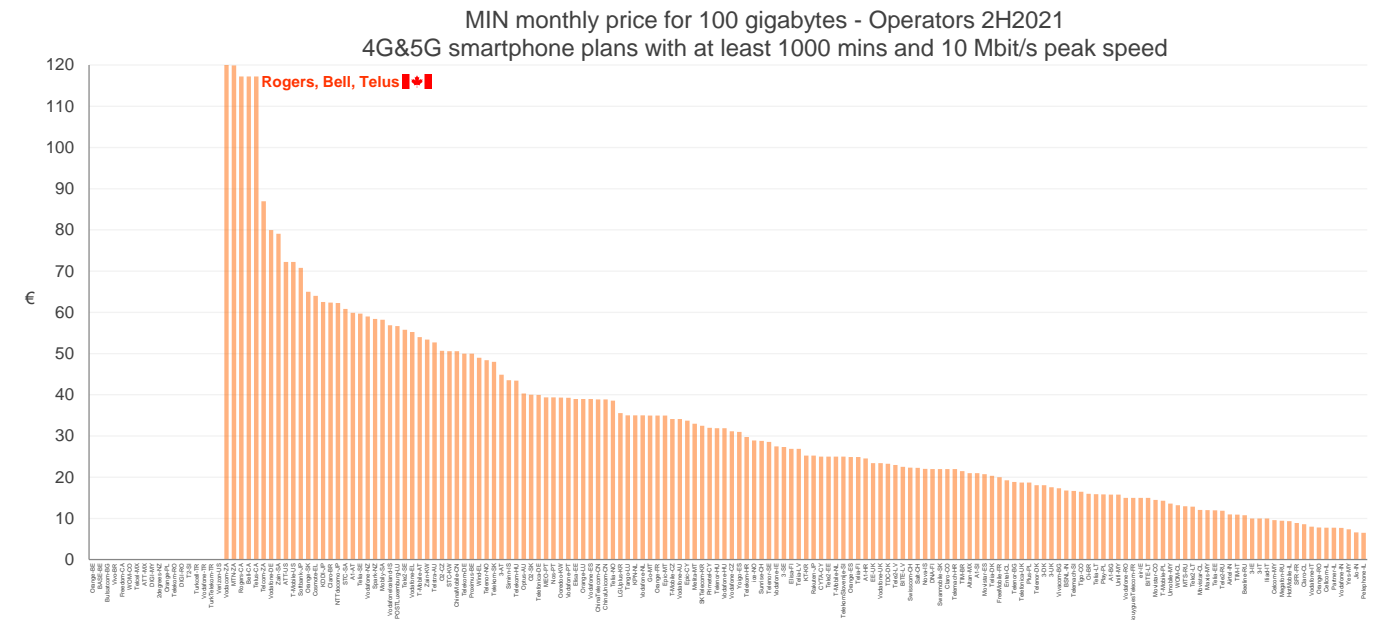


The state of 4G and 5G pricing, 2H2021 – operator rankings

Vodacom's South Africa monthly price for 100 gigabytes was 19x higher than Pelephone's Israel (~126 vs. ~6 EUR). Latest and historic (2014-2021) 4G and 5G prices from 172 operators in 50 European, American, Asia Pacific, Middle East and African countries.

Rewheel research PRO study, Digital Fuel Monitor 16th release – October 2021



MainSubMVNO operator brand/s included in the comparison.
Minimum monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database for operator with at least the specified gigabytes and peak speed.

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Operators with highest smartphone plan prices

- Vodacom and MTN South Africa were the operators with the highest and second highest monthly price (126 EUR and 120 EUR respectively) for a smartphone plan with at least 1000 minutes, 10 Mbit/s peak speed and 100 gigabytes.
- Rogers, Bell and Telus Canada were the operators with the third, fourth and fifth highest prices. All three Canadian operators sold 100 gigabytes for an identical monthly fee of 117 EUR (175 CAD).
- Among the ten operators with the highest monthly prices for 100 gigabytes where operators from the South African, Canadian, German, Saudi Arabian and US markets.
- South Africa is transitioning from 4 to 3 mobile network operators (MNOs). Canada is a de-facto network duopoly¹ where concentration might increase further if the Rogers-Shaw proposed merger² is approved. Germany is transitioning from 3 to 4 MNOs. Saudi Arabia is a 3-MNO market. The United States transitioned to 3 MNOs in 2020 after the acquisition of Sprint by T-Mobile. DISH is expected to launch as the new 4th MNO in United States in 2022.
- Telus Canada was the operator with the highest monthly price for a smartphone plan with at least 10 gigabytes.

Operators with lowest smartphone plan prices

- Pelephone Israel was the operator with the lowest monthly price of 6.50 EUR for a smartphone plan with at least 1000 minutes, 10 Mbit/s peak speed and 100 gigabytes. Jio India had the second lowest price for 100 gigabytes of 6.59 EUR.
- Among the ten operators with the lowest monthly prices for 100 gigabytes where operators from the Israeli, Indian, Malaysian, Romanian, Italian, Chilean and French markets.
- There are 6 MNOs in Malaysia. Israel and India have been transitioning from 5 to 4 MNOs. The Italian market is transitioning from 4 to 5 MNOs while there are 4 MNOs in the Romanian, Chilean and French markets.
- In September 2021 the minimum monthly price for 100 gigabytes was 7.99 EUR in Italy and 8.90 EUR in France.
- Pelephone's minimum monthly price for 100 gigabytes was ~19x lower than Vodacom's (6.50 EUR vs. 126 EUR).

Fixed wireless access (FWA) – Who were the operators with lowest and highest prices for 4G or 5G home broadband?

- 1 Terabyte 25Mbit/s 4G: Lowest: Orange Romania (10 EUR). Highest: Mobily & STC Saudi Arabia and Telus Canada.
- 2 Terabytes 100 Mbit/s 5G: Lowest: TelenorPPF Bulgaria (~13 EUR). Highest: Mobily & STC Saudi Arabia and Telenor Norway
- 3 Terabytes 500Mbit/s 5G: Lowest: Hutchison 3 UK (~26 EUR). Highest: Mobily, STC and Zain Saudi Arabia.

¹http://research.rewheel.fi/downloads/Root_cause_weak_competition_Canada_wireless_market_PUBLIC.pdf

²https://research.rewheel.fi/downloads/Canada_needs_new_maverick_mobile_network_operator_PUBLIC_VERSION.pdf

What's new?

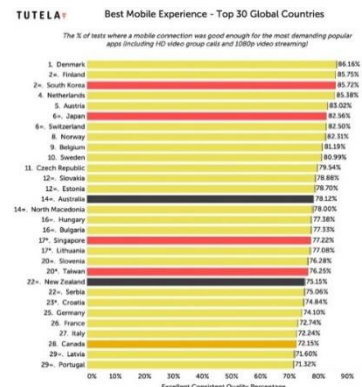
- For the first time we present historic (2014-2021) mobile network operator 4G and 5G smartphone plan prices. The full PRO version of the report includes the historic *MIN monthly prices* of 4G or 5G smartphone plans with at least 1000 minutes, 10 or 500 Mbit/s peak speed and 1, 10, 100 or 1000 gigabytes sold by the four Swedish mobile network operators' main brands, sub-brands and MVNOs.
- Rewheel research subscribers can purchase customized versions of the report with historic prices for operators from another country and/or the entire tariff database (Excel spreadsheet) where they could automatically create charts/tables using the *MIN monthly price* metric for any or all the 172 mobile network operators. Subscribers could select smartphone, mobile broadband or wireless broadband plans and could freely choose to include in the charts 4G plans only, 5G plans only, 4G&5G plans, the operator main brands only, the operator sub-brands only, the MVNOs only or all brands. Subscribers could determine freely the peak speed (e.g., 1, 5, 10, 25, 50, 100, 500, 1000 Mbit/s) rule and the minimum included gigabyte allowance (e.g., 1, 10, 100, 1000 or unlimited gigabytes).

Rogers, Bell, Telus and Freedom Canada prices vs. French operator prices – French monthly prices up to 16x lower

- Freedom's Canada monthly prices for plans with 1 to 40 gigabytes were up to 37% lower than Roger's, Bell's or Telus' prices.
- French operator monthly prices for plans with 1 to 100 gigabytes were up to 16x times lower than Canadian operator prices.
- Even though monthly prices are 5x to 16x lower in France, French mobile networks perform better than Canadian (see Tutela³).

4G&5G smartphone plans with at least 1000 mins, 10 Mbit/s peak speed and...	Rogers minimum monthly price (EUR)	Bell minimum monthly price (EUR)	Telus minimum monthly price (EUR)	Freedom minimum monthly price (EUR)	How much lower Freedom prices are (%)	French operator lowest monthly price	How much lower French prices are from Canadian prices (times)
1 GB	PRO vers.	PRO vers.	PRO vers.	PRO vers.	36.7%	PRO vers.	6
5 GB	PRO vers.	PRO vers.	PRO vers.	PRO vers.	11.1%	PRO vers.	13
10 GB	PRO vers.	PRO vers.	PRO vers.	PRO vers.	20.0%	PRO vers.	5
20 GB	PRO vers.	PRO vers.	PRO vers.	PRO vers.	23.1%	PRO vers.	7
30 GB	PRO vers.	PRO vers.	PRO vers.	PRO vers.	6.3%	PRO vers.	10
40 GB	PRO vers.	PRO vers.	PRO vers.	PRO vers.	8.0%	PRO vers.	16
50 GB	PRO vers.	PRO vers.	PRO vers.			PRO vers.	11
80 GB	PRO vers.	PRO vers.	PRO vers.			PRO vers.	15
100 GB	PRO vers.	PRO vers.	PRO vers.			PRO vers.	13

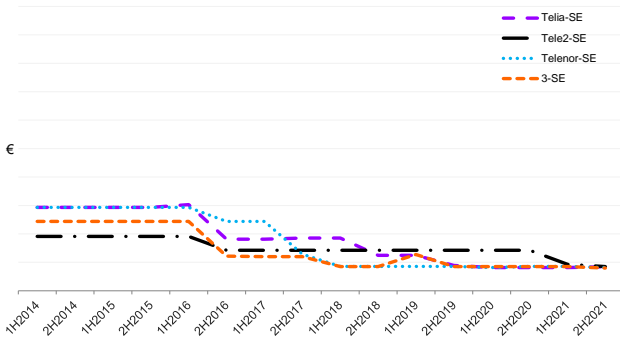
Prices September 2021 (1 CAD = 0.67 EUR) research.rewheel.fi ©



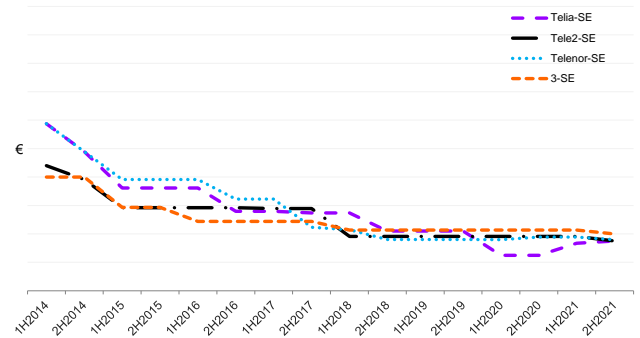
Historic (2014-2021) prices of Swedish mobile network operator' main brands, sub-brands and MVNOs

- Monthly prices of 4G smartphone plans with 1, 10 and 100 gigabytes have more than halved in Sweden while the monthly price of plans with at least 1000 gigabytes has fallen by 43%.

MIN monthly price for 1 gigabytes - MainSubMVNO operator brand/s included 4G&5G smartphone plans with at least 1000 mins and 10 Mbit/s peak speed



MIN monthly price for 10 gigabytes - MainSubMVNO operator brand/s included 4G&5G smartphone plans with at least 1000 mins and 10 Mbit/s peak speed



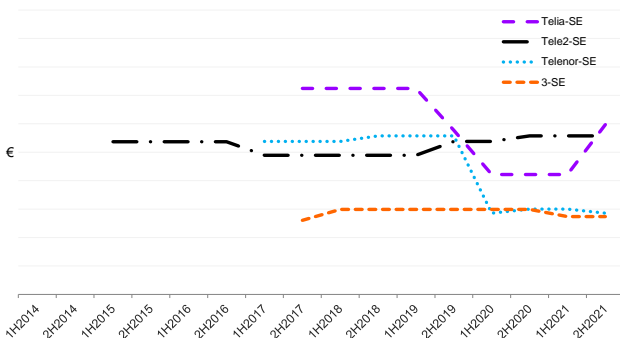
Minimum monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database for operator with at least the specified gigabytes and peak speed.

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Minimum monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database for operator with at least the specified gigabytes and peak speed.

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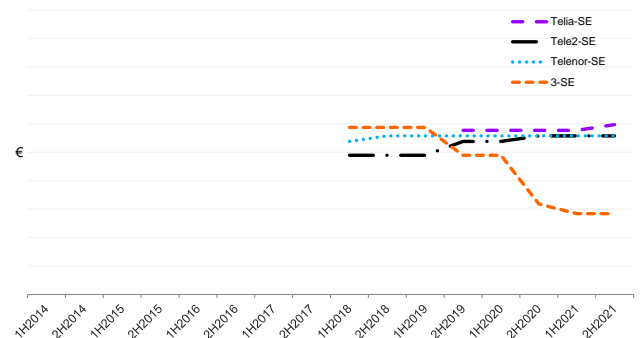
MIN monthly price for 100 gigabytes - MainSubMVNO operator brand/s included 4G&5G smartphone plans with at least 1000 mins and 10 Mbit/s peak speed



Minimum monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database for operator with at least the specified gigabytes and peak speed.

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MIN monthly price for 1000 gigabytes - MainSubMVNO operator brand/s included 4G&5G smartphone plans with at least 1000 mins and 10 Mbit/s peak speed

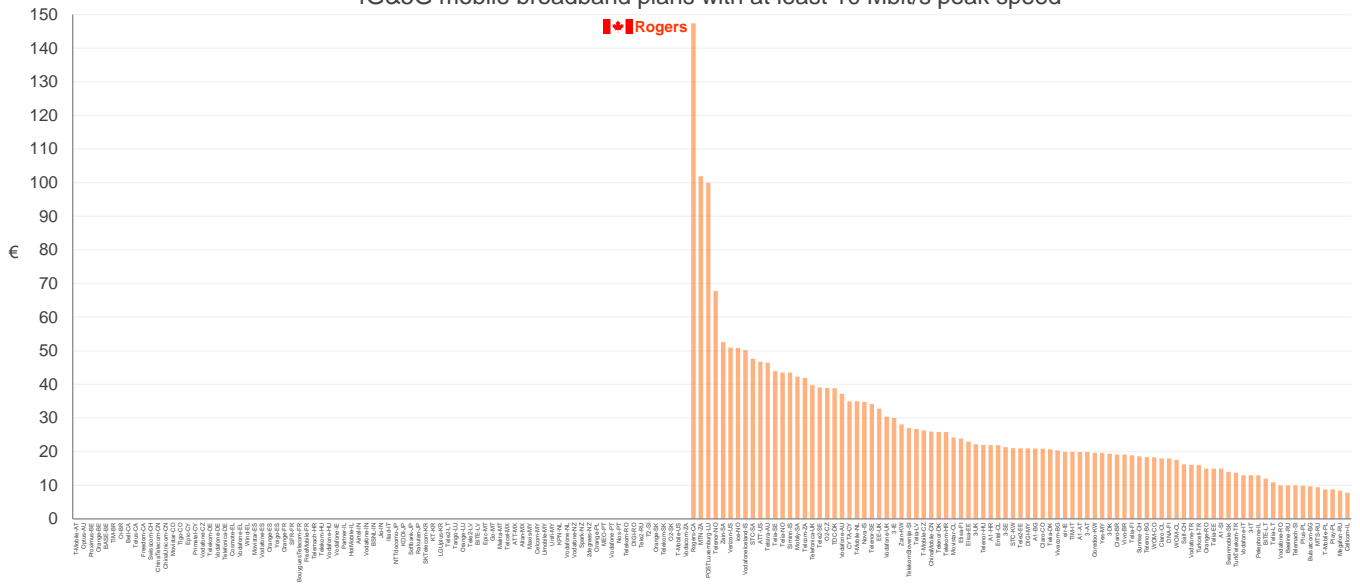


Minimum monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database for operator with at least the specified gigabytes and peak speed.

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³https://www.tutela.com/blog/global-mobile-experience-2021

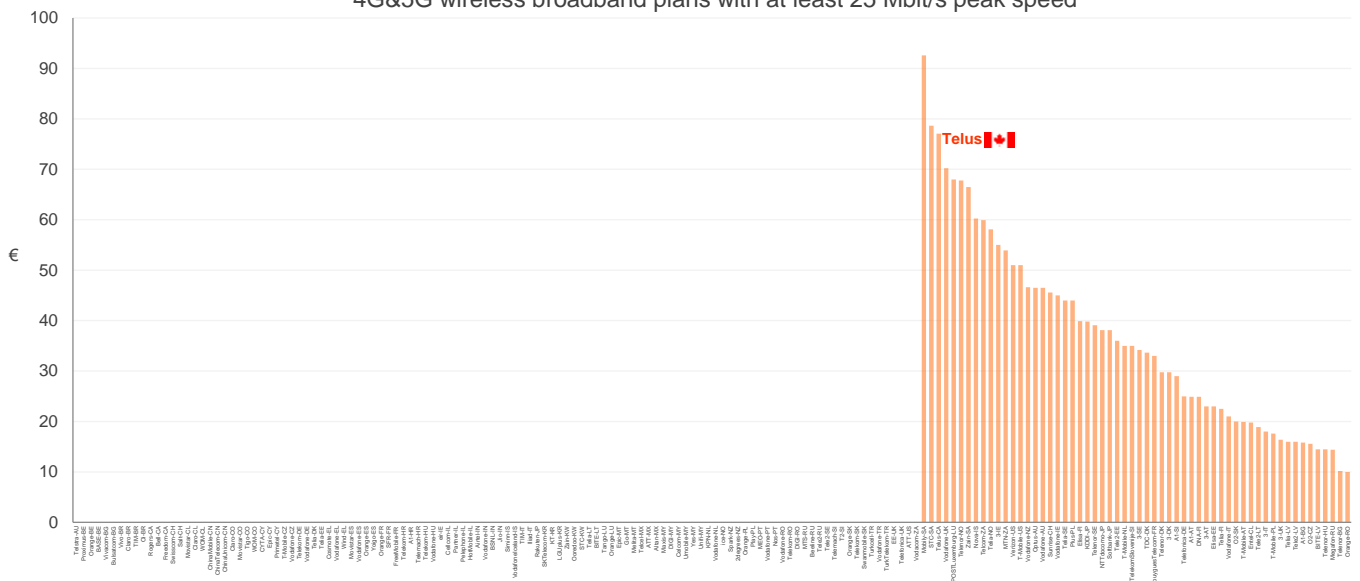
MIN monthly price for 100 gigabytes - Operators 2H2021 4G&5G mobile broadband plans with at least 10 Mbit/s peak speed



MainSubMVNO operator brand/s included in the comparison.
Minimum monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database for operator with at least the specified gigabytes and peak speed.

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MIN monthly price for 1000 gigabytes - Operators 2H2021 4G&5G wireless broadband plans with at least 25 Mbit/s peak speed



MainSubMVNO operator brand/s included in the comparison.
Minimum monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database for operator with at least the specified gigabytes and peak speed.

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Mobile data pricing, mobile operator competitiveness rankings, market modelling & analysis, competition analysis (consolidation, 4 to 3 mobile mergers, effective remedies, new market entries), MNO near-zero marginal data cost, MVNO economics, mobile capacity-only play, mobile centric convergence (MCC) pro-competitive strategies and 4th MNO business case.

Founded in 2009 and incorporated in Finland, Rewheel is a privately owned independent telecom research firm and boutique management consultancy. Our clients are mobile network operators, telco groups, MVNO groups, competition authorities, telecom sector regulators, governments, global internet firms, mobile data-centric start-ups, PE and VC investors.

Rewheel has delivered management consultancy work for clients in the United Kingdom, United States, Ireland, Switzerland, Finland, Sweden, Belgium, Greece, Poland, Slovenia, Hungary, Russia, Romania.

The following authorities have acquired access to Rewheel's independent pricing, mobile market competitiveness, 4 to 3 merger analysis and remedy assessment research: The European Commission Directorate for Competition, the United States Department of Justice, the New York, California and many other US State Attorney General Offices, the national competition authorities of Canada, Australia, the Netherlands and Greece, the Ministry of Economic Affairs of the Netherlands, the Ministry of Industry and Trade of Czechia, the Korean Electronics and Telecommunication Research Institute, the sector regulators of the United Kingdom, Germany, France, the Netherlands, Ireland, Finland, Portugal, etc.

Rewheel's mobile data pricing, strategy, competition analysis, merger assessment, network economics, spectrum, profitability and competitiveness focused reports have been cited by OECD Economic Surveys, The Economist, The Financial Times, The New York Times, Reuters, Bloomberg, WSJ and publicly referenced by the UK telecoms regulator Ofcom, BIPT, Vodafone, Telefonica, Tele2, Elisa, DNA, GSMA, VPs of the EU Commission responsible for Competition, MEPs, IEEE, ITU.

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1 Methodology

Following the publication of the country rankings in Rewheel's Digital Fuel Monitor 16th bi-annual release “*The state of 4G and 5G pricing, 2H2021 – country rankings*” we present and discuss herein the rankings of the 172 mobile network operators (MNOs) that were present in the 50 European, American, Asia Pacific, Middle East and African countries during the second half of 2021.

The data (tariff plan prices and conditions) collection and analysis methodology used in this study is identical to the methodology we used in the 2H2021 country rankings study⁴ that was released on the 1st of October 2021.

1.1 Price metric for operator 2H2021 rankings

Herein we use the *MIN monthly price for a given gigabyte volume and peak speed* (e.g., 100 gigabytes at 10 Mbit/s) to rank the 172 operators that were present in the 50 European, American, Asia Pacific, Middle East and African countries. The *MIN monthly price for a given gigabyte volume and peak speed* is the lowest monthly retail price (including VAT and other applicable taxes) per operator among all eligible tariffs that were logged in the database that included the given gigabyte volume at the specified peak speed.

Please note that in the charts that depict the 2H2021 operator rankings we used the minimum monthly price (i.e., the tariff with the lowest monthly price that meets technology, gigabyte and peak speed criteria) from the operator main brand, sub-brands or any of the MVNOs hosted in the operator network.

For smartphone plans we present the *MIN monthly price* rankings for:

- 4G or 5G plans with at least 1, 5, 10, 20, 30, 40, 50, 80, 100, 200, 300, 500, 1000 gigabytes and 10 Mbit/s
- 5G plans with at least 100, 200, 300, 500, 1000 gigabytes and 100 Mbit/s
- 5G plans with at least, 500, 1000 gigabytes and 500 Mbit/s

For mobile broadband plans we present the *MIN monthly price* rankings for:

- 4G or 5G plans with at least 1, 5, 10, 20, 30, 40, 50, 80, 100, 200, 300, 500, 1000 gigabytes and 10 Mbit/s
- 5G plans with at least 100, 200, 300, 500, 1000 gigabytes and 100 Mbit/s
- 5G plans with at least, 500, 1000 gigabytes and 500 Mbit/s

For wireless broadband plans we present the *MIN monthly price* rankings for:

- 4G or 5G plans with at least 100, 200, 300, 500, 1000, 2000, 3000 gigabytes and 25 Mbit/s
- 5G plans with at least 100, 200, 300, 500, 1000, 2000, 3000 gigabytes and 100 Mbit/s
- 5G plans with at least, 500, 1000, 2000, 3000 gigabytes and 500 Mbit/s

1.2 Price metric for historic (2014-2021) smartphone plan prices of Swedish mobile network operators

For the charts that depict the historic (2014-2021) smartphone plan prices of the four Swedish mobile network operators (i.e., Telia, Tele2, Telenor and 3) we use the *MIN monthly price* for plans with at least 1, 10, 100 or 1000 gigabytes and 10 Mbit/s and as well the *MIN monthly price* for 5G plans with at least 1000 gigabytes and 500 Mbit/s. We present historic price charts depicting the *MIN monthly price* of Telia's Tele2's, Telenor's and 3's main brands only, sub-brands only, MVNOs only and as well the *MIN monthly price* among any of the operator's brands.

1.3 Price metric for latest Canadian vs. French smartphone plan prices comparison

For the charts that depict the latest (September 2021) smartphone plan prices of the Canadian (i.e., Rogers, Bell, Telus, Freedom) vs. the lowest price among all operators in France we use the *MIN monthly price* for plans with at least 1, 5, 10, 20, 30, 40, 50, 80 or 100 gigabytes and 10 Mbit/s among any of the operator's brands.

⁴https://research.rewheel.fi/downloads/The_state_of_4G_5G_pricing_16_release_2H2021_countries_PUBLIC_VERSION.pdf