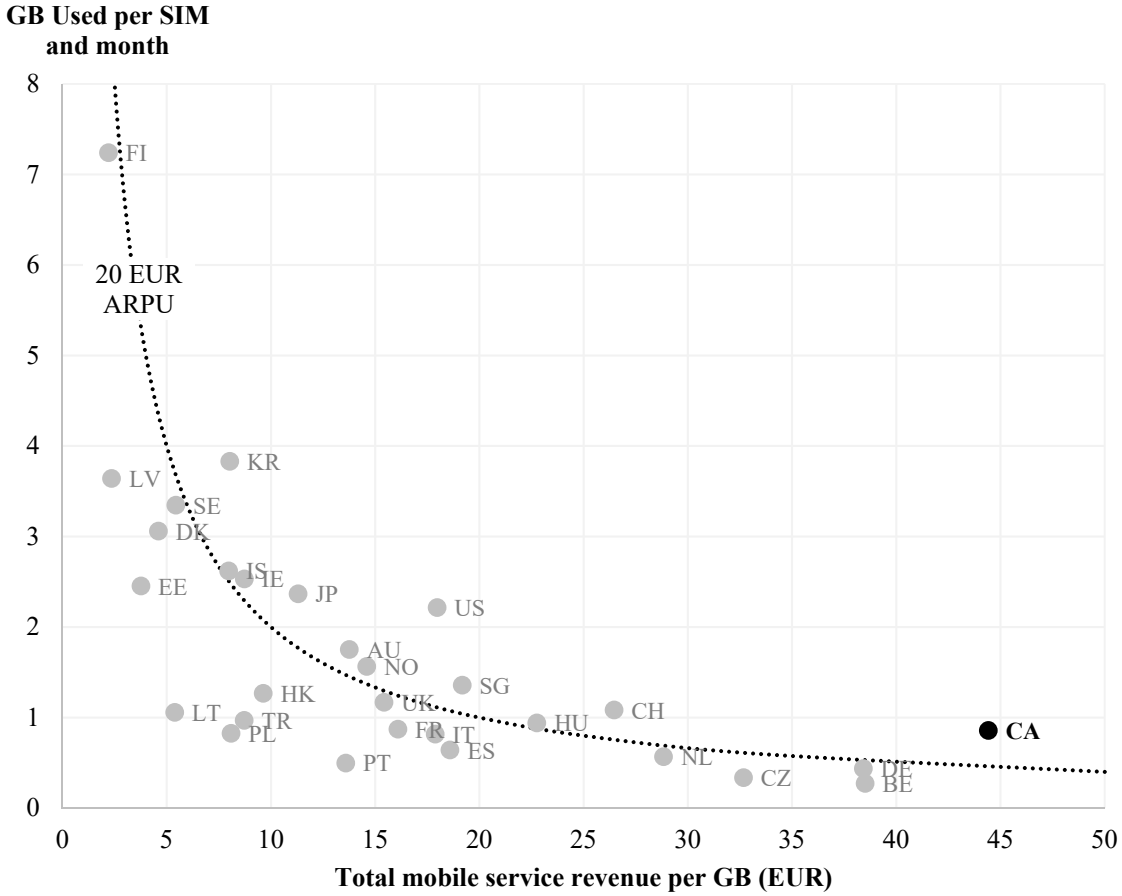


Source:
Strategy Analytics, Teligen Tariff & Benchmarking, OECD Mobile Broadband Price Benchmarking.

41. Another perspective is provided by Tefficient's analysis of the development and drivers of mobile usage. The Tefficient report compares total mobile wireless service revenue per gigabyte to the average mobile data usage across countries.[40] As illustrated in Figure 4, Canada has the highest effective revenue per gigabyte but Canadian mobile usage is low among the countries surveyed.

[40] Tefficient, "Unlimited pushes data usage to new heights," Industry analysis #5 2016 – updated version Mobile data 1H 2016, January 5, 2017, http://media.tefficient.com/2016/12/tefficient-industry-analysis-5-2016-mobile-data-usage-and-pricing-1H-2016-ver-2.pdf.

Figure 4: Total Mobile Service Revenue per GB and Mobile Data Usage



Source:
Tefficient AB.

42. The above evidence from a set of international comparisons using different data sources and various methodologies demonstrates that Canadians pay high prices for mobile wireless telecommunications services, and adoption and usage lag substantially behind the average in OECD countries (not to speak of the gap in adoption and usage relative to leading countries).

B. Within-Canada Comparisons

43. Not all evidence that Canadians pay high rates for mobile telecommunications services comes from international comparisons. Price comparisons across provinces within Canada provide additional evidence that many Canadian consumers pay supra-competitive prices for mobile wireless telecommunications because they live in areas without a strong competitor to the National Wireless Carriers.

44. Publicly posted prices on the website of the National Wireless Carriers reveal stark differences in pricing across provinces.[41] Figure 5 and Figure 6 show the monthly costs of two types of smartphone plans offered by the National Wireless Carriers main brands (Bell, Rogers and TELUS) and flanker brands (Fido, Koodo and Virgin Mobile). The first type of plan offers 4GB of data along with unlimited nationwide minutes. Across most of Canada, this plan is offered for $100 from the main brands. Remarkably, due to effective competition and the presence of a strong regional competitor, residents of Quebec, Manitoba and Saskatchewan are able to obtain this plan from the same service providers for prices that are up to 45% lower.[42] Moreover, the price discount underestimates the value discrepancy because plans in the provinces with lower pricing offer more data. The same pattern exists in the pricing of flanker brands. Residents of Quebec, Manitoba and Saskatchewan can obtain the same plan at a 44% discount relative to the rest of Canada. The comparison shows that mobile wireless prices are lower in areas in which the aggregate share of the National Wireless Carriers (main and flanker brands) is lower.

45. A similar price differential across provinces exist for smartphone plans designed for more modest usage (includes 300 local minutes and 1 GB of data). Although the figures show that provinces in which the aggregate share of the National Wireless Carriers is smaller have prices that are up to 43% lower for plans offered by the main brand (and up to 36% lower for plans offered by flanker brands), the comparison is not as straightforward because plans are not uniform across provinces. In Quebec for example, the minimum data option offered is sometimes higher than the 1GB option offered in other provinces. However, despite sizable difference in data allowances, smartphone plans in Quebec remain over 20% less expensive compared to provinces in which the aggregate market share of the National Wireless Carriers is higher.

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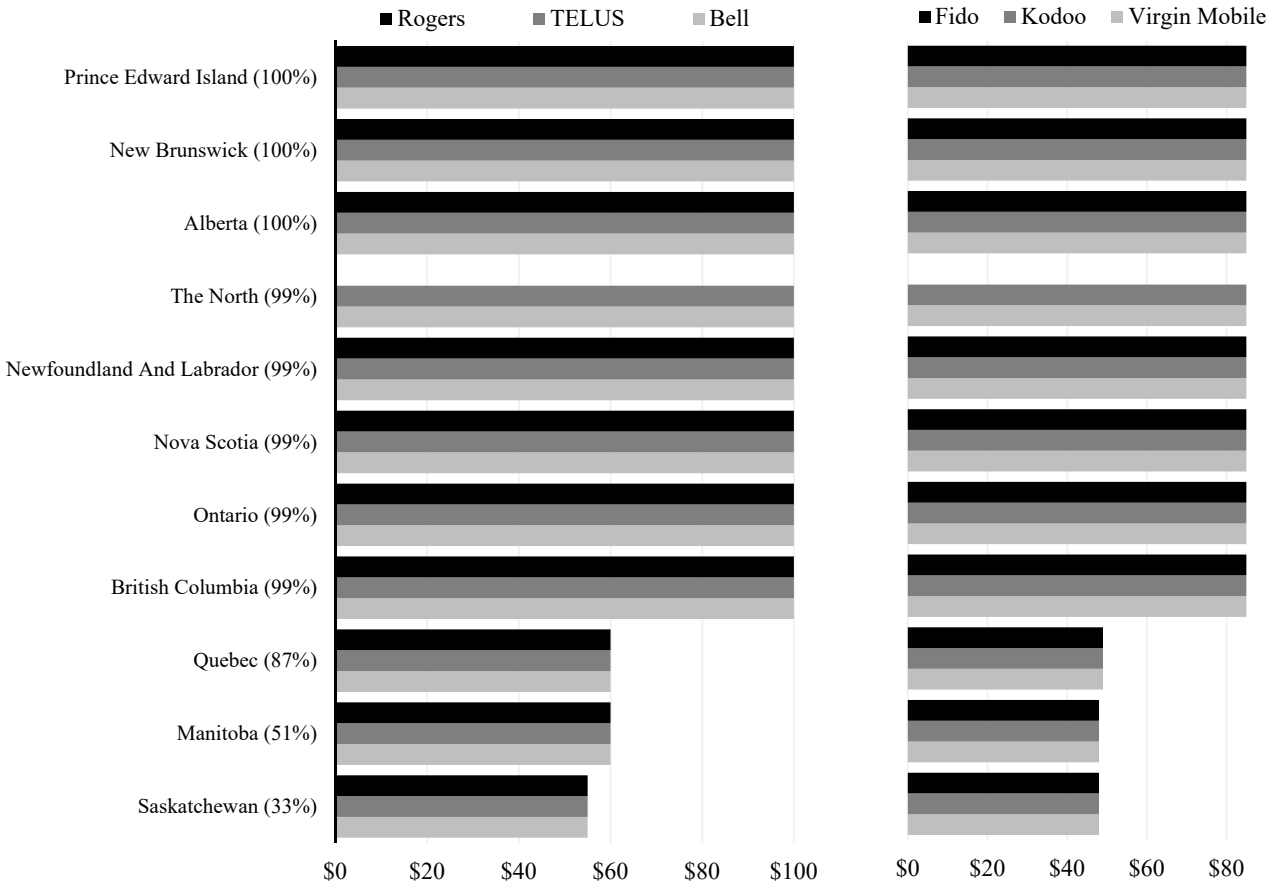
41 As of October 12, 2017.

42 My understanding is that prices in Thunder Bay are also significantly lower than in other areas in Canada due to the presence of a strong regional competitor. Bell's recent acquisition of MTS eliminated the existing competitive constraint provided by MTS as a strong regional competitor. As part of the conditions of merger approval, the Competition Bureau required Bell to divest some MTS post-paid subscribers and dealer locations to TELUS; and to divest assets (spectrum, retail stores, and subscribers) and provide transitional services to Xplornet. The Commissioner was satisfied that these remedies and Xplornet's planned entry into the mobile wireless market in Manitoba address his concerns related to the Bell's acquisition of MTS (*Supra* note 13).

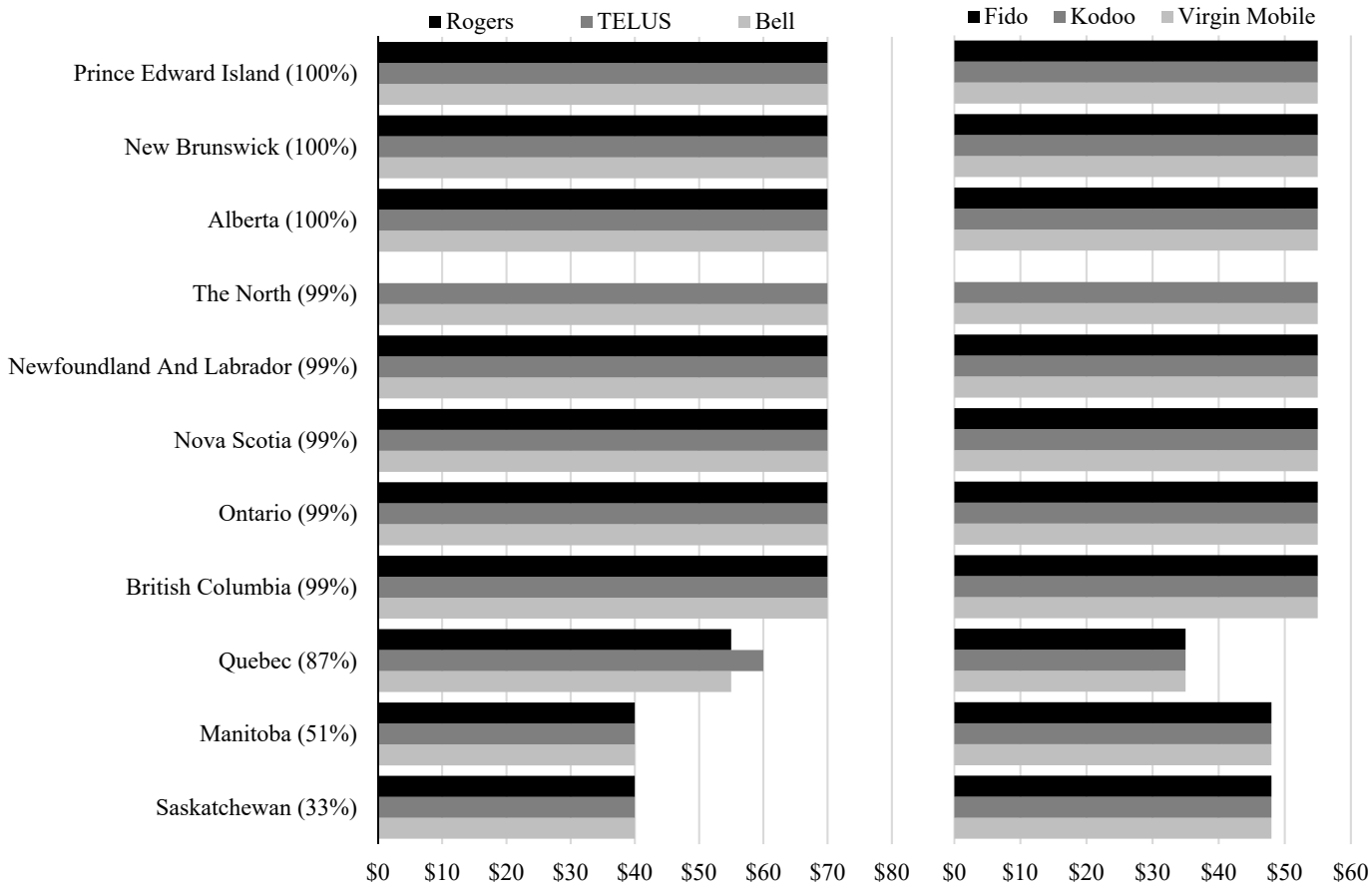
Figure 5: Price of Wireless Plan with 4GB of Data and Unlimited Nationwide Minutes



Notes:
[1] Percentage in brackets refers to the aggregate market share of Bell, TELUS, and Rogers.
[2] Prices are based on bringing your own device.
[3] The North includes: Northwest Territories, Nunavut and Yukon.
[4] Flanker brand plans in Quebec include 6GB of data.
[5] Flanker brand plans in Saskatchewan and Manitoba include 5GB of data.
[6] TELUS and Bell offer a bonus 3GB in Quebec for a total of 7GB of data.
[7] Main brand plans in Manitoba include 6GB.
[8] Main brand plans in Saskatchewan include 5GB of data.
[9] Aggregate market share of the National Wireless Carriers (main and flanker brands) is shown in parentheses next to each province.

Source:
Company websites.

Figure 6: Price of Wireless Plan with 1GB of Data and 300 Minutes



Notes:
[1] Prices are based on individual plans and bringing your own device.
[2] The North includes: Northwest Territories, Nunavut and Yukon.
[3] Plans in Manitoba include unlimited Manitoba calling.
[4] TELUS' plans in New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland offer 500MB for $60.
[5] Rogers' plans in New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland offer unlimited Canada-wide minutes; a 500MB plan is available for $65.
[6] In Quebec, TELUS offers 7GB (4GB + 3GB bonus), Bell offers 6GB (3GB + 3GB bonus) and both plans have unlimited Canada-wide minutes; Rogers offers unlimited Province-wide calling.
[7] Plans in Saskatchewan include unlimited local calling.
[8] Plans from Koodo and Virgin Mobile in Manitoba and Saskatchewan offer 5GB data and unlimited Canada-wide minutes; a 500MB plan is available for $40.
[9] Fido's plans in Saskatchewan and Manitoba offer 5GB of data and unlimited Canada-wide minutes, a 100MB/100min plan is available for $35.
[10] Virgin Mobile, Koodo and Fido also offer 500MB plans for $45 in New Brunswick, Nova Scotia, Prince Edward Island, The North and Newfoundland.
[11] Aggregate market share of the National Wireless Carriers (main and flanker brands) is shown in parentheses next to each province.

Source:
Company websites.

46. The Competition Bureau conducted an extensive analysis of mobile wireless prices in Canada as part of its review of Bell's acquisition of MTS earlier in 2017.[43] Using internal company data, the Bureau found that mobile wireless prices in Saskatchewan, Thunder Bay, Quebec and Manitoba are substantially lower than in the rest of Canada:

> *"A simple review of the Bell, TELUS and Rogers websites demonstrates the magnitude of these price differences. To illustrate, as of February 14, 2017, Bell's website offered a 5GB plan in Ontario for $105 but that same plan was offered for $60 in Manitoba. The same pattern is apparent when considering "flanker" brands. For example, as of February 14, 2017, Bell's flanker brand, Virgin, offered on its website a 5GB plan in Ontario for $75 and offered that same plan in Manitoba for $48."*[44]

47. The Bureau's systematic analysis further determined that the price differential is significant and persistent. While the Bureau's statement refers to advertised prices, the Bureau further clarified that the pattern and magnitude of price differentials observed in advertised prices is consistent with its analysis of confidential internal company data:

> *"[…] Bell, TELUS and Rogers all posted pricing on their websites that corroborates the results of the price study both in terms of the observed pricing pattern and the general magnitude of the pricing differential."*[45]

48. The Eisenach Report claims that the price comparison in the Nordicity Report is inaccurate because it does not account for quality and cost differences.[46] (Eisenach Report, ¶47). It is challenging to accurately control for differences in quality, cost, and usage patterns in international price comparisons.[47] However, the Bureau's investigation of Bell's acquisition of MTS revealed, based on confidential internal company data, that the 70% of Canadians living in areas without a strong regional competitor pay significantly more for mobile wireless services and that these *within-country* differences could not be explained by quality or other factors:

> *"[t]he Bureau concluded that these differences in price could not be explained by factors such as quality, differences in demand or demographics, but instead were based on the existence or non-existence of a strong regional competitor."*[48]

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43 *Supra* note 13.

44 *Supra* note 13.

45 *Supra* note 13.

46 Eisenach Report, ¶47, ¶72-75.

47 The Eisenach Report provides no evidence that consumers are willing to pay an amount for improved quality (e.g., 1% increase in LTE connections or 1Mbps increase in 4G speed) sufficient for quality-adjusted mobile wireless prices in Canada to be on par or lower relative to the comparison countries.

48 *Supra* note 13.

49. Similarly to the international comparisons, the Bureau's investigation revealed that high prices and the lack of competition in areas without effective competition lead to lower usage (output).

> *"The Bureau's investigation also found that, generally, Canadians in areas with a strong regional competitor use substantially more data than Canadians in areas without a strong regional competitor."*[49]

50. While Dr. Eisenach may be aware of only the Nordicity Report showing that Canadians pay high rates for mobile wireless services,[50] a plethora of evidence from various sources and using different methodologies confirm the findings in the Nordicity Report: Not only do Canadians pay high prices for mobile wireless telecommunications services, adoption and usage lag substantially behind the average among OECD countries. Furthermore, the Competition Bureau's extensive investigation as part of its review of Bell's acquisition of MTS revealed that most Canadians, around 70%, pay high prices for mobile wireless services because of the coordinated behaviour of Bell, Rogers, and TELUS. Canadians living in areas with effective competition from a strong regional competitor pay lower prices and use substantially more data.

V. Wi-Fi First Service Providers Offer a Disruptive Innovation that Will Likely Appeal to Some Consumers

A. The Promise of Wi-Fi First

51. Innovative approaches are required to meet the increasingly growing demand in mobile data traffic and connectivity. One solution has been the use of Wi-Fi as a means to offload heavy data traffic from overcrowded mobile networks. Wi-Fi offloading consists of migrating data traffic from infrastructure-based networks (i.e., cellular towers) to Wi-Fi networks. Some wireless carriers, which primarily offer their services by operating their network infrastructure sometimes resort to Wi-Fi to address extra bandwidth demand in large metropolitan areas. Another form of Wi-Fi offloading sometimes provided by mobile operators entails a Wi-Fi hotspot as a service bundled with a mobile subscription. Wi-Fi offloading allows wireless carriers to use an alternative for increasing or, at least, maintaining service performance during peak demand periods.

52. In contrast, Wi-Fi First service providers offer their services primarily on Wi-Fi networks and only incidentally use cellular networks as a backup. The advent of these new players in the market has followed the growth in Wi-Fi availability and capability due to technological developments, which has made Wi-Fi networks an increasingly more viable alternative to cellular networks. In areas

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[49] *Supra* note 13.

[50] Eisenach Report, ¶62.

without Wi-Fi, customers of a Wi-Fi First service provider could access a cellular network if their service provider has an agreement with the wireless carrier.

53. Wi-Fi First service is a disruptive technology challenging the current model of wireless carriers. It is a business model that relies on software—not infrastructure—enabling smartphones to automatically be connected to the Internet using Wi-Fi. Customers of a Wi-Fi First service provider can connect to the Internet for voice calls, text messaging, and data at prices that are substantially lower than those typically offered by a traditional mobile smartphone plan. Wi-Fi First is likely to appeal to price-sensitive consumers and has the potential to expand wireless penetration rates across Canada.[51] Wi-Fi First service providers could considerably change the mobile wireless industry in Canada by introducing pricing pressure and more intense competition—even if only fringe competition for consumers with limited need for cellular usage. Increased wireless competition will ultimately benefit all Canadians.

54. Canadians depend on mobile wireless telecommunications services for many important aspects in their lives: personal and work communication, safety, convenience, as well as entertainment. These services make up a significant portion of Canadian household spending, disproportionately so for low-income households.

55. Wi-Fi First service is expected to improve the choice and affordability of mobile wireless telecommunications services, yet the competitive constraint Wi-Fi First service providers can exert on the market is likely restricted to consumers with limited use of mobile wireless networks. However, in areas of Canada characterized by the absence of a strong regional competitor and coordinated behaviour of the National Wireless Carriers, Wi-Fi First service providers are expected to influence competition even for consumers with increased needs for cellular networks due to high mobile wireless prices.

56. The potential for Wi-Fi First service to disrupt the mobile wireless industry and increase penetration has been well-documented in the press, as the following examples demonstrate:

> *"Change is in the air: "Wi-Fi first" technology will be great for consumers, disruptive for mobile firms"*
>
> Economist, June 18, 2015[52]
>
> *"Bandwidth.com to Spin Off Wi-Fi Cellphone Service Republic Wireless: Bandwith.com considering IPO late next year after successful debut of rival Twilio: Republic Wireless will spin out from its parent company and become an independent entity, a sign that cheaper, Wi-*

[51] This will likely occur even in those parts of the country that are more competitive due to the presence of a strong regional carrier.

[52] https://www.economist.com/news/business/21654602-wi-fi-first-technology-will-be-great-consumers-disruptive-mobile-firms-change.

Fi-based cellphone services are able to stand on their own in a hotly competitive wireless market."

Wall Street Journal, December 1, 2016[53]

"Google, Cablevision Challenge Wireless Industry's Business Model: Companies Ready Phone Plans That Dial Up Pressure on an Industry Already at War Over Prices: Google Inc. and Cablevision Systems Corp. are preparing new cellphone services that would turn the wireless industry's business model on its head, increasing pressure on companies already dealing with an intensifying price war."

Wall Street Journal, January 26, 2015[54]

"While Limited, Wi-Fi-First Phones Are a Good, Frugal Bet"

New York Times, June 30,2016[55]

"Cellphone Start-Ups Use Wi-Fi First to Handle Calls and Take On Rivals"

New York Times, February 16, 2015[56]

57. Interventions of the National Wireless Carriers argue that mandated access for Wi-Fi First service providers is not needed or desirable because public Wi-Fi networks may not offer the same quality of service as Mobile Network Operators ("MNOs"). This argument however conflicts with the needs of Canadian consumers, consumer choice, and competitive markets in general. Not all Canadians drive Mercedes cars. When offered a choice among different cars, many price-sensitive consumers choose a lower quality make of a car that better suits their needs and budget.

58. Well-functioning competitive markets respond to different consumer preferences by offering a range of products and services of various quality that appeal to different types of consumers depending on their respective price sensitivity.

"[S]ociety is almost always better off when consumers enjoy a wide range of choices between high-quality, high-priced and low-quality, low-priced opportunities than when they face a severely restricted choice set."[57]

B. The Entry of Wi-Fi Service Providers in Canada Is Likely to Increase Adoption among Price-Sensitive Consumers with Limited Cellular Consumption Needs

59. Not all consumers exhibit truly 'mobile' behaviour. Many use their mobile device predominantly in a 'nomadic' fashion with a lot of time (and use) occurring at home, at work/school, at a friend's

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53 https://www.wsj.com/articles/bandwidth-com-to-spin-off-wi-fi-cellphone-service-republic-wireless-1480598533.

54 https://www.wsj.com/articles/google-cablevision-challenge-wireless-industrys-business-model-1422248642.

55 https://www.nytimes.com/2016/06/30/technology/personaltech/while-limited-wi-fi-first-phones-are-a-good-frugal-bet.html.

56 https://www.nytimes.com/2015/02/16/technology/small-phone-companies-use-wi-fi-to-punch-above-their-weight.html.

57 Scherer, F.M. (1980): *Industrial Market Structure and Economic Performance*, (Houghton Mifflin), p. 394.

house, or in a café, library, or hotel. All those sites likely have public Wi-Fi connectivity. This shift to Wi-Fi enabled devices and locations is changing how consumers connect their devices.[58] Most mobile users are connecting their devices to Wi-Fi at some point, and most users rely on a mix of cellular connectivity and Wi-Fi connectivity. Depending on their consumption behaviour, a portion of consumers is likely to have limited needs for cellular connectivity.

60. According to Cisco, there are currently close to 600,000 public Wi-Fi hotspots (including home spots) available and this number is expected to grow 19-fold over the next five years.[59] Given the widespread availability of public Wi-Fi and its expected growth in the near future, Wi-Fi First service providers can become a competitive option for at least some consumers.

61. Wholesale roaming rates—whether commercially negotiated or mandated—make permanent roaming on cellular networks economically unattractive. This is one of the reasons why Wi-Fi First service providers tend to focus on offering affordable service for consumers with limited need for cellular network use. Wi-Fi First service is only economical for consumers if they predominantly rely on Wi-Fi and only incidentally rely on cellular networks for backup. As such, Wi-Fi First service providers cannot compete for all consumers and there will be many Canadian consumers with substantial usage and need for cellular connectivity for which the National Wireless Carriers (or regional competitors) remain their preferred choice. Yet, the entry of Wi-Fi service providers into the Canadian market might lead to the development of a competitive option that can improve the adoption and affordability of wireless telecommunications services among a segment of price sensitive consumers.

62. The Sanderson Report contains three figures, one for each type of regulations that provide for mandated MVNO access,[60] from which it is concluded that "mandating MVNO access did not cause a material increase in the growth rate of mobile penetration in any country where such access was mandated. Instead, the slope of the line showing penetration rate growth over time is not steeper after mandated access was provided to MVNOs. Instead, the rate of growth in penetration continued on its earlier path even after mandating MVNO access."[61]

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[58] Cisco, "The New World of SP Wi-Fi: Cisco IBSG Research Uncovers What Canadians Want from W-Fi and Mobile," https://www.cisco.com/c/dam/en_us/about/ac79/docs/sp/SP_Wi-Fi_Consumer_Briefing_Doc_Canada.pdf.

[59] Cisco, VNI Mobile Forecast Highlight 2016-2021, https://www.cisco.com/c/dam/assets/sol/sp/vni/forecast_highlights_mobile/index.html#~Country. For homespots (or community hotspots), subscribers allow part of the capacity of their residential gateway to be open to casual use. These homespot may be provided by a broadband or other provider directly, or through a partner.

[60] The Sanderson Report categorizes regulations into three types by the process through which it gives rise to mandated MVNO access: i) through an analysis of market power, ii) through merger review, and iii) as a condition of spectrum licensing (Sanderson Report, p. 12).

[61] Sanderson Report, p. 15.

63. This conclusion is problematic for multiple reasons. First, eyeballing lines of mobile adoption over time (diffusion curves) and comparing the slope of two different segments of the line is meaningless in the absence of a benchmark for mobile wireless technology adoption. Mobile network penetration tends to follow a classic S-shaped growth curve because of adoption externalities and eventual market saturation. The slope of the diffusion curve, that is, the growth of mobile penetration at a particular point in time, depends on the proportion of the market that is as yet unserved.[62] Second, regulatory decisions such as whether to mandate MVNO access are endogenous.[63] That is, the decision to mandate MVNO access is not random but related to market conditions such as pricing, intensity of competition, adoption, or a merger awaiting approval. In the absence of a proper econometric identification strategy that addresses endogeneity, no causal inference can be made on the effect of mandated MVNO access on adoption.[64]

64. The potential for reaching erroneous conclusions regarding the effect of mandated MVNO access when the decision to mandate occurs in response (or anticipation) of other market events is illustrated by a retrospective study from the Austrian Competition Authority (BWB) on the merger between H3G and Orange in Austria in 2012.[65] As a condition of merger approval, the merging parties committed to enter into an upfront MVNO agreement with a new entrant and committed to grant wholesale access to up to 16 MVNOs based on the same reference offer but limited to 30% of H3Gs network. The remedies failed to attract new entrants in a timely and effective way. Cable TV provider UPC signed the upfront MVNO agreement but entered the market only two years later in December 2014. No other MVNOs entered until 2015 when several MVNOs entered the market.

> *"Prior to the merger, there were four mobile network operators (MNOs) in the market and Austrian consumers enjoyed several years of falling prices. After the mergers were cleared in the end of 2012, prices started to increase. In the course of 2015, several new mobile virtual network operators (MVNOs) entered the market and prices started to decrease again."*

65. Naïvely comparing penetration rates (or prices) before and after MVNO access was mandated (in the absence of the reason *why* access was mandated) entirely misses the true competitive effect of

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62 *Supra* note 36, p. 699.

63 See for example Grajek and Röller (2012) on the importance of accounting for the endogeneity of regulation (Grajek, M. and L.-H. Röller (2012): "Regulation and Investment in Network Industries: Evidence from European Telecoms," *Journal of Law and Economics*, 55(1), pp. 189–216).

64 Causal inference draws conclusions about a causal connection based on the occurrence of an event, whether something is, or is likely to be, the cause of something else. If the regulatory decision to mandate MVNO access is related to market conditions (e.g. intensity of competition, merger), it is not possible to conclude from the mere correlation of mandated MVNO access with an outcome variable (e.g. adoption) that there is a causal connection. The correlation could be due to other market factors that led to regulation.

65 Bundeswettbewerbsbehörde (BWB), "The Austrian Market for Mobile Telecommunication Services to Private Consumers: An Ex-Post Evaluation of the Mergers H3G/Orange and TA/Yesss!," Sectoral Inquiry BWB/AW-393, Final Report, March 2016, https://www.en.bwb.gv.at/Documents/BWB2016-re-Ex-post evaluation of the mobile telecommunications market.pdf.

MVNOs. The example of Austria where prices increased following the merger between H3G and Orange and only decreased again with the entry of MVNOs two years later demonstrates the potential for MVNOs to constrain mobile wireless prices of dominant carriers with market power.

C. Relying solely on Commercially Negotiated Agreements is Unlikely to Lead to the Entry of Wi-Fi First Service Providers in Canada

66. The Dippon Report discusses several Wi-Fi First service providers in the United States and notes that "they all are the results of commercial negotiations" that grant network access through MVNO agreements. [66] The Dippon Report then argues that the CRTC should not change the definition of a "home network" to include public Wi-Fi because "there is no reason to believe that the parties could not negotiate similar agreements" in Canada.[67]

67. This argument entirely fails to consider the differences in wholesale wireless roaming markets in Canada and the United States, differences that are both structural and behavioural. MNOs in the United States are indeed eager to negotiate roaming agreements with MVNOs because if they were to walk away, MVNOs would simply sign an agreement with one of their competitors. Matt Carter, Sprint's President of Wholesale and Emerging Solutions, said that agreements with MVNOs are "a good strategic play for us. […] It's another army to help us garner more subscribers on the network." Critically, he went on to point out that "[i]f we didn't do this [form agreements with MVNOs], someone else would," highlighting the competitiveness of the wholesale wireless roaming market in the United States.[68]

68. The competitive environment in the Canadian wholesale wireless roaming market is markedly different. The CRTC determined in TRP 2015-177 that :

> *"[w]ith respect to rivalrous behaviour in the market for wholesale network access for MVNOs, the national wireless carriers have exhibited limited interest in providing potential MVNOs with access that would enable the provision of retail mobile wireless voice, text, and data services on a national or regional basis. The Commission considers that the inability of these parties to negotiate access to necessary wholesale inputs demonstrates that there is no rivalrous behaviour between the national wireless carriers in the provision of GSM-based wholesale MVNO access at a national level."*[69]

69. This lack of access has a direct effect on potential competitors. For example, Elliott Noss, CEO of Canadian wireless provider Ting who operates in the Unites States, said Ting "would love to be in

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66 Dippon Report (*Expert Report of Christian M. Dippon, PhD On Behalf of TELUS Communications Company*), ¶ 39-40.

67 Dippon Report, ¶ 44.

68 FierceWireless, "Sprint, T-Mobile Execs Explain the MVNO Explosion," http://www.fiercewireless.com/special-report/sprint-t-mobile-execs-explain-mvno-explosion.

69 TRP 2015-177, *supra* note 2, ¶ 86, https://www.crtc.gc.ca/eng/archive/2015/2015-177.htm.

Canada [but] nobody will—at least at this juncture—sell us network."[70] Similarly, Derek Ting, the CEO of TextNow, an MVNO headquartered in Canada but competing only in the United States, confirmed that the wholesale market dynamic is significantly different and the National Wireless Carriers do not offer attractive wholesale rates: "US carriers are much more motivated to play offence against each other but here they're just playing defence."[71]

70. Another characteristic that differs between the two markets is the extent of network sharing. Canadian MNOs have entered into a range of network sharing agreements in various parts of the country (e.g., Bell and TELUS). Network sharing can be an effective solution to reduce costs, facilitate network roll-out, increase coverage, and improve network efficiency. However, network sharing likely results in reduced excess capacity and a diminished incentive to sell capacity to MVNOs or price aggressively at the retail level. The extent to which the (unilateral) incentive is reduced depends on the particulars of the cost sharing arrangements.[72]

71. Aside from unilateral effects, there is an increased risk that the network sharing agreements in Canada lead to tacit coordination among the National Wireless Carriers to refuse to supply MVNOs.[73]

72. As mentioned in Section III.B, the Competition Bureau determined that mobile wireless prices in large parts of Canada are elevated due to coordinated behaviour among the National Wireless Carriers, and found that one of the key features driving the coordinated behaviour among Bell, TELUS and Rogers is their multi-market exposure. Such multi-market exposure among the National Wireless Carriers is significant and covers different geographies and business lines at both the wholesale and retail level. Since there is no other competitor able to disrupt the effects of coordination among the National Wireless Carriers in the national wholesale wireless roaming market, it is possible that the lack of rivalrous behaviour and unwillingness of National Wireless Carriers to provide MVNOs with access is another manifestation of coordinated behaviour among Bell, TELUS and Rogers.

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70 CBC News, "The Canadian Mobile Phone Service You Can't Get Here," July 31, 2013; https://www.cbc.ca/news/business/the-canadian-mobile-phone-service-you-can-t-get-here-1.1337824.

71 The Globe and Mail, "Canadian Cellphone Startup Has Success Stateside, But Shut Out at Home," July 2, 2017, https://beta.theglobeandmail.com/report-on-business/small-business/startups/canadian-cellphone-startup-has-success-stateside-but-shut-out-at-home/article35509946. *See* also Emch Report (*An assessment of wholesale roaming policy in Canada: The interaction of competition, regulation, access, and investment*), filed on behalf of Shaw Communications Inc., ¶¶ 67-69.

72 OECD (2014): "Wireless Network Structures and Network Sharing," *OECD Digital Economy Papers*, No. 243, OECD Publishing, Paris, pp 67-70; https://dx.doi.org/10.1787/5jxt46dzl9r2-en.

73 Wholesale competition is lessened if MNOs do not remain independent wholesale providers over the shared network infrastructure.

VI. Mandated Wholesale Access for Wi-Fi First Service Providers Is Unlikely to Reduce Investment in Canada

73. Experts for the National Wireless Carriers have cited academic research to support their assertion that expanding the definition of 'home network' to allow for alternative service providers (e.g., Wi-Fi First)—through mandated access—is expected to reduce investment. Their reports, however, i) predominantly refer to research on the fixed (wireline) telecommunications industry rather than the mobile wireless telecommunications industry, ii) present a biased and selective view of the academic literature, and iii) most importantly, exclude the most recent (and most advanced) research on competition and investment specifically in the wireless telecommunications industry. A closer review of relevant research with the most-recent economic evidence reveals that—given the state of the Canadian telecommunications market—increasing competition by mandating access for Wi-Fi First service providers is unlikely to negatively impact investments in wireless network infrastructure.

74. Largely, the academic literature has investigated the relationship between competition and investment in the context of the fixed telecommunications industry, and the research cited by experts for the National Wireless Carriers is almost exclusively related to competition and investment matters in fixed broadband networks. Two previous reports filed in recent CRTC proceedings and Cabinet reviews of telecom regulatory policy extensively review the academic literature on competition and investment in fixed telecommunications industry, and how its findings apply to the Canadian broadband market.[74] They revealed that no clear consensus view has emerged on the relationship between regulation, investment incentives, and industrial policy, or the effect of mandated access to next-generation infrastructure in the presence of broadband competition.

> *"Several attempts have been made to uncover the relationship between competition and investment within specific industries. In the telecommunications industry, most papers have analysed the impact of competition on investment in the fixed broadband market. Cambini and Jiang (2009) review this literature and find that the impact is rather ambiguous. Likewise, Grajek (2012) finds that competition through access regulation negatively affects investment in fixed broadband networks, whereas Bacache, Bourreau, and Gaudin (2014)*

[74] Ginn, M. and M. von Wartburg, "Economic Review of the Provision of Wholesale Telecommunications Services and Associated Policies in Canada," June 27, 2014, prepared for the Canadian Network Operators Consortium as part of its submission in response to Telecom Notice of Consultation CRTC 2013-551, *Review of wholesale services and associated policies*; von Wartburg, M., "Economic Review of Bell Canada's Petition to the Governor in Council to Vary TRP CRTC 2015-326, *Review of Wholesale Wireline Services and Associated Policies,"* December 21, 2015, prepared for the Canadian Network Operators Consortium as part of its comments on Bell's petition.

find that access regulation has no effect on new entrants' investment in fixed broadband networks."[75]

75. Moreover, specifically related to the Canadian fixed broadband market, announcements of sizeable next-generation broadband infrastructure investments (following the announcement of mandated access), public statements and investor reports from incumbent broadband providers, and financial analyses of broadband networks in Canada are entirely consistent with the CRTC's assessment that incumbent carriers will likely continue to invest in wireline infrastructure to respond to consumer demand and compete.[76] Earlier this year, a Moody's Investor Services report similarly concluded that competition between Canadian telecommunications and cable companies drives continued network investment in fibre-optic network infrastructure.[77]

76. Thus, even evidence from the fixed telecommunications industry indicates that mandated access is unlikely to reduce investment by incumbents in markets where telecommunications and cable companies compete. This conclusion can also be drawn from recent research into the mobile wireless telecommunications industry, the relevant industry to focus on in the current proceeding. The academic literature investigating the empirical relationship between competition and investment in the mobile wireless telecommunications industry is still nascent. The Sanderson and Dippon Reports rely solely on an early study by Kim et al. (2011) that finds that mandated MVNO access is associated with reduced investment intensity—defined as capital expenditures divided by

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[75] Houngbonon, G.V. and F. Jeanjean (2016): "What level of competition intensity maximises investment in the wireless industry," *Telecommunications Policy*, 40(8), pp. 774-790, at 776. (Cited are Cambini, C., and Y. Jiang (2009): "Broadband Investment and Regulation: A Literature Review," *Telecommunications Policy*, 33(10-11), pp. 559-574; Grajek, M. and L.-H. Röller (2012): "Regulation and Investment in Network Industries: Evidence from European Telecoms," *Journal of Law and Economics*, 55(1), pp. 189–216; and Bacache, M., M. Bourreau, and G. Gaudin (2014): "Dynamic Entry and Investment in New Infrastructures: Empirical Evidence from the Fixed Broadband Industry," *Review of Industrial Organization*, 44(2), pp. 179–209).

[76] Telecom Regulatory Policy CRTC 2015-326, *Review of wholesale wireline services and associated policies*, 22 July 2015 ("TRP 2015-326"), ¶141, https://www.crtc.gc.ca/eng/archive/2015/2015-326.htm.

[77] Moody's Investor Service, "Broadband Communications - Canada: Unique Market Structure Guides Capital Spending for Broadband Providers," March 21, 2017, https://www.moodys.com/research/Moodys-Competition-in-Canadian-broadband-sector-on-the-upswing-as--PR_363869; Financial Post, "Investment race heating up between Canada's cable companies, telecoms: Moody's," March 21, 2017, http://business.financialpost.com/technology/investment-race-heating-up-between-canadas-cable-companies-telecoms-moodys.

revenue—by MNOs.[78] The authors used annual firm-level data of 58 MNOs from 21 developed countries (including Canada) from 2000 to 2008.[79]

77. The statistical evidence of this study on the effect of mandated MVNO access on investment intensity cited by the Sanderson and Dippon Reports is relatively weak, that is, the results are not statistically significant at the most commonly used 5% significance level.[80,81] Since small sample sizes lead to imprecise results, this finding is not particularly surprising given the limited number of jurisdictions with mandated MVNO access in the authors' sample.

78. More importantly, setting the weak evidence aside, the Kim et al. (2011) study suffers from two key shortcomings identified by researchers.[82] First, the authors impose a linear restriction on the relationship between investment and competition. By doing so, they assume that the effect of competition—specifically mandated MVNO access—on investment is the same regardless of the level of competition in the market. This is problematic because the theoretical relationship between competition and investment is ambiguous. The empirical evidence showing that competitive markets generally exhibit higher levels of investment and innovation relative to monopoly industries is consistent with Nobel-prize winning economist Kenneth Arrow's 'escape the competition' effect.[83] The effect arises because a monopolist has a reduced incentive to invest in innovation and new technology (compared to a competitive firm) since the more a firm earns more

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[78] Kim, J., Y. Kim, N. Gaston, R. Lestage, Y. Kim, and D. Flacher (2011): "Access regulation and infrastructure investment in the mobile telecommunications industry," *Telecommunications Policy*, 35(11), pp. 907-919. The authors caution that "MVNO entry and regulation may encourage MNOs to adjust their investment level. As competition among MNOs places pressure on infrastructure capacity, services-based competition triggered by MVNOs may promote a more efficient use of network resources. Therefore, a lower investment intensity should not be interpreted as evidence that access agreements lead to under-investment, independently of any market and technological contexts" (p. 915). Furthermore, "a lower investment intensity should not necessarily be interpreted as evidence against granting market access to MVNOs. For example, lower investment is not necessarily undesirable where duplication of, or over-investment, in existing networks matter" (p. 916).

[79] The study's data period covers a time when mobile markets were highly voice-centric. These results may not carry over for data-centric mobile markets in which subscriber and usage growth is very different from what they were when mobile provided mainly voice telephony.

[80] A lack of statistical significance implies that it cannot be ruled out that the relationship identified by the study's authors is simply due to random chance.

[81] Woolridge, J.M. (2005): *Introductory Econometrics: A Modern Approach*, 2nd Ed. (Mason, OH: Thomson/South-Western), p.119 ("We must first decide on a significance level or the probability of rejecting H_0 when it is in fact true. For concreteness, suppose we have decided on a 5% significance level, as this is the most popular choice."); Stock, J.H. and M.W. Watson (2011): *Introductory Econometrics* 3rd Ed. (Boston: Pearson/Addison Wesley), pp. 77-78 ("In many cases, statisticians and econometricians use a 5% significance level."). None of the estimated parameters on the effect of mandated MVNO access in the main specification (or the sensitivity analysis) is significant at the 5%-level, and most estimated parameters on this effect in the sensitivity analyses are not even statistically significant at the 10%-level.

[82] Houngbonon and Jeanjean (2016), *supra* note 75.

[83] Arrow, K.J. (1962): "Economic welfare and the allocation of resources to invention," in R.R. Nelson (Ed.), *The rate of direction of inventive activity: Economic and social factors* (New York: Princeton University Press), pp. 609-626.

from the old technology the lower the incentive to invest in the new technology.[84] On the other hand, intense competition may reduce post-investment profits thereby creating a disincentive for investment: The prospect of earning monopoly rent incentivizes investment and innovation (Schumpeterian effect).[85] In a general equilibrium framework, Aghion, Bloom, Blundell, Griffith, and Howitt (2005) find an inverted-U shaped relationship between competition and innovation, both theoretically and empirically.[86] Although Kim et al. (2011)—the study cited in the Sanderson and Dippon Reports—extensively discuss the two opposing effects and the inverted-U relationship between competition and investment, the authors' empirical specification does not allow for such a nonlinear effect for MVNOs.

79. Second, the research by Kim et al. (2011) does not control for the endogeneity of competition.[87] As explained above, since mandated MVNO access is typically not random but rather the outcome of regulatory processes that evaluate the level of competition in the market and the existence of voluntary MVNO access agreements for MNVO, the study is unable to isolate the causal effect of the regulatory policy on investment.[88]

80. The most recent available evidence on investment in the mobile wireless industry is a study by Houngbonon and Jeanjean (2016) which relaxes the linear restriction and uses an instrumental variable approach to correct for the endogeneity of competition. Using firm-level data on 110 wireless operators from 2005 through 2012, the authors build a dynamic model linking infrastructure investment and competition and find an inverted-U shaped relationship in the mobile wireless industry.[89] More specifically, a wireless carrier's investment increases with the intensity of competition as long as its profit is above the thresholds of 37-40 per cent of its total revenue.[90]

81. This inverted-U shaped relationship estimated by Houngbonon and Jeanjean implies that while there is a tradeoff between the intensity of competition and investment if a firm's EBITDA ratio is

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84 Monopoly firms can rely on old technologies for longer (i.e., recoup their investment over a longer period) as they are not faced with pressure from competitors to upgrade to newer technologies.

85 Schumpeter, J.A. (1942): *Capitalism, socialism, and democracy* (New York: Harper & Brothers).

86 Aghion, P., N. Bloom, R. Blundell, R. Griffith, and P. Howitt (2005): "Competition and innovation: An inverted-u relationship," *Quarterly Journal of Economics*, 120(2), pp. 701-728.

87 Houngbonon, G.V. and F. Jeanjean (2016): "What level of competition intensity maximises investment in the wireless industry," *Telecommunications Policy*, 40(8), pp. 774-790. The intensity of competition is measured as the ratio of a firm's operating profit to its total revenue which proxies for the Lerner index of market power. This ratio is used generally in empirical papers on competition (See for example Aghion, P., N. Bloom, R. Blundell, R. Griffith, and P. Howitt (2005): "Competition and Innovation: An Inverted-U Relationship," *Quarterly Journal of Economics*, 120 (2), pp. 701-728.

88 *Supra* note 63.

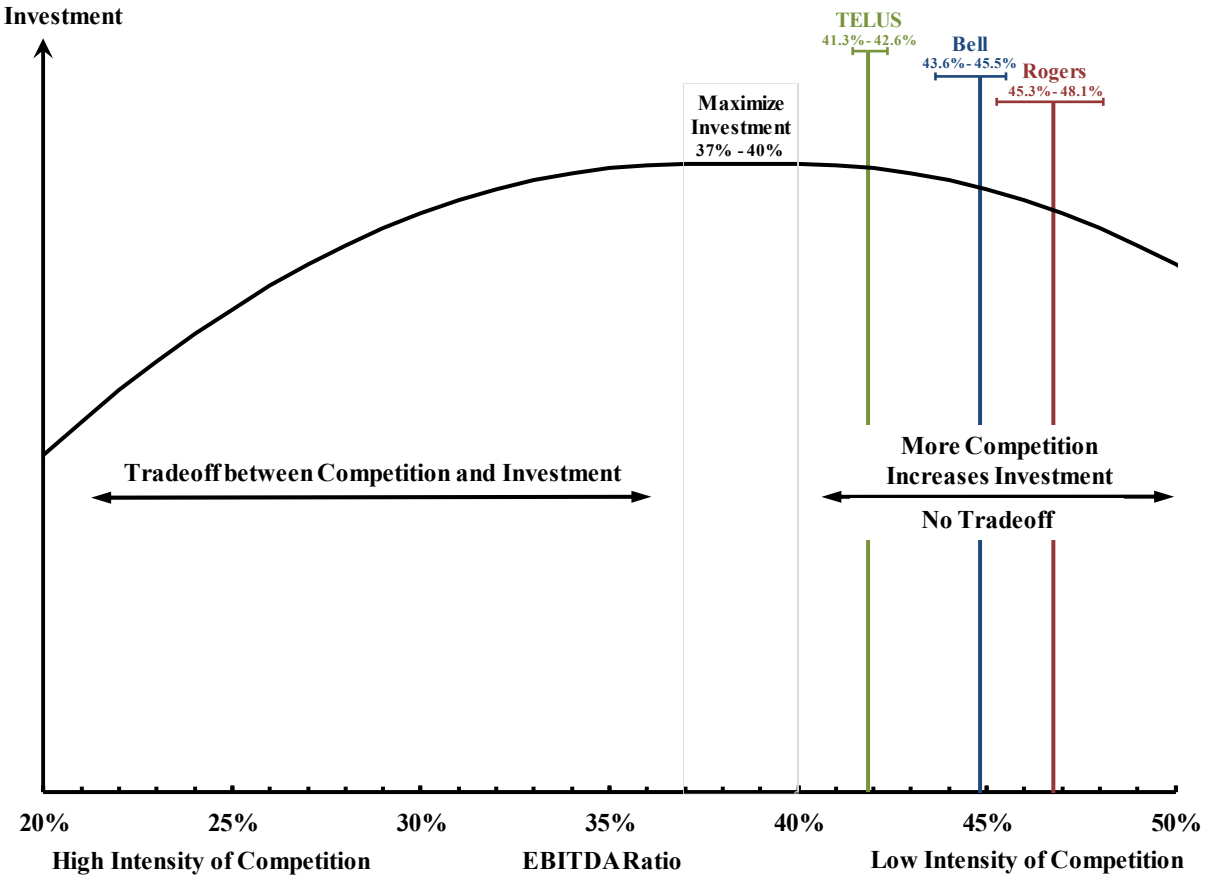
89 This inverted-U shaped relationship is robust to i) alternative measures of investment, ii) heterogeneity of demand and cost parameters such as market size and network deployment cost, iii) different modeling specifications; and iv) various estimators.

90 Houngbonon and Jeanjean (2016), *supra* note 75.

below 37-40 per cent, no such trade-off exists when the EBITDA ratio exceed the 37-40 per cent threshold. More specifically, the authors find that a wireless carrier's investment increases with the intensity of competition, as long as its profit is above 37-40 percent of its total revenue.

82. Figure 7 illustrates the inverted-U shaped relationship between the intensity of competition and investment estimated by Houngbonon and Jeanjean (2016), together with the range of EBITDA ratios reported by the National Wireless Carriers over the last four years (2013-2016). It is apparent that the average EBITDA ratio of Rogers (46.8%), Bell (44.8%), and TELUS (46.2%) substantially exceeds the threshold below which there exists a tradeoff between investment and competition.[91] Rather, in the range where the National Wireless Carriers operate, additional competition is estimated to increase investment.

Figure 7: Intensity of Competition and Investment (Houngbonon and Jeanjean, 2016)



Sources:
Houngbonon and Jeanjean (2016).
Annual Reports of Bell, TELUS, and Rogers for EBITDA ratio of wireless segment (2013-2016).

[91] The CRTC reports an EBITDA margin of 44.6% for the whole wireless industry in 2015 (CRTC, *Communications Monitoring Report 2016*, Figure 5.0.3; http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2016/cmr.pdf. Other wireless service providers generally do not report segment-specific profitability.

83. Particularly interesting, and at odds with the assertions of experts for the National Wireless Carriers,[92] are Houngbonon and Jeanjean's empirical findings related to MVNOs and the level of investment of wireless carriers that host an MVNO on their network:

> *"The regression also controls for whether or not a wireless operator hosts an MVNO.* ***The estimates suggest that wireless operators which host an MVNO invest more than their rivals.*** *This superior investment reflects the additional expenditures needed to provide upstream network access to the downstream MVNO" (emphasis added).*[93]

This research finding also suggests a lack of a policy rationale for subjecting Wi-Fi First service providers (or MVNOs in general) to higher wholesale rates since it would only limit their effect on competition and not improve investment incentives given the state of the Canadian mobile wireless telecommunications markets.

84. It is interesting to note that the empirical findings of Houngbonon and Jeanjean are not in conflict with the earlier research of Kim et al. (2011). Rather, they confirm that investment can be inefficiently low in markets characterized by high intensity of competition and low operating profits. However, the available data shown in Figure 7 suggests that these conditions are not present in Canada. Instead, the evidence on the Canadian market indicates that no trade-off exists between increased competition and network investment. Given the low intensity of competition in the Canadian mobile wireless telecommunications market, any increase in competition is unlikely to depress investment in wireless network infrastructure—instead, investment may even increase with additional competition from Wi-Fi First service providers.

85. Academic research cited by experts for the National Wireless Carriers relates predominantly to the fixed telecommunications industry and presents a biased and selective view of the academic literature. The most recent research on competition and investment in the wireless telecommunications industry addresses shortcomings in previous research and suggests that—given the state of the Canadian telecommunications market—increasing competition by mandating access for Wi-Fi First service providers is unlikely to have any negative impact on investments in wireless network infrastructure.

86. The Commission should strive for a market structure that maximizes consumer welfare while preserving investment incentives. The most recent economic evidence applied to the Canadian

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[92] Sanderson Report, pp. 6-7 and 20-23; Dippon Report, ¶86; Emch Report, ¶33 and ¶40, citing Kim et al. (2011). This research was not published until after the CRTC denied a request from the Canadian Network Operators Consortium Inc. ("CNOC") to review and vary its determinations made in TRP 2015-177 that it would not be appropriate to mandate MVNO access since it would significantly undermine network investments as a whole (Telecom Decision CRTC 2016-60, *The Canadian Network Operators Consortium Inc. – Application to review and vary Telecom Regulatory Policy 2015-177*, 18 February 2016, https://www.crtc.gc.ca/eng/archive/2016/2016-60.htm; *Supra* note 2).

[93] Supra note 90, p. 784.

context suggests that—given the state of the Canadian telecommunications market—specific remedies, such as expanding the definition of 'home network' to allow for alternative service providers (e.g., Wi-Fi First) can be employed to increase competition without a negative impact on investments in wireless network infrastructure. Such a remedy is unlikely to reverse the low intensity of competition in the sector in general, but it can improve the affordability of telecommunications services for price-sensitive Canadians, in particular those with low household income.

Appendix A: Additional Tables and Figures

Table 3: Market Concentration at the Time of Mandating MVNO Access in Countries where MVNO Access is Mandated Compared to Market Concentration in Canada

Country		HHI
The North	CRTC 2015	9,801
Newfoundland and Labrador	CRTC 2015	5,771
Ireland	Q1 2002	4,870
Saskatchewan	CRTC 2015	4,775
Prince Edward Island	CRTC 2015	4,354
Norway	Q3 2003	4,319
New Brunswick	CRTC 2015	4,214
Nova Scotia	CRTC 2015	4,149
Colombia	Q3 2015	4,106
Peru	Q4 2015	3,973
Alberta	CRTC 2015	3,963
Manitoba	CRTC 2015	3,810
Korea	Q3 2010	3,792
France	Q2 2011	3,773
Japan	Q3 2007	3,649
Ontario	CRTC 2015	3,593
Spain	Q4 2005	3,589
British Columbia	CRTC 2015	3,533
Chile	Q3 2011	3,465
Finland	Q3 2015	3,229
Argentina	Q3 2014	3,139
Italy	Q1 2007	3,085
Austria	Q3 2012	2,966
Canada (National)	*CRTC 2015*	*2,714*
Quebec	CRTC 2015	2,698
Germany	Q2 2014	2,625
Malaysia	Q1 2016	2,517
Brazil	Q2 2014	2,462
Hong Kong	Q4 2000	1,944

Sources:
[1] Sanderson Report, Table 2.
[2] CRTC, *Communications Monitoring Report 2016*, Table 5.5.8.

Table 4: Market Concentration in Countries with and without Mandated MVNO Access Compared to Canada

Country	Mandated MVNO Access		HHI
Northern Territories	**CDN**	**CRTC 2015**	**9,801**
Newfoundland and Labrador	**CDN**	**CRTC 2015**	**5,771**
Ireland	✓	Q1 2002	4,870
Saskatchewan	**CDN**	**CRTC 2015**	**4,775**
Prince Edward Island	**CDN**	**CRTC 2015**	**4,354**
Norway	✓	Q3 2003	4,319
New Brunswick	**CDN**	**CRTC 2015**	**4,214**
Nova Scotia	**CDN**	**CRTC 2015**	**4,149**
Colombia	✓	Q3 2015	4,106
Peru	✓	Q4 2015	3,973
Alberta	**CDN**	**CRTC 2015**	**3,963**
Manitoba	**CDN**	**CRTC 2015**	**3,810**
Australia		Q2 2017	3,884
Greece		Q2 2017	3,812
Korea	✓	Q3 2010	3,792
France	✓	Q2 2011	3,773
Japan	✓	Q3 2007	3,649
Ontario	**CDN**	**CRTC 2015**	**3,593**
Spain	✓	Q4 2005	3,589
British Columbia	**CDN**	**CRTC 2015**	**3,533**
New Zealand		Q2 2017	3,488
Belgium		Q2 2017	3,483
Chile	✓	Q3 2011	3,465
Czech Republic		Q2 2017	3,419
Portugal		Q2 2017	3,371
Finland	✓	Q3 2015	3,229
Argentina	✓	Q3 2014	3,139
Italy	✓	Q1 2007	3,085
Slovakia			2,980
Austria	✓	Q3 2012	2,966
United Kingdom		Q2 2017	2,741
Canada (National)	*CDN*	*CRTC 2015*	*2,714*
Quebec	**CDN**	**CRTC 2015**	**2,698**
Germany	✓	Q2 2014	2,625
Malaysia	✓	Q1 2016	2,517
Brazil	✓	Q2 2014	2,462
Denmark		Q2 2017	2,331
Hong Kong	✓	Q4 2000	1,944

Sources:
[1] Sanderson Report, Table 3.
[2] CRTC, *Communications Monitoring Report 2016*, Table 5.5.8.

Table 5: Post-Merger Market Concentration in Countries Mandating MVNO Access as a Condition of Merger Approval Compared to Market Concentration in Canada

Country		HHI
Northern Territories	CRTC 2015	9,801
Newfoundland and Labrador	CRTC 2015	5,771
Saskatchewan	CRTC 2015	4,775
Prince Edward Island	CRTC 2015	4,354
New Brunswick	CRTC 2015	4,214
Nova Scotia	CRTC 2015	4,149
Alberta	CRTC 2015	3,963
Manitoba	CRTC 2015	3,810
Ontario	CRTC 2015	3,593
Austria (post-merger)	**Q1 2013**	**3,575**
British Columbia	CRTC 2015	3,533
Germany (post-merger)	**Q3 2011**	**3,380**
Finland[A]	**Q3 2015**	**3,229**
Austria (pre-merger)	*Q3 2012*	*2,966*
Canada (National)	*CRTC 2015*	*2,714*
Quebec	CRTC 2015	2,698
Germany (pre-merger)	*Q2 2014*	*2,625*

Notes:
[A] The HHI in Finland did not meaningfully change at the time the Sanderson Report states that MVNO access was mandated as a condition of merger approval (https://www.viestintavirasto.fi/en/statisticsandreports/statistics/2013/marketsharesofmobilesubscriptions.html).

Sources:
[1] Sanderson Report, Table 2.
[2] CRTC, *Communications Monitoring Report 2016*, Table 5.5.8.
[3] RTR (Austria), DSP Partners (Germany).

Appendix B: About the Author

Dr. Markus von Wartburg is a Vice-President in the Montreal office of Analysis Group, Inc., an economic consulting firm. He specializes in the application of econometric methods and microeconomic theory to complex problems in antitrust and competition, commercial litigation, media and telecommunications, finance, and intellectual property. Dr. von Wartburg has (co-)authored expert reports on investment and competition in the Canadian telecommunications industry in CRTC proceedings and Cabinet reviews of telecom regulatory policy. He has a Ph.D. in economics from the Vancouver School of Economics at the University of British Columbia (Dissertation: *Consumer Behaviour and Pricing in the Mobile Telecommunications Industry*), specializing in industrial organization, antitrust and competition economics, and applied microeconomics. Prior to joining Analysis Group, Dr. von Wartburg lectured on strategy and game theory at the University of British Columbia.

EDUCATION

Ph.D. Economics, University of British Columbia, Vancouver, Canada

M.A. Economics, University of Toronto, Toronto, Canada.

B.A. Economics, Simon Fraser University, Burnaby, Canada.

PROFESSIONAL EXPERIENCE

2008 - present Analysis Group, Montreal, Canada

Vice President

Senior Economist

Economist

2006 - 2007 University of British Columbia, Vancouver, Canada

Sessional Lecturer (Department of Economics)

TESTIMONY AND EXPERT REPORTS

- Bell Canada's Petition to the Governor in Council to Vary TRP CRTC 2015-326, *Review of wholesale wireline services and associated policies*: on behalf of the Canadian Network Operators Consortium, filed an expert report addressing the economic framework of mandated wholesale fibre-to-the-home (FTTH) high-speed access services in Canada.
- Canadian Radio-Television and Telecommunications Commission (CRTC), Telecom Notice of Consultation 2013-551, *Review of wholesale service and associated policies*: on behalf of the Canadian Network Operators Consortium, filed an expert report (co-authored with Marissa Ginn) and testified on investment and competition in the wholesale telecommunications services market.

PROFESSIONAL AFFILIATIONS

Canadian Economic Association (Member)

American Economic Association (Member)

Canadian Bar Association (Affiliate, Chair of Economics & Law Committee, Competition Law Section)

American Bar Association (Associate, Antitrust Law)