CT-2022-002

IN THE MATTER OF the *Competition Act*, R.S.C. 1985, c. C-34;

AND IN THE MATTER OF the proposed acquisition by Rogers Communications Inc. of Shaw Communications Inc.;

AND IN THE MATTER OF an application by the Commissioner of Competition for one or more orders pursuant to section 92 of the *Competition Act*.

B E T W E E N :

COMMISSIONER OF COMPETITION

Applicant

- and -

ROGERS COMMUNICATIONS INC. AND SHAW COMMUNICATIONS INC.

Respondents

- and -

ATTORNEY GENERAL OF ALBERTA AND VIDEOTRON LTD.

Intervenors

WITNESS STATEMENT OF MICHAEL A M DAVIES

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1. My name is Michael Allan Martin Davies. I have worked for more than thirty years in the telecommunications and related industries with a particular focus on innovation in mobile devices, communications services and network infrastructure.

2. I am the Founder and Chairman of Endeavour Partners ("Endeavor"), a technology strategy consulting firm that works with leading businesses throughout the high-tech, mobile and telecom areas on business strategy for the digital economy. The firm is headquartered in Cambridge, MA, with an office in London, United Kingdom.

3. I have an MA in Electrical Sciences from the University of Cambridge, a Masters in Engineering from the University of Durham and a Masters in Business Administration (with Distinction) from London Business School.

4. I began my professional career as an engineer and then worked for consulting firms with clients from a wide range of technology firms and telecom businesses. I was then Chief of Strategy for BellSouth NZ (now Vodafone NZ), in which position I was directly involved in various projects related to the implementation of wireless telephony, including pioneering work on digital cellular connectivity and the economics of wireless networks. I subsequently became the principal of a consulting firm working on broadband, IP and next generation wireless technologies for a range of telecom and other clients, founded my own firm twenty-five years ago and then left it and founded founding Endeavour Partners in 2003.

5. I am a Senior Lecturer at MIT, where I teach or have taught courses on topics including innovation, product management, finance and business models, pricing and marketing, competitive analysis, market opportunity identification, and data-driven decision making. As a Guest Lecturer at the London Business School, where I have long led the New Technology Ventures program, and I am the Course Director for the program "The Business of AI".

6. As a result of the foregoing, my expertise includes: the design, development and deployment of digital and high-tech products; research and development; technology; and business strategy. I have particular direct, consulting and expert evidence experience with issues related to the design, implementation and management of wireless networks, competition in mobile services, and other digital technologies.

7. I also have experience providing evidence as an expert witness related to wireless and other digital products and markets. I have provided evidence and testified in numerous proceedings before the United States international Trade Commission

and the United States District Court. In 2011, for example, I prepared an expert report in the U.S. Department of Justice's antitrust challenge to AT&T's proposed acquisition of T-Mobile, a case which would was ultimately settled.

8. In this case, I was asked by counsel for the Commissioner of Competition to prepare a report expressing my opinion, given my knowledge and expertise related to how wireless networks are constructed and operate, on certain questions set out in my report relevant to the proposed acquisition of Shaw Communications Inc. by Rogers Communications Inc., and the proposed divestiture to Videotron

9. I attach as Exhibit "A" to this affidavit my report.

10. I attached as Exhibit "B" to this affidavit my curriculum vitae.

11. I attach as Exhibit "C" to this affidavit my Acknowledgement of Expert Witness.

12. I attach as Exhibit "D" to this affidavit a list of the sources and documents relied upon in preparing my report.

Signed this 22nd day of September, 2022.

Michael A M Davies

Expert Report of Michael A M Davies

23 September 2022

I. INTRODUCTION

A. Case Background

1. The parties, Rogers Communications Inc. ("Rogers") and Shaw Communications Inc. ("Shaw"), propose to merge their relevant businesses.

2. Their preliminary plans for integration were set out in the report of the Brattle Group, titled "Initial Report Assessing Productive Efficiencies Arising from the Proposed Transaction" prepared by Andrew C. Harrington, dated November 8, 2021 ("Brattle Report").[1] I understand further details of those plans will be forthcoming.

3. Rogers and Shaw have proposed a remedy (the "Parties' Proposed Remedy") to address regulatory issues, divesting some elements of the Freedom Mobile network to a third party named Vidéotron.

B. Michael A M Davies

4. A summary of my relevant experience to this case and my CV is provided in the attached statement.

C. My Task for Report in Chief

5. I was asked by counsel for the Commissioner of Competition to prepare a report expressing my opinion, given my knowledge and expertise related to how wireless networks are constructed and operate, on the following questions relevant to the proposed acquisition of Shaw Communications Inc. by Rogers Communications Inc.:

[1] Brattle Report, relevant sections K, L, and O. [redacted]

a) describe the extent to which Shaw Communications Inc. was in a position to roll out 5G wireless services at the time of the announcement of the proposed acquisition in March 2021 and how advanced in that process the company was at that time; and

b) describe the extent to which competitors such as Rogers, Shaw and others in the wireless services market compete with respect to the reliability of their network and the extent to which network outages experienced by Rogers may be relevant to that question.

6. I was also asked by counsel to provide my opinion, based on available information, on the competitive strength of the proposed divested Freedom entity if acquired by Vidéotron as proposed by the respondents, in comparison with the competition afforded by Shaw through its Freedom and Shaw Mobile wireless products. I understand from counsel that the receipt and review of materials on the proposed divestiture is on-going and hence that any conclusions reached may have to be updated when all relevant information has been obtained and provided to me.

II. SUMMARY OF OPINIONS

A. The extent to which Shaw was in a position to roll out 5G wireless at the time of the Rogers-Shaw merger announcement

7. Shaw was well-positioned in March 2021 to launch 5G mobile services. Shaw had declared its 5G network ready for launch and had significant completion of deployments in three major Canadian cities (Toronto, Calgary, Vancouver), planned 5G devices to be ready for use on its network, invested considerable time to communicate product offerings to

retail outlets, and was preparing for the 3500 MHz spectrum auction in June 2021, with associated planned deployments in Q4 2021.[2]

B. The extent to which competitors in the mobile services market compete with respect to the reliability of the network, and the extent to which the network outage experienced by Rogers may be relevant.

8. Competitors such as Rogers, Shaw and others in the mobile services market **do compete to a significant extent** with respect to the reliability of their networks. The reliability of wireless networks is one of the key factors that determine which providers customers choose.

9. Network outages experienced by Rogers are **highly relevant** to the extent to which competitors in the wireless services market such as Rogers, Shaw and others compete with respect to the reliability of their networks. Recent outages made reliability more salient to consumers, and the proposed transaction would have an impact on the reliability of wireless networks.

C. The competitive strength of the proposed Freedom entity, if acquired by Vidéotron, in comparison with the competition by Shaw prior to the announcement of the Rogers-Shaw merger

10. It is my opinion that the competitive strength of the proposed divested Freedom Mobile entity, if acquired by Vidéotron, will be greatly reduced in comparison with the strength of the competition afforded by Shaw through its Freedom Mobile and Shaw Mobile wireless products.

III. OVERVIEW OF MY REPORT

11. The following sections comprise the main body of my opinion.

12. I begin by first providing a brief background on the business of communications services in general, and of the wireless networks and their

[2] SJRB-CCB00220780, at page 10, SJRB-CCB00220780.

evolution, and mobile services which are relevant to the issues which I discuss. Next, I describe the specific characteristics of the communications businesses that Rogers, Shaw, and Vidéotron currently own and operate, focusing on the most relevant areas which are the wireless networks and mobile services.

13. I then set out the steps that the parties propose to take to merge the two businesses and implement the Parties' Proposed Remedy.

14. I then discuss Shaw's ability to roll out 5G wireless services at the time of the announcement of the proposed acquisition in March 2021.

15. I then explain how competitors such as Rogers, Shaw and others in the wireless services market compete with respect to the reliability of their network, and the extent to which network outages experienced by Rogers may be relevant to competition between them.

16. I conclude by examining the competitive strength of the proposed divested wireless services business, relative to the competitive strength of Shaw prior to the proposed merger and divestiture, and by explaining the basis for my opinion.

IV. THE BUSINESS OF COMMUNICATIONS SERVICES, AND OF MOBILE SERVICES AND WIRELESS NETWORKS

A. Overview

17. The three key elements of communications businesses are the network or networks, product development, and customer acquisition and retention.

18. The quality, the cost to operate, and other key characteristics of a wireless or wireline network, determines the products that a communications business can offer to its customers for mobile and fixed services. These products attract customers who subscribe to a specific service or services.

These products can be bundled together across mobile services and fixed services based on the market and customer demand.

19. The business processes of product development, customer acquisition, and customer retention, in conjunction with the mobile and fixed services offered and their characteristics determine the prices for those services; this combination results in the number of customers that the business has, and hence its revenues.

20. The access network provides access to two categories of users: mobile users and fixed location users. These users are primarily serviced by network assets from two types of networks: wireless networks and wireline networks, each of which utilizes a largely separate set of infrastructure.

B. Wireless networks

21. A modern communications network consists of four main categories of assets:

- User Equipment (UE), such as wireline modems and mobile phones;
- The Access Network;
- The Internet Protocol backbone network, and its connections with other networks, such as the Internet; and
- Data centres and cloud infrastructure.[3]

22. A general view of a typical network and associated assets is reflected in Figure 1.

[3] These networks interconnect with the legacy ***Public Switched Telephone Network (PSTN)***, provided primarily by ***Incumbent Local Exchange Carriers (ILEC)*** for telephone calls to conventional landline services; these are now a small portion of telephone calls and a negligible portion of traffic.

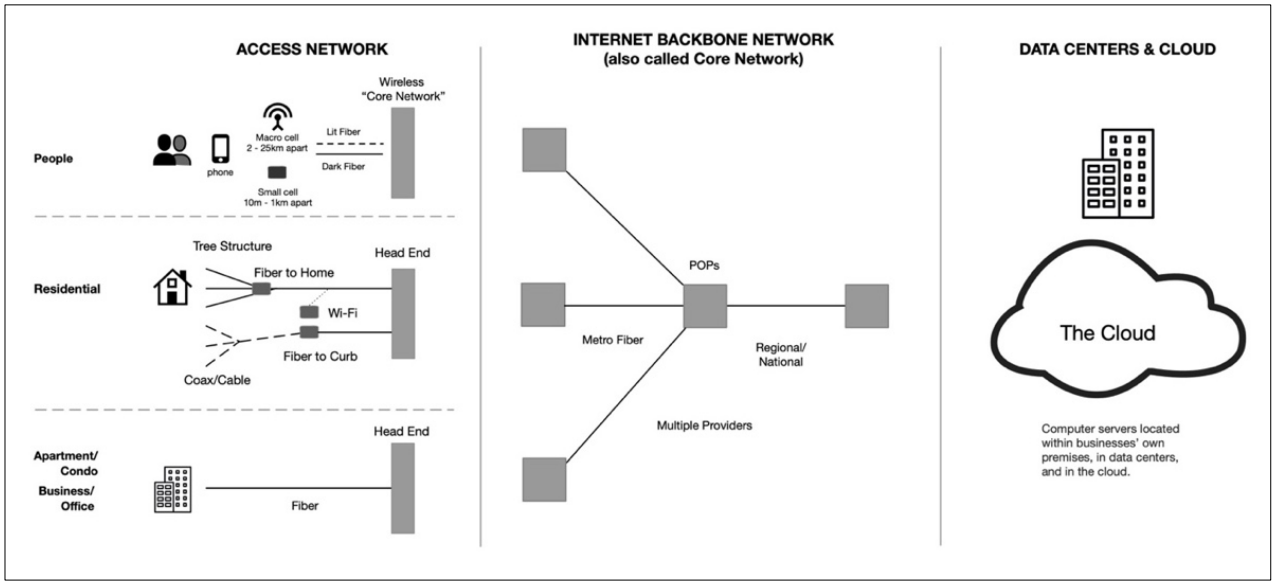

Figure 1 *Wireline and Wireless Infrastructure and their Interrelationship*

23. The cellular wireless network is depicted in the upper left portion of the diagram. It has a set of assets that constitute the ***radio access network*** (RAN) which customers connect to via their mobile phone, in particular when they are away from their home or place of work. The wireless network is also referred to as the cellular network or the mobile network. Wireless services are sold to customers as 3G, 4G/LTE or 5G access, depending on the wireless technology that is deployed.[4]

24. The RAN consists of network equipment called ***macro cell base stations*** (commonly referred to as ***cell phone towers***), typically up to 25 km apart, and small cells (femto-, pico-, and micro-cells) that provide densification of the network and hence additional density of capacity and which can be tens of meters to a few hundred meters apart, as shown in Figure 1.[5] These

[4] They may also be provided to provide some fixed services.

[5] https://www.litepoint.com/5g-small-cell/. Litepoint Is a wireless test company. Subsidiary of Teradyne, American automatic test equipment (ATE) designer and manufacturer (total equity of USD$2.56B).

are usually attached to various types of physical infrastructure such as buildings, rooftops, street furniture or towers.

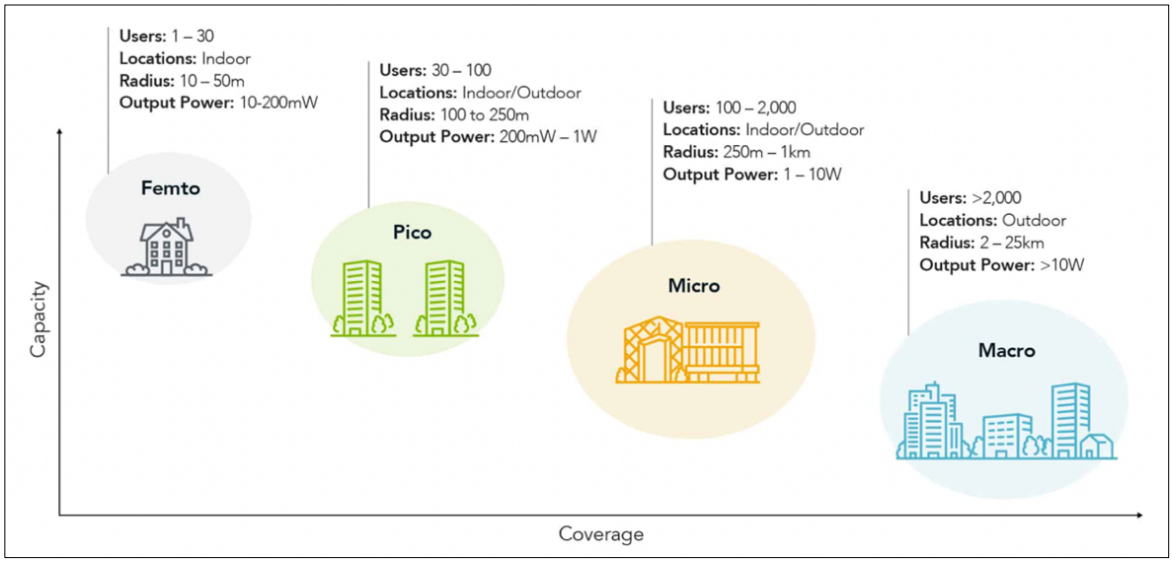

Figure 2 *Cell sizes: macros are optimized for coverage, and small cells are optimized for capacity.*

C. The evolution of wireless networks

25. I lay out the background about why wireless networks evolve through different generations and what value the successive generations of network provide. Each generation typically provides greater capacity (typically through increased spectral density), faster throughput speeds, better quality/reliability and lower unit costs, which in turn support or enable broader use cases around mobile services and data transmission. They are important both because of their objective differences, and because of the perception of these generations of technology that customers may have.

26. Mobile networks evolve to a new generation of technology approximately every decade, with each generation offering new capabilities, such as increased capacity, faster throughput speeds, more efficient use of

spectrum, and higher network quality and reliability. All of these enable more consumer mobility and availability of more connected devices, as shown in Figure 3.

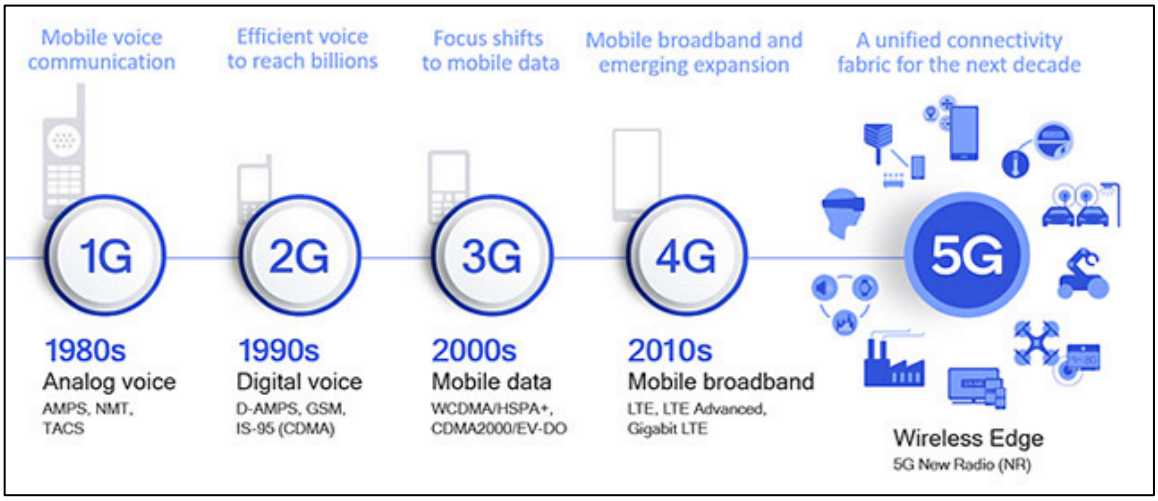

Figure 3 *Mobile technology standards evolution*[6]

27. The significant differences with each generation of wireless technologies can be characterized as follows:[7]

- **1G:** Introduced mobile voice telephony services via analog technology available to general public.
- **2G:** Introduced a shift from analog to digital communications to deliver voice telephony services, along with messaging technologies such as SMS and MMS, and low speed data communications services. The shift to digital communications was a significant shift

[6] https://www.qualcomm.com/news/onq/2019/09/5g-launches-globally-what-comes-next.

[7] 5G NR: The Next Generation Wireless Access Technology, 2018, Chapter 1 (pages 1-2), Erik Dahlman, Stefan Parkvall, Johan Sköld.

The speeds referred to here are theoretical download speeds that are specified in the 3GPP standards as achievable in ideal and/or lab conditions and are an indication to the ability of the technology innovation. In real world deployments download speeds, both peak and average can be significantly lower depending on deployment architecture, environment interference and number of users.

that enabled cheaper electronics that enabled an evolution, and proliferation, of smaller and cheaper mobile devices. In addition, digital-based communications provides reliability over-the-air for end-to-end communication due to its enhanced resilience to signal noise and interference.

- **3G:** Introduced higher speed mobile broadband and Internet access with throughput up to 42 Mbps.[8] In addition, 3G brought a significant shift in spectrum handling, as previous wireless networks had been designed for using fixed allocations of paired spectrum bands (one frequency used for the uplink and a different for the downlink), whereas 3G introduced technologies that could use unpaired spectrum in which uplink and downlink share the same frequency, so-called time-division duplexing.
- **4G:** Introduced further improvements in mobile broadband, and significant increases in potential peak data throughput speeds, of up to 1,000 Mbps[9] under certain conditions. This was achieved by utilizing wider transmission bandwidths and additional signal paths, enabled by advancements in digital transmission mechanisms and in more complex and sophisticated antenna technologies. Finally, 4G introduced the use of paired and unpaired spectrum in a single wireless technology.
- **5G:** The current milestone in the evolution of wireless networks introduces very high throughput, up to a potential peak of 20,000

[8] 4G: LTE/LTE-Advanced for Mobile Broadband 2011, Chapter 1 (pages 1-2), Erik Dahlman, Stefan Parkvall, Johan Sköld, Chapter 1.

[9] 4G: LTE/LTE-Advanced for Mobile Broadband 2011, Chapter 1 (pages 1-2), Erik Dahlman, Stefan Parkvall, Johan Sköld, Chapter 1.

Mbps.[10] Critically, it also provides higher spectral efficiency and has enabled the effective use of higher frequency bands where there is abundant spectrum available, so-called mmWave spectrum. In additional, it provides significant improvements for low latency and reliability, which enables the connected world through network support for use cases in industry such "automotive, logistics, public safety, media, and manufacturing."[11]

- **Beyond 5G:** Cellular networks are in a constant state of design and development with the next generation technology building upon the previous generation and leveraging new learnings and innovations. The requirements for the next generation of cellular networks are established by the United Nations International Telecommunication Union (ITU), an intergovernmental panel established to provide requirements for communication systems based on the vision of future needs of society.[12] Research is already underway for exploring the next major enhancements to 5G and features for 6G evolution [see Figure 4].[13]

[10] 5G NR: The Next Generation Wireless Access Technology, 2018, Chapter 1 (pages 1-2), Erik Dahlman, Stefan Parkvall, Johan Sköld, page 11.

[11] https://www.ericsson.com/en/reports-and-papers/white-papers/5g-wireless-access-an-overview.

[12] The standards process for cellular communications systems is based on two major organizations: 1) the ITU, an intergovernmental panel tasked with establishing the requirements for the next generation of networks, and 2) 3GPP, an engineering organization that develops the technical specifications of the next generation cellular networks that satisfy the ITU requirements. These specifications are then used to produce standards in the seven regional standards bodies around the world. https://www.itu.int/en/about/Pages/default.aspx.

https://www.qualcomm.com/news/onq/2017/08/understanding-3gpp-starting-basics.

[13] 6G vision: An ultra-flexible perspective, ITU Journal on Future and Evolving Technologies, Volume 1 (2020), Issue 1, 18 December 2020 https://www.itu.int/dms_pub/itu-s/opb/itujnl/S-ITUJNL-JFETS.V1I1-9-2020-PDF-E.pdf.

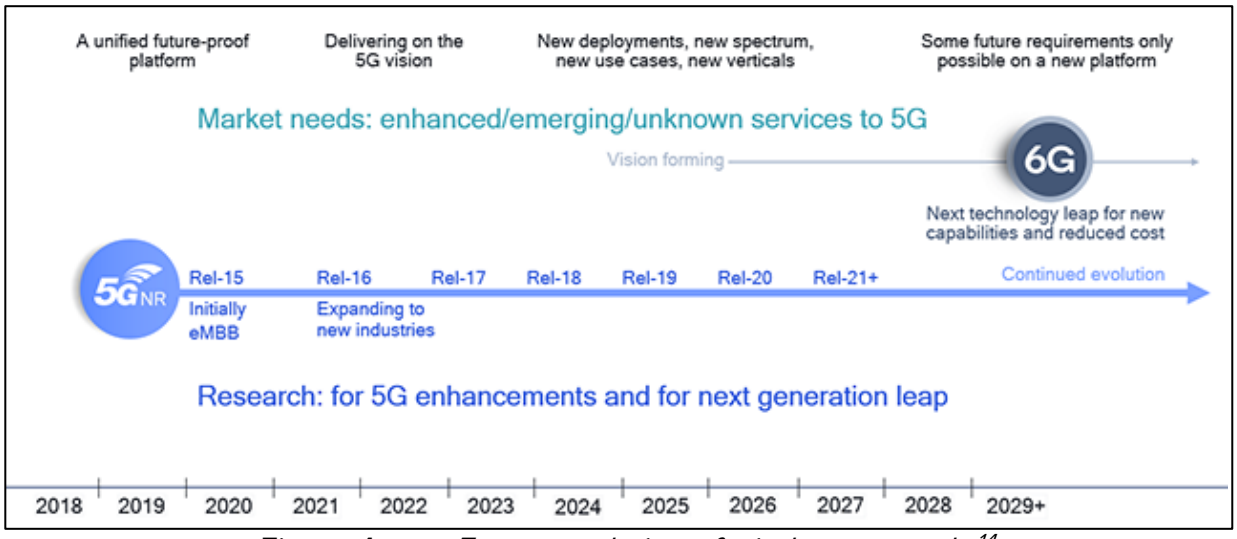

Figure 4 *Future evolution of wireless networks*[14]

28. Each step along the wireless network evolution path typically involves a significant investment by operators of cellular wireless networks; this is and has been business as usual for many years, decades in the case of longer-established network operators. They may need to purchase new spectrum to deploy services, upgrade the core network to be able to handle the new technology, and deploy new radios throughout the network. Mobile service providers often seek to be the first to deploy the latest generation of technology, so they can market their capabilities to entice customers to choose their mobile services and switch to their wireless network.

D. Wireline networks

29. The wireline network or fixed network is provided by a set of assets connected by optical fibre, cable (or coax), and copper. This is marketed to residential customers as fixed services, including cable services, Internet services, or fibre services and provides connectivity to the access network.

[14] https://www.qualcomm.com/news/onq/2019/09/5g-launches-globally-what-comes-next.

30. The wireline access network provides services to residential and enterprise customers. For residential services the access network generally consists of fibre infrastructure to a local ***Fibre Distribution Hub (FDH)*** then to the home via coax or optical fibre. This is illustrated in the middle of the left-hand side of Figure 1.[15]

31. While much of the infrastructure is distinct, the wireless network typically possesses some critical dependencies on the wireline infrastructure.

- Use of metro fibre or other wireline fibre links for macro cell and small cell backhaul.
- The Internet backbone,[16] sometimes referred to as the Core Network, or Internet Core Network, is the connection between large urban areas via metro fibre and regional/national fibre through interchange "Points of Presence" (POPs).[17]
- Wi-Fi access points (residential or public Wi-Fi hotspots) may be used by wireless devices, such as mobile phones, to connect to the Internet; these Wi-Fi access points are themselves typically connected to the Internet backbone via residential coax/cable or enterprise metro fibre.

32. The data centre and cloud infrastructure consist of computer servers hosted in different locations depending on the needs of the business. Some are located within businesses' own premises, others are in third-

[15] Enterprises will typically have full fibre connectivity to the business; this is illustrated in the lower left corner of Figure 1.

[16] Handbook of Telecommunications Economics, Volume 2: Technology Evolution and the Internet, Volume 2, 2005, Chapter 9.

[17] Note that this is different than the "core network" that is part of the RAN in the wireless access network described above and in Figure 1.

party data centres that provide shared facilities or services for storing and processing data, while others are hyperscale cloud services such as Amazon, Microsoft, and Google. The distributed nature of cloud facilities allows cloud service providers to have multiple options for connecting to the Internet backbone network.

E. Mobile services

33. Product development for mobile includes selecting the devices made available to customers, what services are available (based on what generation technology is available) and how they are packaged (such as how much data / month at unlimited speeds, roaming to other partners within Canada, or the inclusion of roaming or calls to other countries). It also includes defining what other services are bundled together, such as bundling fixed services with the wireless services.

34. Conversely (and critically in this context) **wireless services may be bundled together with fixed services**. The difference in this case, is which service, fixed or mobile, comes first in being purchased, and the relative margins that come from those services.

35. Customer preference may vary based on their individual circumstances. For example, a customer who has good wireless service that meets their requirements and that is available from several networks may decide primarily on price, while a customer who has good service (based on wireless signal reception) from one network and none from others may choose primarily on network quality. Similarly, heavy data users may choose based on the availability and characteristics of an ‘unlimited’ data bundle, or customers may choose based on the quality of the network, that is, its speed and reliability.

36. Customer acquisition consists of a set of (marketing) activities and processes required to sign up a new user. This includes engaging with a consumer who is in the process of selecting a device, trading in an old device, transferring service from a previous provider if any, porting a previous number if desired, selecting a new number if not porting a number, credit checks, payments, online account setup and so forth.

37. Customer acquisition typically takes place through several channels: owned stores (for example, a Shaw store or a Freedom Mobile store); retail partners (for example, Best Buy or Wal-Mart); online using the Internet (using for example, shaw.ca or freedommobile.ca); and other channels such as call centers or direct mail. Physical retail stores, whether owned by the business or by partners, have long been and remain a key distribution channel for these services.[18]

38. Customer retention depends on several factors. Dissatisfaction with network quality can be a main driver for customer ***churn***, as well as better offers from competitors at different price points, or with different services included. Customer care activities can help with retention, as can bundling with other services that can make it less compelling for customers to switch amongst providers overall.

[18] Note that store closures resulting from the Covid pandemic significantly slowed growth: Rogers Communications Inc. April 22, 2020 Earnings Call Transcript. "As a result of the market essentially being frozen with no or very limited growth in March. We posted net postpaid subscriber losses of 6,000. This was an abnormal result and due solely to the COVID-related decision to substantially wind down competitive offer activities in the final weeks or the quarter." "As you would expect, we do not anticipate the subscriber market to reactivate in any material way until the public is allowed to safely return to malls and our stores. While the market was previously growing at approximately 4% on an annual basis, this lack of subscriber growth rate will impact our revenue growth."

F. Fixed services

39. Product development for fixed services includes selecting which modems and routers are made available to customers, what services are available and how they are packaged (such as how much what speed tiers are available). It also includes defining what other services are bundled together, such as bundling TV with Internet or with the wireless subscription.

40. Critically bundling additional services, such as wireless services, can have an impact on customers' propensity to churn to other providers of fixed services, hence customer loyalty and tenure. As the costs of customer acquisition and retention are significant, these increases in tenure can have a significant positive impact on customer lifetime value, and the overall profitability of the business.

41. Customer preference may vary based on their individual circumstances. There are a limited set of options based on geography, as a fixed provider must have built out a network in the area of a residence for it to be available. For example, a customer who works from home may choose primarily on the basis of speed tiers or quality, while another might choose primarily on the basis of price, and a third might choose based on specific TV channels included in a bundle.

42. Customer acquisition consists of a set of (marketing) activities and processes required to sign up a new user. This includes engaging with a consumer who may be open to considering new service, especially if they have moved, or enticing them to switch to a new service provider with a

better product offering. This includes everything from setting up an account to scheduling a technician to come to the location to install the service.

43. Customer acquisition typically takes place through owned stores (for example, a Shaw store); online using the Internet (using for example, Shaw.ca); and other channels such as call centers.

44. Customer retention depends on several factors, in ways that are broadly similar to mobile services, as described above.

G. The basis for competition in mobile services, and fixed services

1. Competition in the Canadian market

45. In a market such as Canada that has achieved a high penetration (90%+) of both fixed[19] and mobile services,[20] there are few new customers entering the market. Those entrants to the market are either new immigrants to the country, or young people acquiring their first phone or first signing up for fixed broadband services. As a result, most competition is among people who already have either or both fixed and mobile services.

46. The competitive dynamic is very different based on whether operators are positioned as incumbents or challengers. An incumbent provider, who already has the subscriber, is focused on retaining or upgrading those subscribers, to maximize their customer lifetime value (CLV), which is the value that customer generates during their tenure as a customer.

[19] https://crtc.gc.ca/eng/publications/reports/PolicyMonitoring/ban.htm.

[20] CRTC, Communication Marketing Reports, Data - Retail Mobile, "Mobile subscriber penetration rates, as a percent of total population, by province/territory (%), 2015-2020", Last modified December 2021.

47. Challengers, seeking to get would-be customers to switch providers, face a more difficult challenge; they need to convince a customer that already has one or more (in the case of a bundle) services, to switch.

48. First, switching volumes are low, as only a small percentage of consumers reconsider each year and leave their provider, known as churn. For example, Shaw's postpaid monthly average wireless churn in the second quarter of 2021 was 1.25%.[21] [redacted][22] In another example, [redacted][23] The bundles make it easier for an incumbent to keep customers, and leave fewer customers available for competitors to target. In this case, the incumbent just needs to keep their customer satisfied, and look for opportunities to better retain them, and to upgrade them to additional services. This is exactly what Shaw did, adding wireless to existing cable customers. [redacted]

49. The new Freedom Mobile entity will be in a very different situation than an incumbent fixed services provider such as Shaw. To expand its customer

[21] https://www.globenewswire.com/en/news-release/2021/04/14/2210369/0/en/Shaw-Announces-Second-Quarter-and-Year-to-Date-Fiscal-2021-Results.html.

[22] VID00296440, Jul22 tab.

[23] ROG00841098, page 16.

base and grow its business, it needs to convince customers with existing mobile and fixed services offerings that they should switch, rather than just cross-sell an additional service as was the case with Shaw.

50. Shaw was able to offer highly discounted mobile services to a portion of their fixed services customers. [redacted][24] [redacted][5]

2. How service providers generally compete in the marketplace:

51. Several factors determine the competitiveness of a wireless product offering in the market. These include service availability, determined by network coverage; the services in the offering, including bundles; price; and network quality, that is its speed and its reliability.

52. Coverage is if the service is available where the customer needs it to work. This includes both at a market level, such as if Freedom Mobile is available to purchase in British Columbia, and at the granular location level, such as at the consumers home or workplace, wherever they live, work or play.

[24] ROG00798921, slide 10.

[25] It is our understanding that some resellers offer IP TV as well, which is not an exact substitute for Cable TV from both a product feature and margin perspective.

53. Bundling involves combining multiple services together to form a more compelling offer overall. Shaw, for example, offered bundled services combining fixed Internet, TV and mobile. Carriers see significant benefits to bundles, as they tend to decrease the chance that a customer leaves, and as a result increases their tenure as a customer. It is also significantly easier to add an additional service to an existing customer, than it is to create a new relationship with a customer who must be convinced to switch.

54. Price is then a competitive lever that must be considered in the context of the above factors. If all the other factors are equivalent, a lower price might win. But customers choose on all those factors considering the value for the money spent, as it may be worth more to a consumer for faster speeds or better coverage. In addition, price on one service may be artificially lowered because of the overall value the carrier sees across the bundled relationship. Shaw for example was able to offer $0 (no data) add-on mobile to cable customers as it decreased the risk of those customers switching from a high value fixed plan.

55. Speed is how fast the network is and is a function of the technology utilized (4G or 5G), the amount of spectrum that is available, and the density of the network. A network with more spectrum and more cell sites using 5G will be able to provide more speed to an individual and in aggregate than a network with less of each. There are trade-offs, however. A carrier providing 5G through radios using spectrum in a lower frequency band (such as 600MHz) where the amount of available spectrum is more limited, could possibly have slower speeds than a carrier providing 4G through radios using spectrum in a higher frequency band (such as 2100 MHz or higher) where more spectrum is available.

56. Reliability is a measure of how well the network works as expected. This can be measured in granular metrics, such as number of dropped calls per 100. It can also be a measure of the overall network reliability, such as the frequency and size of network outages impacting large numbers of people.

V. SHAW'S, ROGERS', AND VIDÉOTRON'S COMMUNICATIONS BUSINESS, AND THEIR WIRELESS NETWORKS AND MOBILE SERVICES

A. Overview of Shaw's, Rogers', and Vidéotron's communication networks and businesses

57. Shaw's communication networks and businesses are comprised of wireless networks for mobile services in Alberta and British Columbia (Shaw), and those provinces plus Ontario (Freedom), and wireline networks and fixed Internet services serving retail and business customers in Alberta, British Columbia, Saskatchewan, Manitoba, and Northern Ontario.[26]

58. Shaw's total revenues in 2021 were $5.5BN, of which $3.7BN comes from its consumer wireline business.[27]

59. Rogers' communication networks and businesses are comprised of wireless networks providing mobile services nationally, and wireline networks and fixed Internet services serving retail and business customers in Ontario, New Brunswick and Newfoundland.[28]

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[26] Shaw's coverage map (https://www.shawmobile.ca/en-CA/network-coverage). Shaw, 2021 Annual Report (October 29, 2021) P.7 - Wireline in British Columbia, Alberta, Saskatchewan, Manitoba, and northern Ontario. Shaw Mobile currently operates in British Columbia and Alberta. Freedom Mobile current operates in Ontario. British Columbia and Alberta.

[27] Shaw's 2021 Annual Report. https://www.globenewswire.com/news-release/2021/10/29/2323626/0/en/Shaw-Announces-Fourth-Quarter-and-Full-Year-Fiscal-2021-Results.html.

[28] [redacted]

60. Rogers' total revenues are $14.6BN, of which $3.9BN comes from its wireline networks.[29]

61. The combined businesses of Rogers and Shaw would comprise wireless networks providing mobile services nationwide and distinct wireline networks providing fixed services in Alberta, British Columbia, Saskatchewan, Manitoba, Northwestern Ontario (via erstwhile Shaw fixed network), and in Ontario, Newfoundland and New Brunswick (via erstwhile Rogers fixed network).

62. Shaw provides mobile and fixed communications services using its wireless and wireline networks across Canada through the following brands:

- Freedom Mobile: Provides mobility services in Alberta and British Columbia and Ontario through ***LTE***. It provides Wi-Fi wireless services mostly in Alberta and British Columbia, but also Saskatchewan, Manitoba, and Ontario;[30]
- Shaw Mobile: Connects individuals through LTE and Wi-Fi wireless services in Alberta and British Columbia;
- Shaw: Provides fixed access for residential customers for Internet and TV in Alberta, British Columbia, Saskatchewan and Manitoba, and Northwestern Ontario. It also provides Wi-Fi services in Alberta and British Columbia, Saskatchewan, Manitoba and Ontario;
- Shaw Direct: Provides entertainment via licensed satellite video services across Canada; and

[29] Rogers Earnings Release Q4 2021.

[30] Shaw, 2021 Annual Report (October 29, 2021) page 8, Shaw's Go Wi-Fi coverage map (https://www.shaw.ca/internet/wifi/find-a-wifi-hotspot).

- Shaw for Business: Provides businesses with enterprise-class services for business Internet, phone, security, and Wi-Fi.

63. I focus on Shaw's wireline and wireless businesses, namely Shaw, Shaw Mobile, and Freedom Mobile as these brands have deep interrelationships when it comes to the underlying network infrastructure that is used to provide these services.

64. Vidéotron is a telecommunications company that provides mobile and fixed services within Canada. It is a subsidiary of the Canadian company Quebecor Media, Inc. (owned by Quebecor, Inc.), [redacted][31]

65. Vidéotron provides fixed services (internet, telephony and cable television) in Quebec and mobile services in Quebec and Eastern Ontario.[32]

66. In 2018 Vidéotron launched the Fizz brand to provide mobile and Internet services to help growth with Generation Z and Millennials.[33] Vidéotron and Fizz brands provide consumers with mobile services, mobile high-speed Internet access, and global voice and data roaming.[34]

B. Shaw's network business

1. Shaw's wireless network

67. The Shaw wireless network has approximately [redacted] cell sites throughout Alberta, British Columbia, and Ontario utilizing 3G and LTE (4G) wireless

[31] SJRB-CCB00884705, page 13.

[32] [redacted]

[33] United States Securities and Exchange Commission, Form 20-F VIDEOTRON LTD., VL_20F_Q42021.pdf, page 25.

[34] [redacted]

technologies.[35] [redacted]

68. The information provided indicates that prior to this proposed merger (and divestiture) Shaw had in place a robust roadmap for deploying 5G wireless technology. This roadmap included initial rollouts in 600 MHz to start in early FY2021 and rollouts in 3500 MHz spectrum had it acquired, as it had planned, additional spectrum.[36]

69. Shaw planned to roll out 5G networks [redacted]

"[redacted]

[redacted]

[35] Specification 28 - Cell Site & Spectrum Data UPDATED (Sept. 23).xlsx.

SJRB-CCB00208891, [redacted]

[36] Shaw. SJRB-CCB00223003 (1).pptx, page 7, 11, 20, 23-26; also Shaw 2020 Annual Report p 20.

[37] Rogers, ROG00243956.pdf, slide 6.

[38] Document: SJRB-CCB00786205, at Page 170.
[39] Document: SJRB-CCB00786205, at Page 172.

[redacted]

70. [redacted][42]

71. [redacted][3] [redacted][4] However, if the proposed merger and divestiture is terminated Shaw would have access to the termination fee of $1.2B,[45] which could be used to attempt to purchase or lease suitable spectrum, provided such spectrum was available for purchase.

72. As a result of this pending transaction Shaw was not, however, able to bid on mid-band 3500 MHz 5G spectrum because at the time of the relevant

[40] Document: SJRB-CCB00786205 at Page 172.

[41] Document: SJRB-CCB00786205, at Page 173.

[42] Document: SJRB-CCB00786205, at Page 174.

[43] The Brattle Report, paras 227 – 228.

[44] Brattle Schedule 2.1.7; [redacted]

[45] RBCH00002_000000453.pdf page 80 (article 8.2(e)).

auction it was a related party with respect to Rogers, which was also pursuing additional mid-band spectrum.[46]

2. Shaw's mobile services

73. Shaw provides mobile services under two brands:

- Freedom Mobile: Originally acquired as Wind Mobile ("Wind")[47] to provide Shaw with a wireless network which it could use to provide mobile services, and from which it formed the Freedom Mobile brand; and
- Shaw Mobile: A brand launched in 2020[48] with the intent to compete with Premium brands of BCE, Inc. ("Bell"), Rogers, and TELUS Corporation Inc ("Telus")[49]

74. Shaw Mobile currently provides three bundles of services that have four levels of pricing based on the consumer's tier of internet service[50], all of which include access to 450,000+ Shaw Wi-Fi Hotspots, voicemail, incoming calls, and Unlimited Canada-wide telephone calls and Unlimited Global text messaging.[51]

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[46] SJRB-CCB00162831 pages 7-8; "Building a Brighter Future for Canadians", (April 14, 2021) page73, Shaw, 2021 Annual Report (October 29, 2021), page 46, RBCH00002_000000453 - "Arrangement Agreement" Article 4.1(f) (March 13, 2021).

"Each of the Company and the Purchaser acknowledge and confirm that in respect or their communications they have at all times complied with, and will continue to comply with, ISED Canada's policy on prohibition of collusion and other communication rules applicable to spectrum license auctions'.

[47] ""Shaw Closes WIND Acquisition" March 01, 2016, https://newsroom.shaw.ca/corporate/newsroom/article/materialDetail.aspx?MaterialID=6442451782.

[48] https://www.shawmobile.ca/docs/default-source/general/terms_of_service.pdf Appendix A: Terms of Service, July 30, 2020.

[49] SJRB-CCB00618778 (October 2019) Slide 8 - Guiding Principles of a Shaw Branded Wireless.

[50] SJRB-CCB00829142.

[51] https://shop.shawmobile.ca/en-CA/plans.

- 'By the Gig' for the light data user which includes Unlimited Canada-wide Calling + Global Text and enables the user to Purchase Rollover Data by the Gig for $10/GB
- A plan that includes 25GB Fast LTE Data (Shaw network) and 2GB LTE Data (roaming onto other networks) and Unlimited Canada-wide Calling + Global Text.
- A plan that adds US and Mexico calling and roaming to the above.

75. Shaw Mobile currently prices its mobile services product offering that bundle these with fixed services at a substantial discount to other facilities-based providers on the market, with unlimited mobile service plans at $25 / month (when bundled with fixed services) vs. $85 / month for competitors.[52] The level of discount also depends on the tier of Internet speed that is purchased.

76. As of November 16, 2021, these tiers are:

	By the GB	25 GB	25 GB + US / Canada roaming
Fibre+ Gig 1.5	$0	$25	$35
Fibre+ Gig	$5	$40	$50
Other internet	$10	$45	$55
No internet	$15	$85	$95

Table 1 Pricing Tiers for Shaw Mobile Based on Internet Speed Tier

[52] https://shop.shawmobile.ca/en-CA/plans .

https://www.telus.com/en/mobility/plans.

https://www.rogers.com/plans.

77. Freedom Mobile has an equivalent 25GB / month plan that is priced at $55 / month (including a promotional discount, down from regular $60), or if you bring your own phone, $50 /month.[53] It has other price points as well.

78. [redacted]

[redacted]

Figure 5 [redacted][5]

[53] https://www.freedommobile.ca/en-CA/plans; accessed on 20 September, 2022.

[54] SJRB-CCB00880579, at slide24; SJRB-CCB00818578, at page 31.

[55] SJRB-CCB00880579, at slide24.

79. The mobile services that Freedom Mobile and Shaw Mobile provide share the same characteristics in terms of their coverage, capacity and quality, but differ greatly in terms of their packaging and their pricing. Both leverage the same mobile network and Wi-Fi hotspots and offer essentially the same devices. The key difference is in the bundling of mobile services with fixed services, in the greatly discounted pricing relative to stand-alone mobile services, and in the branding; these differences drove the growth that was realized by Shaw Mobile.

80. The Shaw wireless business enjoys the advantage of access to Shaw's existing base of [redacted] fixed services customers in its wireless footprint,[56] as it is easier to cross-sell an existing customer an additional service than it is to bring in a new customer with no existing relationship. For example, Shaw's website, Shaw.ca, is a distribution channel with visits from existing Shaw customers or those shopping for fixed services on a regular basis. SimilarWeb reports 11.6 million visits to Shaw.ca in January 2022.[57]

81. [redacted][59]

[56] SJRB-CCB00682056 – Project Ellipse: Wireline & Wireless CBM Journeys, at page 8.

[57] https://www.similarweb.com/website/shaw.ca/#overview, visited 3/10/2022.

In my opinion this is an excellent source for comparing the order of magnitude of web traffic, as it is used by more than half of Fortune 100 companies and all of the big 6 marketing agencies. In addition Endeavour Partners uses it for its own business. https://www.similarweb.com/corp/clients/.

[58] SJRB-CCB00824667.

[59] REAB00003_000000490, at slide 49.

82. Shaw's fixed services business gains economic benefit from the bundle because it increases the number of customers that it has and increases the customer lifetime value of each of those customers across all the services that it provides, because it can offer this bundle to acquire new customers, and because in aids in retaining current customers due to lower churn.[60] Bundling has been shown to reduce churn overall.[61] [redacted][62][63]

[60] Shaw states in its 1Q 2020 report, page 2, "Consumer Wireline RGU4 losses of approximately 76,200 improved over the prior year period, led by positive Internet additions as customers continue to bundle their Internet and Wireless service together." It also states, "Internet subscriber growth, driven by Shaw Mobile bundle" and "Internet churn lower than historical, reflecting favorable impacts of Shaw Mobile and COVID". Also, "Internet pricing power is expected to remain strong with our focus on Shaw Mobile bundling helping drive sustainable ARPU increases and churn reduction over the forecasted period".

[61] ROG00119303 at page 40; ROG00251667 at page 2; ROG00127766 at page 24.

[62] REAB00003_000000490, at page 53.

[63] REAB00003_000000490, at page 54.

Figure 6 [redacted][4]

83. Shaw mobile currently offers 28 devices from Apple, Samsung, Google, Motorola, Alcatel and ZTE.[65] Freedom Mobile offers a similar assortment, plus Apple watches and tablets from ZTE and Samsung.[66]

84. The Shaw brand is well established since Shaw went public in 1972 and renamed to Shaw Cablesystems Ltd.in 1984[67] and is supported by

[64] REAB00003_000000490, at page 51.

[65] https://shop.shawmobile.ca/en-CA/devices.

[66] https://shop.freedommobile.ca/en-CA/.

[67] Shaw's Annual information form, Jan 13, 1999 “"Shaw Communications Inc. ("Shaw") is a Canadian-controlled corporation incorporated under the laws of the Province of Alberta on December 9, 1966, and became a public company on November 14. 1972. Its corporate name was changed from Capital Cable TV Ltd. to Shaw Cablesystems Ltd. on February 29, 1984".

substantial advertising. In 2020, Shaw spent [redacted] in marketing costs on the wireline business[68] and approximately [redacted] in marketing costs on the wireless business, both promoting the Shaw brand.[69,70]

85. Shaw's brand shows much higher unaided awareness, at 86%, versus Freedom at only 21%. Shaw also rates much more highly than Freedom on brand attributes such as "Has modern technology that makes life easier" (52% vs. 20%) and "Has products and services that work as expected" (50% vs 18%).[71]

86. In 2020 Shaw's physical retail stores accounted for [redacted][72]

87. Freedom Mobile has no substantial online sales channel.[73]

88. Freedom Mobile has physical distribution in [redacted] locations and Shaw Mobile has physical distribution in [redacted] locations; this notwithstanding, [redacted][4]

3. Shaw's wireline network

89. Shaw's wireline network provides services to retail customers (i.e. consumers in households) and to businesses. In addition, it provides

[68] Shaw, "SJRB-CCB00700294.xlsx.".
[69] Shaw [redacted]
[70] Brattle 284; [redacted] Brattle 304 [redacted]
[71] SJRB-CCB00419797, slide 11.
[72] SJRB-CCB00468970 [redacted]
[73] SP_000128.PDF page 14 [redacted]
[74] Shaw Retail.xlsx; [redacted]

wholesale wireline services to business customers to access other communications networks, including its own wireless networks.

90. Shaw has two cross-North America fibre long haul routes, covering over 12,000km. It has local fibre where it provides service primarily in Alberta and British Columbia, with smaller systems in Saskatchewan, Manitoba, and Northern Ontario.[75]

91. It has approximately a hundred thousand public Wi-Fi deployments[76] throughout its service territory, in Alberta and British Columbia, Saskatchewan, Manitoba and Ontario and it also has almost 1M home hotspots that can also provide Wi-Fi to Shaw subscribers within range. [77]

92. Shaw also utilizes Wi-Fi hotspots throughout its customer footprint to help with mobile coverage and capacity; these serve to both reduce its costs and have been an important element in its product offering. Shaw has also identified the need to incorporate more small cell deployments as a part of its 5G strategy.[78]

[75] Shaw's coverage map (https://www.shawmobile.ca/en-CA/network-coverage). Shaw, 2021 Annual Report (October 29, 2021) P.7 - Wireline in British Columbia, Alberta, Saskatchewan, Manitoba, and northern Ontario.

[76] RFI00000245, slide 25.

[77] SJRB-CCB00884607.

[78] Shaw, SJRB-CCB00223517, slide 10; SJRB-CCB00023005.pptx, slide 8.

4. Shaw's fixed services

93. Shaw's wireline networks and fixed Internet services serve retail and business customers in Alberta, British Columbia, Saskatchewan, Manitoba, and Northern Ontario.[79]

94. Shaw has around 5M fixed wireless connections across video, Internet and phone, businesses and consumers.[80]

5. The interrelationship between Shaw's wireless network business and its wireline network business

95. From the information provided, the interrelationship between Shaw's wireless network and wireline network lies in three main areas:

1) Small cells;

2) Connectivity for the RAN – which includes fibre for small cells; and

3) Capacity at an appropriate cost provided by Wi-Fi hotspots in the form of Wi-Fi offload.

a. Small cells

96. Small cells are low-powered cellular radios which provide wireless services to customers in the RAN that have a range of a few hundred meters and operate within wireless providers' licensed frequency bands. Small cell deployments are different than that of Wi-Fi as small cells are a part of the regular capacity planning of a carrier and have, in general, more

[79] Shaw's coverage map (https://www.shawmobile.ca/en-CA/network-coverage). Shaw, 2021 Annual Report (October 29, 2021) P.7 - Wireline in British Columbia, Alberta, Saskatchewan, Manitoba, and northern Ontario.

[80] Shaw, 2021 Annual Report (October 29, 2021) page 11.

requirements around installation, antennae, and backhaul due to their higher capacity.

97. Small cells are used to provide “densification” of the wireless network -- which is the process of deploying more cells to improve network coverage and capacity. Small cells provide a lower cost for deployment, as they can be installed indoors and on existing outdoor fixtures, eliminating the need for full macro cell site build out. Small cells are a critical component of the evolution of wireless to be able to handle future demand. Small cells provide the most important factor in wireless system capacity growth, increasing wireless infrastructure nodes to provide better coverage and capacity at lower costs than macro cells.[81]

b. Connectivity for the RAN (backhaul)

98. Shaw’s wireless networks rely on Shaw’s wireline networks to provide backhaul connectivity to the wireless core network, which in turn provides connectivity to the Internet backbone network and connects long distance regions through intermediary Points of Presence (PoPs).

99. Wireless access points, whether Wi-Fi or cellular wireless, are physical units of hardware and software that have transmit and receive radios that provide communications over wireless spectrum to mobile devices. These units of equipment require connection to the wireless core network. These backhaul connections provide connectivity paths through to the existing Shaw wireline (fixed) network through fibre or microwave.

100. Shaw’s wireless network utilizes [redacted] providers for fibre backhaul through leased line agreements with a monthly cost of [redacted] The two largest

[81] [redacted]

[redacted][82]

101. Shaw's wireline network provides backhaul for macro cells and small cells via Microwave Fixed Wireless Access ("FWA") or fibre connectivity. [redacted][3][redacted][84][redacted][85]

102. [redacted][86]

[82] Shaw, SJRB-CCB00208891, slide 6.
[83] Shaw, SJRB-CCB00211493, slide 4.
[84] Ibid., slide 7.
[85] Shaw, SJRB-CCB00211493.pptx, slide 6.
[86] Shaw, SJRB-CCB00092221, slide 5 and SJRB-CCB00231597, slide 3.

103. The importance of fibre to any new wireless business entity, particularly in a 5G environment is demonstrated by this quote from Rogers: [redacted]

c. Wi-Fi Hotspots and Wi-Fi Offload

104. Shaw has a large footprint of many Wi-Fi hotspots. These hotspots fall into two categories: Home Hotspots and Public Wi-Fi hotspots.[88] ***Shaw Go*** Wi-Fi is available in British Columbia, Alberta, Saskatchewan, Manitoba, and Ontario.[89]

105. The Home Hotspots, of which Shaw was expecting to reach more than 1 million by early fiscal year 2022 [90], are residential Wi-Fi access points that Shaw has configured in a split configuration. The residential user has their private home Wi-Fi network, and the split is another broadcasted Wi-Fi network from same access point that is available to all Shaw and Freedom customers.

[87] ROG00300981.pdf, page 2.

[88] Shaw, SJRB-CCB00163860, at slide 6; Shaw Annual Report 2021, page 20.

[89] https://www.shaw.ca/internet/wifi/find-a-wifi-hotspot.

[90] SJRB-CCB00884607.

106. The Public Wi-Fi hotspots, of which there are more than 100,000[91], are Wi-Fi access points deployed outdoors or in public/private venues that are available to both Shaw wireline and wireless customers, and Freedom customers.

107. The information available indicates that Shaw has a well-planned program for use of Wi-Fi hotspots that would lead it to continue to leverage its Home Hotspot and Public Wi-Fi Hotspot strategies while evolving into small cells.

[redacted][94]

108. The purpose of this program is to address congestion in cellular networks through Wi-Fi offload. As Rogers and Shaw said in their ARC Request letter, "This use of Wi-Fi hotspot also reduces usage on Shaw's wireless network."[95] This is intended to provide additional incremental capacity and to fill coverage gaps in the cellular network.[96] It also moves wireless signal traffic to the Wi-Fi hotspots, reducing load on the macro cell network and

[91] Shaw, SJRB-CCB00163860, at slide 6; Shaw Annual Report 2021, page 20.

[92] SJRB-CCB00219615.

[93] Ibid, at slide 3.

[94] SJRB-CCB00891124, slide 11.

[95] [redacted]

[96] RFI00000243, slide 114.

limiting the need for additional cells and radio equipment. This is achieved by deploying public Wi-Fi and making it available to their customers in critical spots. This is often done in lieu of deploying small cells, a more expensive deployment option.

109. Shaw relies heavily on this Wi-Fi network in providing capacity for wireless transmission and in marketing its products and services to end users. This is true for both Shaw Mobile and for the Freedom Mobile marketing material, both of which promote these services by referring to the availability of over 450,000 Wi-Fi hotspots:[97]

> "In addition to our reliable Internet service enhanced by our BlueCurve experience, a key differentiator for our customers continues to be the access they receive to our carrier-grade Shaw Go Wi-Fi network. With over 3.7 million devices authenticated on our network and over 117,000 public access points covering locations from British Columbia to Ontario, we continue to see growth in usage of our Shaw Go Wi-Fi network for Shaw Internet and Freedom Mobile customers, and now Shaw Mobile customers. As an added value proposition, Wireless customers have access to over 350,000 additional "hotspots" by way of our home hotspot deployment."[98]

[97] Shaw 2020 Annual Report, page 23; https://www.shawmobile.ca.

[98] Shaw 2020 Annual Report, page 23.

110. [redacted][99]

111. Shaw Mobile provides Shaw Internet customers with bundling opportunities, combined with the ability to customize their mobile data requirements:

> "This approach is a powerful example of how facilities-based service providers can compete and innovate. Shaw Mobile capitalizes on the long-term trend that shows the vast majority of Canadians' smart device data usage occurs on Wi-Fi networks, a fact amplified by recent work-from-home trends."[100]

112. Shaw's internal documents state that Shaw views its Wi-Fi network as a key part of the competitiveness of its mobile product offering, as it sees [redacted][104]

[99] RFI00000245, slide 25.

[100] Shaw 2020 Annual Report, p18.

[101] SJRB-CCB00876302.

[102] SJRB-CCB00219615.pptx, slide 5.

[103] SJRB-CCB00219615, at slide 5.

[104] RFI00000245, at slide 25.

113. This is consistent with similar companies elsewhere in North America. For example, a similar company to Shaw due to having cable and mobile offers that can be bundled along with a Wi-Fi network, Comcast's Xfinity Mobile states its value proposition, and hotspot access is one of the four main points of value:[105]

> "Xfinity Mobile also offers the best coverage. Here's how:
>
> - Access to our fast, reliable network wherever you go
> - 5G nationwide included at no additional cost
> - The most reliable 4G LTE network
> - Automatically connect to over 20 million secure Xfinity Wi-Fi hotspots"[106]

114. Shaw's significant usage of Wi-Fi to densify its mobile network creates a degree of reliance on Wi-Fi Offload as a capacity remedy for its mobile network. [redacted]

[105] https://www.xfinity.com/hub/mobile/xfinity-mobile-new-unlimited-pricing.

[106] Ibid.

[107] Shaw, SJRB-CCB00230611 page 9; SIRB-CCB00356295.

[108] Shaw, SJRB-CCB00230611 page 12.

[redacted][10]

Figure 7 [redacted][1]

[109] SJRB-CCB00875029, page 19.

[110] SJRB-CCB00876302.

[111] SJRB-CCB00875029, page 19.

115. [redacted]

116. Building additional small cells that do not leverage an existing wireline network would be more expensive than an incremental Wi-Fi site. The proposed divested wireless business will not have the option of deploying such additional Wi-Fi sites, since it will not have access to the wireline network, and will not have access to homes to place the equivalent of Home Hotspots.

117. Note that the ability of a third party to obtain cost-competitive[113] access to that Wi-Fi network on a wholesale basis would be highly dependent on negotiated terms and unlikely to be favorable to any new entrant or comparable to the internal cost.

118. [redacted][14]

[112] SJRB-CCB00832766.

[113] [redacted]

[114] SJRB-CCB00219615, page 18.

[redacted]

[redacted][15]

Figure 8 [redacted]

[115] SJRB-CCB00888907, slide 28.

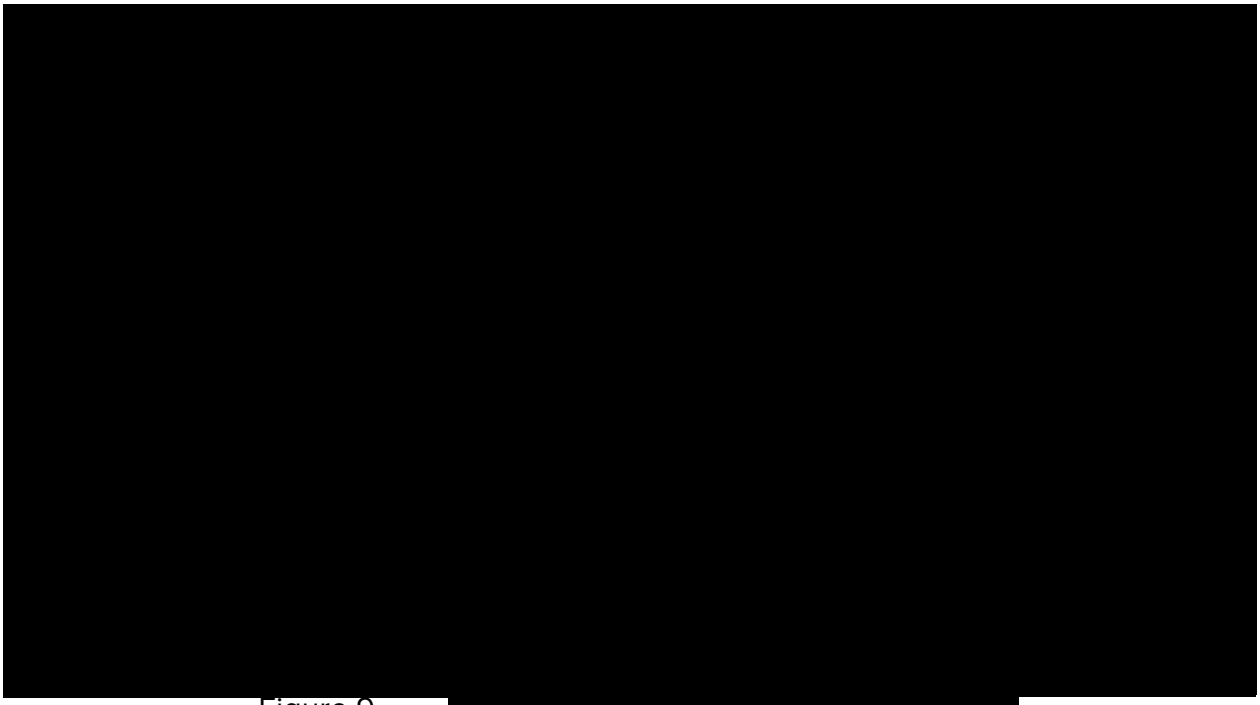

Figure 9

C. Rogers' network business

1. Rogers' wireless network

119. Rogers is one of the top three mobile and fixed access providers in Canada. Its wireless coverage spans over 98.1% of the population with 10.1M and 1.1M post and prepaid subscribers respectively.[116]

120. As of January 2018, Rogers has a nationwide wireless network that supports 2G through 5G technologies[117]

121.

[116] ROGERS COMMUNICATIONS REPORTS FOURTH QUARTER AND FULL-YEAR 2021 RESULTS, https://1vjoxz2ghhkclty8c1wjich1-wpengine.netdna-ssl.com/wp-content/uploads/2021/03/Rogers-Q4-2021-Press-Release.pdf, at page 8.
[117] Rogers, ROG00083323,

[redacted][118]

2. Rogers' mobile services

122. Rogers provides mobile services under three distinct brands:

- Rogers Wireless: The flagship brand owned by the parent company, Rogers Communications. It is the largest wireless operator in Canada with approximately [redacted] subscribers.[119]
- Fido: Fido is a flanker brand of Rogers Communications that was a acquired in 2004 and operates 4G/LTE and HSPA+ networks.
- Chatr Mobile: Chatr is another flanker brand of Rogers and operates in major Canadian cities.

3. Rogers' wireline network

123. The Rogers wireline network provides service for home Internet access, video, Rogers Home phone, and Smart home monitoring. Its wireline network can potentially service approximately [redacted] homes (Homes Passed).[120] Within its potential homes passed, [redacted] are Fibre to the Home

[118] Rogers, ROG00332275 - [redacted]
Rogers, ROG00083323, [redacted]
ROG00624265 [redacted]

[119] Ibid, at page 8.

[120] Homes Passed" is the potential number of Premises which a Service Provider has capability to connect to an FTTH/FTTB network in a service area. Typically, new service activation will require the installation and/or connection of a drop cable from the homes passed point (e.g. fibre-pedestal, manhole, chamber, utility-pole) to the Premises, and the installation of subscriber Premises equipment at the Premises. Source: http://www.ftthcouncilap.org/wp-content/uploads/2016/08/FCGA-Definition-of-Terms-Revisions2016.pdf.

(***FTTH***), [redacted] Fibre to the Curb (***FTTC***), and [redacted] Fibre to the Frontage (***FTTF***).[121]

124. [redacted][22]

125. [redacted][23] [124]

4. Rogers' fixed services

126. Rogers fixed services consist of cable television, telephone, and Internet services, including:

- Internet services to residential and businesses, including Wi-Fi, and Smart Home Monitoring, and speeds up to 1 Gbps;
- Television services through traditional cable, or IP-based streaming;
- Phone services for residential and small businesses; and
- Enterprise services such as private networking, IP-voice, cloud solutions.

[121] ROG00083323, slide 5.

[122] Rogers, ROG00083323, at slide 14.

[123] Rogers, ROG00082655, at slide 13.

[124] [redacted]

5. [redacted]

127. Rogers' wireline network provides services to retail customers i.e., consumers in households, and to businesses. In addition, it provides wholesale services to other communications networks, including its own wireless networks.

128. [redacted]

a. [redacted]

129. [redacted][25]

b. [redacted]

130. [redacted][26]

131. [redacted]

[125] [redacted]

[126] ROG00834457, page 2.

[redacted][127]

132. [redacted][28]

133. [redacted][29]

134. [redacted][30]

135. [redacted]

c. [redacted]

136. [redacted]

[127] ROG00834457, slide 4.

[128] Rogers, ROG00082655, slide 6.

[129] Rogers, ROG00082655, slide 11.

[130] Ibid, at slide 20.

137. [redacted][131]

138. [redacted][132][133]

[131] Ibid, at slide 11.

[132] Ibid, at slide 8, 11.

[133] Ibid, at slide 19.

D. Vidéotron's network business

1. Vidéotron's wireless network

139. Vidéotron has a total of about [redacted] in Quebec and Eastern Ontario (Ottawa), with [redacted] specifically.[134]

140. Vidéotron entered into an agreement with Rogers in 2013 to build a shared LTE network in the Province of Quebec and the Ottawa region. The network share agreement maintains Vidéotron's independence with products, customer acquisition, and backend systems. [redacted] [35]

141. Vidéotron acquired 294 blocks of spectrum in the 3500 MHz frequency band in the areas of Quebec, Southern Ontario, Eastern Ontario, Manitoba, Alberta and British Columbia. The cost of the new spectrum was [redacted] [36]

142. [redacted] [137]

143. Vidéotron's spectrum holdings consists mainly of 600 MHz, 700 MHz, and 2500 MHz across Quebec and Eastern Ontario and across multiple frequency bands. In addition, it acquired 20MHz of 3500MHz spectrum in

[134] SJRB-CCB00786386, page 7.

[135] SJRB-CCB00786386, page 4.

United States Securities and Exchange Commission, Form 20-F VIDEOTRON LTD., VL_20F_Q42021.pdf, page 28 https://www.quebecor.com/documents/20143/223107/VL_20F_Q42021.pdf/92fccedf-f0bc-41d5-c4cb-9dc47f916386?version=1.0&t=1648473739453.

Form 20-F originates from Vidéotron and is an annual submission of foreign private issuers to provide information to the US Securities and Exchange Commission.

[136] SJRB-CCB00878014, [redacted]
[137] SJRB-CCB00878014, [redacted]

British Columbia, Manitoba, Alberta, Southern Ontario, Eastern Ontario, and Quebec.[138]

144. "Vidéotron began as an MVNO on Rogers' network in 2006, launched its own wireless network in 2010, launched 4G service on that network in 2011, and upgraded service to 5G in 2020."[139]

145. On December 13, 2019, following a request for proposal process, Vidéotron selected Samsung as its LTE-A and 5G network equipment provider. During 2020 and 2021, both LTE-A and 5G technologies were deployed in selected areas [redacted]

146. Vidéotron's LTE network reaches 94% of the population of the Province of Québec and the Greater Ottawa Area.[140]

2. Vidéotron's mobile services

147. The number of subscriber connections to the mobile telephony service stood at 1,601,900 on December 31, 2021, an increase of 120,800 (8.2%) in 2021 compared with an increase of 150,600 in 2020.[141]

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[138] SJRB-CCB00786386, [redacted]

United States Securities and Exchange Commission, Form 20-F VIDEOTRON LTD., VL_20F_Q42021.pdf, page 28 https://www.quebecor.com/documents/20143/223107/VL_20F_Q42021.pdf/92fccedf-f0bc-41d5-c4cb-9dc47f916386?version=1.0&t=1648473739453.

United States Securities and Exchange Commission, Form 20-F VIDEOTRON LTD., VL_20F_Q42021.pdf, page 39 https://www.quebecor.com/documents/20143/223107/VL_20F_Q42021.pdf/92fccedf-f0bc-41d5-c4cb-9dc47f916386?version=1.0&t=1648473739453.

[139] [redacted] VID00359690.

[140] Ibid, at page 3.

[141] United States Securities and Exchange Commission, Form 20-F VIDEOTRON LTD., VL_20F_Q42021.pdf, page 29 https://www.quebecor.com/documents/20143/223107/VL_20F_Q42021.pdf/92fccedf-f0bc-41d5-c4cb-9dc47f916386?version=1.0&t=1648473739453.

148. Vidéotron has approximately [redacted] market share within Gatineau (population approximately 0.3 million), that translates to [redacted] in the region (which is in Quebec and borders Ottawa, ON).[142]

149. Vidéotron has approximately [redacted] market share within Ottawa, ON (population approximately 1 million), that translates to [redacted] in the city.[143]

150. Most households and businesses within Vidéotron's cable footprint have access to its advanced mobile services.[144]

151. Vidéotron Business is a telecommunications provider servicing small, medium and large sized businesses. Products and services include mobile telephony, Internet access, telephony and television solutions, as well as fibre connectivity, private network connectivity, Wi-Fi, managed services and security solutions.[145]

3. Vidéotron's wireline network

152. Vidéotron's wireline network utilizes a single cluster hybrid of fibre-coax architecture. It covers approximately 3.0 million homes in the Province of Québec and is the largest broadband network in the province. It covers

[142] SJRB-CCB00786386, at page 6.

[143] Ibid, at page 6.

[144] Ibid.

[145] United States Securities and Exchange Commission, Form 20-F VIDEOTRON LTD., VL_20F_Q42021.pdf, page 29 https://www.quebecor.com/documents/20143/223107/VL_20F_Q42021.pdf/92fccedf-f0bc-41d5-c4cb-9dc47f916386?version=1.0&t=1648473739453.

approximately 81% of premises. It does not have a wireline network in British Columbia, Alberta, Saskatchewan, or Manitoba.[146]

153. Vidéotron claims it can provide a better quality and more reliable network utilizing its network architecture. It further claims that the network architecture provides them the ability to launch new products and services such as Helix, Club illico, Fizz and Vrai, while at the same time lower its cost structures related to maintenance and technical support.[147]

154. In 2021, Vidéotron entered into joint agreements with the governments of Québec and Canada roll-out of high-speed Internet services in rural regions of Québec. As a result, Vidéotron is expanded its high-speed Internet network to connect approximately 37,000 more households.[148]

155. On August 5, 2021, Vidéotron had [redacted] telephony subscribers representing a [redacted] if compared to 2020.[149]

156. Vidéotron estimates that it holds, as of 2021, a [redacted] market share in mobile telephony in the geographic areas it serves.[150]

157. [redacted]

[146] United States Securities and Exchange Commission, Form 20-F VIDEOTRON LTD., VL_20F_Q42021.pdf, page 30 https://www.quebecor.com/documents/20143/223107/VL_20F_Q42021.pdf/92fccedf-f0bc-41d5-c4cb-9dc47f916386?version=1.0&t=1648473739453.

[147] United States Securities and Exchange Commission, Form 20-F VIDEOTRON LTD., VL_20F_Q42021.pdf, page 25 https://www.quebecor.com/documents/20143/223107/VL_20F_Q42021.pdf/92fccedf-f0bc-41d5-c4cb-9dc47f916386?version=1.0&t=1648473739453.

[148] Ibid, page 26.

[149] SJRB-CCB00876314, page 2.

[150] Ibid, page 24.

switching. “Vidéotron's cable network consists of fibre-optic cable and coaxial cable covering approximately [redacted] households and serving approximately [redacted] customers in Quebec. Its network is the largest broadband network in Quebec covering approximately [redacted] of households”[151]

4. Vidéotron’s fixed services

158. [redacted]

159. As of 2021, the number of subscribers to the Internet access service was 1,840,800, an increase of 44,000 (2.4%) in 2021 compared with an increase of 69,500 in 2020.[152] In 2021, Vidéotron’s Internet access customers represented 60.4% of its total homes passed.[153]

160. As of 2021, Vidéotron is the largest provider of Internet access services in its service areas, with an estimated market share of 47.2%.[154]

161. Vidéotron offers wireline telephony service to its residential customers in Québec using VoIP technology. As of 2021, Vidéotron had 824,900

[151] [redacted]

[152] United States Securities and Exchange Commission, Form 20-F VIDEOTRON LTD., VL_20F_Q42021.pdf, page 27 https://www.quebecor.com/documents/20143/223107/VL_20F_Q42021.pdf/92fccedf-f0bc-41d5-c4cb-9dc47f916386?version=1.0&t=1648473739453.

[153] VL_20F_Q42021.pdf, page 27. https://www.quebecor.com/documents/20143/223107/VL_20F_Q42021.pdf/92fccedf-f0bc-41d5-c4cb-9dc47f916386?version=1.0&t=1648473739453.

[154] Ibid.

subscribers to its wireline telephony service, representing a penetration rate of 27.1% of its homes passed.[155]

5. [redacted]

162. Vidéotron's single hybrid fibre coaxial clustered network covers approximately [redacted] of the Province of Québec's total addressable market and nine of the province's top ten urban areas. Vidéotron's shared LTE network reaches 94% of the population of the Province of Québec and the Greater Ottawa area. Vidéotron believes that its single cluster network architecture provides many benefits, including a higher quality and more reliable network, the ability to launch and deploy new products and services such as Helix, Club illico, Fizz and Vrai, and a lower cost structure through reduced maintenance and technical support costs.

163. [redacted]

[redacted][156]

164. [redacted]

[155] Ibid., page 28.

[156] [redacted]

[redacted][157] **[Emphasis added]**

VI. THE STEPS THE PARTIES PROPOSE TO TAKE TO MERGE THEIR BUSINESSES AND IMPLEMENT THE PARTIES' PROPOSED REMEDY

A. The steps that Rogers and Shaw propose to take to merge their businesses and implement the Parties' Proposed Remedy

1. Rogers and Shaw propose to merge their fixed businesses

165. This section of the report describes the steps that the parties propose to take to merge their businesses and to implement the Parties' Proposed Remedy, and some additional steps that may be taken within two years after the closing of the transaction.

166. The steps that the parties propose to take to integrate these two businesses are reflected in the Brattle Report. In addition, the Parties' Proposed Remedy is outlined in the executed LOI / Term Sheet that describes the handling of the Freedom Mobile wireless assets and business.

167. The two key steps that the parties plan to take are divesting elements of the Freedom Mobile network and Freedom Mobile subscribers (but not the

[157] Ibid.

Shaw Mobile business and subscribers),[158] along with the Freedom Mobile retail distribution channels (but not the Shaw branded distribution channels) into Vidéotron and merging the Shaw wireless and wireline business with Rogers' wireline and wireless businesses.

168. The combined wireline networks would be complementary, providing Rogers with wireline services in Alberta, British Columbia and Manitoba/Saskatchewan in addition to its current share in Ontario and the Atlantic region.

169. The parties have also outlined some short and long term transition services to support the divested wireless business in combination with Vidéotron.

2. [redacted]

170. [redacted][59]

B. The major steps that Rogers and Shaw propose to divest the Freedom business and combine it with Vidéotron

1. Rogers and Shaw propose to transfer some of the assets of Shaw to Vidéotron

171. The **Freedom Transaction** will divest Freedom Mobile, and it is proposed that it will be acquired by Vidéotron. This will include certain wireless assets and associated contracts related to:[160]

[158] Project Mars - SPA (Execution Version) - Confidential - Level B., Aug 12, 2022.

[159] June 30, 2022 Presentation to Competition Bureau, page 12.

[160] Project Mars - SPA (Execution Version) - Confidential - Level B.pdf.

- The wireless network, including radio access equipment, cell sites, core network equipment
- Mobile network codes
- Spectrum
- Roaming agreements
- Phone inventory
- Backhaul contracts (other than those with Shaw's wireline business)
- Brand and distribution
- IT systems
- Business functions
- Real estate leases

172. The Freedom Transaction will include the Freedom Internet Gateway Subscribers in Alberta (AB) and British Columbia (BC)

173. [redacted][61][redacted][62]

[161] It is our understanding that some resellers offer IP TV as well, which is not an exact substitute for Cable TV from both a product feature and margin perspective.

[162] June 30, 2022 Presentation to Competition Bureau, page 10.

174. The Transaction will exclude the Shaw Go Wi-Fi sites as they are considered by the Parties to be part of the Shaw wireline business, but provide access to those public sites for [redacted] (but exclude access to home sites).

175. [redacted]

176. [redacted]

2. Rogers and Shaw propose to divest the Freedom Mobile wireless network and subscribers to Vidéotron

177. The 1.74M Freedom Mobile customers, as well as the 17,000 Freedom-branded Internet subscribers, would become part of Vidéotron.

3. [redacted]

178. [redacted]

179. [redacted] Lacking the same ability to bundle, distribute through Shaw stores, leverage the Shaw Brand, and leverage Shaw web traffic, (as described above, the only significant differences between Shaw Mobile and Freedom Mobile) the competitiveness of the offer for the new proposed divested wireless business will be significantly reduced relative to that of the Shaw wireless business prior to the merger and divestiture.

4. Separate the distribution network

180. The parties propose to separate the distribution networks of the new entity from the distribution networks of the Shaw wireline business.

181. While the new proposed divested wireless business would keep most of its distribution locations, it would lose access to Shaw corporate retail locations representing 12% of the Freedom Mobile / Shaw Mobile retail locations. [redacted]

182. The new proposed divested wireless business will also lose access to a large amount of organic traffic that comes through the Shaw website. SimilarWeb reports 11.6 million visits to Shaw.ca in January 2022, and 2.6 million visits to Freedom. [164] Reliance only on Freedom would represent an [redacted] drop in web traffic due to the transaction, which would substantially reduce the visibility of the new proposed divested wireless business relative to that of the Shaw wireless business prior to the merger and divestiture.

[163] SJRB-CCB00468970 (January 2018) [redacted]

[164] https://www.similarweb.com/website/shaw.ca/#overview.

https://www.similarweb.com/website/freedommobile.ca/#overview; visited 3/10/2022.

In my opinion this is an excellent source for comparing the order of magnitude of web traffic, as it is used by more than half of Fortune 100 companies and all of the big 6 marketing agencies. https://www.similarweb.com/corp/clients/.

183. Shaw's wireline business currently provides significant free advertising for the Shaw wireless business, as any visitor to Shaw.ca from Alberta or British Columbia immediately sees an offer:

> "BUNDLE MORE TO SAVE THE MOST"
>
> "Discover more of what you love, like brilliant savings when you bundle your Fibre+ Internet with Mobile and Total TV." [165]

184. In addition, the new proposed divested wireless business would no longer benefit from the [redacted] annually that Shaw spends on advertising its wireline products and brand. That advertising drives consumers to the Shaw website or stores, where they can be exposed to Shaw bundle offers that include mobile as well.

VII. SHAW'S ABILITY TO ROLLOUT 5G WIRELESS NETWORKS

A. Overview of this section of the report

185. This section of my report responds to the request by counsel for the Commissioner of Competition to describe the extent to which Shaw Communications Inc. was in a position to roll out 5G wireless services at the time of the announcement of the proposed acquisition in March 2021 and how advanced in that process the company was at that time.

B. Shaw was in a robust position to roll-out and launch 5G networks

186. Shaw was in a robust position to roll-out and launch 5G prior to the announcement of the acquisition [redacted]

[165] Shaw.ca homepage retrieved in September 2022.

[redacted][66]

187. [redacted][67]

188. [redacted]

189. [redacted][168]

190. [redacted]

C. Shaw was well-positioned to procure and provide 5G devices for its customers

191. [redacted][69]

[166] SJRB-CCB00220780, [redacted]

[167] SJRB-CCB00219892, at page 7.

[168] SJRB-CCB00843120, [redacted]

SJRB-CCB00682299, at page 6.

SJRB-CCB00220780, at page 9.

[169] SJRB-CCB00220780, at page 5.

192. Availability of devices is a critical aspect of planning a new network launch and requires significant effort to procure devices to use in field testing and in employee and friendly user trials.

D. Shaw was well-positioned to launch its 5G product offerings

193. [redacted][71]

194. [redacted].[172]

195. [redacted]

[170] SJRB-CCB00421457, at slide 4.

[171] SJRB-CCB00220780.

[172] SJRB-CCB00620123, pages 3, 8; SJRB-CCB00620122, first point.

[redacted][173]

196. These facts present a clear indication that Shaw had been fully prepared from technical and business perspectives to offer 5G services and participate in the 3500 MHz auction had it not been for the proposed merger with Rogers.

E. Shaw was positioned to be able to acquire spectrum for 5G

197. [redacted]

198. [redacted]

199. Paul Deverell stated that the decision to not participate in the 3500 MHz auction was "not due to any issues or lack of delivery by all teams involved," but was due to "agreement with Rogers and the confirmation of our nonparticipation of 3500 MHz auction."[175]

F. Conclusion

200. The information available is clear that Shaw had been fully prepared from both technical and business perspectives to participate in the 3500 MHz

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[173] [redacted]

[174] SJRB-CCB00223517, at page 13.

SJRB-CCB00682299, at pages 4, 9.

[175] SJRB-CCB00162831 pages 7-8.

auction had it not been for the agreement with Rogers on the proposed merger. While Shaw still would have had to conduct upgrades to its network had it acquired 3500 MHz spectrum, efforts such as adding/upgrading radios, ensuring proper fibre connectivity, and deploying small cells are normal steps it would have taken after its initial 600 MHz based 5G deployments. The new spectrum would have provided it with more capacity and with the opportunity for faster speeds.

VIII. THE EXTENT TO WHICH COMPETITION TAKES PLACE ON NETWORK RELIABILITY AND TO WHICH THE ROGERS' NETWORK OUTAGES ARE RELEVANT

A. Overview of this section of the report

201. This section of my report provides my response to the request by counsel for the Commissioner of Competition to describe the extent to which competitors such as Rogers, Shaw and others compete with respect to the reliability of their network, and the extent to which the network outages experienced by Rogers may be relevant.

B. Competitors in the wireless services market do compete to a significant extent on the reliability of their networks, and the network outages experienced by Rogers are highly relevant

202. Competitors such as Rogers, Shaw and others in the wireless services market **do compete to a significant extent** with respect to the reliability of their networks. The reliability of wireless networks is one of the key factors that determine which providers customers choose.

203. This is demonstrated by multiple competitive assessments of the reliability of wireless networks that are produced and published to inform customers' decisions. Notably this includes recent such information published by Rogers itself, including proprietary research that it commissioned to be produced.

204. Network outages experienced by Rogers are **highly relevant** to the extent to which competitors in the wireless services market such as Rogers, Shaw and others compete with respect to the reliability of their networks: recent outages have made this much more salient in the minds of customers; the steps that the parties propose to take involve changes to competition in the wireless services market that include changes to competition on the basis of the reliability of networks.

C. Competitors in the wireless services market do compete to a significant extent with respect to the reliability of their networks

205. As described above, customers in the wireless services market consider a few key factors in choosing a provider of wireless services. There is some interrelationship amongst some of these factors, wherein customers make trade-offs amongst them.

206. The initial necessary consideration is the **availability** of services: which wireless service providers have wireless networks that provide the coverage that a customer requires. This determines which wireless services providers a customer can choose amongst.

207. A first key factor that then typically determines the choice of wireless service provider is then **price**, for the services that a customer requires. The significant features of the services typically include whether they are provided on a monthly contract or ‘pay-as-you-go’ (PAYG) basis, whether they include a mobile device or it is provided by the customer, also known as ‘bring-your-own' (BYO), and the amount of the services, nowadays primarily the amount of data and the number of connections (or lines).[176]

[176] https://moving2canada.com/cell-phone-plan-in-canada/; https://www.whistleout.ca/CellPhones/News/comparing-rogers-bell-telus-5g.

208. There are two other important related considerations that come into play along with price: the customer's current wireless service provider and hence the extent to which the choice is between **staying** with an existing provider or **switching** to a different provider, which typically involves some transaction costs; and associated with this is **bundling**, that is whether wireless services can be added on to existing services, in particular fixed broadband Internet services, or are only available as a stand-alone offer.

209. The **quality** of the wireless services provided, which is determined by the wireless network, is another key factor in the choice of wireless service provider, and in particular the **reliability**[177] of the wireless network and the **speed**[178] of the network.

210. Several sources produce and publish information about the reliability of wireless networks in Canada. These include, amongst others, Ookla, umlaut and JD Powers.

211. Rogers Communications itself has publicized information about the reliability of its networks. For example, it commissioned a report from umlaut of mobile network performance in major Canadian markets in 2021 that focused on the reliability of the wireless networks for providers in the wireless services market. Furthermore, when Ookla announced its results

[177] https://www.umlaut.com/uploads/documents/Reports-Certificates/202107_umlaut_Canada_AuditReport.pdf; https://www.jdpower.com/business/press-releases/2021-canada-wireless-network-quality-study.

[178] https://www.speedtest.net/awards/canada/.

for the consistency of wireless services, Rogers Communications issued a press release publicising the results, including the comment:

> "At a time where Canadian consumers and businesses continue to rely on strong and consistent networks to keep connected to what matters most…".[179]

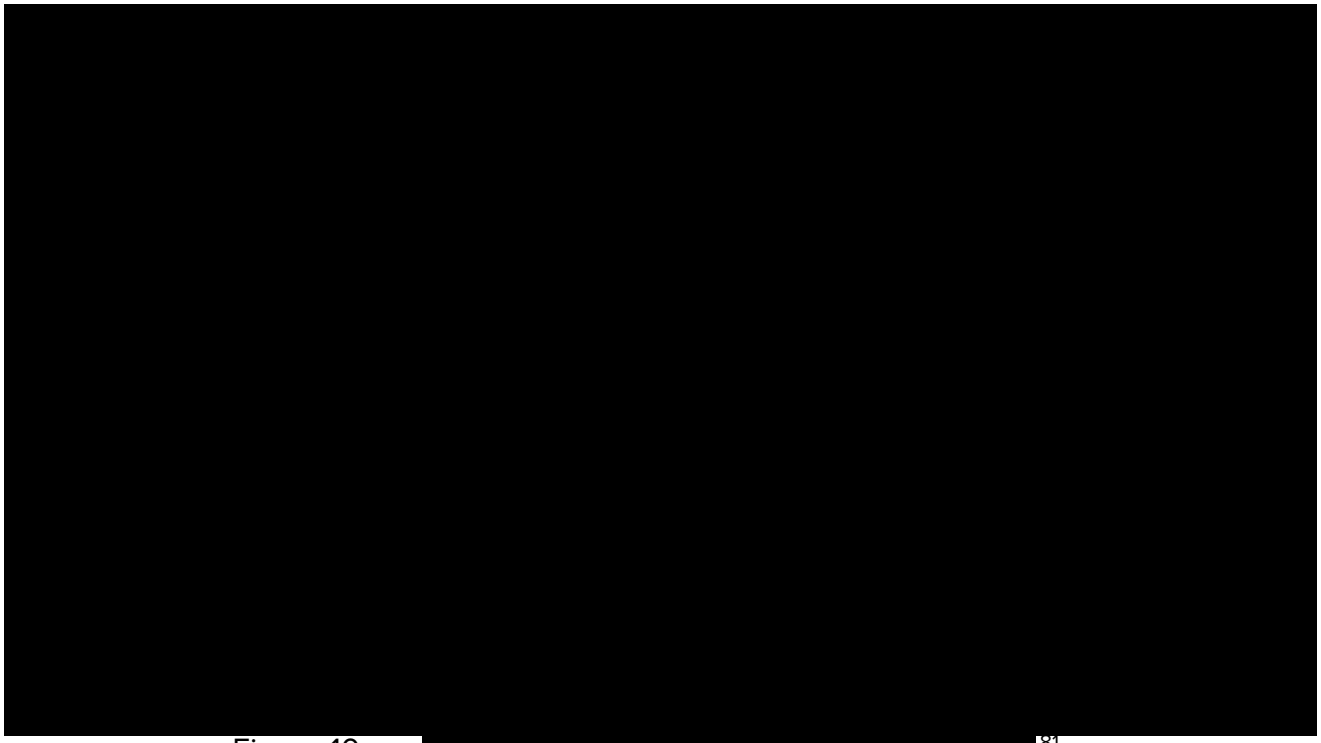

Figure 10

[179] ROG00811874, page 2; SJRB-CCB00895948, slide 7, slide 40; https://www.globenewswire.com/news-release/2021/10/18/2315958/0/en/Rogers-Ranked-by-Ookla-as-Canada-s-Most-Consistent-National-Wireless-and-Broadband-Provider-with-Fastest-Internet-in-Ontario-New-Brunswick-and-Newfoundland-and-Labrador.html.

[180] ROG00423947; page 5-7; page 11-16, page 28.

[181] ROG00423947; page 28.

D. The network outages experienced by Rogers are highly relevant to competition with respect to the reliability of wireless network

212. Rogers Communications has recently experienced network outages.

213. In particular, on July 8th, 2022 Rogers experienced a major network outage.

214. This network outage affected [redacted] wireline customers, and [redacted] wireless customers, which comprises approximately [redacted] of customers for wireless services in Canada.[182]

215. As a result of this outage at least these [redacted] customers were directly affected, finding themselves unable to communicate using their mobile phones. In addition, almost all Canadian customers for wireless services would have been aware of this outage either through direct personal contacts, or because the outage was a leading in news coverage throughout Canada for a significant period of time.[183]

216. This experience will have made the reliability of wireless networks a more salient factor in the choices that customers make about their wireless service providers, and hence increase the extent to which competitors in the wireless services market compete with respect to the reliability of their wireless networks.

217. In addition, the steps that the parties propose to take involve changes in the mobile services market that impact competition on the basis of the reliability of wireless networks.

[182] Rogers Amended CRTC responses, page 7.

[183] Rogers Amended CRTC responses, page 7.

218. On the basis of available information, the new Freedom Mobile and Vidéotron entity will rely to a significant extent upon fixed connectivity provided by Rogers using its wireline networks, including the erstwhile wireline networks of Shaw, for backhaul and other connectivity for its wireless networks. During the Rogers outage on July 8th, 2022, if Rogers and Shaw had been integrated, Vidéotron would have lost connectivity to [redacted][184]

219. [redacted][185]

Many other providers lost partial or all service due to the outage, including roaming partners of Rogers who could no longer roam, partners who use Rogers wholesale services, all TPIA vendors who use Rogers, as well as Rogers Bank, Rogers Media, critical infrastructure (hospitals, energy providers), and governmental and municipal customers.[186]

220. The proposed merger would reduce the level of competition on the basis of the reliability of wireless networks.

221. Prior to this proposed transaction most customers for mobile services in British Columbia and Alberta could choose mobile services that were provided by at least three distinct wireless networks (Rogers, Bell/Telus and a regional provider such as Shaw),[187] each of which generally relied

[184] VID00283821, at page 1.

[185] SJRB-CCB00895954 at page 5.

[186] Rogers CRTC Responses, 22 July 2022, Re: Rogers Canada-wide service outage of July 2022, at page 7-12.

[187] For the purposes of my opinion on this issue, I am treating the Bell and Telus wireless services which are provided by a shared wireless network as not competing with each other on network reliability to any significant extent.

upon one of three typically distinct and separate wireline networks for their connectivity. As a result of this transaction, in British Columbia and Alberta there would, if the proposed merger is completed, now typically be only two wholly distinct and separate wireline networks providing connectivity for wireless networks: the wireline network used by Bell/Telus wireless networks, and the Rogers' wireline network which will generally be providing fixed connectivity for both the Rogers' wireless network and to a significant extent for the Freedom Mobile wireless network.

222. In addition, on the basis of available information, the steps that the parties to the proposed merger and divestiture propose to take will increase the extent to which the reliability of mobile services is dependent upon the fixed networks operated by Rogers, that is the fixed networks that have experienced network outages. First, as described above, the wireless services for customers of Freedom Mobile and of Vidéotron will become dependent for their reliability upon the fixed networks operated by Rogers. Second, the wireless services for the erstwhile Shaw Mobile customers will also become dependent for their reliability on combined Shaw-Rogers fixed network now operated by Rogers. This is the fixed network that has experienced outages. Rogers' plan to attempt to mitigate future outages is insufficient in the face of the additional risk that comes from eliminating a separate independent network that could have and would have inherently provided redundancy.

E. Conclusion

223. As described above, competition based on network reliability is relevant to competition between fixed and mobile service providers in the marketplace.

224. The Rogers outage is relevant to competition in the marketplace as it has made reliability more salient, and the proposed merger would reduce the number of service providers and consumer choice based on network reliability and resiliency. Prior to the proposed transaction customers in British Columbia and Alberta had a choice of providers that generally relied upon three distinct wireline networks, however with the proposed divestiture and acquisition, that choice would generally be limited to two wireline networks.

IX. THE COMPETITIVE STRENGTH OF THE PROPOSED DIVESTED WIRELESS SERVICES BUSINESS, RELATIVE TO SHAW PRIOR TO THE PROPOSED MERGER AND DIVESTITURE

A. Overview of this section of the report

225. This section of my report provides my response to the request by counsel for the Commissioner of Competition to provide my opinion, based on available information, on the competitive strength of the proposed divested Freedom Mobile entity if acquired by Vidéotron, in comparison with the competition afforded by Shaw through its Freedom Mobile and Shaw Mobile wireless products.

226. As part of this I understand from counsel that the receipt and review of materials on the proposed divestiture is on-going and hence that any conclusions reached may have to be updated when all relevant information has been obtained and provided to me.

B. The competitive strength of the proposed divested Freedom Mobile entity if acquired by Vidéotron will be greatly reduced

227. It is my opinion based on the existing information that the competitive strength of the proposed divested Freedom Mobile entity, if acquired by Vidéotron will be greatly reduced, in comparison with the competition

afforded by Shaw through its Freedom Mobile and Shaw Mobile wireless products.

228. [redacted]

229. [redacted]

230. Third, the **overall cost structure** for the proposed divested Freedom Mobile entity **will be much less competitive** than that of Shaw for its Freedom Mobile and Shaw Mobile products; it will lose access to wireline infrastructure which [redacted] and the business will have greatly diminished scale relative to that of Shaw.

231. [redacted]

C. [redacted]

232. [redacted]

233. The product offering of the new entity is unlikely to be able to match or sustain the pricing that Shaw Mobile has been able to offer. [redacted][88] [redacted] Adding additional elements into a bundle with fixed services, and in particular adding wireless services into such a bundle, reduces the propensity of the customers for fixed services to churn to other providers of fixed services and thereby increases the loyalty and average tenure of customers for fixed services.[189] [redacted]

234. Rogers makes the point that "[redacted]"[190] It also states that "[redacted]"[191] [redacted]

[188] VID00362876, at page 9.

[189] ROG00841098, at page 16.

[190] ROG00697774, at page 25.

[191] ROG00693437, at page 7.

are significant, this increased average tenure can have large positive impact on customer lifetime value. [92] [193] [194] and in particular wireless services, at much lower prices than as stand-alone services. These much lower prices provide positive economic benefits in conjunction with the payoff to the fixed services business, but cannot be sustained absent these payoffs. [96]

235. [97]

236. It is very difficult or impossible to realise these same economies of scope for fixed services made available to be part of a bundle, such as under the TPIA regime. These provide services under a rate scheme that does not take into account the impact of bundling on customer economics, and in

[192] ROG00693438, page 18.

[193] SJRB-CCB00817625, page 53.

[194]

[195] SJRB-CCB00872844, at page 36-39.

[196] ROG00677708, at page 22; ROG00720755, at page 1.

[197] SJRB-CCB00835426,

particular the positive payoff to customer lifetime value of increased loyalty and tenure that results.

237. [redacted][198]

238. [redacted][199]

239. [redacted][200] Hence that is why it is building its network there. [redacted][201]

240. Moreover, the product offering of the new entity will become less compelling to existing customers who have multiple products each of which is with other carriers, as choosing this product offering now requires these customers to switch providers for either or both mobile services and fixed services, rather than just expanding the scope of the product offering that they obtain from carriers with whom they have existing services.

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[198] [redacted]

[199] Ibid., [redacted]

[200] Ibid., [redacted]

[201] Ibid., - [redacted]

241. As discussed above, as a result of the steps that the parties propose to take with regard to the provision of connectivity for the wireless network through access to Rogers' fixed networks its ability to compete on the reliability of its wireless network will also be reduced.

242. It is my opinion that the acquisition by Vidéotron does not make any significant difference to this. It is unlikely to be able to provide the relevant fixed services at a cost structure needed to compete as effectively for both bundling and customer acquisition.

D. [redacted]

243. [redacted]

244. The new entity will lose access to the Shaw website and other online distribution channels representing an [redacted] loss in organic web traffic from wireline shopping and customer service activity.

245. [redacted]

E. [redacted]

246. [redacted]

247. [redacted]

[redacted][202]

248. [redacted][203]

- [redacted]

[202] [redacted]

[203] ROG00803811; ROG00803812; ROG00771052; ROG00837698, at pages 48-51; ROG00834457, at pages 2-17.

- [redacted]

249. Shaw had 108,000 Shaw Go Wi-Fi public hotspots and another 823,000 Home Hotspots, for a total of over 931,000 Wi-Fi hotspots across Shaw's footprint for mobile customer access as of July 17, 2021 and planned to be at over 1 million by early 2022.[204]

250. The new entity will also have greatly diminished scale relative to that of Shaw with its Freedom Mobile and Shaw Mobile products, and relative to the scale of a larger carrier such as Rogers. There are significant economies of scale associated with wireless networks, and with the overall business of providing wireless services, and there are economies of scope across mobile services and fixed services. In the relevant markets for mobile services, the new entity will be much smaller than that of Shaw[205] with its Freedom Mobile and Shaw Mobile products. It will also lack the economies of scope with Shaw's fixed services and with that business.

251. Vidéotron is acquiring 1.74M Freedom subscribers, pre- and post-paid.[206] This compares to 2.189M subscribers of the combined Freedom / Shaw Mobile in 2Q22, and 1.762M Freedom subs before the transaction, that had more postpaid subscribers.[207] This is a 20% drop in scale from the current mobile combined operation.

[204] SJRB-CCB00884607, at page 3.

[205] Among other things, it will have 400k fewer subscribers.

[206] June 30, 2022 Presentation to Competition Bureau.

[207] See Figure 5.

252. It is my opinion that these losses of economies of scale are not significantly offset by other elements of the proposed acquisition by Vidéotron, such as free backhaul for 4 years valued at [redacted][208]

253. It is my opinion that the proposed acquisition by Vidéotron does not make any significant difference in the economies of scale of the Freedom Mobile entity, given its geographical footprint. It cannot provide the same [redacted] It does not provide the same economies of scope in the relevant wireless markets with fixed services, nor any significant economies of scale in these markets.

F. [redacted]

254. [redacted]

255. Within Shaw there is a significant overlap between wireless and wireline support functions: [redacted] [09] Separating Freedom assets from Shaw requires analyzing 14 categories of common technologies and 178 IT functions in major areas such as back office, data segmentation, network,

[208] [redacted]

[209] SJRB-CCB00842531, pages 7, 8, 11, 12.

[redacted] [10]

256. [redacted] [211]

257. In particular as part of this transition the new entity will face a lengthy period of between several months and a couple of years during which its product offering will lag significantly behind those that would have been afforded by Shaw through its Freedom Mobile and Shaw Mobile wireless products, [redacted]

258. [redacted]

G. Conclusion

259. As described above, the competitive strength of the proposed divested Freedom Mobile entity if acquired by Vidéotron will be greatly reduced, in comparison with the competition afforded by Shaw through its Freedom Mobile and Shaw Mobile wireless products.

[210] SJRB-CCB00885792, pages 7-9.

[211] [redacted]

260. [redacted]

261. [redacted] and its worsened overall cost structure because of its reduced scale and economies of scope due to its loss of access to owned wireline infrastructure.

262. It will then face a lengthy, costly and disruptive transition through divestment, acquisition and reconfiguration, [redacted]

263. None of these factors are offset to any significant extent by the acquisition of the proposed divested Freedom Mobile entity by Vidéotron.

264. The proposed transaction will result in a very substantial lessening of competition that is likely irreversible.

X. GLOSSARY

ARPU - Average Revenue Per Unit (ARPU) measures the earnings generated per user or unit. This figure is most often reported by telecom companies and media companies. ... It indicates which is doing the best job of maximizing revenue from its subscribers or users.

Backhaul - A term used for the transmission of a signal (normally video) from the ends of transmission systems such as microwave to a central point.

Base station - In telecommunications, a base station is a fixed transceiver that is the main communication point for one or more wireless mobile client devices. A base station serves as a central connection point for a wireless device to communicate.

Bundling - A package that includes several products for one price

C-Band - The terms C-band and Mid-band are often incorrectly used to mean the same. The C-band frequency range is defined as a component of the larger mid-band spectrum. C-band specifically refers to the 500 MHz segment of spectrum between 3.7 GHz to 4.2 GHz. The 5G 3500 MHz range is the spectrum between 3.3 GHz to 4.2 GHz, of which C-band is a sub-range.

Cell site - A cell site, cell tower, or cellular base station is a cellular-enabled mobile device site where antennas and electronic communications equipment are placed—typically on a radio mast, tower, or other raised structure—to create a cell (or adjacent cells) in a cellular network. The raised structure typically supports antenna and one or more sets of transmitters, receivers, transceivers, digital signal processors, control electronics, a GPS receiver for timing (for CDMA2000/IS-95 or GSM systems), primary and backup electrical power sources, and sheltering.

Churn - is the percentage of subscribers moving from a specific service or a service provider to another in a given period of time.

Core network - Typically, in telecommunication networks, the term 'core' is used by service providers and refers to the high-capacity communication facilities that connect primary nodes. A core/backbone network provides paths for the exchange of information between different sub-networks.

Dark fibre - Dark fibre is fibre-optic infrastructure that is not yet “lit” or put into use by a service provider. A dark fibre lease requires the customer rather than the service provider to maintain and operate the equipment required to “light” the fibre and use it for Internet access and communications.

Densification - refers to integrating more elements into a given space primarily by adding more cellular transmission points into a network; additionally, it also means a way to increase the number/volume of signals that can be carried on wireless networks, both by widening the range of frequencies that can carry signals as well as increasing the amount of information that can be carried on any given frequency. Collectively, the goal of all these efforts is to make 5G networks faster and to reduce latency, or lag times.

Distributed Antenna Systems (DAS) - A distributed antenna system, or DAS, is a network of spatially separated antenna nodes connected to a common source via a transport medium that provides wireless service within a geographic area or structure. ... A distributed antenna system may be deployed indoors (an iDAS) or outdoors (an oDAS).

Fibre Distribution Hub (FDH) - is an enclosure that provides the connection between fibre optic cables and passive optical splitters in the outside plant segment of the network. It makes it easy and fast to service connections and reconfigurations and serves as a testing point in the outside plant network.

FTTx – Refers to the demarcation point of where a network provider runs their fibre infrastructure, i.e., Fibre to the Home (FTTH), Fibre to the Curb (FTTC), and Fibre to the Frontage (FTTF)

Fixed Wireless Access (FWA) - Fixed Wireless Access enables network operators to deliver ultra-high-speed broadband to suburban and rural areas, supporting home and business applications where fibre is prohibitively expensive to lay and maintain.

Flanker Brand - is a new brand introduced into the market by a company that already has an established brand in the same product category. The new brand is designed to compete in the category without damaging the existing item's market share by targeting a different group of consumers.

Fronthaul - Fronthaul is defined as the fibre-based connection in RAN infrastructure between the Baseband Unit (BBU) and Remote Radio Head (RRH). Fronthaul originated with LTE networks when operators first moved their radios closer to the antennas.

ILEC - Incumbent Local Exchange Carrier is a local telephone company which held the regional monopoly on landline service before the market was opened to competitive local exchange carriers, or the corporate successor of such a firm.

LTE - Long-Term Evolution is a standard for wireless broadband communication for mobile devices and data terminals, based on the GSM/EDGE and UMTS/HSPA standards. It improves on those standards' capacity and speed by using a different radio interface and core network improvements.

Macro cells - A macro cell or macro site is a cell in a mobile phone network that provides radio coverage served by a high-power cell site (tower, antenna, or mast). Generally, macro cells provide coverage larger than microcell.

Metro Fibre - Metro fibre is fibre optic networks used to connect buildings in a large metropolitan area over the Internet. Often the providers of metro fibre lease out unused fibres (dark fibre) to other companies to establish high-speed connections in their area.

Macro cell base stations - A macro cell is a cellular base station that sends and receives radio signals through large towers and antennas.

Internet Gateway - A computer that sits between different networks or applications. The gateway converts information, data or other communications from one protocol or format to another.

Public Switched Telephone Network (PSTN) - Network that provides infrastructure and services for public telecommunication. The PSTN is the aggregate of the world's circuit-switched telephone networks that are operated by national, regional, or local telephone operators.

Points Of Presence (POPs) - Point of Presence. A central office where the inter-exchange carrier's responsibilities for the line begins and the local exchange carrier's responsibility ends. Location of a communications carrier's switching or terminal equipment.

Radio Access Network (RAN) - A radio access network (RAN) is a major component of a wireless telecommunications system that connects individual devices to other parts of a network through a radio link. The RAN links user equipment, such as a cellphone, computer or any remotely controlled machine, over a fibre or wireless **backhaul** connection.

Radio base station - In telecommunications, a base station is a fixed transceiver that is the main communication point for one or more wireless mobile client devices.

Remedy - is a form of court enforcement of a legal right resulting from a successful civil lawsuit.

RGU - Revenue Generating Unit (RGU) - is an individual service subscriber who generates recurring revenue for a company. This is used as a performance measure for management, analysts, and investors.

Shaw GO - Shaw customers have access to ‘Shaw Go’ which is Wi-Fi access that automatically connects to secure hotspots nationwide.

Small cell - A small cell is a low-cost radio access point with low radio frequency (RF) power output, footprint and range. It can be deployed indoors or outdoors, and in licensed, shared or unlicensed spectrum.

Spectrum - Range of electromagnetic radio frequencies used in transmission of voice, data, and TV of which some are allocated to the mobile industry and specifically to a mobile network operator

Wi-Fi hotspots - A hotspot is a physical location where people can access the Internet, typically using Wi-Fi, via a wireless local area network (WLAN) with a router connected to an Internet service provider. ... While many public hotspots offer free wireless access on an open network, others require payment.

Wi-Fi Offload - is the use of Wi-Fi hotspots to keep mobile devices connected. Wi-Fi is a more affordable way to connect and provides better connection experiences than cellular. It is also a coverage densification strategy used by mobile operators to mitigate coverage gaps in the cellular network. It also offloads traffic to the Wi-Fi hotspots, reducing load on the macro cell network and limiting need for densification.

Michael A M Davies

Senior Partner and Chairman, Endeavour Partners

Senior Lecturer, Massachusetts Institute of Technology

Guest Lecturer, London Business School

CEO and Founder, WKD.SMRT, Inc. and Founder, Silverthread Inc.

Expertise

Michael Davies' expertise and experience covers the spectrum of the key issues involved in high-tech businesses, particularly mobile devices and services and wireless networks, and business strategies for the digital economy:

- anticipating the future – developing insight into the co-evolution of technological innovation and technology infrastructure, the demand opportunity, and the business ecosystem, with a particular focus on novel and breakthrough technologies, on projecting demand and determining consumers' purchase preferences and buying behavior, and on creative business models
- developing creative and robust business strategies – identifying opportunities and options for initiatives, investments, and business models to create and to capture value
- executing effectively – aligning activities with opportunities and evolving to adapt for new episodes in the co-evolution of the enterprise and its environment

He has several areas of specialist expertise relevant to these challenges:

- the architecture and economics of communication networks, in particular broadband wireless, fiber infrastructure, shared infrastructure, packet networks, cloud services and 'edge computing'
- the economics of hardware electronic and mechanical systems, in particular semiconductor and hardware manufacturing, modern computing systems, and consumer electronics, and their related supply chain
- creative business models, co-opetition and building business ecosystems, including open innovation, open source, shared infrastructure, and other innovative approaches
- the economics of innovation, standards, and intellectual property (trade secrets, patents, and licensing strategies), and in particular how to create and capture value from technological innovation, or commoditize others' IP to protect value
- the economics of systems, platforms, architecture, and modularity, in particular as this relates to complex products and services that combine software and computers
- consumer behavior and segmentation, for high-tech and other novel products
- strategy and management for R&D, product creation and technological innovation
- how knowledge-intensive technical teams, such as R&D people, work effectively

Experience

Michael Davies has worked for more than thirty years in the telecommunications and related industries with a particular focus on innovation in mobile devices, communications services, and network infrastructure. His experience spans the design, development, and deployment of mechanical, electrical, electronic, and high-tech products; manufacturing; software coding; video; supply chain management; research and development; technology; product creation; and business strategy.

As the Senior Partner and Chairman of Endeavour Partners, Michael:

- leads a firm specializing in the connections between technology, innovation, product development, consumer choice and behavior, the adoption and diffusion of new products, intellectual property, and the emergence and evolution of mobile and digital ecosystems
- provides consulting services to companies throughout the mobile and wireless industry, including cellular infrastructure providers, mobile device manufacturers, and mobile network operators, as well as traditional companies that are being impacted by technology
- provides expert witness testimony on matters related to intellectual property, public policy, and commercial relationships within the mobile, wireless and digital sectors

As a Senior Lecturer at MIT, Michael:

- created and teaches courses in fundamental and advanced topics in integrated design and product development process
- teaches topics including creative innovation, value creation, digital transformation, emerging technologies, product management, product marketing, basic finance and business models, pricing and marketing, competitive analysis, market opportunity identification, funding entrepreneurship, business plan & pitch, and data-driven decision making

As a Guest Lecturer at the London Business School, Michael manages and teaches the New Technology Ventures Program, which enables emerging entrepreneurs to evaluate novel ideas and inventions and turn them into new technology ventures

As the Founder of WKD.SMRT and Silverthread Inc., Michael:

- leads a company that is accelerating innovation in healthcare by provide superior real-life data for clinical trials, through a turnkey solution that combines state-of-the-art technologies in sensing, machine learning, and computer processing
- founded a company that helps clients diagnose and improve the economics of maintaining, evolving, and developing very large-scale software systems

Education

London Business School **1989-1991**

MBA (With Distinction)

Business Strategy, Technology Management and Decision Sciences

Participation in the PhD Program on Systems Dynamics

Post-graduate study in Systems Thinking

University of Durham, UK **1982-1984**

Master of Engineering

Microelectronics, Cybernetics and Robotics, and Management Science

St Catharine's College, University of Cambridge **1979-1982**

Master of Arts

Electrical Sciences Tripos (Computer Science, Mathematics, Engineering and Physics)

Engineering Part I and Part II

Harvard Business School

Post-graduate study in Innovation & Organizations

Expert Reports and Testimony Experience

United States of America et al. v. AT&T Inc et al.

- Department of Justice anti-trust investigation, Civil Action No. 11-01560 (ESH)
- Antitrust
- Expert Report (2011)

Apple v. Samsung Electronics America, Inc., Samsung Telecommunications America LLC, and Samsung Electronics Co., Ltd.

- International Trade Commission Investigation No. 337-TA-796
- Public Interest
- Expert Declaration (2013)

Ericsson Inc. and Telefonaktiebolaget LM Ericsson v. Samsung Electronics America, Inc., Samsung Telecommunications America LLC, and Samsung Electronics Co., Ltd.

- International Trade Commission Investigation No. 337-TA-862
- Public Interest
- Expert Report, Rebuttal Expert Report, Expert Witness Statement, Deposition Testimony, Trial Testimony (all 2013)

Samsung Electronics Co., Ltd. And Samsung Telecommunications America, LLC v. Ericsson Inc. and Telefonaktiebolaget LM Ericsson

- International Trade Commission Investigation No. 337-TA-866

- Public Interest
- Expert Report, Rebuttal Expert Report, Deposition Testimony, Trial Testimony (all 2013)

InterDigital Communications, Inc., InterDigital Technology Corporation, IPR Licensing, Inc. and InterDigital Holdngs v. Samsung Electronics America, Inc. and Samsung Telecom America, LLC

- International Trade Commission Investigation No. 337-TA-868
- Public Interest
- Expert Report, Rebuttal Expert Report, Deposition Testimony, Expert Witness Statement, Trial Testimony (2013-2014)

Sasken Communication Technologies Limited v. Spreadtrum Communications, Inc. and Spreadtrum Communications USA

- American Arbitration Association, International Centre for Dispute Resolution No. 50-117-T-0092-12
- Industry Expert
- Expert Report, Deposition Testimony, Trial Testimony (2013-2014)

On Track Innovations LTD v. T-Mobile USA, Inc.

- United States District Court, Southern District of New York No. 12-cv.02224-AJN-JCF
- Technical Expert
- Expert Report, Deposition Testimony (2013-2014)

Enterprise Systems Technologies v. Samsung Electronics America, Inc., Samsung Electronics Co. Ltd. and Samsung Telecommunications America, LLC

- International Trade Commission Investigation No. 337-TA-925
- Public Interest
- Expert Report, Deposition Testimony (2015)

NVIDIA Corporation v. Samsung Electronics America, Inc., Samsung Electronics Co. Ltd. and Samsung Telecommunications America, LLC

- International Trade Commission Investigation No. 337-TA-932
- Public Interest
- Expert Report, Deposition Testimony, Trial Testimony (2015)

Nokia Corporation v. Samsung Electronics Co., LTD

- Arbitration, International Chamber of Commerce No. 19602/AGF/RD (c.19638/AGF)
- Intellectual Property and Patent Royalties
- Expert Report, Trial Testimony (2015)

Ericsson Inc. and Telefonaktiebolaget LM Ericsson v. Apple, Inc.

- International Trade Commission Investigation No. 337-TA-952
- Public Interest
- Expert Report, Deposition Testimony, Trial Testimony (2015)

Core Wireless Licensing S.A.R.L. v. LG Electronics, Inc., LG Electronics Mobilecomm U.S.A., Inc.

- United States District Court, Eastern District of Texas No. 2-14-cv-00911-JRG-RSP
- Technical Expert
- Expert Declaration, Expert Report, Deposition Testimony (2015)

ParkerVision Inc. v. Apple Inc., Samsung Electronics Co., Ltd and Samsung Electronics, Inc., LG Electronics, Inc., and LG Electronics Mobilecomm U.S.A., Inc., and Qualcomm Inc.

- International Trade Commission Investigation No. 337-TA-982
- Public Interest
- Expert Report, Deposition Testimony (2016)

T-Mobile U.S.A., Inc. v. Huawei Device U.S.A., Inc., and Huawei Technologies Co Ltd.

- United States District Court, Western District of Washington No. 14-cv-01351-RAJ
- Trade Secrets
- Expert Report, Deposition Testimony (2016), Declarations, Trial Testimony (2017)

Immersion Corporation v. Apple Inc., and AT&T Mobility LLC.

- International Trade Commission Investigation No. 337-TA-1004/990
- Public Interest
- Expert Report (2016), Deposition Testimony, Trial Testimony (2017)

Netlist, Inc. v. SK hynix America Inc., SK hynix Inc., SK hynix memory solutions Inc.

- International Trade Commission Investigation No. 337-TA-1023
- Public Interest
- Expert Report, Deposition Testimony, Trial Testimony (2017)

Andrea Electronics Corporation v. Samsung Electronics America, Inc., Samsung Electronics Co., LTD

- International Trade Commission Investigation No. 337-TA-1026
- Public Interest
- Expert Report, Deposition Testimony (2017)

Motorola Solutions, Inc. v. Hytera America, Inc., and Hytera Communications America (West), Inc.

- International Trade Commission Investigation No. 337-TA-1053
- Technical Expert
- Inter Partes Review
- Expert Report (2017)

Huawei Technologies, Co., LTD. et al. v. Samsung Electronics Co. LTD., et al.

- United States District Court, Northern District of California No. 16-cv-02787-WHO
- Technical Expert
- Standards Essential Patents
- Expert Report (2018)

BiTMICRO, LLC v. Samsung Electronics America, Inc., Samsung Electronics Co., LTD, SK Hynix America Inc, and SK Hynix Inc.

- International Trade Commission Investigation No. 337-TA-1097
- Public Interest
- Expert Report, Deposition Testimony (2018)

United States of America et al. in the matter of T-Mobile and Sprint

- Work as Industry Expert (2019)

EVS Codec Technologies and St Lawrence Communications v. Sony Mobile Communications, Inc.

- United States District Court, Southern District of New York, No. 1:18-cv-09518-JSR
- Technical Expert
- Industry Expert
- Declarations and Expert Report (2019)

Peloton Interactive, Inc. v. Flywheel Sports, Inc.

- United States District Court, Eastern District of Texas 2:2018-cv-00390-RWS-RSP and 2:19-cv-00317-JRG-RSP
- Trade Secrets, Intellectual Property, *Inter Partes Review*
- Expert Reports (2020)

Neodron v. Samsung Electronics and others

- International Trade Commission Investigation No. 337-TA-1062 and No. 337-TA-1093
- Industry Expert

- Public interest
- Expert Report (2020)

Helios Towers v. Orange

- Arbitration, International Chamber of Commerce
- Expert Report (2020)

United States of America v. Huawei

- Western District of Washington Docket No. CR19-010-RSM
- Eastern District of New York Docket No. 18-CR-457 (AMD)
- Theft of trade secrets, and conspiracy to steal trade secrets, violating the Racketeer Influenced and Corrupt Organizations (RICO) Act
- Expert (trial in 2021)

RED v. CloudMinds

- Arbitration
- Expert Report
- Deposition
- *Hearing (Forthcoming)*

Nokia v. Lenovo

- International Trade Commission Investigation No. 337-TA-1208
- Industry Expert
- Public interest
- Domestic Industry
- Bonding
- Remedies
- Deposition

Evolved Wireless v. Samsung Electronics and others.

- International Trade Commission Investigation No. 337-TA-1253
- Public interest
- Expert Report
- Deposition

United States of America v. Google

- United States District Court for the District of Columbia Docket No. 1:20-cv-03010

Competition Bureau Canada in the matter of Rogers and Shaw

- Assessment of the proposed acquisition by Rogers Communication of Shaw Communication
- Public interest
- Expert Report for §'104 Injunction

Sonrai Memory v. Amazon, Dell, Lenovo, Samsung and LG

- International Trade Commission Investigation No. 337-TA-1280
- Public Interest
- Deposition
- Hearing (Forthcoming)

Professional Experience

Endeavour Partners

Founder and Chairman *2003-Present*

Endeavour Partners is a technology strategy consulting firm that works with the top management teams of leading businesses throughout the high-tech, mobile and digital business ecosystems, to drive growth and innovation, and with global businesses worldwide on business strategy for the digital economy. The firm is headquartered in Cambridge, MA, with an office in London, United Kingdom.

Technical Experience

Michael and his team have experience working throughout the digital ecosystem, across mobile, Internet and digital convergence and commerce. This includes extensive work on communications, in particular mobile devices (feature phones, smartphones, tablets, cameras, connected home, home automation), services (video/PnP, data, messaging, mobile payment, barcode, Bluetooth), components (codecs, sensors) and networks (network infrastructure and equipment), broadband and internet, computing (from semiconductors through personal computing to software services), consumer electronics, content (video, audio, gaming), commerce and the convergence of these domains. The firm specializes in technological innovation, the adoption and diffusion of new products, and the emergence and evolution of business ecosystems from a systems point of view.

This expertise extends to the key digital technologies redefining business, the economy and society: smartphones; cloud services; the internet of things (IoT); artificial intelligence (AI) and robotics.

Clients

Michael's clients include: leading network operators and service providers, including Verizon Wireless, AT&T, Sprint, T-Mobile, Vodafone, and BT; network infrastructure providers such as Crown Castle, Samsung, and Lucent; and most of the leading mobile device/connected home OEMs, including HTC,

Samsung, Apple, Nokia, LG, Sony Ericsson, and Motorola. His work also includes standards work for the GSMA, the leading network operator association.

Most recently, his work in this area has focused on the empowering business leaders to build new businesses through creative innovation that harnesses advanced technologies.

Recent Work (IP and strategy work)

Corporate strategy, business strategy, technology strategy and product creation including:

- being the expert for the Department of Justice on the anti-trust case of the proposed AT&T and T-Mobile merger in 2011
- being a technical and industry expert on Standard Essential Patents (SEPs) on mobile connectivity and related mobile services for an IP arbitration case
- being a technical expert on a patent case related to the capture and decoding of real-time video signals and communication on smartphones
- being a technical expert on various wireless standard creation, including prior art and invalidity expert for the leading wireless network operator association
- being a technical expert in the area of audio codecs for a leading mobile device manufacturer
- being an expert on a number of ITC cases involving wireless infrastructure/network, mobile devices/connected home devices, software applications and ecosystems
- developing strategies for wireless carriers on video/PnP, 4G and LTE technologies, Bluetooth and data/messaging, particularly around innovative business models
- being an expert on contract disputes involving computer software and licensing
- developing the video and media platform strategy for one of the world's largest and most successful network operators and service providers
- developing strategies on Internet and mobile advertising for various services providers, including market sizing, opportunity assessment and business model deployment
- developing strategies on smart and connected home products and connectivity standards within the home
- driving strategies in NFC technology and mobile payments for a major wireless carrier, including a deep technical analysis of competing solutions, as well as assessment on the surrounding business ecosystem, viable business models and drivers and consumer adoption patterns
- developing a comprehensive projection of the medium and long-term demand for all digital services and devices, and the related attributes driving consumer choice and preference, including projected market share for major players under a variety of alternative scenarios, and the strategic implications
- driving strategies on software innovation and content management for the world's largest information technology provider
- providing external stimulus and challenge to the top management team on the renewal of product creation for one of the world's largest, most complex, and fastest-changing R&D organizations, which was one of the world's largest software development organizations) with ~20,000 people in R&D

- developing an “R&D University” with the world’s top academics for the top management team of the #1 mobile device vendor
- mapping the future of the consumer electronics and connected home devices, computing and communications business ecosystem for the world’s #1 consumer electronics business
- driving the renewal of technology management for a multi-billion-dollar broad scope global technology business, with activities from semiconductors through software platforms to devices and complete solutions
- support for corporate and business strategy for top-tier service providers and network operators (such as BT and Deutsche Telekom), for software businesses, innovative start-ups, and infrastructure vendors.

WKD.SMRT, Inc.

Co-Founder and Chief Executive Officer *2019-present*

WKD.SMRT is accelerating innovation in healthcare by delivering superior real-life data for clinical trials in the home. Its solution makes clinical trials faster, easier, lower cost and lower risk by combining state-of-the-art sensing, machine learning and computing technologies to deliver data that is more precise, more complete, more objective and more real-life. It is partnering with the world’s leading pharma company focused on neurodegenerative diseases, the world’s #1 neurology department, and the leading research group worldwide working on the medical aspects of activities of daily living, and quality of life.

Silverthread, Inc.

Co-Founder *2013-present*

Silverthread’s services and tools help clients diagnose and improve the design architecture of large software systems to improve predictability of project schedules, reduce unnecessary overhead costs, and prevent compounding complexity. Silverthread’s clients include large corporations and government entities that own and manage large, complex software systems.

Zero-360

Co-Founder and Board Member *2012-2015*

Strategic thought leader for this next-generation wearable device and solutions company focused on unique interactions and bio-sensing capabilities. The company’s cloud platform provided an open and scalable solution that integrated with 3rd party wellness programs that captured valuable health and wearable data.

EquuSys

Co-Founder and Chief Technology Officer *2004-present*

Led development of the company’s patented solution, including the development of a hardware electronics sensor product and the accompanying software. EquuSys is a telemetry and informatics company that provides real time real-world data to enhance the evaluation, diagnosis, rehabilitation, training and conditioning of elite horses.

Mercator Partners

Founder and Chairman Emeritus *1998-2009*

Thought leader for this technology strategy consulting firm; designed, directed and delivered all training programs in strategy and technology. Its alumni have gone on to top strategy roles with a number of industry leading firms, including Google, HTC, Nielsen, Yahoo!, Sony Ericsson, HTC and Vodafone. His work with clients focused on how to build creative new business models and develop effective business strategies, including:

- for the leading US mobile company, work on building business ecosystems, on challenging its business strategies, and on understanding customers and their likely behavior
- for a major global JV with European and Japanese parents, understanding emerging applications and potential business models
- for the most successful MVNO in the world, a range of work including strategies for data services, market entry and partnership development
- for several high-tech R&D-intensive businesses across consumer electronics, telecommunications, automotive and aerospace, looking at how to commercialize highly innovative technologies
- for the #1 US communications infrastructure company, work on customer needs, and on its strategy for 3G mobile
- for a leading Japanese consumer electronics and industrial conglomerate, a wide range of work on the evolution of consumer electronics, on monetizing its semiconductor intellectual property, on consumer segmentation, on creative business models and on product portfolios, pipeline, and positioning
- work with a variety of media companies on business models and content plays in the Internet and mobile service space
- for a leading European mobile operator, developing novel values- and lifestage-based consumer segmentations that enabled it to increase customer loyalty and reduce its costs
- for UK 3G auctions, assembling a consortium bid (SpectrumCo), and raising >$4 billion for an innovative business model, with players such as Virgin, Sonera, Nextel, and Tesco
- for several broadband and IP players, developing business models and market entry strategies
- for several top-tier private equity players, (such as The Carlyle Group, Providence Equity, Kohlberg Kravis Roberts, Blackstone, and Berkshire Partners) due diligence and strategic counsel on technology and telecoms investments.

GeoPartners Research

Principal *1996-1998*

Technology evaluation and strategy focused on broadband, IP and next generation wireless technologies:

- for AT&T, overall corporate strategy, including IP, VoIP, local entry, wireless and broadband, including network infrastructure and equipment (including NAT and DNS for VoIP)
- for Qualcomm, evaluating new technologies, business ventures, and organizational design

- for HP, Northern Telecom (subsequently Nortel Networks) and Intel, work on business models and building business ecosystems.

BellSouth International

Chief of Strategy, BellSouth NZ (now Vodafone NZ) *1992-1996*

Corporate and business strategy, government relations and industry relations, and R&D, including:

- pioneered the first PDA with digital cellular connectivity (Apple Newton, Nokia Data Card and Nokia 2110) and collaborated with Nokia on the development and testing of the very first modern smartphone, the Nokia Communicator
- elected as a Vice Chairman of the GSM MoU (later became the GSMA); founder and chairman of its 3rd Generation Interest Group; chaired Government working parties on PCS Spectrum
- built the business from pre-launch through to profitability, which has now become the clear market leader and Vodafone's most successful business worldwide
- designed and drove a path-breaking multi-million-dollar global academic research program on the economics of communications, networks and technologies in deregulated markets, whose participants included: Jean-Jacques Laffont; Jean Tirole; Paul David; David Teece; David Gabel; and Glenn Woroch.

Boston Consulting Group

Manager *1991-1993*

Focused on technology and telecoms businesses, including Philips Electronics, Telecom NZ, Telstra and in particular BellSouth International. Responsible for training programs in advanced analytical techniques for strategy development.

Braxton Associates

Manager *1987-1991*

Worked on a wide range of strategy projects, focusing on electronics and defense businesses in particular, and on corporate strategy, product development, manufacturing and operational transformation, and market entry. Played a leading role in development and training, focusing in particular on approaches to organizational transformation.

Mars Electronics

Senior Engineer, Program Manager *1984-1987*

Worked as roboticist, cyberneticist and designer, developer and program manager for large scale real-time systems for manufacturing and logistics. Involved in the development of overall business strategy.

Cookson Group

Robotics Engineer, Project Manager *1982-1984*

Worked as a robotics engineer and automation manager overseeing and supporting many existing robotic handling and other automation systems. Designed, developed, and deployed additional state of the art robotic and automation systems for manufacturing processes and material handling.

Academic Experience

Massachusetts Institute of Technology

Senior Lecturer- Integrated Design and Management

Invited to create and teach as part of Integrated Design Lab I and Integrated Design Lab II (EM.441 and EM.442), courses that present fundamentals of and advanced topics in integrated design and product development process.

Developed and taught fundamental concepts including innovation, emerging technologies, product management, product marketing, basic finance and business models, and pricing and marketing. developed taught advanced topics including competitive analysis and market opportunity identification, funding entrepreneurship, business plan & pitch, and data-driven decision making.

Senior Lecturer – Engineering Systems Division (now Institute for Data, Systems, and Society)

Responsible for creating, managing and teaching two capstone leadership courses, the Systems Leadership & Management Lab (ESD.39) and Praxis (ESD.S51).

SL&M Lab is a semester-long course in which SDM Fellows work an average of at least one full day per week (~fifteen person-days) with the top management of a high tech business on a relevant real-world systems and management challenge. The host companies set the project focus; that is project teams work on the problems that are of real concern to the host companies.

The course also includes an intense focus on how to work effectively with these types challenges, including team roles, logical thinking and writing, and the use of graphical communication. Assignments can range from a high-level systems thinking issue, through to building a prototype. SDM students take this experience with them as they work with their sponsoring companies or continue in their career progression and development.

The SL&M Praxis course is about praxis, practice, as distinguished from theory; application or use, as of knowledge or skills. The course gives SDM Fellows insights into the realities of decision-making and managerial behavior in large, complex high-tech and systems businesses. It provides them with a systematic approach and the practical skills needed for the application of their rich and deep learning and frameworks about systems, architecture, technology and strategy to real-world leadership and management challenges. It runs during the summer session as a complement to and preparation for the SL&M Lab course.

Senior Lecturer – Bernard M. Gordon-MIT Engineering Leadership Program, School of Engineering

Taught the capstone undergraduate leadership course, Engineering Leadership (ESD.045), and Technology & Strategy (15.905/15.965).

The Bernard M. Gordon-MIT Engineering Leadership Program (http://web.mit.edu/gordonelp/) fosters new approaches that prepare the nation's young engineering leaders for productive and effective careers in engineering companies and continues MIT's rich, innovative tradition of engineering leadership. The Engineering Leadership course exposes students to the models and methods of engineering leadership within the contexts of conceiving, designing, implementing and operating products, processes and systems.

The Technology & Strategy course provides a strategic framework for managing high-technology businesses. Its emphasis is on the development and application of ways of thinking or mental models that bring clarity to the complex co-evolution of technological innovation, the demand opportunity, business ecosystems, and decision-making and execution within the business.

These tools provide managers with insights when anticipating and deciding how to respond to the behavior of competitors, complementors, and customers, and when deciding which technologies to invest in, opportunities to target or partnerships to pursue.

Principal Investigator – Engineering Systems Division (now Institute for Data, Systems, and Society)

Involved in the research on the improvement of software project outcomes by attacking complexity and technical debt as part of a National Science Foundation (NSF) I-Corps program.

Researcher and Thesis Advisor

Supervises thesis work on related areas, including recent prize-winning work on the future of the smart grid, and theses on a broad range of issues.

Conducts research on how psychology shapes consumers' buying behavior and how product features and specifications influence consumers' choices among products and their liking for products. This culminated in a keynote presentation at MIT in Europe, held in Vienna, Austria

London Business School

The Business of Artificial Intelligence

Course director for the new online program in how to create business value from artificial intelligence.

New Technologies Ventures Program

Manages and teaches this unique program that brings together MBAs and business students from London Business School with post-doctoral researchers from University College London.

The goal of this course is to enable would-be entrepreneurs to evaluate novel ideas and inventions and turn them into new technology ventures. Participants, who are business professionals, scientists, engineers and would-be entrepreneurs, explore how entrepreneurs and investors identify and analyze the feasibility of innovative technical ideas, turn them into products and services, and take these products and services to market, in both start-ups and established businesses. A key element of the program is projecting demand for innovative products and new product features

Professional Affiliations

Recognized as a World Class New Zealander (March 2007)

Appointed to U.S. Beachhead Board of New Zealand Trade & Enterprise (NZTE) (July 2006)

Member, Board of Directors, Massachusetts Technology Leadership Council (MassTLC)

Co-Chairman, Mobile Cluster, Massachusetts Technology Leadership Council (MassTLC)

Member, Board of Advisors, Department of Systems Engineering at the United States Military Academy at West Point

Member, Executive Committee, Boston Area Chapter of the Communications Society of the Institute of Electrical and Electronic Engineers (IEEE)

Member, Association for Computing Machinery (ACM)

Member, Academy of Management

Member, Strategic Management Society

Member, INFORMS

Member, Product Development Management Association (PDMA)

Leader, London Business School alumni in North America

Founder and President, Kiwi Expatriates Association (KEA) in New England

CT-2022-002

IN THE MATTER OF the *Competition Act*, R.S.C. 1985, c. C-34;

AND IN THE MATTER OF the proposed acquisition by Rogers Communications Inc. of Shaw Communications Inc.;

AND IN THE MATTER OF an application by the Commissioner of Competition for one or more orders pursuant to section 92 of the *Competition Act*.

B E T W E E N :

COMMISSIONER OF COMPETITION

Applicant

- and -

ROGERS COMMUNICATIONS INC. AND SHAW COMMUNICATIONS INC.

Respondents

- and -

ATTORNEY GENERAL OF ALBERTA AND VIDEOTRON LTD.

Intervenors

ACKNOWLEDGEMENT OF EXPERT WITNESS OF MICHAEL DAVIES

I, Michael Davies, acknowledge that I will comply with the Competition Tribunal's code of conduct for expert witnesses which is described below:

1. An expert witness who provides a report for use as evidence has duty to assist the Tribunal impartially on matters relevant to his or her area of expertise.

2. This duty overrides any duty to a party to the proceeding, including to the person retaining the expert witness. An expert is to be independent and objective. An expert is not an advocate for a party.

22nd September 2022

Date

Michael Davies

Appendix A
Materials relied upon

Michael A. M. Davies Expert Report for the 92 Proceeding

Materials produced by Rogers in response to the Supplementary Information Request

ROG00052642
ROG00082655
ROG00083323
ROG00109203
ROG00119303
ROG00127766
ROG00141352
ROG00192359
ROG00243956
ROG00247605
ROG00251667
ROG00256226
ROG00300981 Press-Release.pdf
ROG00332275
ROG00624265
ROG00646941

Materials produced by Shaw in response to the Supplementary Information Request

SJRB-CCB00023005
SJRB-CCB00035043
SJRB-CCB00162831
SJRB-CCB00163860
SJRB-CCB00167977
SJRB-CCB00208891
SJRB-CCB00211493
SJRB-CCB00219615
SJRB-CCB00223003
SJRB-CCB00223517
SJRB-CCB00230611
SJRB-CCB00356295
SJRB-CCB00468970
SJRB-CCB00502428
SJRB-CCB00618778
SJRB-CCB00682056
SJRB-CCB00699795

SJRB-CCB00700294
SJRB-CCB00782956
SJRB-CCB00786205
Shaw, Specification 28 – Cell Site & Spectrum Data UPDATED (Sept. 23).xlsx
Shaw Response to Bureau April 7, 2022 RFI.pdf

Materials provided by Rogers in response to the Remedy RFI

RFI00000042
RFI00000229
RFI00000243
RFI00000245
RFI00000258
RFI00000286
RFI00000288

Materials produced by Stonepeak

SP_000004
SP_000116
SP_000118
SP_000122
SP_000128
SP_000158.PDF
SP_000235
SP_00236
SP000004

Materials provided by the Rogers and Shaw in respect of their submission on claimed efficiencies

The Brattle Report, “Proposed Merger Between Rogers and Shaw: Initial Report Assessing Productive Efficiencies Arising From the Proposed Transaction”, submitted November 8, 2021.

Brattle Report supporting materials summitted by Rogers and Shaw

Rogers, Shaw Retail.xlsx
Shaw, C.3 – Specification 28 – Retail Locations.xlsx
Shaw, C8 – 1.05 – Wireless Advertising and Marketing Spend.xlsx

Other materials produced by Rogers and Shaw

Rogers-Shaw ARC Request.pdf , Letter dated April 13, 2021 from Goodmans LLP Re: Acquisition of Shaw Communications Inc. by Rogers Communications Inc. or an Affiliate thereof.

RBCH00002_000000453, Arrangement Agreement among Rogers and Shaw, March 13, 2021.

Other materials produced in respect of the Proposed Remedy

Executed Mars LOI & Term Sheet.pdf , March 25, 2022.
[redacted] Freedom Mobile – ARC Request – PROTECTED AND CONFIDENTIAL_slipsheet.pdf, Letter dated March 28, 2022 from McCarthy Tétrault LLP Re: Proposed acquisition by [redacted] of all of the issued and outstanding shares of Freedom Mobile Inc. (along with its subsidiary, "Freedom") from Shaw Telecom Inc.

Joint [redacted] Shaw Letter to ISED re Spectrum Transfer CONFIDENTIAL Mar 28 2022.pdf. , Letter dated March 28, 2022 Re: Deemed Transfer of Freedom's Spectrum Licences from Shaw to [redacted]

Public documents
Handbook of Telecommunications Economics, Volume 2: Technology Evolution and the Internet, Volume 2, 2005.

Shaw 2020 Annual Report.
Shaw's 2021 Annual Report.
Rogers Earnings Release Q4 2021
Shaw's Annual information form, Jan 13, 1999
Shaw F_21_Annual_Report_Filing_Verision_.pdf
Shaw quarterly report, July 30, 2020.
Rogers Communications Reports Second Quarter 2021 Results.
Rogers Communications Inc. April 22, 2020 Earnings Call Transcript.
Abbreviations and codes for provinces and territories, Statistics Canada, 2011 – available at: https://www150.statcan.gc.ca/n1/pub/92-195-x/2011001/geo/prov/tbl/tbl8-eng.htm

2021AR-Appendix-A-Complaints-by-Service-Provider.xlsx , Commission for Complaints for Telecom-television services, complaints by Service Provider between August 1, 2020 and July 31, 2021.

Shaw, "Building a Brighter Future for Canadians", (April 14, 2021) - available at: https://assets.ctfassets.net/tzb4ihmthaev/3LNtSBJIE69RVXffgi9aa1/939409f3eeb09bd074439be6d4620645/SCI_-_Notice___Mngmnt_Information_Circular.PDF

Public links

https://www.litepoint.com/5g-small-cell/
https://www.shawmobile.ca/en-CA/network-coverage
https://www.shawmobile.ca/docs/default-source/general/terms_of_service.pdf
https://shop.shawmobile.ca/en-CA/plans
https://www.telus.com/en/mobility/plans
https://www.rogers.com/plans
https://www.freedommobile.ca/en-CA/plans/?planSku=Big%20Gig%20Unlimited%20%2B%20Talk%2010GB)
https://1vjoxz2ghhkclty8c1wjich1-wpengine.netdna-ssl.com/wp-content/uploads/2021/03/Rogers-Q4-2021-Press-Release.pdf

https://www.similarweb.com/website/shaw.ca/#overview
https://shop.shawmobile.ca/en-CA/devices
https://shop.freedommobile.ca/en-CA/
https://www.shaw.ca/internet/wifi/find-a-wifi-hotspot
https://www.xfinity.com/hub/mobile/xfinity-mobile-new-unlimited-pricing
http://www.ftthcouncilap.org/wp-content/uploads/2016/08/FCGA-Definition-of-Terms-Revisions2016.pdf
Shaw.ca homepage

https://www.infrastructureinvestor.com/stonepeak-doubles-predecessor-to-close-fund-iv-on-14bn/
https://www.xplornet.com/dealer-locator/

https://www.businesswire.com/news/home/20220202005746/en/Stonepeak-Closes-Fourth-North-American-Infrastructure-Fund-with-14-Billion-of-Commitments

July 30, 2020 – Shaw Mobile Launch press release:
https://newsroom.shaw.ca/corporate/newsroom/article/materialDetail.aspx?MaterialID=6442452394

https://sedar.com/DisplayCompanyDocuments.do?lang=EN&issuerNo=00001544
https://crtc.gc.ca/eng/archive/2021/2021-181.htm

https://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/02170.html

https://newsroom.shaw.ca/corporate/newsroom/article/materialDetail.aspx?MaterialID=6442451782

https://www.globenewswire.com/news-release/2021/10/29/2323626/0/en/Shaw-Announces-Fourth-Quarter-and-Full-Year-Fiscal-2021-Results.html

Other Documents

Affidavit of Christopher Hickey (Distributel Communications Limited)

Materials produced by Rogers

ROG00082655
ROG00083323
ROG00119303
ROG00127766
ROG00243956
ROG00251667
ROG00300981
ROG00332275
ROG00423947
ROG00624265
ROG00677708
ROG00683484
ROG00693437
ROG00693438
ROG00695269
ROG00697774
ROG00699011
ROG00720755
ROG00720776
ROG00729355
ROG00771052
ROG00798215
ROG00798921
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ROG00803812
ROG00811874
ROG00828646
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Rogers CRTC Responses, 22 July 2022

Rogers-Q2-2022-Press-Release
COC – Rogers Amended Reply
Project Mars – SPA (Execution Version) – Confidential – Level B
Protected & Confidential – Submission re Rogers acquisition of Shaw
Rogers CRTC Responses, 22 July 2022
Rogers CRTC Responses, 22 July 2022
Rogers Response to RFIs Outage CONFIDENTIAL August 22 2022_Redacted
Rogers Response to RFIs Outage CONFIDENTIAL July 22 202224-Redacted
COC – Shaw Amended Reply

Materials produced by Shaw

Remedy RFI Response (Shaw Response to Bureau April 7, 2022 RFI
SJRB-CCB00023005
SJRB-CCB00092221
SJRB-CCB00156659
SJRB-CCB00157288
SJRB-CCB00157461
SJRB-CCB00162831
SJRB-CCB00163860
SJRB-CCB00208891
SJRB-CCB00211493
SJRB-CCB00219615
SJRB-CCB00219892
SJRB-CCB00220780
SJRB-CCB00223003
SJRB-CCB00223517
SJRB-CCB00230611
SJRB-CCB00231597
SJRB-CCB00419797
SJRB-CCB00421457
SJRB-CCB00434040
SJRB-CCB00468970
SJRB-CCB00618778
SJRB-CCB00620122
SJRB-CCB00620123
SJRB-CCB00682056
SJRB-CCB00682299
SJRB-CCB00700294
SJRB-CCB00786205
SJRB-CCB00786386
SJRB-CCB00814067
SJRB-CCB00814293

SJRB-CCB00814608
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SJRB-CCB00832766
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SJRB-CCB00872844
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SJRB-CCB00875029
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SJRB-CCB00876694
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SJRB-CCB00877905
SJRB-CCB00879774
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SJRB-CCB00879915
SJRB-CCB00880307
SJRB-CCB00880579
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SJRB-CCB00884705
SJRB-CCB00885390
SJRB-CCB00885792
SJRB-CCB00888468
SJRB-CCB00888907
SJRB-CCB00162831
SJRB-CCB00891124
SJRB-CCB00891195
SJRB-CCB00895948
SJRB-CCB00659976

08-22-2022 – Examinations for Discovery Transcript – Paul McAleese (Shaw) FNL (1)-CT
08-23-2022 – Examinations for Discovery Transcript – Paul McAleese (Shaw)
08-24-2022 – Examinations for Discovery Transcript – Kristen McLean – FNL-CT
08-25-2022 – Examinations for Discovery Transcript – Dean Prevost (Rogers) FNL – CT
08-26-2022 – Examinations for Discovery Transcript – Dean Prevost (Rogers) Cont'd FNL-CT
Paul McAleese Discovery Transcript, August 22, 2022
Quebecor_Shaw (Freedom Mobile) – ARC Request Letter
Shaw' Remedy RFI Response (Shaw Response to Bureau April 7, 2022 RFI

Materials produced by Videotron

VID00077644
VID00077879
VID00280504
VID00281525
VID00283242
VID00283821
VID00284496
VID00286472
VID00287457
VID00296440
VID00320234
VID00320238
VID00320391
VID00330823
VID00339162
VID00359690
VID00362876
VID00364736
Privileged & Confidential – Videotron Responses to Bureau Questions (December 21)
Protected & Confidential – Responses to Bureau Questions (Dec 22 and Jan 13)
Protected & Confidential – Submission re Rogers acquisition of Shaw
I think there are many more document here… include all in the directories from Sept in OneDrive
Vidéotron deposition
United States Securities and Exchange Commission, Form 20-F VIDEOTRON LTD., VL_20F_Q42021
Videotron Discoveries – Lescadres Transcripts

Materials produced by [redacted]

SP_000004
SP_000116

SP_000118
SP_000122
SP_000128
SP_000158
SP_000158.PDF
SP_000235
SP_00236
SP000004

Materials produced by Québecor

QUE00000307
QUE00003045

Other materials produced by Rogers and Shaw

08-23-2022 – Examinations for Discovery Transcript – Paul McAleese (Shaw)
I think there are many more document here... include all in the directories from Sept in OneDrive
INDUEV31-E
Paul McAleese Discovery Transcript, August 22, 2022
Privileged & Confidential – Videotron Responses to Bureau Questions (December 21)
Project Mars – SPA (Execution Version) – Confidential – Level B
Protected & Confidential – Responses to Bureau Questions (Dec 22 and Jan 13)
Protected & Confidential – Submission re Rogers acquisition of Shaw
Quebecor_Shaw (Freedom Mobile) – ARC Request Letter
United States Securities and Exchange Commission, Form 20-F VIDEOTRON LTD., VL_20F_Q42021

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5G NR: The Next Generation Wireless Access Technology, 2018
4G: LTE/LTE-Advanced for Mobile Broadband 2011
6G vision: An ultra-flexible perspective, ITU Journal on Future and Evolving Technologies, Volume 1 (2020)
Handbook of Telecommunications Economics, Volume 2: Technology Evolution and the Internet, Volume 2, 2005
CRTC, Communication Marketing Reports, Data - Retail Mobile
Shaw's 2021 Annual Report
Rogers Earnings Release Q4 2021
Shaw 2020 Annual Report
Shaw's Annual information form, Jan 13, 1999

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https://www.qualcomm.com/news/onq/2017/08/understanding-3gpp-starting-basics
https://www.qualcomm.com/news/onq/2019/09/5g-launches-globally-what-comes-next
https://crtc.gc.ca/eng/publications/reports/PolicyMonitoring/ban.htm
https://www.globenewswire.com/en/news-release/2021/04/14/2210369/0/en/Shaw-Announces-Second-Quarter-and-Year-to-Date-Fiscal-2021-Results.html
(https://www.shawmobile.ca/en-CA/network-coverage
https://newsroom.shaw.ca/corporate/newsroom/article/materialDetail.aspx?MaterialID=6442451782
https://www.shawmobile.ca/docs/default-source/general/terms_of_service.pdf
https://shop.shawmobile.ca/en-CA/plans
https://www.telus.com/en/mobility/plans
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https://www.similarweb.com/website/shaw.ca/#overview.
https://www.shaw.ca/internet/wifi/find-a-wifi-hotspot
https://1vjoxz2ghhkclty8c1wjich1-wpengine.netdna-ssl.com/wp-content/uploads/2021/03/Rogers-Q4-2021-Press-Release.pdf
https://www.similarweb.com/website/freedommobile.ca/#overview
https://moving2canada.com/cell-phone-plan-in-canada/;
https://www.whistleout.ca/CellPhones/News/comparing-rogers-bell-telus-5g
https://www.speedtest.net/awards/canada/
https://www.umlaut.com/uploads/documents/Reports-Certificates/202107_umlaut_Canada_AuditReport.pdf;
https://www.jdpower.com/business/press-releases/2021-canada-wireless-network-quality-study
https://www.globenewswire.com/news-release/2021/10/18/2315958/0/en/Rogers-Ranked-by-Ookla-as-Canada-s-Most-Consistent-National-Wireless-and-Broadband-Provider-with-Fastest-Internet-in-Ontario-New-Brunswick-and-Newfoundland-and-Labrador.html