

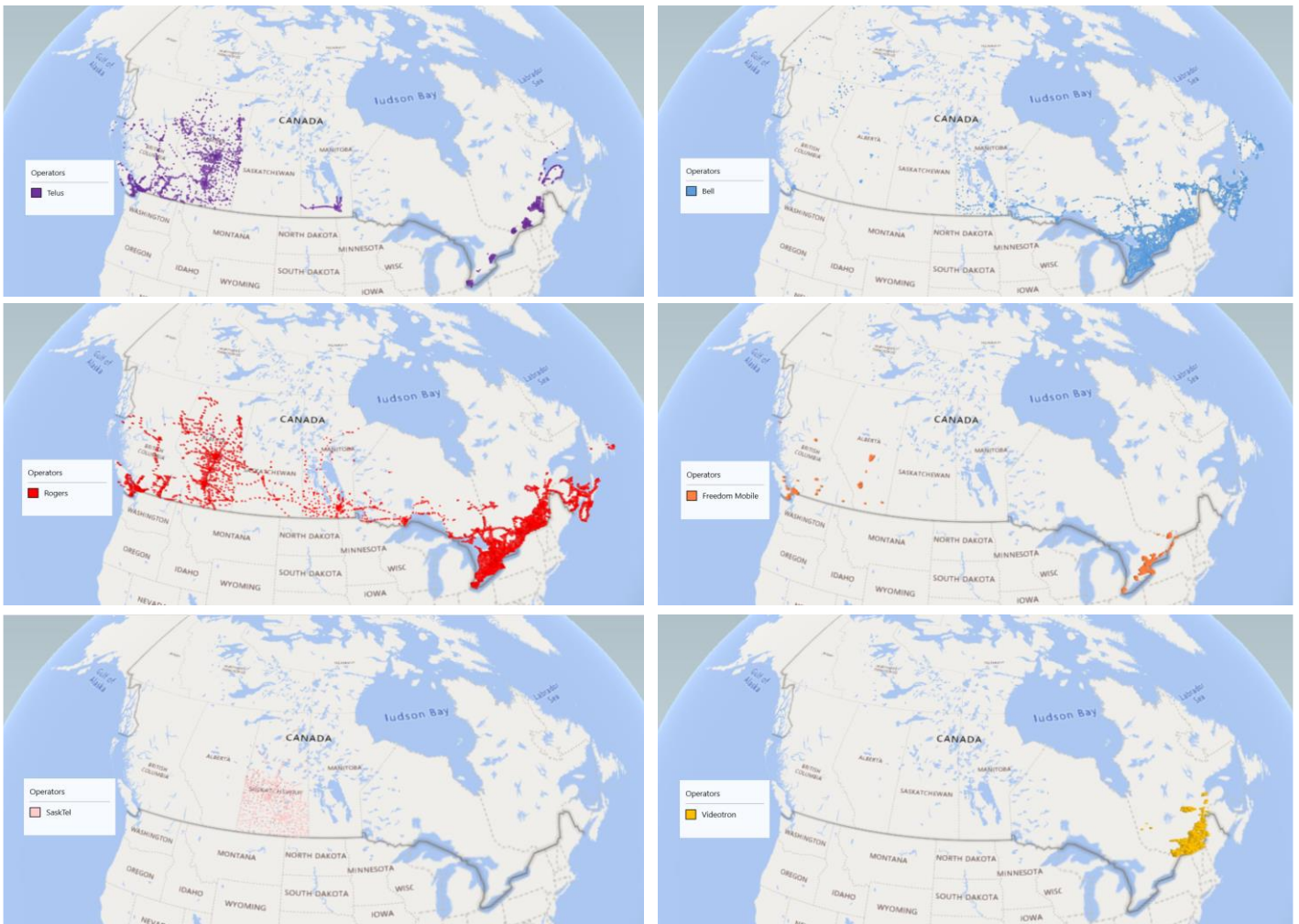
## Root cause of weak competition in the Canadian wireless market

The Canadian wireless market is ruled by provincial mobile network duopolies and monopolies. While in some provinces regional operators increasingly challenge the incumbents, at the national level, Canada is a de-facto network duopoly.

Rewheel research PRO study, 8<sup>th</sup> September 2019

- At first glance the Canadian wireless market appears like any other 4-MNO market where three incumbent operators are challenged by new entrant/s. Look closer though and a very different, non-competitive picture emerges.
- The Canadian wireless market is not national in scope. It is a fragmented wireless market, a stack of provincial mobile network duopolies and monopolies stitched together by extensive and possibly coordinated roaming and network sharing agreements.
- Quebec is the only province where 4 operators are present with an independent and substantial mobile network infrastructure.
- To make matters worse, the three incumbents (Rogers, Bell and Telus) engage in reciprocal network sharing, spectrum cross-licensing, subordination and joint spectrum acquisitions – measures that are most likely restrictive and anti-competitive.
- And to top it all off, CRTC, using a flawed methodology, mandated national roaming mobile data wholesale rates that are excessive and hence ineffective, i.e. they shield the duopolistic network structure from aspiring challenger operators.
- FACT: Rogers, Bell and Telus – while claiming world leading mobile network performance – each has less or roughly the same amount of macro cell sites as Finnish operators for serving 6x more population and 30x larger land area. 😞
- Mandated MVNO access cannot and will not remedy effective competition. Significant structural (bold) remedies are required.

### The Canadian model: network-sharing driven market consolidation

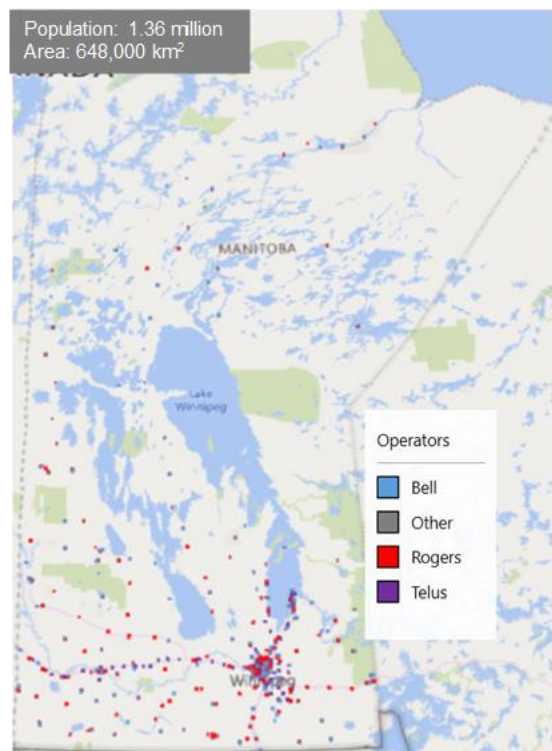


Shares of distinct cell site locations

	CANADA	ON	QC	BC	AB	MB	SK	NS	NB	NL	PE	NT	YT	NU
Million pop ->	37.43	14.50	8.50	5.00	4.36	1.36	1.17	0.97	0.77	0.52	0.16	0.04	0.04	0.04
1000 sqr km ->	9,982	1,076	1,542	944	661	648	651	55	73	405	6	1,346	482	2,093
<b>Telus</b>	29%	3%	32%	74%	51%	24%	0%	0%	0%	0%	0%	0%	0%	0%
<b>Rogers</b>	27%	37%	23%	17%	35%	44%	14%	18%	25%	5%	20%	0%	0%	0%
<b>Bell</b>	25%	41%	26%	1%	1%	31%	0%	46%	62%	90%	47%	81%	95%	44%
<b>Videotron</b>	4%	1%	18%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>Freedom Mobile</b>	7%	14%	0%	8%	13%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>SaskTel</b>	3%	0%	0%	0%	0%	0%	86%	0%	0%	0%	0%	0%	0%	0%
<b>Bragg</b>	2%	0%	0%	0%	0%	0%	0%	35%	13%	5%	33%	0%	0%	0%
<b>Other</b>	2%	3%	0%	0%	0%	0%	0%	1%	1%	0%	0%	19%	5%	56%
check total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
# of operators with >15% share	3	2	4	2	2	3	1	3	2	1	3	2	1	2
# ops with >50% of Nr1's cell sites	3	2	4	1	2	3	1	2	1	1	2	1	1	2

Selected extracts

Manitoba (MB) – 1.36 million pop, three networks but duopoly outside Winnipeg and surrounding southern main roads



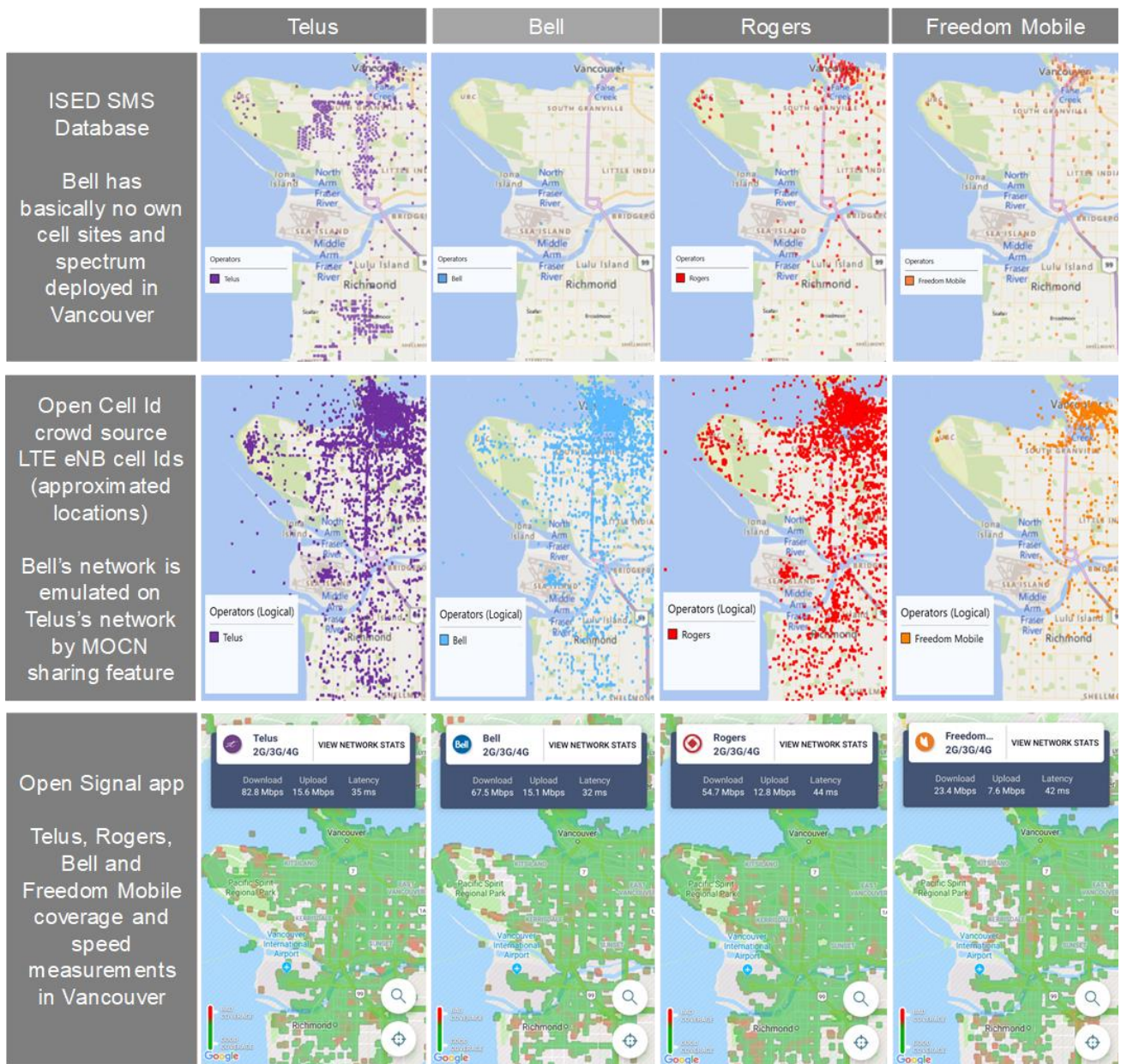
MB (Manitoba)	# Distinct transmitters	# Distinct cell sites	# Distinct high power cell sites	# Distinct low power only cell sites	# Distinct multi sector cell sites	# Distinct single sector cell sites
Telus	8,780	184	181	3	165	19
Rogers	3,341	338	331	7	268	70
Bell	5,349	239	238	1	209	30
Videotron	0	0	0	0	0	0
Freedom Mobile	0	0	0	0	0	0
SaskTel	0	0	0	0	0	0
Bragg	0	0	0	0	0	0
Other	3	1	1	0	1	0
<i>Total</i>	<i>17,473</i>	<i>762</i>	<i>751</i>	<i>11</i>	<i>643</i>	<i>119</i>

Source: ISED SMS database, physical radio transmitter locations, Rewheel analysis

In Manitoba Rogers has the most extensive coverage followed by Bell. Telus is present with own cell sites only in Winnipeg and along the main roads in the South. According to Open Cell Id’s data and Rewheel’s analysis there is MOCN network sharing (i.e. coordination) between Bell, Tell and Rogers in some parts of Manitoba.

Other operators in Manitoba that have licensed transmitters in the mobile service bands: Inuksuk Wireless (a single cell site).

Crowd sourced mobile performance apps like OpenSignal see reciprocally shared (MOCN) Canadian networks as distinct networks. It appears as if Telus and Bell had two independent high performing Canada-wide LTE radio networks. In this respect speed measurements of Canadian wireless operators from such apps are misleading.

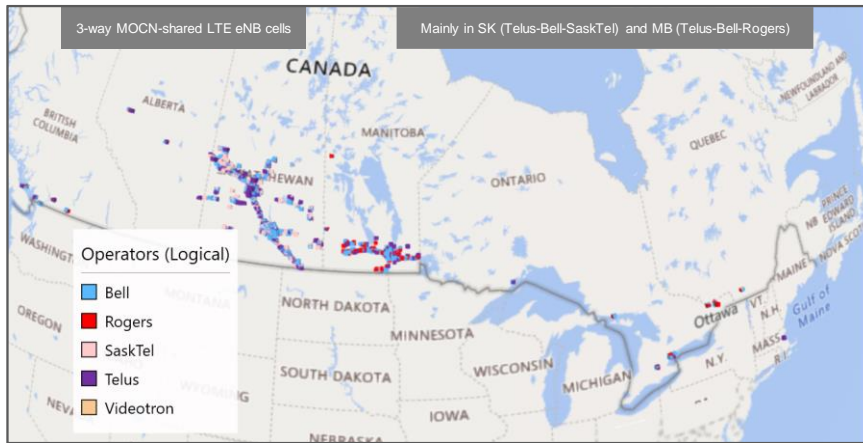
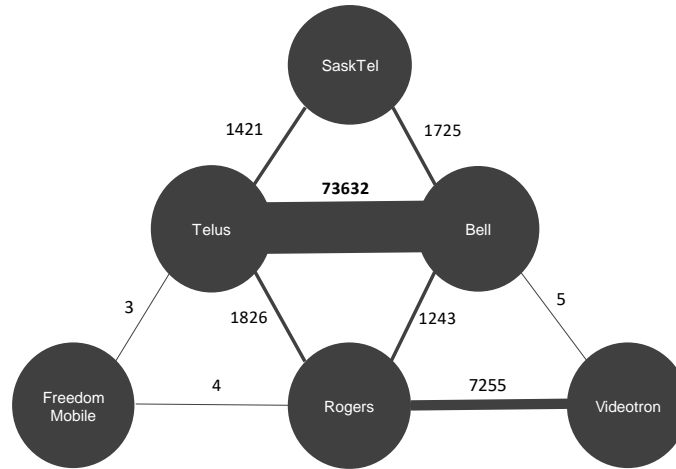


Source: ISDE SMS database Open Cell Id<sup>1</sup> raw database OpenSignal app snapshots

<sup>1</sup><https://opencellid.org>

Reciprocal access using MOCN sharing significantly restricts the independency of Canadian wireless networks.

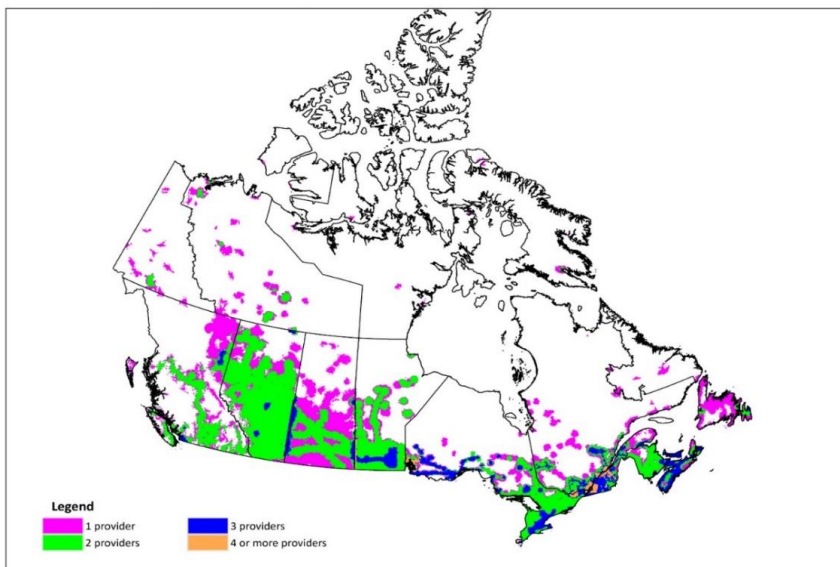
MOCN sharing mesh relationships between operators across Canada. The numbers next to the links represent the number of shared LTE eNodeB cells as registered by the crowd sourcing-based Open Cell Id database (a single macro cell site typically has several sectors and each sector often has several cells, e.g. one per frequency band). Row database: Open Cell Id, graph analysis: Rewheel



Wireless service coverage by number of facilities-based wireless providers (operators) – CRTC’s own analysis

Map 5.5.1 Wireless service availability by number of facilities-based WSPs, 2016

Wireless service coverage by number of facilities-based WSPs, 2016



Source: CRTC data collection

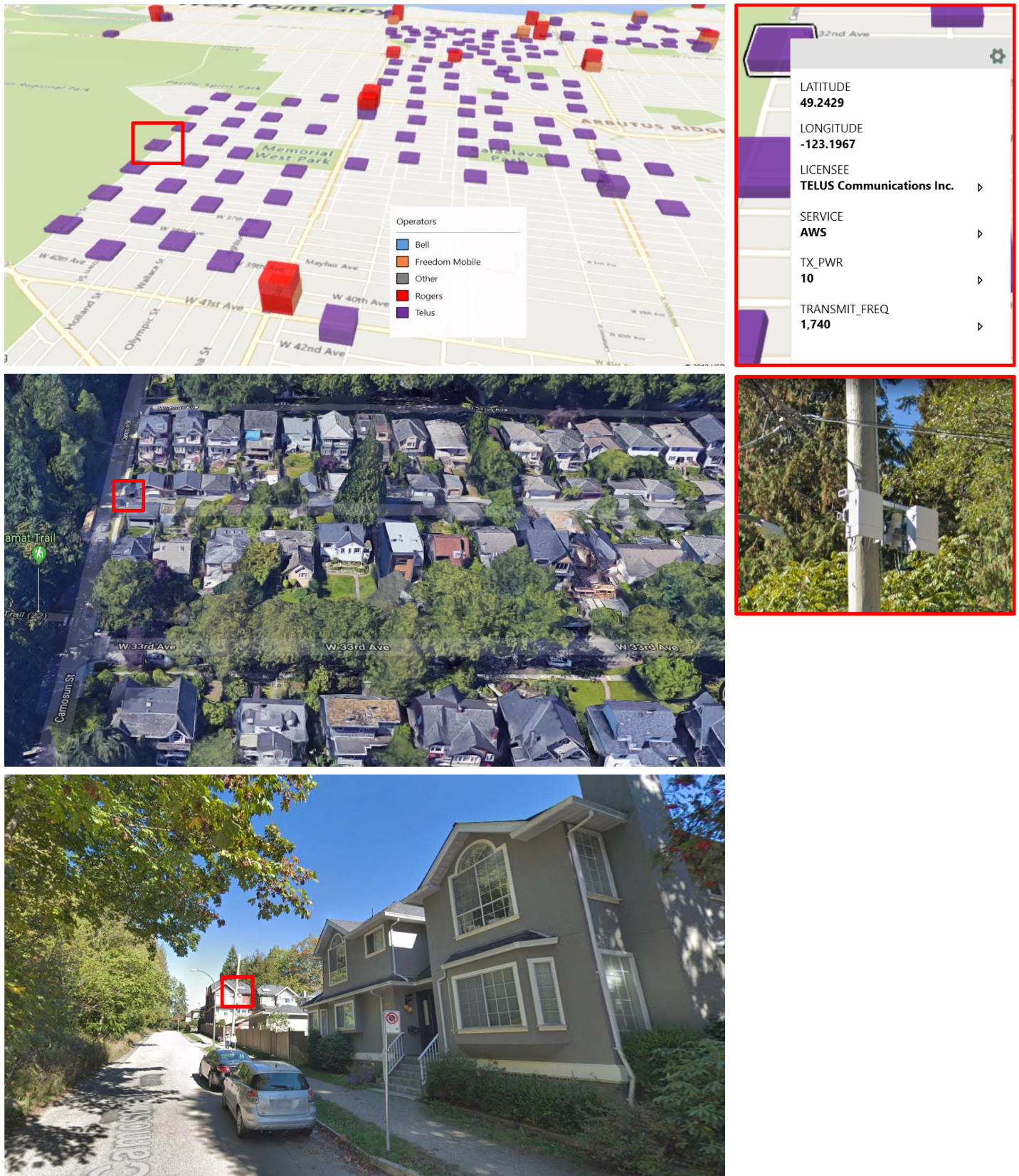
This map shows the cross-country availability of wireless services from facilities-based WSPs.

Since 2017 CRTC stopped reporting this coverage map.

Judging from the diminishing amount of information disclosed every year by CRTC in its Communications Monitoring Reports we could safely conclude that the news regarding the progress of facilities-based competition in the Canadian wireless market are not encouraging. Facilities-based competition actually decreased the last 4 years while the incumbents (Rogers, Bell and Telus) are calling for further consolidation. The future of competition in the Canadian wireless market looks gloomy.

### Telus's and Bells's massive small cell deployment on utility poles in selected suburban areas

Telus, Vancouver, BC (suburban part) – single sector, maximum transmit power per transmitter: 10 watts



The satellite photo and street view picture seen above are taken from Google Maps and Google Street View.

## Context

**CRTC asserted that under the current regulatory framework certain aspects of the wireless market are not, in fact, sufficiently competitive and proposed mandated MVNO wholesale access obligations as a potential remedy.**

In February 2019, the Canadian Radio-television and Telecommunications Commission (CRTC), initiated<sup>2</sup> a review of the Canadian mobile wireless services. Interested parties were invited to submit their interventions by the 15<sup>th</sup> of May 2019 and a public hearing is scheduled to take place on the 13<sup>th</sup> of January 2020.

The key objective of CRTC's ongoing review is to assess the need and the market benefits of mandated wholesale MVNO access obligations to the three so called '*national wireless carriers*' (i.e. Rogers, Bell and Telus).

Earlier, in 2015, CRTC mandated the provision of national wholesale roaming by the '*national wireless carriers*'. Rogers, Bell and Telus have currently an obligation to provide national roaming services at regulated rates to regional mobile network challengers (e.g. Freedom Mobile, Videotron, SaskTel, etc.) but not to MVNOs.

**Contrary to CRTC, the Competition Bureau noted that Canadian wireless prices are high relative to other countries, asserted that in provinces where the three incumbent operators (Rogers, Bell and Telus) are challenged by a regional network competitor prices are lower, concluded that competition appears to be restricted in Canada and questioned whether mandated MVNO access obligations or facilities-based measures was the right regulatory remedy.**

In May 2019, the Competition Bureau Canada (CBC), made its first intervention<sup>3</sup> in CRTC's ongoing consultation. By citing Rewheel's and other independent (not commissioned and paid by Canadian operators) research studies conducted by the OECD, ISED and FCC, the Bureau highlighted that Canadian wireless prices are high relative to other countries.

The Competition Bureau asserted in its first intervention that the Canadian wireless market is susceptible to coordination and concluded that substantial differences in prices among Canadian provinces were based on the presence or absence of a strong regional competitor, which disrupted coordination among the three national wireless carriers.

The Competition Bureau concluded, during its preliminary assessment, that while effective competition in the Canadian wireless market does appear to be currently restricted, it is possible that such restrictions could be countervailed in the future by the strengthening of regional facilities-based competitors. The Competition Bureau did not fully endorse the CRTC-proposed mandated MVNO access and questioned whether mandated MVNO access obligations or further measures to stimulate facilities-based competition should be the preferable approach.

In August 2019, CRTC, after having received an earlier request from the Commissioner of Competition to have certain designated information disclosed to the Bureau, decided to allow the disclosure. It is important to underscore that CRTC decided to disclose to the Commissioner of Competition all the requested information with the exception of copies of the Canadian operator network sharing agreements.

Network sharing agreements whereby operators build single networks that cover significant amount of population in selected geographical areas of the country and give reciprocal access to each other are – in most cases, as Rewheel<sup>4</sup> and the body of European telecom regulators (BEREC)<sup>56</sup> have argued – anti-competitive. Most recently, the European Commission sent<sup>7</sup> a Statement of Objections to T-Mobile and O2 in the Czech Republic (T-Mobile runs the network in the West and O2 runs the network in East of the

<sup>2</sup><https://crtc.gc.ca/eng/archive/2019/2019-57.htm>

<sup>3</sup><https://services.crtc.gc.ca/pub/ListeInterventionList/Documents.aspx?ID=278712&en=2019-57&dt=i&S=C&PA=t&PT=nc&PST=a&lang=e>

<sup>4</sup>[http://research.rewheel.fi/insights/2016\\_dec\\_pro\\_tightligopoly/](http://research.rewheel.fi/insights/2016_dec_pro_tightligopoly/)

<sup>5</sup>[https://berec.europa.eu/eng/document\\_register/subject\\_matter/berec/regulatory\\_best\\_practices/common\\_approaches\\_positions/8605-berec-common-position-on-infrastructure-sharing](https://berec.europa.eu/eng/document_register/subject_matter/berec/regulatory_best_practices/common_approaches_positions/8605-berec-common-position-on-infrastructure-sharing)

<sup>6</sup>[https://berec.europa.eu/eng/document\\_register/subject\\_matter/berec/reports/8164-berec-report-on-infrastructure-sharing](https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/8164-berec-report-on-infrastructure-sharing)

<sup>7</sup>[https://ec.europa.eu/commission/presscorner/detail/en/ip\\_19\\_5110](https://ec.europa.eu/commission/presscorner/detail/en/ip_19_5110)

country) informing them its preliminary view that their network sharing agreement restricts competition. Is Bell's and Telus's reciprocal network sharing any different?

### Rewheel's involvement in the consultation process

In January 2019 the Canadian Competition Bureau reached out and requested access to Rewheel's EU28 & OECD wireless pricing database for carrying out its own econometric analysis of the wireless industry. In May 2019 the Competition Bureau purchased an annual subscription to our premium research service and gained access to the tens of thousands of wireless smartphone and mobile broadband tariffs that we have collected bi-annually the last 5 years from the operator main brands, sub-brands and major MVNOs in the 41 EU28 & OECD countries.

In this study we take a closer look at the atypical structure of the Canadian wireless infrastructure market and in particular at the provincial network capabilities (presence, number of transmitters, macro and micro/small cell sites) of Canadian network operators. Our aim is to examine if the Canadian operator provincial network capabilities and/or network sharing arrangements are restrictive and consequently the root cause of the observable very weak retail and wholesale competition.

The last two years in our "*Capacity utilization and fixed-to-mobile broadband substitution potential with existing macro site grids*" studies<sup>8</sup> we have gathered intelligence regarding the amount of macro cell sites for over 100 mobile network operators present in EU28 and OECD countries in order to estimate the capacity utilization and capacity potential for each operator. Therein we observed an interesting anomaly concerning the amount of macro cell sites deployed by the three incumbent Canadian wireless operators: Rogers, Bell and Telus each has less or roughly the same amount of macro cell sites as each of the three Finnish operators even though Canadian operators serve a country with 6x higher population and 30x larger land area than Finland. How is that possible?

Driven by our curiosity – have Canadian operators invented new, more efficient ways of rolling out mobile networks and/or do electromagnetic waves propagate further in Canada? – we downloaded the official ISED wireless transmitter database (4<sup>th</sup> September 2019) and crunched the numbers. We were in for a big surprise.

The Canadian wireless market is not a 4-MNO market in the making (i.e. 3-MNO market where a 4<sup>th</sup> entrant is building out its network). It is not even a typical 3-MNO market where 3 mobile network operators cover the entire country with an independent network.

The Canadian wireless market is not national in scope. Canada is a fragmented wireless market, a stack of provincial mobile network duopolies and monopolies that are stitched together by extensive and possibly coordinated national roaming and network-spectrum sharing agreements that are probably anti-competitive. The Canadian wireless market is an archetype of network-sharing driven market consolidation.

Unfortunately, MVNO wholesale access obligations cannot and will not repair the structural failures of the Canadian wireless market. The European Commission Directorate for Competition<sup>9,10</sup>, a number of Member State national competition authorities<sup>11</sup> and Rewheel<sup>12,13</sup> have rejected the notion that MVNO wholesale access obligations are an effective remedy in 4 to 3 mergers. Rewheel has shown that MVNO wholesale access obligations are inherently ineffective<sup>14,15</sup>. Under no circumstances can MVNOs substitute the short- and long-term competitive pressure exerted by challenger mobile network operators that deploy their substantial spectrum holdings, which are national in scope, in their own independent infrastructure.

<sup>8</sup>[http://research.rewheel.fi/insights/2018\\_sep\\_pro\\_capacity/](http://research.rewheel.fi/insights/2018_sep_pro_capacity/)

<sup>9</sup>[https://ec.europa.eu/competition/mergers/cases/decisions/m7612\\_6555\\_3.pdf](https://ec.europa.eu/competition/mergers/cases/decisions/m7612_6555_3.pdf)

<sup>10</sup>[https://ec.europa.eu/competition/mergers/cases/decisions/m7758\\_2937\\_3.pdf](https://ec.europa.eu/competition/mergers/cases/decisions/m7758_2937_3.pdf)

<sup>11</sup><https://www.ft.com/content/d10483aa-f8a0-11e3-befc-00144feabdc0>

<sup>12</sup>[http://research.rewheel.fi/downloads/T-Mobile\\_Tele2\\_4\\_to\\_3\\_mobile\\_merger\\_effective\\_remedies\\_REDACTED\\_PUBLIC.pdf](http://research.rewheel.fi/downloads/T-Mobile_Tele2_4_to_3_mobile_merger_effective_remedies_REDACTED_PUBLIC.pdf)

<sup>13</sup>[http://research.rewheel.fi/downloads/Hutchison\\_WIND\\_merger\\_Italy\\_remedies\\_01092016\\_PUBLIC.pdf](http://research.rewheel.fi/downloads/Hutchison_WIND_merger_Italy_remedies_01092016_PUBLIC.pdf)

<sup>14</sup>[http://research.rewheel.fi/downloads/Effectiveness\\_MVNO\\_wholesale\\_access\\_remedies\\_25012016\\_PUBLIC.pdf](http://research.rewheel.fi/downloads/Effectiveness_MVNO_wholesale_access_remedies_25012016_PUBLIC.pdf)

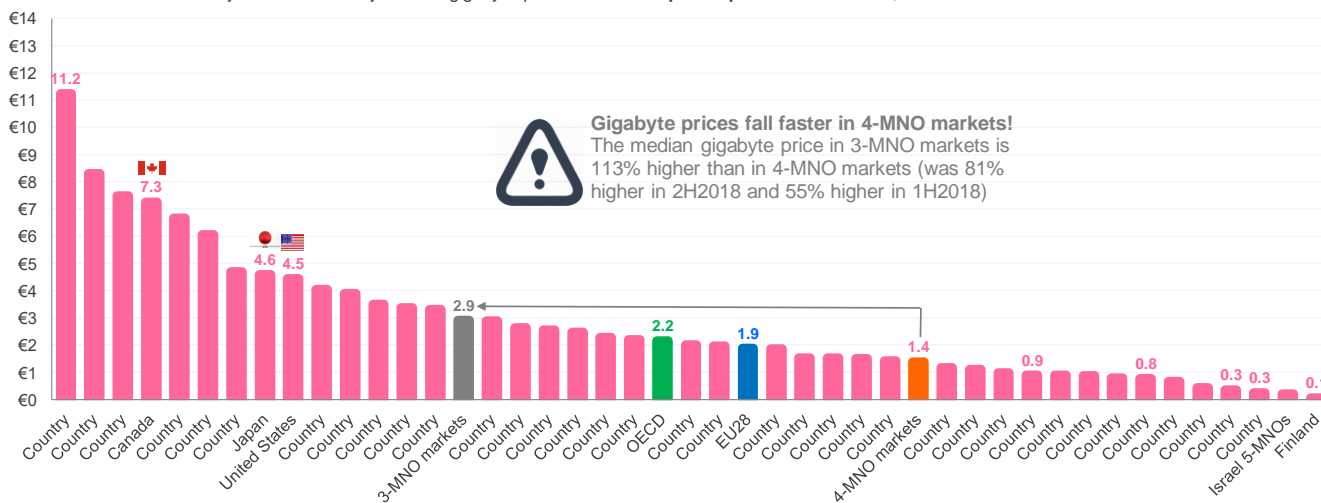
<sup>15</sup>[http://research.rewheel.fi/downloads/Near\\_zero\\_marginal\\_mobile\\_data\\_cost\\_25092017\\_PUBLIC.pdf](http://research.rewheel.fi/downloads/Near_zero_marginal_mobile_data_cost_25092017_PUBLIC.pdf)

**Rewheel’s European ‘competitive markets perspective’**

The Canadian wireless market where network duopolies, reciprocal sharing and excessive gigabyte prices is the norm fails the European ‘competitive market test’. The Canadian wireless market is a universe apart from competitive European 4-MNO markets.

**Country median gigabyte price in EU28 & OECD markets - April 2019**

Fully allocated country median gigabyte price of 4G smartphone plans with at least 1,000 minutes and 3Mbit/s for HD video



Fully allocated GB price: tariff retail monthly price (incl. VAT) divided by included gigabyte allowance. 3-MNO markets (25 countries), 4-MNO markets (16)  
 Median price among all eligible plans logged in the database for country or group of countries. Unlimited plans were assigned 500 GB finite volume.

Prices: April 2019  
 research.rewheel.fi ©

**Rewheel’s intervention: The root cause of weak competition in Canada is structural (i.e. provincial network duopolies/monopolies). Mandated MVNO access is not an effective remedy. Significant structural remedies are required.**

Effective competition in the Canadian wireless market can only be achieved by a set of very significant (bold) structural remedies.



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New radio spectrum bands, 4.5G and 5G technology, unlimited mobile data plans and the Internet of Things radically change mobile network operators' cost, revenue and profitability dynamics. **Rewheel's mission is to help operators prepare for the paradigm shift in network and spectrum strategy, spectrum valuation, network sharing, M&A, MVNO economics and mobile data pricing.**

Founded in 2009, Rewheel is a Finland based boutique management consultancy. Our clients are mainly European mobile network operators, telco groups, MVNO groups, sector regulators, governments, global internet firms, mobile data-centric start ups, PE and VC investors.

We delivered management consultancy work for clients in the United Kingdom, United States, Ireland, Switzerland, Finland, Sweden, Belgium, Greece, Poland, Slovenia, Hungary, Russia, Romania. Buyers of our research reports and related strategic workshops include many companies and authorities across Europe and worldwide.

Since 2010 we have been supporting a number of European challenger mobile operators in multiband (700, 700 SDL, 800, 900, 1400 SDL, 1800, 2600, 3.5 GHz) auctions with spectrum valuation and strategic advisory services.

### Network economics metrics

For comprehensive data usage, spectrum usage and capacity utilisation metrics in EU28 and OECD markets visit  
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⇒ [http://research.rewheel.fi/insights/2017\\_nov\\_pro\\_2h2017\\_release/](http://research.rewheel.fi/insights/2017_nov_pro_2h2017_release/)

#### Unlimited mobile data and near zero marginal cost – a paradigm shift in telco business models

⇒ [http://research.rewheel.fi/insights/2017\\_sep\\_pro\\_near\\_zero\\_marginal\\_cost/](http://research.rewheel.fi/insights/2017_sep_pro_near_zero_marginal_cost/)

#### O2 – Ready to disrupt the German tight oligopoly market

⇒ [http://research.rewheel.fi/insights/2017\\_apr\\_pro\\_o2\\_germany\\_turnaround/](http://research.rewheel.fi/insights/2017_apr_pro_o2_germany_turnaround/)

#### Capacity utilization and fixed-to-mobile broadband substitution potential – A study of 64 European operators

⇒ [http://research.rewheel.fi/insights/2017\\_mar\\_pro\\_network\\_utilisation\\_mimo/](http://research.rewheel.fi/insights/2017_mar_pro_network_utilisation_mimo/)

#### Effective structural remedies for Hutchison-WIND 4 to 3 Italian mobile merger

⇒ [http://research.rewheel.fi/insights/2016\\_sept\\_premium\\_italy\\_hutch\\_wind\\_merger/](http://research.rewheel.fi/insights/2016_sept_premium_italy_hutch_wind_merger/)

#### Telenor Denmark – Turnaround strategy

⇒ [http://research.rewheel.fi/insights/2016\\_apr\\_premium\\_telenor\\_denmark\\_turnaround/](http://research.rewheel.fi/insights/2016_apr_premium_telenor_denmark_turnaround/)

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