

The state of broadband (FBB&FWA) pricing – 1H2023

5G fixed wireless access (FWA) broadband plans are marketed and priced as equal or better alternatives compared to non- pure fibre based broadband plans. In 9 out of 50 countries (e.g., in the UK and Switzerland) plans with the lowest monthly price, for 100 Mbit/s download speed, were 5G FWA rather than fixed broadband plans. While broadband prices are higher in more expensive countries mobile prices are not. Mobile monthly prices are, in average, 2-3 times lower in 4 vs. 3 MNO markets.

Rewheel research PRO study – June 2023

Fixed broadband (FBB) plans



Median monthly price in EU €30.0

Median terabyte price in EU €3.0

Fixed Wireless Access (FWA) plans

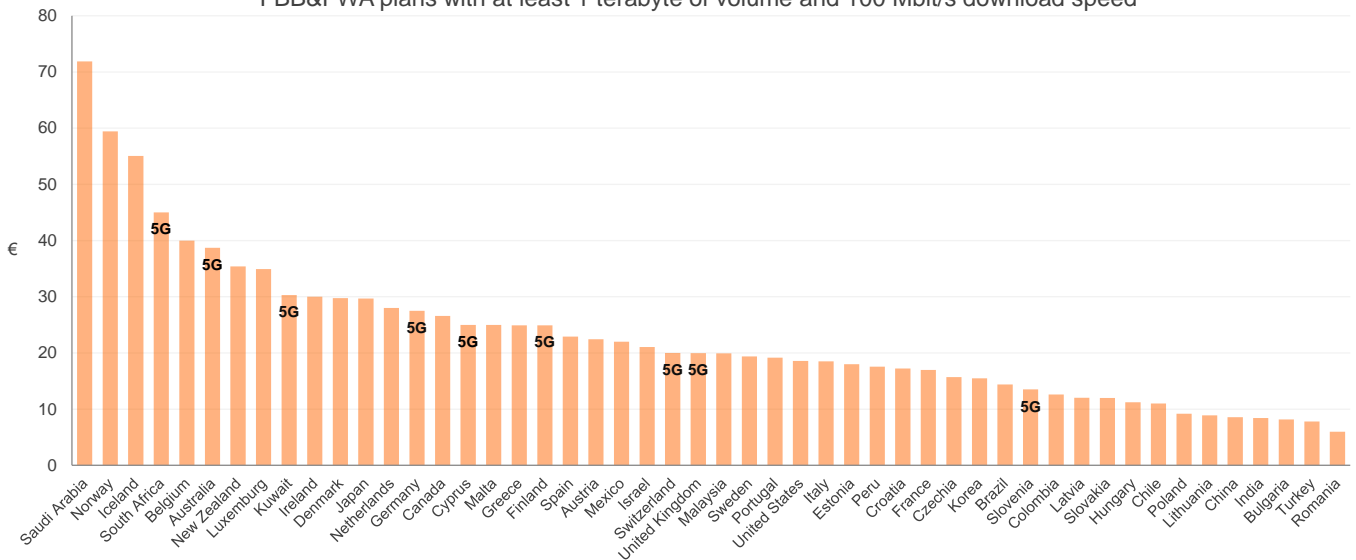


Median monthly price in EU €29.4

Median terabyte price in EU €3.1

Romania was the country with the cheapest broadband plans. Romanian operators sold fibre-based broadband plans with download speeds of 500 Mbit/s to 1 Gbit/s for €6 to €9 per month.

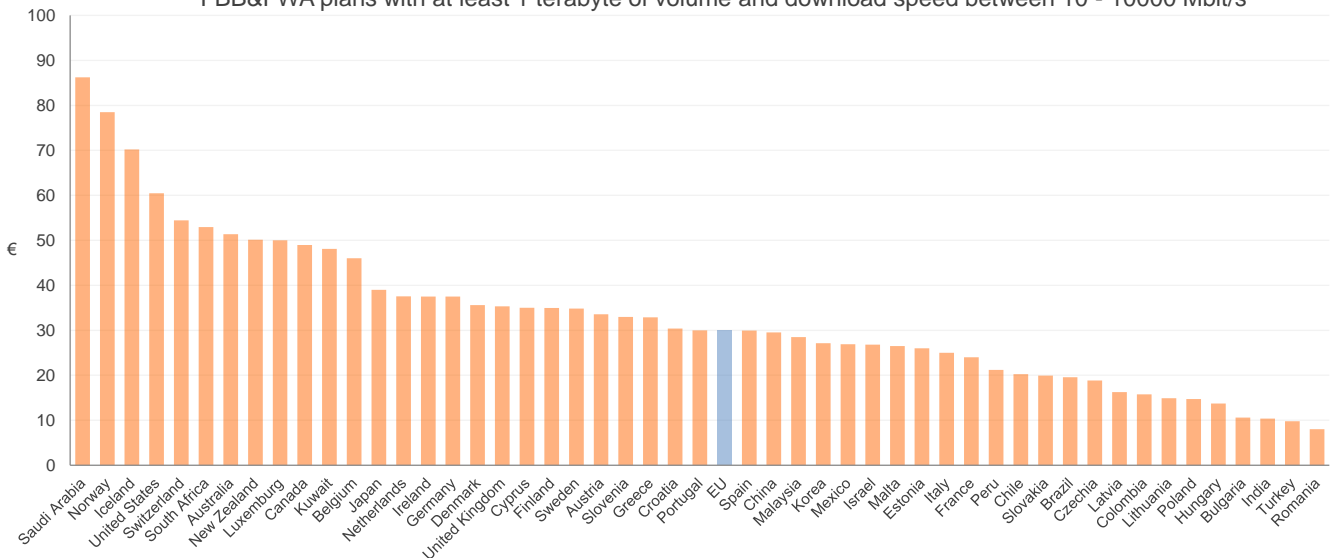
MIN monthly price of broadband plans - 1H2023
FBB&FWA plans with at least 1 terabyte of volume and 100 Mbit/s download speed



Minimum monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database for country.
Unlimited data volume tariffs had no finite terabyte volume named (i.e. no throttling or deprioritization at specified named terabyte volume).
Fixed broadband (FBB) plans are FTTx (ADSL, VDSL, FTTP, FTTN, FTTB, etc.) or FTTH broadband connections with symmetrical upload-download speed capability.
Fixed Wireless Access (FWA) plans are 4G or 5G plans for home or stationary broadband use sold with or without an external antenna.

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MEDIAN monthly price of broadband plans - 1H2023
FBB&FWA plans with at least 1 terabyte of volume and download speed between 10 - 10000 Mbit/s



Median monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database for country or group of countries.
Fixed broadband (FBB) plans are FTTx (ADSL, VDSL, FTTP, FTTN, FTTB, etc.) or FTTH broadband connections with symmetrical upload-download speed capability.
Fixed Wireless Access (FWA) plans are 4G or 5G plans for home or stationary broadband use sold with or without an external antenna.

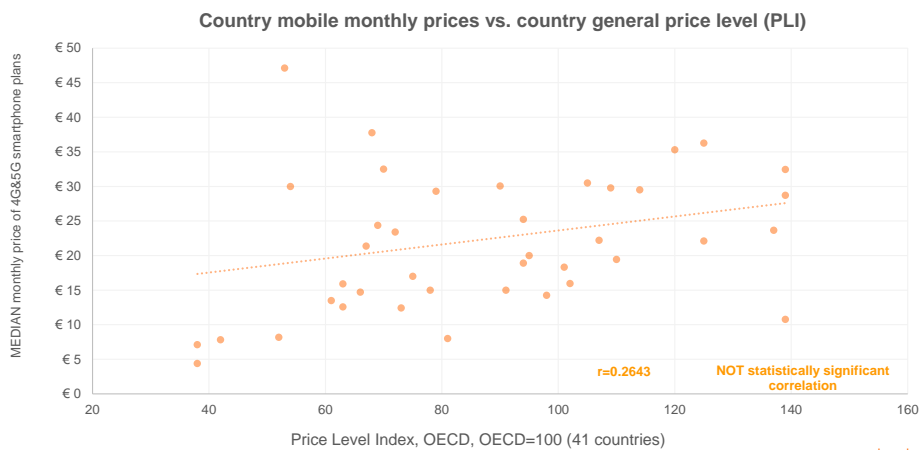
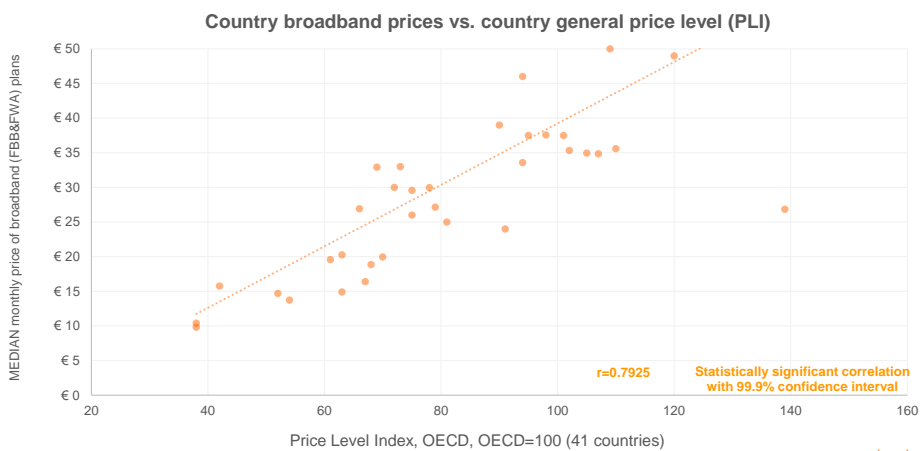
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Dependency of broadband and mobile prices upon the country general price level and dependency of mobile prices upon competition related factors (HHI and HHI adjusted).

Are broadband prices higher in countries with higher general price level (i.e., in expensive countries)? Yes, they are.

Are mobile prices higher in countries with higher general price level (i.e., in expensive countries)? No, they are not.

Legend: Positive correlation Negative or no correlation Yes, statistically significant correlation No, NOT statistically significant correlation	Price Level Index, World Bank, World=100 Are broadband or mobile prices higher in more expensive countries (countries with higher PLI)? Statistical significance of broadband prices and mobile prices correlation with Price Level Index					Price Level Index, OECD, OECD=100 Are broadband or mobile prices higher in more expensive countries (countries with higher PLI)? Statistical significance of broadband prices and mobile prices correlation with Price Level Index					Price Level Index, Eurostat, EU27=100 Are broadband or mobile prices higher in more expensive countries (countries with higher PLI)? Statistical significance of broadband prices and mobile prices correlation with Price Level Index				
	90% conf.interv.	95% conf.interv.	98% conf.interv.	99% conf.interv.	99.9% conf.interv.	90% conf.interv.	95% conf.interv.	98% conf.interv.	99% conf.interv.	99.9% conf.interv.	90% conf.interv.	95% conf.interv.	98% conf.interv.	99% conf.interv.	99.9% conf.interv.
	Sample size 50 countries					Sample size 41 countries					Sample size 31 countries				
Broadband (FBB&FWA) plans	Sample size 27 EU countries					Sample size 22 EU countries					Sample size 27 EU countries				
Broadband (FBB&FWA) plans	Sample size 19 Euro countries					Sample size 17 Euro countries					Sample size 19 Euro countries				
Mobile smartphone (4G&5G) plans	Sample size 50 countries					Sample size 41 countries					Sample size 31 countries				
Mobile smartphone (4G&5G) plans	Sample size 27 EU countries					Sample size 22 EU countries					Sample size 27 EU countries				
Mobile smartphone (4G&5G) plans	Sample size 19 Euro countries					Sample size 17 Euro countries					Sample size 19 Euro countries				



With the exception of 1 out of 180 correlations where the confidence interval was 99% rather 99.9%, we observed 179 out of 180 statistically significant uniformly positive linear correlations with 99.9% confidence interval for all four broadband price metrics across all the three PLI data sets (World Bank, OECD and Eurostat) and across all the three groups of countries (the group of 50 European, American, Asian Pacific, Middle East and African countries, the group of EU27 countries that share a common regulatory framework and the group of EU19 Euro countries that share both a common regulatory framework and a common currency).

We therefore conclude, that there is a positive relationship (link) between broadband prices and the country general price level. Broadband prices are higher in countries where the general price level is higher (expensive countries).

On the contrary, we observed positive and negative (or no correlation) between mobile prices and the country general price level. All but 1 out of the 270 correlations between the mobile price metrics and the country general price level were NOT statistically significant. The correlation between the MEDIAN monthly price of 4G&5G smartphone plans and the country general price level using the Eurostat PLI data set was positive and statistically significant with 95% confidence level when considering the 31 countries (the 27 EU countries plus Iceland, Norway, Switzerland and Turkey) for which Eurostat data were available. However, when the non-EU countries were excluded (i.e., sample 27 EU countries) or when only the 19 Euro countries were considered the correlations between the MEDIAN monthly price of 4G&5G smartphone and the Eurostat PLI were no longer statistically significant.

We therefore conclude, by re-affirming our previous study¹² findings, that there is NO relationship (link) between mobile prices and the country general price level. Mobile prices are neither higher nor lower in countries where the general price level is higher (expensive countries).

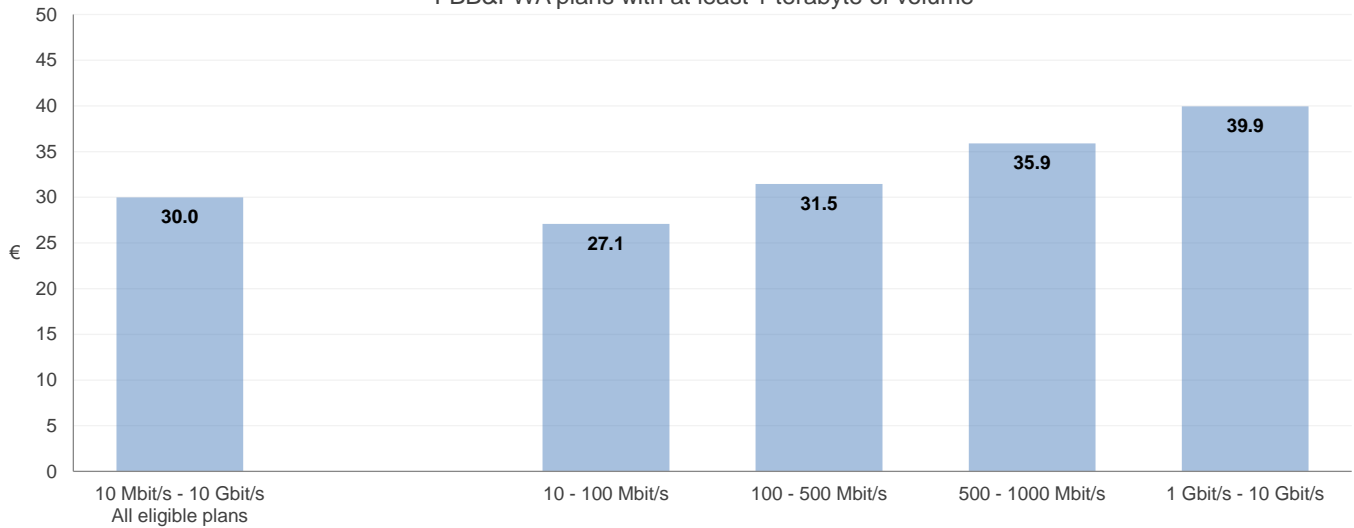
In the presence of countervailing competition related factors in mobile markets – in mobile most consumers have access to competitively priced plans from the 4th mobile network and/or maverick operator – mobile prices are not higher in countries where the general price level is higher. Mobile prices are significantly lower in countries where more than 3 mobile network operators are present. The presence of the 4th mobile network and/or maverick operator has a counteracting neutralizing effect on the country's general price level.

In the absence of countervailing competition related factors in broadband markets – unlike in mobile in broadband few consumers have access to more than two or at most three high speed broadband network providers – broadband prices are higher in countries where the general price level is higher.

¹https://research.rewheel.fi/downloads/Mobile_prices__2_to_5_times_lower_in_markets_with_4_MNOs_PUBLIC_VERSION.pdf

²https://research.rewheel.fi/downloads/4G_5G_prices_2x_to_4x_lower_in_markets_with_4_MNOs_PUBLIC.pdf

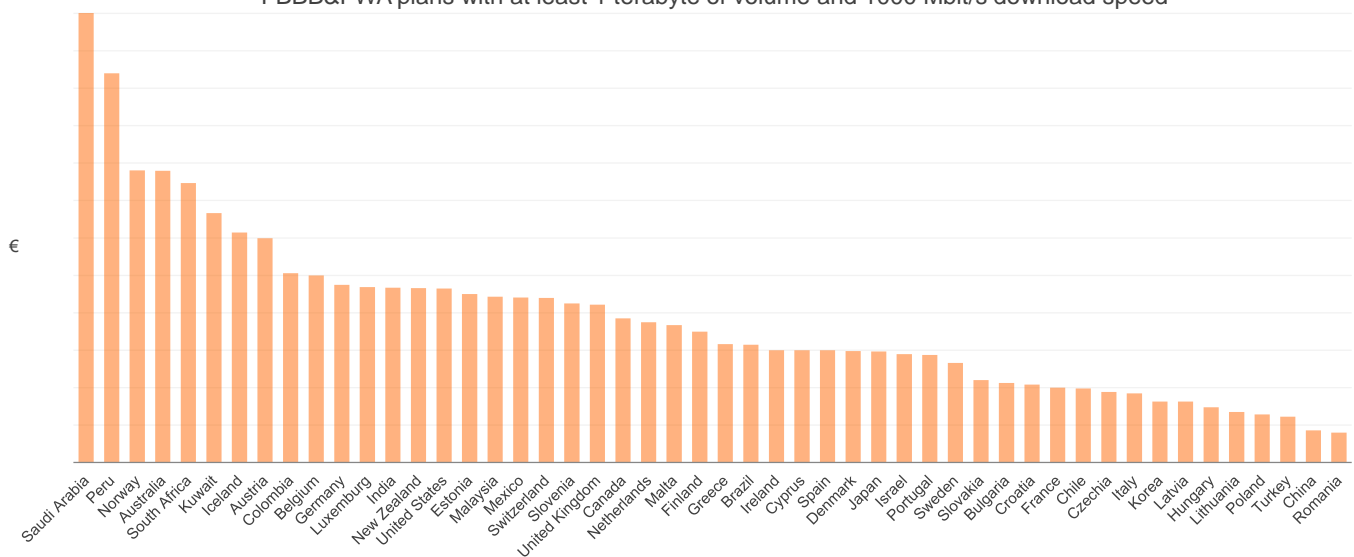
MEDIAN monthly price of broadband plans in EU - 1H2023
FBB&FWA plans with at least 1 terabyte of volume



Median monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database across all 27 EU countries. Fixed broadband (FBB) plans are FTTx (ADSL, VDSL, FTTP, FTTN, FTTB, etc.) or FTTH broadband connections with symmetrical upload-download speed capability. Fixed Wireless Access (FWA) plans are 4G or 5G plans for home or stationary broadband use sold with or without an external antenna.

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MIN monthly price of broadband plans - 1H2023
FBB&FWA plans with at least 1 terabyte of volume and 1000 Mbit/s download speed



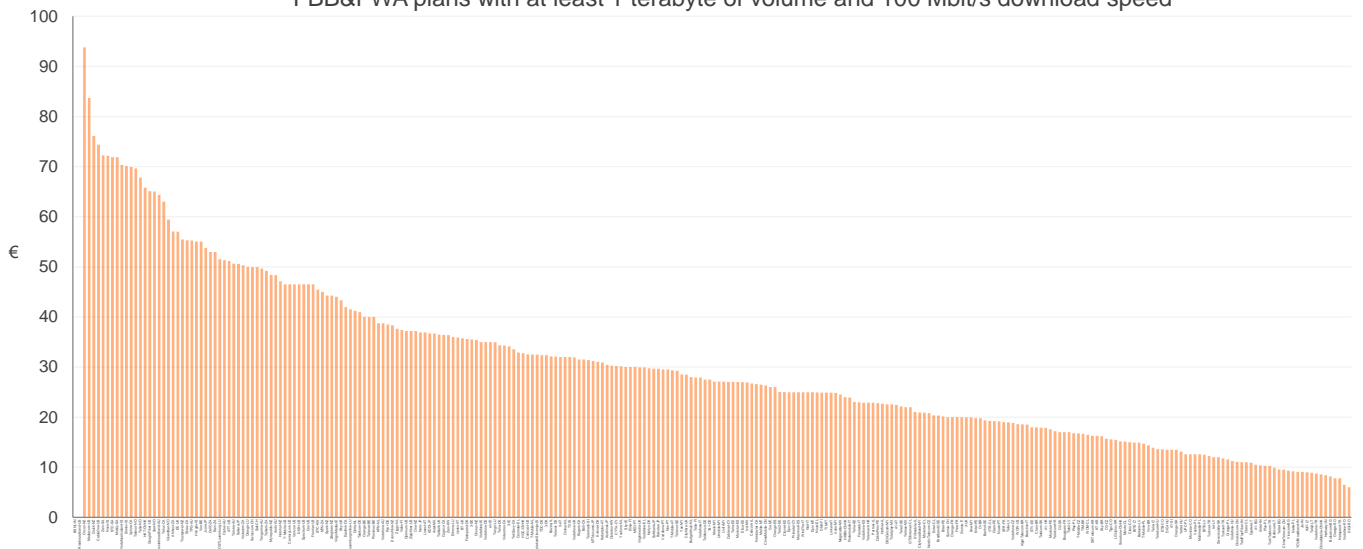
Minimum monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database for country. Unlimited data volume tariffs had no finite terabyte volume named (i.e. no throttling or deprioritization at specified named terabyte volume). Fixed broadband (FBB) plans are FTTx (ADSL, VDSL, FTTP, FTTN, FTTB, etc.) or FTTH broadband connections with symmetrical upload-download speed capability. Fixed Wireless Access (FWA) plans are 4G or 5G plans for home or stationary broadband use sold with or without an external antenna.

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Prices for all 50 European, American, Asia Pacific, Middle East and African countries for all seventeen MEDIAN and MIN price metrics seen in the table below are available in the full PRO version of the report.

Country MEDIAN and MIN monthly prices and country MEDIAN terabyte price of broadband plans 1H2023 - Eligible plans: fixed broadband (FTT&FTTH) and fixed wireless access (4G&5G) plans with at least 1 terabyte of data volume																													
EU	OECD	Country code	Country name	MEDIAN monthly price of plans with download speed of:					MEDIAN monthly price	MEDIAN terabyte price	MIN monthly price of broadband plans with download speed of at least:																		
				10-100Mbps	100-500Mbps	500-1000Mbps	1-10 Gbps	All speeds, >=10 Mbps			All speeds, >=10 Mbps	10 Mbps	50 Mbps	100 Mbps	200 Mbps	300 Mbps	500 Mbps	1 Gbps	2 Gbps	3 Gbps	5 Gbps	10 Gbps							
Yes	Yes	AT	Austria					33.58						22.43															
No	Yes	AU	Australia					51.35						38.72															
Yes	Yes	BE	Belgium					46.00						39.99															
Yes	No	BG	Bulgaria					19.51						8.15															
No	No	BR	Brazil					19.57						14.40															
No	Yes	CA	Canada					48.97						26.60															
No	Yes	CH	Switzerland					54.45						20.00															
No	Yes	CL	Chile					20.25						10.99															
No	No	CN	China					29.55						8.58															
No	Yes	CO	Colombia					15.76						12.60															
Yes	No	CY	Cyprus					35.00						24.99															
Yes	Yes	CZ	Czechia					18.86						15.71															
Yes	Yes	DE	Germany					37.49						27.49															
Yes	Yes	DK	Denmark					35.59						29.77															
Yes	Yes	EE	Estonia					26.00						18.00															
Yes	Yes	EL	Greece					32.90						24.92															
Yes	Yes	ES	Spain					29.96						22.90															
Yes	Yes	FI	Finland					34.95						24.90															
Yes	Yes	FR	France					23.99						16.99															
Yes	No	HR	Croatia					30.39						17.22															
Yes	Yes	HU	Hungary					13.73						11.23															
Yes	Yes	IE	Ireland					37.50						30.00															
No	Yes	IL	Israel					26.83						21.06															
No	No	IN	India					10.38						8.42															
No	Yes	IS	Iceland					70.21						55.04															
Yes	Yes	IT	Italy					24.99						18.50															
No	Yes	JP	Japan					38.98						29.68															
No	Yes	KR	Korea					27.15						15.47															
No	No	KW	Kuwait					48.10						30.30															
Yes	No	LT	Lithuania					14.90						8.90															
Yes	Yes	LU	Luxemburg					49.99						34.93															
Yes	Yes	LV	Latvia					16.27						12.02															
Yes	No	MT	Malta					26.50						24.99															
No	Yes	MX	Mexico					26.90						22.00															
No	No	MY	Malaysia					28.51						19.92															
Yes	Yes	NL	Netherlands					37.56						28.00															
No	Yes	NO	Norway					78.49						59.43															
No	Yes	NZ	New Zealand					50.15						35.40															
No	No	PE	Peru					21.18						17.58															
Yes	Yes	PL	Poland					14.70						9.19															
Yes	Yes	PT	Portugal					29.99						19.17															
Yes	No	RO	Romania					8.00						6.00															
No	No	SA	Saudi Arabia					86.25						71.88															
Yes	Yes	SE	Sweden					34.84						19.38															
Yes	Yes	SI	Slovenia					32.99						13.50															
Yes	Yes	SK	Slovakia					19.95						12.00															
No	Yes	TR	Turkey					9.80						7.79															
No	Yes	UK	United Kingdom					35.33						19.95															
No	Yes	US	United States					60.45						18.59															
No	No	ZA	South Africa					52.95						45.00															

MIN monthly price of broadband plans - Operators 1H2023
FBB&FWA plans with at least 1 terabyte of volume and 100 Mbit/s download speed



Minimum monthly retail price (incl. VAT & tax) among all eligible tariffs logged in the database for operator or any of its sub-brands.
 Unlimited data volume tariffs had no finite terabyte volume named (i.e. no throttling or deprioritization at specified named terabyte volume).
 Fixed broadband (FBB) plans are FTTx (ADSL, VDSL, FTTP, FTTN, FTTB, etc.) or FTTH broadband connections with symmetrical upload/download speed capability.
 Fixed Wireless Access (FWA) plans are 4G or 5G plans for home or stationary broadband use sold with or without an external antenna.

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Prices for all 274 operators present across the 50 European, American, Asia Pacific, Middle East and African countries for all eighteen MIN price metrics seen in the tables below are available in the full PRO version of the report.

Please note that Rewheel research subscribers that purchase the mobile and broadband tariff database (Excel spreadsheet) could automatically create charts/tables for MEDIAN and MIN price metrics for smartphone, mobile broadband, wireless broadband, fixed broadband and fixed-wireless access plans. Subscribers could freely choose to include in the charts 4G plans only, 5G plans only, 4G&5G plans, FBB plans only, FWA plans only FBB&FWA plans, the operator main brands only, the operator sub-brands only, the MVNOs only or all brands. Subscribers could determine freely the plan speed (e.g., 10, 50, 100, 500, 1000 Mbit/s, 10 Gbit/s), the minimum gigabyte data allowance (e.g., 1, 5, 10, 25, 50, 100, 250, 500, 1000 or unlimited gigabytes) or the maximum monthly EUR basket rule (e.g., 5, 10, 20, 30, 40, 50, 60, 70, 80, 90 or 100 EUR).

Table of Contents

1	Methodology	7
1.1	50 European, American, Asia Pacific, Middle East and African countries included in the comparison	7
1.2	Broadband prices - Detailed methodology	8
1.2.1	Number of tariff plans, network operators, operator sub-brands and mobile virtual network operators (MVNOs)	8
1.2.2	Tariff collection and tariff eligibility rules	8
1.2.3	Price competitiveness metrics	10
2	Broadband price rankings.....	11
2.1	Country rankings	11
2.1.1	MEDIAN monthly price of broadband (FBB&FWA) plans	11
2.1.2	MEDIAN monthly price of broadband (FBB&FWA) plans with download speed between 10 – 100 Mbit/s.....	13
2.1.3	MEDIAN monthly price of broadband (FBB&FWA) plans with download speed between 100 – 500 Mbit/s.....	13
2.1.4	MEDIAN monthly price of broadband (FBB&FWA) plans with download speed between 500 Mbit/s – 1 Gbit/s	14
2.1.5	MEDIAN monthly price of broadband (FBB&FWA) plans with download speed between 1 Gbit/s – 10 Gbit/s.....	14
2.1.6	MEDIAN monthly price of broadband (FBB&FWA) plans in EU with sub-Gigabit and multi-Gigabit speeds	15
2.1.7	MEDIAN terabyte price of broadband (FBB&FWA) plans	16
2.1.8	MIN monthly price of broadband (FBB&FWA) plans	18
2.1.9	Summary table of broadband prices – 50 European, American, Asia Pacific, Middle East and African countries	24
2.2	Operator rankings	25
2.2.1	MIN monthly price of broadband (FBB&FWA) plans	25
2.2.2	Summary table of fixed (FBB) and fixed-wireless (FWA) broadband prices – 274 operators across 50 countries	29
3	Are broadband prices higher in more expensive countries?	32
3.1	Comparative Price Level Indices – Sources World Bank, OECD and Eurostat	33
3.2	Broadband and mobile price metrics	38
3.3	Tested hypothesis: Are broadband prices higher in countries where the general price level is higher?	40
3.4	Dependency of broadband prices upon country general (overall) price level	42
3.4.1	Country broadband monthly prices versus World Bank Price Level Index – (sample size 50 countries).....	43
3.4.2	Country broadband monthly prices versus World Bank Price Level Index – (sample size 27 EU countries).....	44
3.4.3	Country broadband monthly prices versus World Bank Price Level Index – (sample size 19 Euro countries)	45
3.4.4	Country broadband monthly prices versus OECD Price Level Index – (sample size 41 countries).....	46
3.4.5	Country broadband monthly prices versus OECD Price Level Index – (sample size 22 EU countries).....	47
3.4.6	Country broadband monthly prices versus OECD Price Level Index – (sample size 17 Euro countries)	48
3.4.7	Country broadband monthly prices versus Eurostat Price Level Index – (sample size 31 countries).....	49
3.4.8	Country broadband monthly prices versus Eurostat Price Level Index – (sample size 27 EU countries).....	50
3.4.9	Country broadband monthly prices versus Eurostat Price Level Index – (sample size 19 Euro countries)	51
3.5	Dependency of mobile prices upon country general (overall) price level	52
3.5.1	Country mobile monthly prices versus World Bank Price Level Index – (sample size 50 countries)	53
3.5.2	Country mobile monthly prices versus World Bank Price Level Index – (sample size 27 EU countries)	55
3.5.3	Country mobile monthly prices versus World Bank Price Level Index – (sample size 19 Euro countries).....	57
3.5.4	Country mobile monthly prices versus OECD Price Level Index – (sample size 41 countries)	59
3.5.5	Country mobile monthly prices versus OECD Price Level Index – (sample size 22 EU countries)	61
3.5.6	Country mobile monthly prices versus OECD Price Level Index – (sample size 17 Euro countries).....	63
3.5.7	Country mobile monthly prices versus Eurostat Price Level Index – (sample size 31 countries)	65
3.5.8	Country mobile monthly prices versus Eurostat Price Level Index – (sample size 27 EU countries)	67
3.5.9	Country mobile monthly prices versus Eurostat Price Level Index – (sample size 19 Euro countries).....	69
3.6	Findings and conclusions	71
3.6.1	Dependency of broadband and mobile prices upon the country general price level	71
3.6.2	Dependency of mobile prices upon competition related factors	76

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Mobile data and broadband 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, Germany, Ireland, Switzerland, Finland, Sweden, Belgium, Greece, Poland, Slovenia, Hungary, Russia, Romania.

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⇒ http://research.rewheel.fi/insights/2018_oct_pro_2h2018_release/

Capacity utilization and fixed-to-mobile broadband substitution potential with existing macro site grids – 2017

⇒ http://research.rewheel.fi/insights/2018_sep_pro_capacity/

The 4 to 3 consolidation effect – Ahead of the Commission's merger ruling Tele2 increased prices in the Netherlands

⇒ http://research.rewheel.fi/insights/2018_july_pro_T-mobile-Tele2_Netherlands/

The state of 4G pricing – 1H2018 – Digital Fuel Monitor 9th release

⇒ http://research.rewheel.fi/insights/2018_may_pro_1h2018_release/

Gigabyte price development in 4 to 3 consolidated versus 4-MNO European markets – September 2013 to March 2018

⇒ http://research.rewheel.fi/insights/2018_apr_pro_4to3_consolidation_vs_4MNO/

The state of 4G pricing – 2H2017 – Digital Fuel Monitor 8th 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/

O2 – Ready to disrupt the German tight oligopoly market

⇒ 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/

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

⇒ https://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/

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1 Methodology

1.1 50 European, American, Asia Pacific, Middle East and African countries included in the comparison

Rewheel has been tracking mobile prices since 2012. Rewheel’s Digital Fuel Monitor releases are the world’s most comprehensive 4G&5G mobile price comparison studies. Our latest study³ that was released in March 2023 included 4G&5G smartphone, mobile broadband and wireless broadband plan prices from 50 European, American, Asia Pacific, Middle East and African countries, 168 mobile network operator main brands, 93 sub-brands and 74 major MVNOs. The 50 countries that are tracked have a combined population of ~4.7 billion (around 60% of the world’s population).

Rewheel first international comparison study⁴ of mobile prices was conducted in December 2012. It tracked mobile prices across the 27 countries that were members of the European Union at the time. The main finding of our 2012 study “*Research shows that users pay up to ten times more to use their smartphones in those Member States where there is no challenger to the big European operators.*” was cited⁵ by the former Vice President of the European Commission, Joaquin Almunia in a speech dated the 28th of February 2013.

Herein, for the first time we tracked and analysed broadband prices across the 50 European, American, Asia Pacific, Middle East and African countries. The 50 countries are listed in the table below.

	EU27	OECD	Country code	Country name
1	Yes	Yes	AT	Austria
2	No	Yes	AU	Australia
3	Yes	Yes	BE	Belgium
4	Yes	No	BG	Bulgaria
5	No	No	BR	Brazil
6	No	Yes	CA	Canada
7	No	Yes	CH	Switzerland
8	No	Yes	CL	Chile
9	No	No	CN	China
10	No	Yes	CO	Colombia
11	Yes	No	CY	Cyprus
12	Yes	Yes	CZ	Czechia
13	Yes	Yes	DE	Germany
14	Yes	Yes	DK	Denmark
15	Yes	Yes	EE	Estonia
16	Yes	Yes	EL	Greece
17	Yes	Yes	ES	Spain
18	Yes	Yes	FI	Finland
19	Yes	Yes	FR	France
20	Yes	No	HR	Croatia
21	Yes	Yes	HU	Hungary
22	Yes	Yes	IE	Ireland
23	No	Yes	IL	Israel
24	No	No	IN	India
25	No	Yes	IS	Iceland
26	Yes	Yes	IT	Italy
27	No	Yes	JP	Japan
28	No	Yes	KR	Korea
29	No	No	KW	Kuwait
30	Yes	No	LT	Lithuania
31	Yes	Yes	LU	Luxemburg
32	Yes	Yes	LV	Latvia
33	Yes	No	MT	Malta
34	No	Yes	MX	Mexico
35	No	No	MY	Malaysia
36	Yes	Yes	NL	Netherlands
37	No	Yes	NO	Norway
38	No	Yes	NZ	New Zealand
39	No	No	PE	Peru
40	Yes	Yes	PL	Poland
41	Yes	Yes	PT	Portugal
42	Yes	No	RO	Romania
43	No	No	SA	Saudi Arabia
44	Yes	Yes	SE	Sweden
45	Yes	Yes	SI	Slovenia
46	Yes	Yes	SK	Slovakia
47	No	Yes	TR	Turkey
48	No	Yes	UK	United Kingdom
49	No	Yes	US	United States
50	No	No	ZA	South Africa

³https://research.rewheel.fi/downloads/The_state_of_4G_5G_pricing_18_release_1H2023_PUBLIC_VERSION.pdf

⁴https://research.rewheel.fi/downloads/Rewheel_EU27_smartphone_tariff_competitiveness_report_December_2012_HIGHLIGHTS.pdf

⁵https://ec.europa.eu/commission/presscorner/detail/en/speech_13_168

1.2 Broadband prices - Detailed methodology

Similar to Rewheel's mobile price comparison methodology that was designed from the onset to measure the price of naked mobile data connectivity our broadband price comparison methodology is design to measure the price of naked broadband connectivity. Surely, many operators prefer to sell plans – locking-in consumers to contracts with a total higher monthly fee – that on top of broadband connectivity includes fixed-line telephony and/or TV services and/or OTT video streaming services and/or mobile services but more often than not these additional services are either redundant (e.g., fixed-line telephony is redundant to most consumers having a mobile telephone), duplicate (e.g., telco-own video streaming services since most consumers subscriber to OTT video streaming services such as Netflix) or add little incremental value to a naked broadband connection.

The study methodology is design to measure the price of broadband connections that are delivered by mainstream fixed (FTTx&FTTH) broadband networks or fixed wireless access (4G&5G) broadband networks.

1.2.1 Number of tariff plans, network operators, operator sub-brands and mobile virtual network operators (MVNOs)

This first release 1H2023 contains 1466 broadband tariff plans. 1265 of those were fixed broadband (FBB) tariff plans and 225 were fixed wireless access (FWA) tariff plans. We have designated the fixed broadband tariff plans to either FTTx (Fiber To The Premise, Node, Building, etc. and noted the type of the access technology use such as ADSL, VDSL, cable, etc. wherever information was available) or FTTH (Fiber To The Home with symmetrical download and upload speed capability wherever information was available). The fixed wireless access (FWA) tariff plans were designated to either 4G or 5G.

The 1466 broadband tariff plans were sold by 274 network operators, 39 operator sub-brands and 3 MVNOs. The number of MVNOs (Mobile Virtual Network Operators) were so small because very few MVNOs sold eligible FWA plans. Alternative operators that used the fixed broadband network/s of other operators were designated as well as network operators even though they had no physical broadband access infrastructure of their own.

1.2.2 Tariff collection and tariff eligibility rules

Tariffs were collected from the operator websites during April and May 2023. We archived screenshots from every single operator tariff that was used in the comparative analysis and as well downloaded and archived the tariff terms and conditions wherever needed and readily available.

Eligible broadband plans were fixed broadband (FBB) or fixed wireless access (FWA) plans that included at least 1000 gigabytes (1 terabyte) of data volume and at least 10 Mbit/s download speed. Fixed broadband (FBB) plans were FTTx (ADSL, VDSL, FTTP, FTTN, FTTB, etc.) or FTTH broadband plans with symmetrical upload-download speed capability. Fixed Wireless Access (FWA) plans were 4G or 5G (with both 5G&4G capability) plans intended for home or stationary location broadband use sold with or without an external antenna.

Eligible plans were monthly rolling plans that were available to all consumers with or without an initial fixed contract duration. Plans will lower prices, higher gigabyte allowances, higher speeds, etc. offered to selected consumers such as youth, seniors, soldiers, additional family members, second homes, customers with PayPal accounts, etc. were not eligible.

We logged the eligible naked broadband tariff plan retail (including VAT and other applicable taxes where specified) prices for all the available eligible technologies and speeds. For operators that did not sell naked broadband access tariff plans or limit the naked tariff plans to lower speeds we also logged the cheapest available bundled (2-3-4 play) plans for each available higher speed. The following parameters have been collected for each tariff plan: the date and time of collection, the country, the operator's name, the brand's name, the brand's type (operator main or sub-brand or MVNO in case of FWA plans), the monthly price in local currency, the monthly price in Euro, the included data volume allowance (finite volume of 1000 gigabytes or more or unlimited data volume), the download speed specified by the operator (varying from 10 Mbit/s to 10 Gbit/s), the tariff broadband type (FBB or FWA), the tariff technology type (FTTx, FTTH, 4G or 5G), the tariff bundle type (naked broadband or 2-3-4 play plan), the tariff name and any applicable options and finally the URL of the operator.

All commercial promotions available at the time of collection were considered (e.g., 2 months free if purchased online or 10% off if purchased before a certain date). All discounts were calculated for a minimum period of 12 months or for the specified contract

period if it was longer than 12 months. If a tariff was cheaper with longer contract duration, we logged in the database the lowest available price (e.g., 10% off with a 24-month contract).

The tariff monthly fee logged in the database for each plan did not include one-off fees such as activation fee, etc. or one-off fees for the upfront purchase of a modem. Monthly recurring fees for the lease of a modem – for tariffs where such fees were separately specified – were not included.

No Purchase Power Parity (PPP) operation has been performed on the raw tariff plan prices. Prices in Euro are the retail (VAT and other applicable taxes included where available) prices found on the operator web sites. Prices in other national currencies have been converted to Euro by using the exchange rates seen in the table below found in our latest mobile price comparison study⁶ “The state of 4G and 5G pricing, 1H2023 – Inflation edition” dated March 2023.

EU	OECD	Country code	Country name	Currency	1H2023
Yes	Yes	AT	Austria	EUR	1.0000
No	Yes	AU	Australia	AUD	0.6500
Yes	Yes	BE	Belgium	EUR	1.0000
Yes	No	BG	Bulgaria	BGN	0.5100
No	No	BR	Brazil	BRL	0.1800
No	Yes	CA	Canada	CAD	0.7000
No	Yes	CH	Switzerland	CHF	1.0000
No	Yes	CL	Chile	CLP	0.0011
No	No	CN	China	CNY	0.1400
No	Yes	CO	Colombia	COP	0.00020
Yes	No	CY	Cyprus	EUR	1.0000
Yes	Yes	CZ	Czechia	CZK	0.0420
Yes	Yes	DE	Germany	EUR	1.0000
Yes	Yes	DK	Denmark	DKK	0.1300
Yes	Yes	EE	Estonia	EUR	1.0000
Yes	Yes	EL	Greece	EUR	1.0000
Yes	Yes	ES	Spain	EUR	1.0000
Yes	Yes	FI	Finland	EUR	1.0000
Yes	Yes	FR	France	EUR	1.0000
Yes	No	HR	Croatia	EUR	1.0000
Yes	Yes	HU	Hungary	HUF	0.0025
Yes	Yes	IE	Ireland	EUR	1.0000
No	Yes	IL	Israel	ILS	0.2700
No	No	IN	India	INR	0.0110
No	Yes	IS	Iceland	ISK	0.0064
Yes	Yes	IT	Italy	EUR	1.0000
No	Yes	JP	Japan	YEN	0.0071
No	Yes	KR	Korea	WON	0.00074
No	No	KW	Kuwait	KWD	3.0300
Yes	No	LT	Lithuania	EUR	1.0000
Yes	Yes	LU	Luxemburg	EUR	1.0000
Yes	Yes	LV	Latvia	EUR	1.0000
Yes	No	MT	Malta	EUR	1.0000
No	Yes	MX	Mexico	MXN	0.0490
No	No	MY	Malaysia	MYR	0.2100
Yes	Yes	NL	Netherlands	EUR	1.0000
No	Yes	NO	Norway	NOK	0.0930
No	Yes	NZ	New Zealand	NZD	0.5900
No	No	PE	Peru	PEN	0.2400
Yes	Yes	PL	Poland	PLN	0.2100
Yes	Yes	PT	Portugal	EUR	1.0000
Yes	No	RO	Romania	EUR	1.0000
No	No	SA	Saudi Arabia	SAR	0.2500
Yes	Yes	SE	Sweden	SEK	0.0890
Yes	Yes	SI	Slovenia	EUR	1.0000
Yes	Yes	SK	Slovakia	EUR	1.0000
No	Yes	TR	Turkey	TRY	0.0490
No	Yes	UK	United Kingdom	GBP	1.1400
No	Yes	US	United States	USD	0.9300
No	No	ZA	South Africa	ZAR	0.0530

⁶https://research.rewheel.fi/downloads/The_state_of_4G_5G_pricing_18_release_1H2023_PUBLIC_VERSION.pdf

1.2.3 Price competitiveness metrics

We use the following three price competitiveness metrics for analysing the broadband tariff plans and ranking the countries included in the comparison.

- a) *MEDIAN monthly price of broadband*
- b) *MINIMUM monthly price of broadband plans with at least X Mbit/s download speed*
- c) *MEDIAN terabyte price of broadband plans*

All tariff plan prices logged in the database are retail prices including VAT and other applicable taxes where specified and available.

The *MEDIAN monthly price* is the median monthly price among all eligible tariff plans logged in the database for a country or a group of countries. Eligible tariff plans where broadband tariff plans with at least 1000 gigabytes (1 terabyte) of data volume and at least 10 Mbit/s download speed. There are three variants of the *MEDIAN monthly price* metric. The *MEDIAN monthly price of FBB&FWA*, i.e., all eligible broadband plans. The *MEDIAN monthly price of FBB*, i.e., only fixed broadband plans. The *MEDIAN monthly price of FWA*, i.e., only 4G & 5G plans. Moreover, subvariants of the *MEDIAN monthly price* metric are created by limiting the range of all available download speeds (10 Mbit/s to 10 Gbit/s) to a subset of all available speeds, e.g., *MEDIAN monthly price of FBB&FWA plans with download speeds between 10 to 100 Mbit/s*.

The *MINIMUM monthly price with at least X Mbit/s download speed* is the country minimum monthly price of tariff plans that had at least 1000 gigabytes (1 terabyte) of data volume and at least the specified (e.g., 50 Mbit/s or 100 Mbit/s) X download speed. Similarly, to the *MEDIAN monthly price* metric there are three variants of the *MINIMUM monthly price* metric. The *MINIMUM monthly price of FBB&FWA*, i.e., all eligible broadband plans with at least X Mbit/s download speed. The *MINIMUM monthly price of FBB*, i.e., only fixed broadband plans with at least X Mbit/s download speed. The *MINIMUM monthly price of FWA*, i.e., only 4G & 5G plans with at least X Mbit/s download speed.

The *MEDIAN terabyte price* is the median terabyte price among all eligible tariff plans logged in the database for a country or a group of countries. The terabyte price for each plan was calculated by dividing the plan's monthly price with the included data volume allowance. Eligible tariff plans where broadband tariff plans with at least 1000 gigabytes (1 terabyte) of data volume and at least 10 Mbit/s download speed. Similarly, to the *MEDIAN monthly price* metric there are three variants of the *MEDIAN terabyte price* metric. The *MEDIAN terabyte price of FBB&FWA*, i.e., all eligible broadband plans. The *MEDIAN terabyte price of FBB*, i.e., only fixed broadband plans. The *MEDIAN terabyte price of FWA*, i.e., only 4G & 5G plans.

For example, a plan with a monthly price of 30 Euro that included 3 terabytes had a terabyte price of 10 Euro per terabyte while a plan of 30 Euro that included unlimited data volume had a terabyte price of 3 Euro per terabyte. Plans with unlimited data volume were designated the highest finite name data volume of 10 terabytes.