Barometer of mobile Internet connections in Indonesia

Year 2018

Contents

1 Summary of overall 2G/3G/4G results

1.1 2G/3G/4G nPerf score
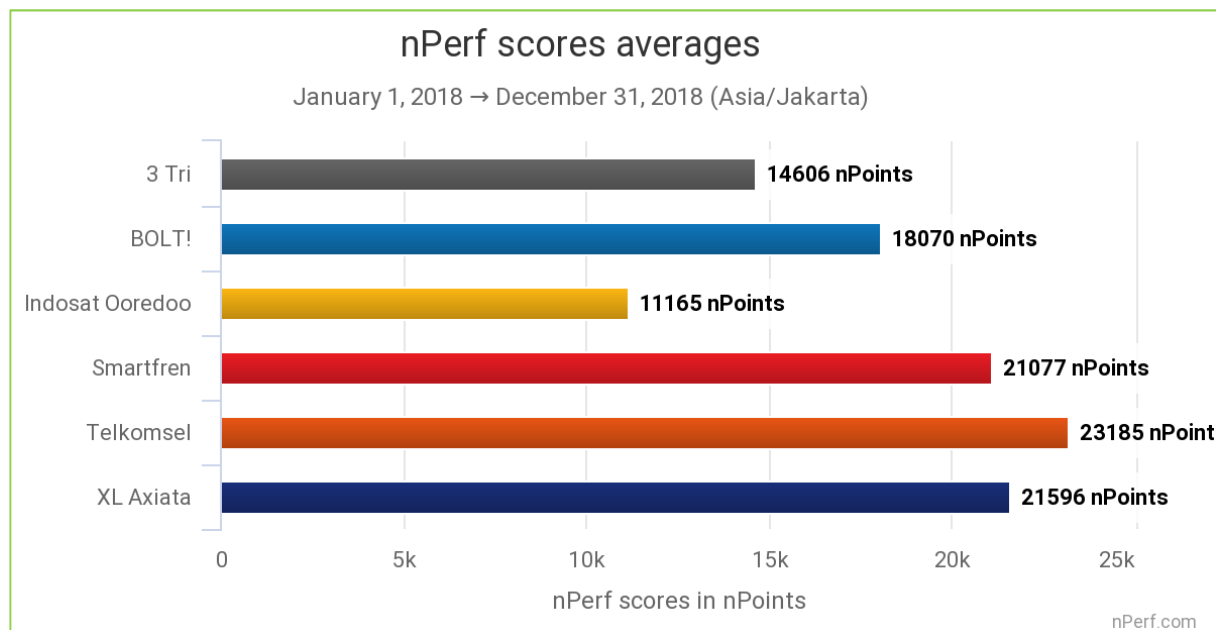
nPerf scores averages
January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Operator	nPoints
3 Tri	14606 nPoints
BOLT!	18070 nPoints
Indosat Ooredoo	11165 nPoints
Smartfren	21077 nPoints
Telkomsel	23185 nPoint
XL Axiata	21596 nPoints

nPerf scores in nPoints

nPerf.com

The highest value is the best.

The best mobile Internet performance in 2018:

Telkomsel provided the best mobile Internet services in 2018.

1.2 Our analysis

In 2018, nPerf users in Indonesia have   carried out 636 757 tests, including speed tests, streaming tests and browsing tests. All nPerf statistics are based on these measurements coming from end users.

Indonesian networks still suffer from capacities

When we look at the download speed we notice that most of the mobile carriers deliver a speed that is limited for intensive uses such has video streaming in high definition. Only Smartfren provides sufficient download speed for intensive use.

Telkomsel takes the first place, XL Axiata second and Smartfren third

It's an unexpected result. Despite its good results during the first half of 2018, Smartfren lost its first place for the benefit of Telkomsel. Telkomsel is the operator who performed the best in 2018. This place is due to a very good upload speed and a significant browsing performance rate. According our scoring methodology, with 23 185 nPoints, Telkomsel is the mobile carrier who has delivered the best Quality of Experience to its customers.

nperf

XL Axiata, the new challenger

In our last survey we wrote that XL Axiata was back in the competition. Finally, we were right as the mobile carrier took the second place with very good performances, especially in upload speed (5,01Mb/s), latency, browsing and streaming.

Smartfren, best download speed and best LTE-advanced performances

Despite its third place, Smartfren is the mobile carrier who has delivered the best download speed (14,77 Mb/s) far ahead Telkomsel (8,06 Mb/s). This very good performance comes from strong results in LTE advanced. Indeed, Smartfren seems to be the only operator who really developed its LTE Advanced network. With a connection rate of 39,72%, Smartfren is far ahead from its competitors whose rates don't exceed 6% !

On top of that, Smartfren delivered a perfect latency for gamers.

The battle for network performances is very hard, and is, in the same time, benefits to Indonesians customers who enjoy performances that are getting better every day.

Indonesia is a specific case for mobile networks measurements because of the size of the country. So, we invite our user to look at our coverage map so check the networks performance in their area because it can change from an area from another. But globally Telkomsel delivered in 2018 the best internet mobile network performances.

Since the BOLT network was suspended in November, there is no data on it in December.
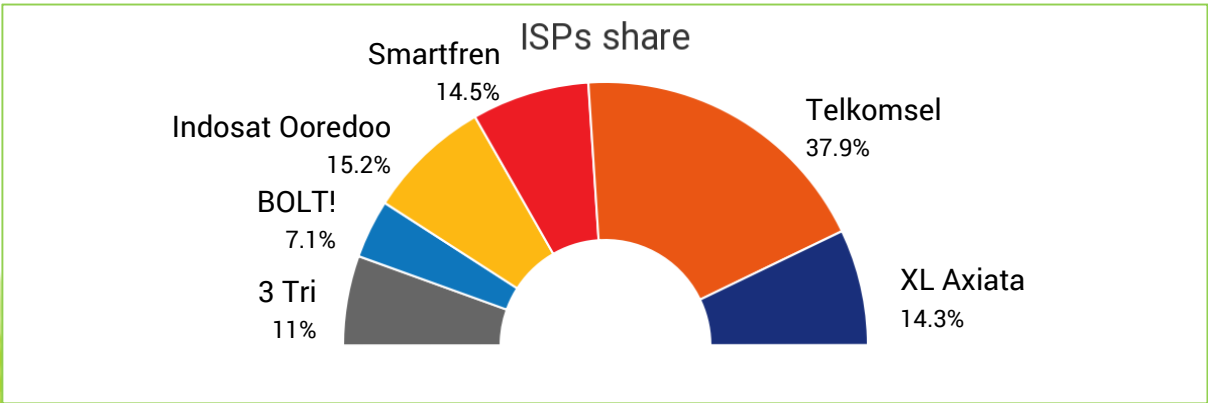
2 Overall results 2G/3G/4G

Results from all cell generations taken from tests carried out on 4G-compatible terminals.

2.1 Data amount and distribution

The nPerf application allows the user to perform a full test or each test separately. Between January 1, 2018 and December 31, 2018, we counted 636 757 tests, distributed as follows, after filtering (see §5.1.3):

Technology	Speed	Browsing	Streaming
2G/3G/4G	217 177	103 234	79 559

The overall breakdown of the tests per provider is as follows:

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2.2 Success rate 2G/3G/4G

The success rate is the number of successful tests compared to the number of tests performed.
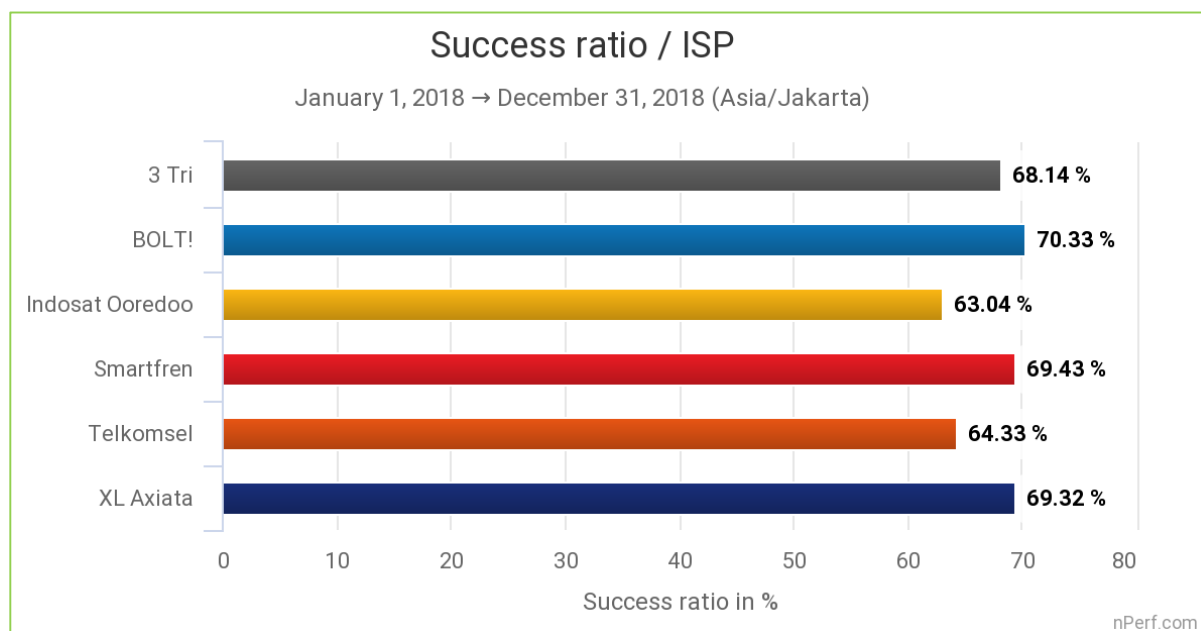
The highest value is the best.

Smartfren, XL Axiata and BOLT! have provided the best average success ratios in 2018.

The highest value is the best.

Evolution of the success rate throughout the year. We can see a sporadic issue with Telkomsel in May.

2.3 Download speed 2G/3G/4G

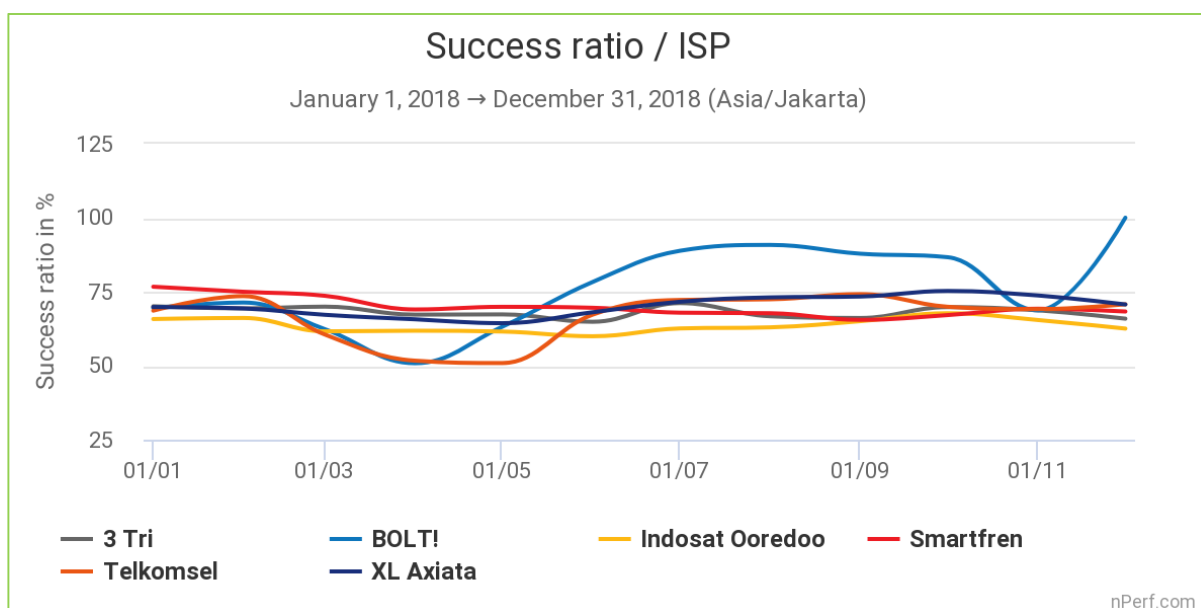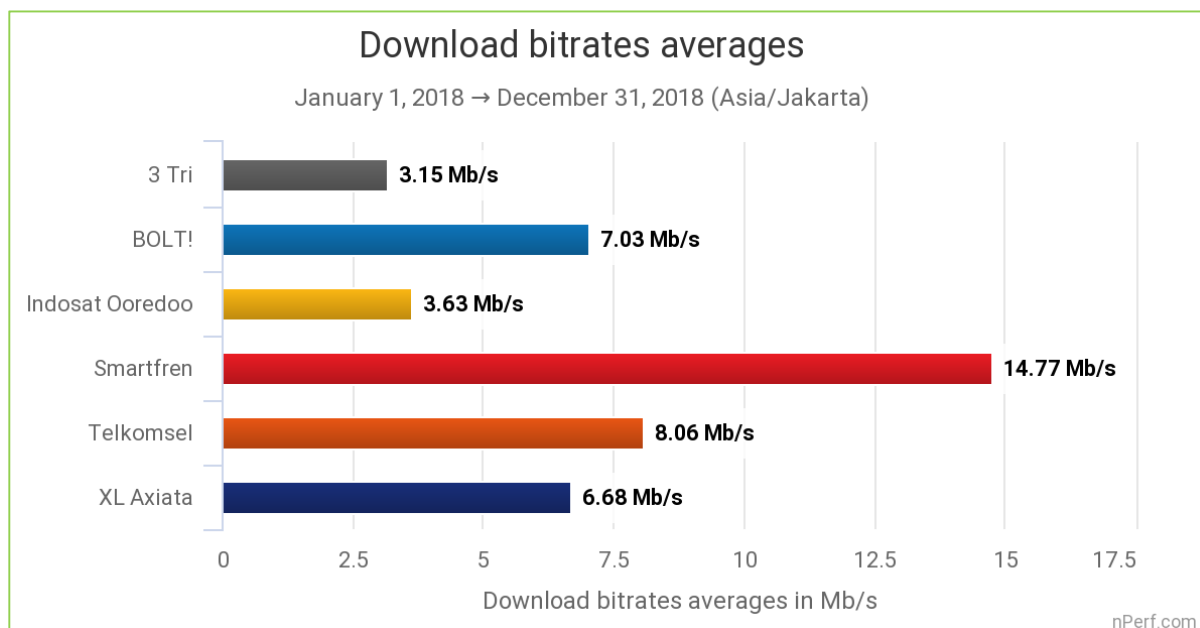### Download bitrates averages
January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Provider	Download bitrates averages in Mb/s
3 Tri	3.15 Mb/s
BOLT!	7.03 Mb/s
Indosat Ooredoo	3.63 Mb/s
Smartfren	14.77 Mb/s
Telkomsel	8.06 Mb/s
XL Axiata	6.68 Mb/s

nPerf.com

The highest value is the best.

Smartfren has provided the best average download speed during the year 2018.

Smartfren and XL Axiata have increased their download throughput by 54% (respectively +5Mb/s and +2.5 Mb/s) compared to 2017.
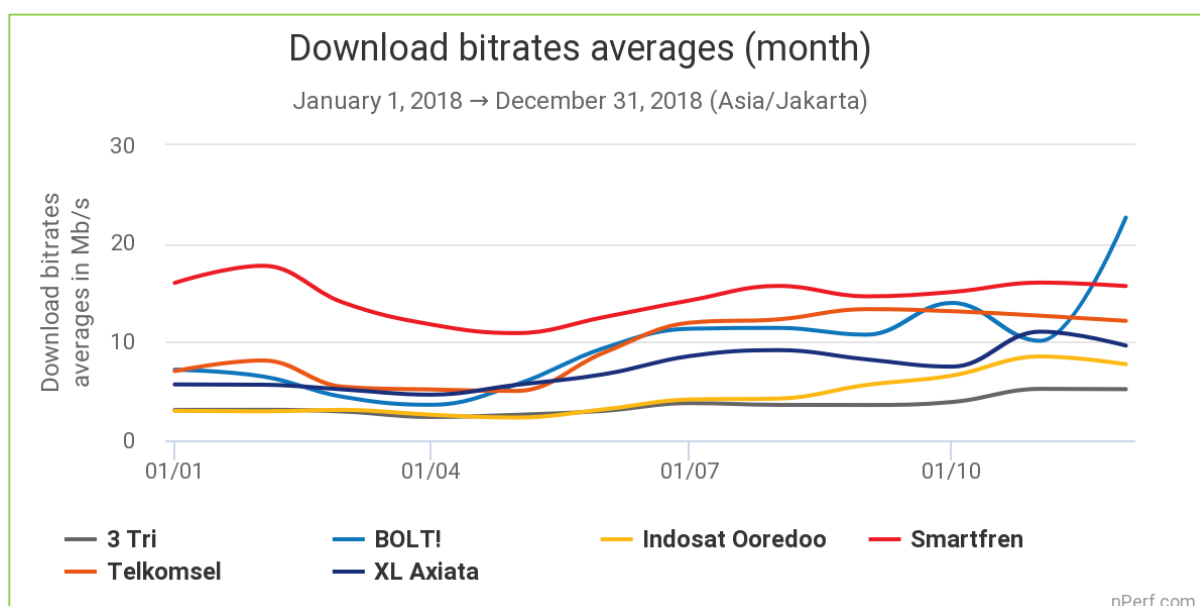
Download bitrates averages (month)
January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Legend: 3 Tri, BOLT!, Indosat Ooredoo, Smartfren, Telkomsel, XL Axiata

nPerf.com

The highest value is the best.

This graph illustrates the ability of providers to maintain a constant download speed during the year, regardless of network load (number of connected clients).

Indosat Ooredoo's speed has been increasing since last August.

Download bitrates averages (hours of day)
January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Legend: 3 Tri, BOLT!, Indosat Ooredoo, Smartfren, Telkomsel, XL Axiata

nPerf.com

The highest value is the best.

This graph illustrates the ability of providers to ensure a constant download speed throughout the day, regardless of network load (number of connected clients). We note for all operators a decline in download speed late in the day.

2.4 Upload speed 2G/3G/4G

Upload bitrates averages
January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Provider	Upload bitrates averages in Mb/s
3 Tri	3.44 Mb/s
BOLT!	1.19 Mb/s
Indosat Ooredoo	2.95 Mb/s
Smartfren	4.66 Mb/s
Telkomsel	5.79 Mb/s
XL Axiata	5.01 Mb/s

nPerf.com

The highest value is the best.

Telkomsel provided the best upload speed in the year 2018.

Upload bitrates averages (month)

January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Legend:
- 3 Tri
- BOLT!
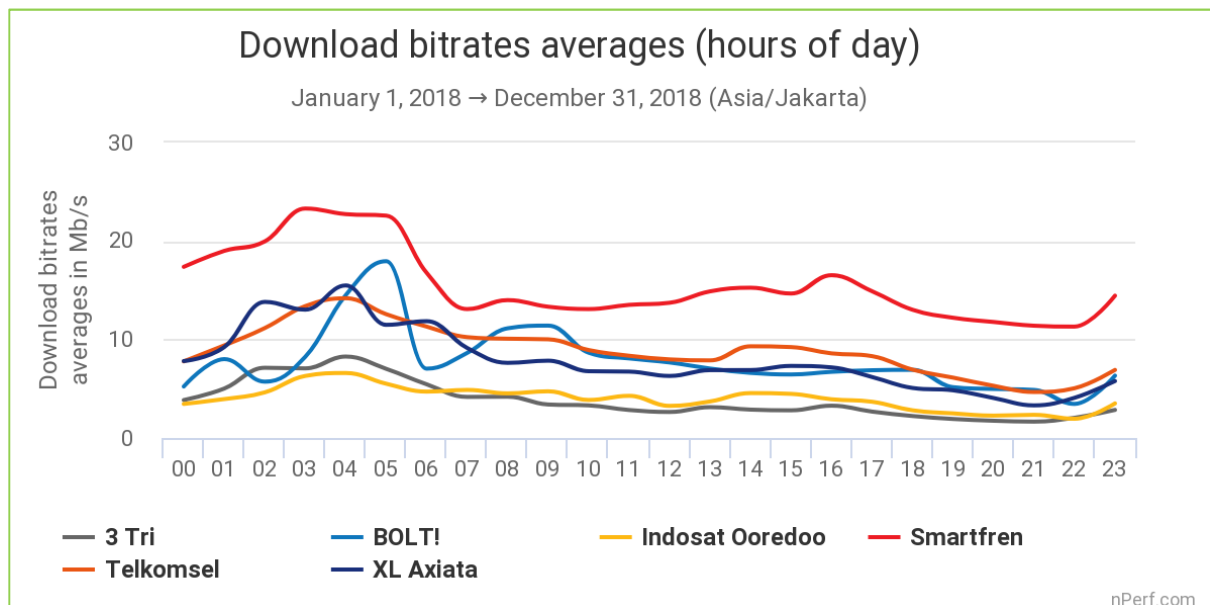- Indosat Ooredoo
- Smartfren
- Telkomsel
- XL Axiata

nPerf.com

The highest value is the best.

This graph illustrates the ability of providers to maintain a constant upload speed during the year, regardless of network load (number of connected clients).
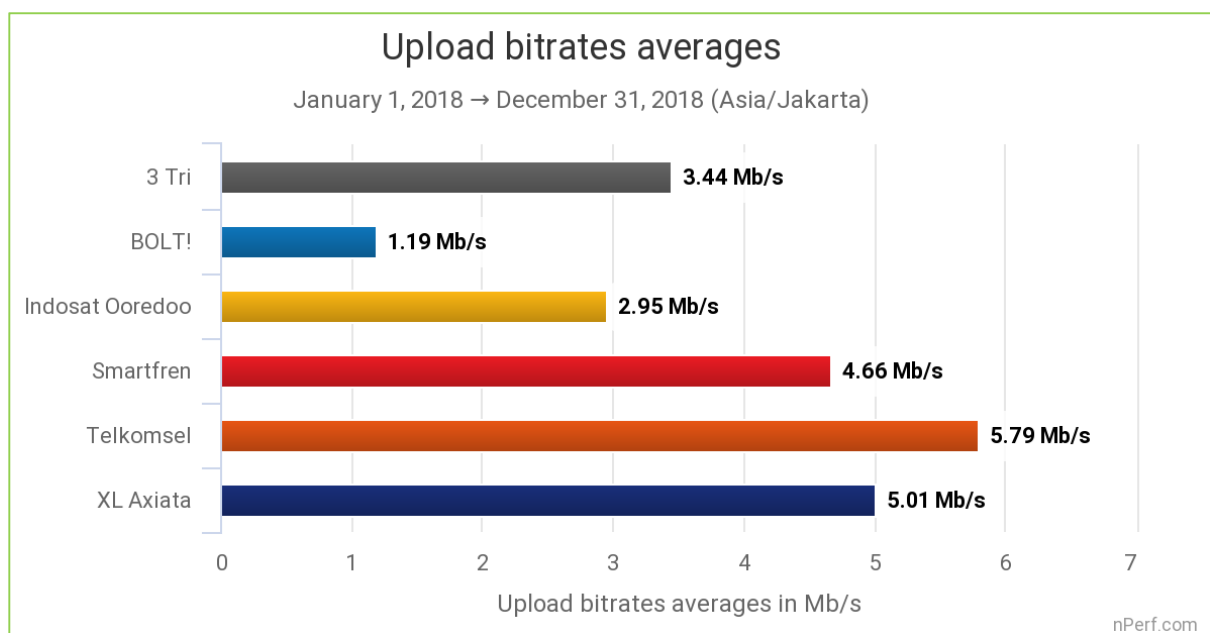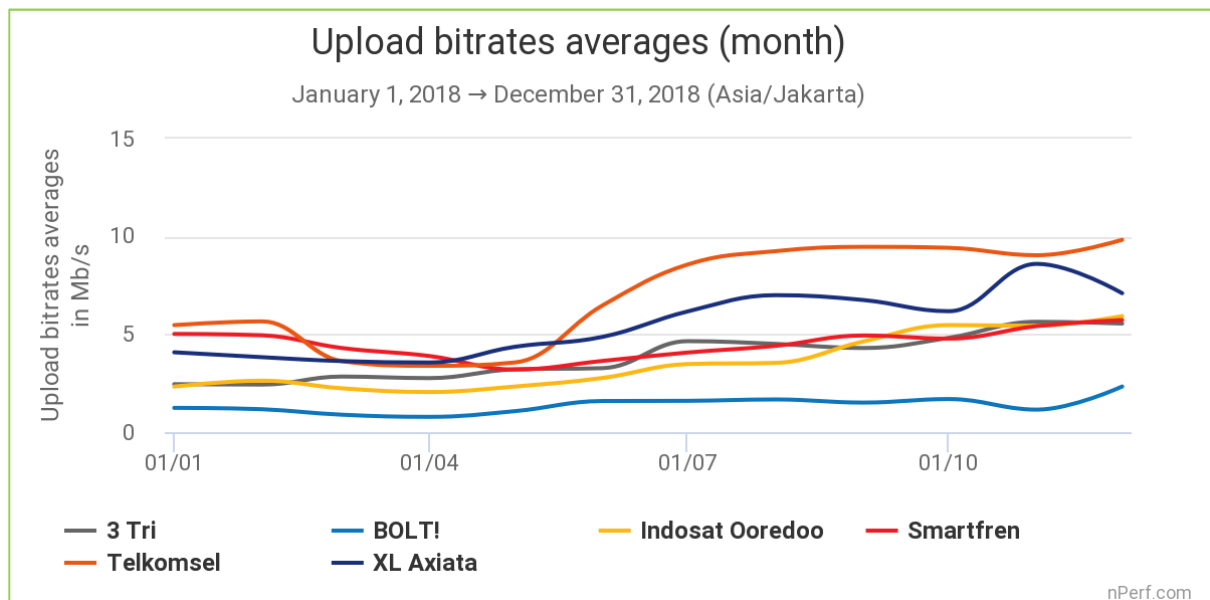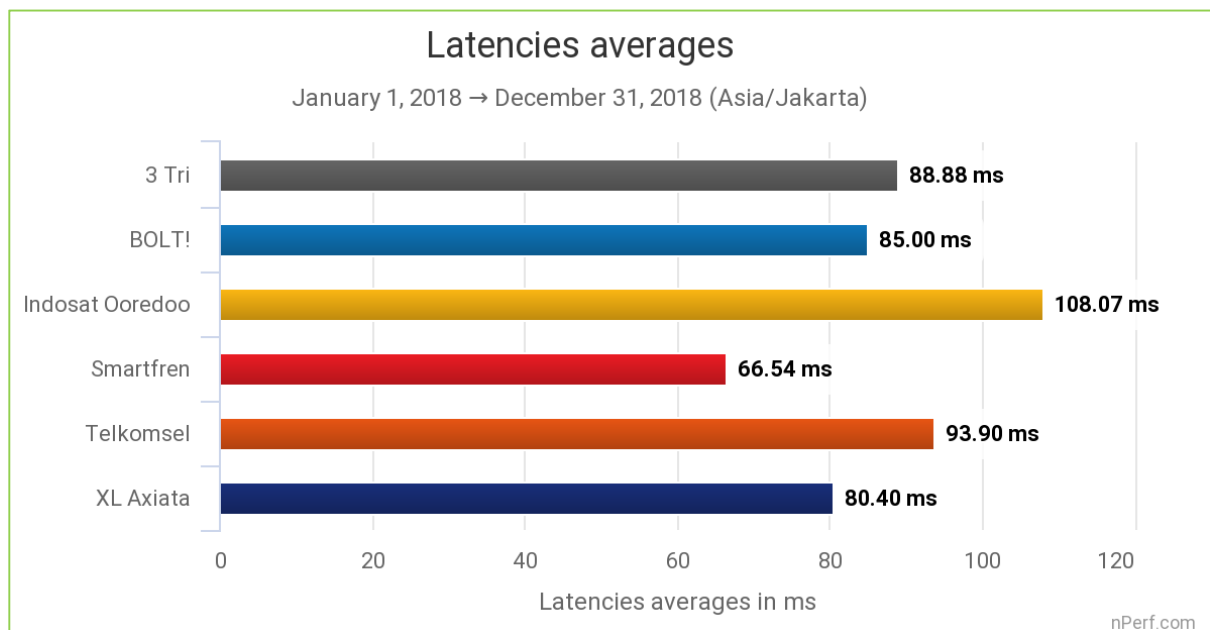
Except BOLT!, all the operators have been increasing from May their upload throughput.

2.5 Latency 2G/3G/4G

Latencies averages

January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Operator	Latency
3 Tri	88.88 ms
BOLT!	85.00 ms
Indosat Ooredoo	108.07 ms
Smartfren	66.54 ms
Telkomsel	93.90 ms
XL Axiata	80.40 ms

Latencies averages in ms

nPerf.com

The lowest value is the best.

Smartfren provided the best average latency during the year 2018.

Latencies averages (month)

January 1, 2018 → December 31, 2018 (Asia/Jakarta)

The lowest value is the best.

This graph illustrates the ability of providers to maintain a constant latency during the year, regardless of network load (number of connected clients).
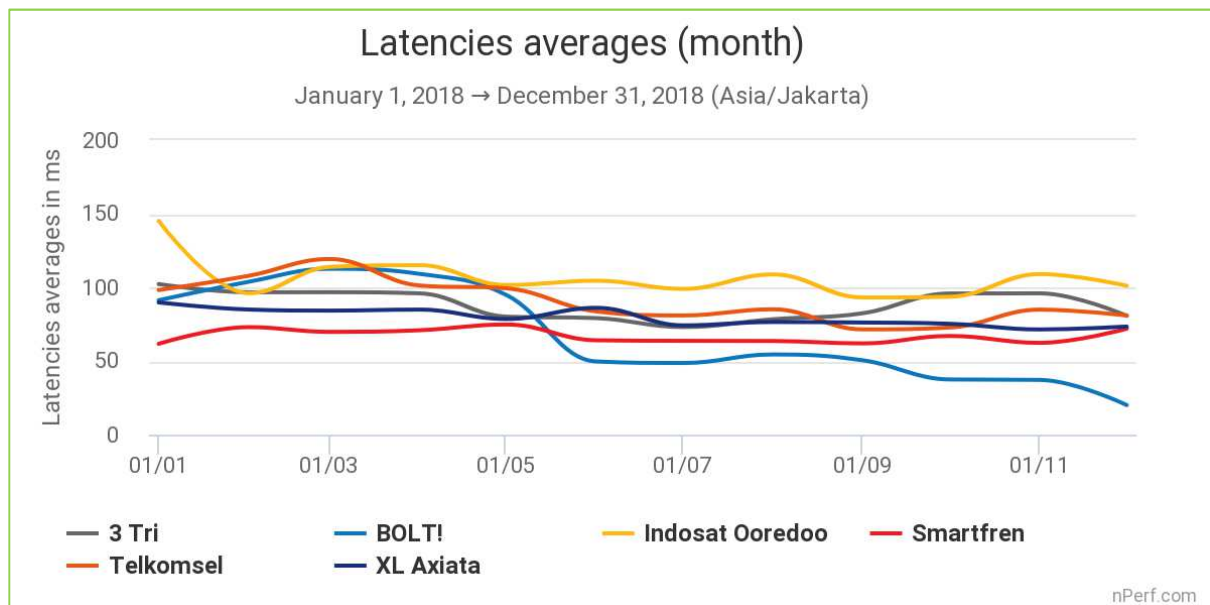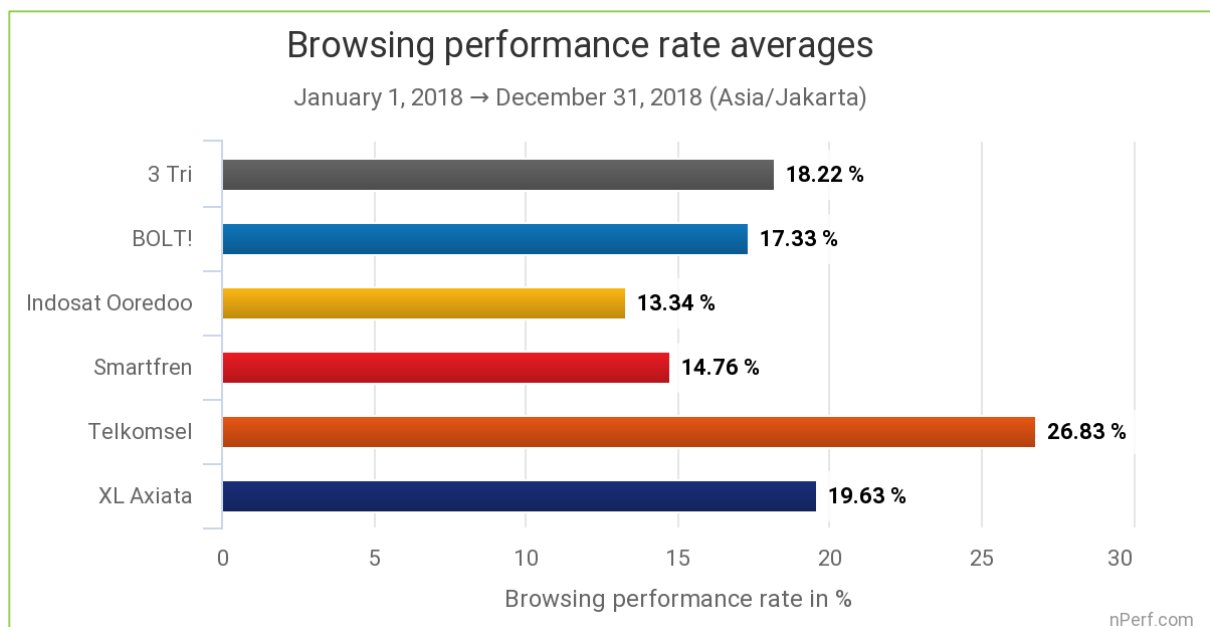
Latencies tend to converge at the end of the year.

2.6 Browsing test 2G/3G/4G

Average performance of the loading times of the 5 websites most frequented by Indonesian Internet users (excluding YouTube).

Browsing performance rate averages

January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Provider	Browsing performance rate in %
3 Tri	18.22 %
BOLT!	17.33 %
Indosat Ooredoo	13.34 %
Smartfren	14.76 %
Telkomsel	26.83 %
XL Axiata	19.63 %

The highest value is the best.

During the year 2018, Telkomsel proposed the best performance in Internet browsing.
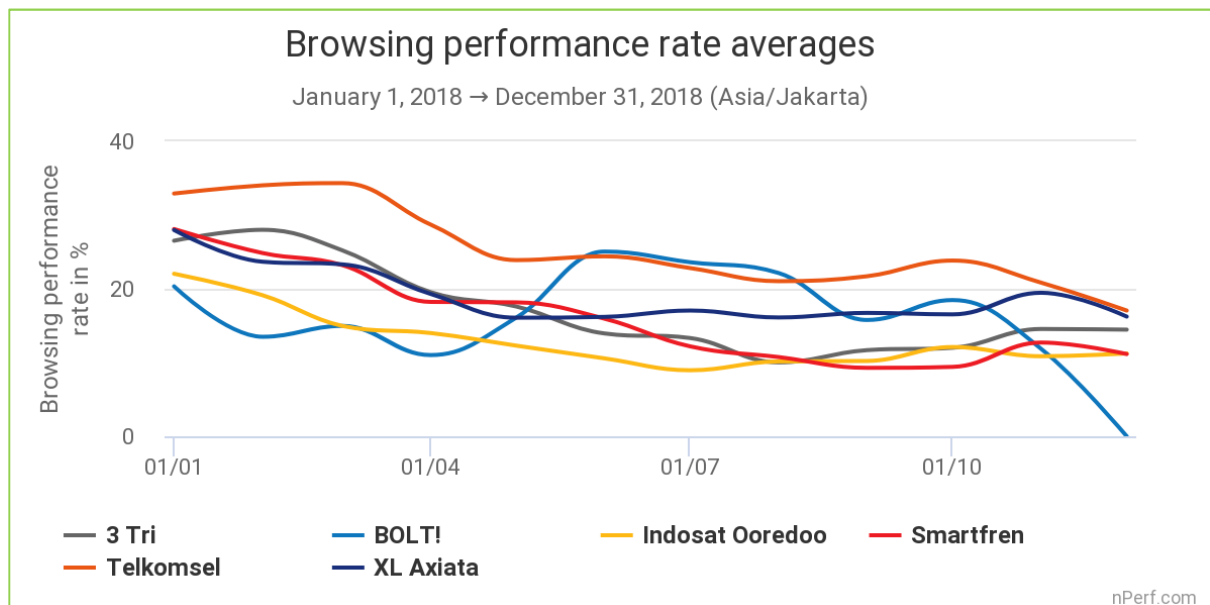
Browsing performance rate averages

January 1, 2018 → December 31, 2018 (Asia/Jakarta)

The highest value is the best.

This graph illustrates the ability of providers to maintain a constant browsing performance during the year, regardless of network load (number of connected clients).

2.7 Streaming test 2G/3G/4G

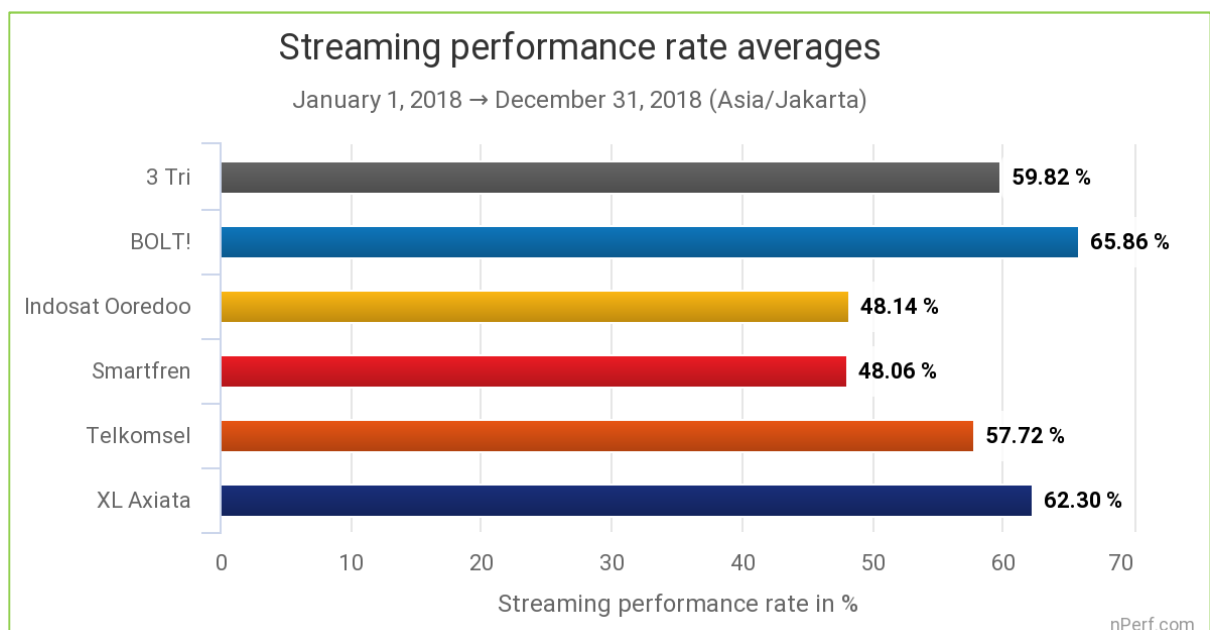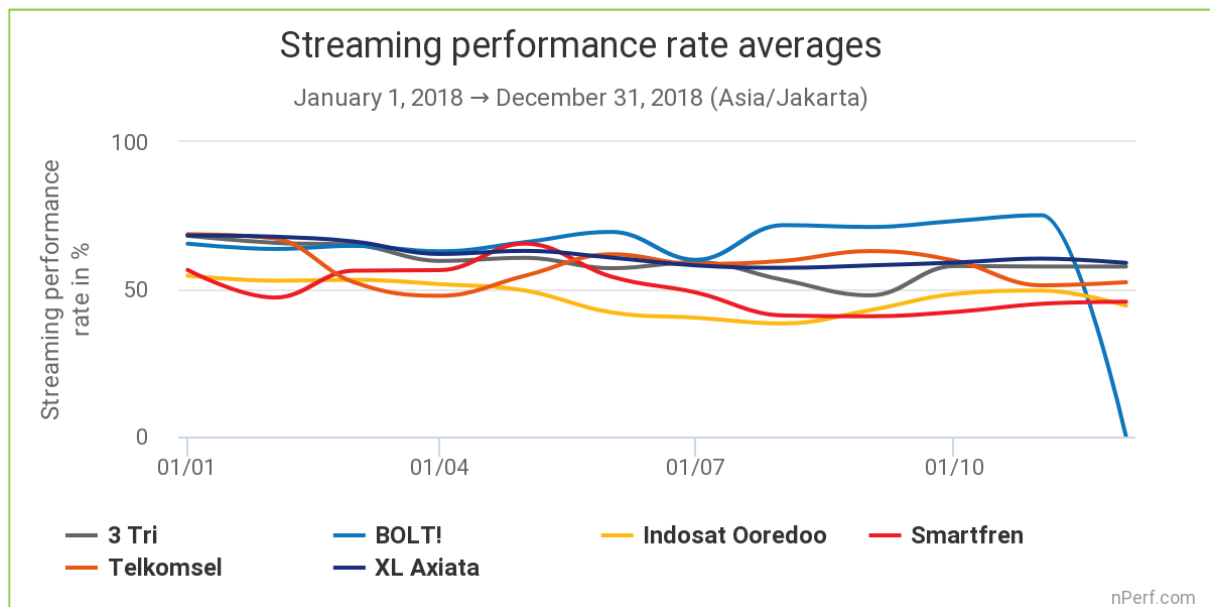Measuring the quality of watching a video on the YouTube streaming platform.

Streaming performance rate averages

January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Provider	Rate
3 Tri	59.82 %
BOLT!	65.86 %
Indosat Ooredoo	48.14 %
Smartfren	48.06 %
Telkomsel	57.72 %
XL Axiata	62.30 %

Streaming performance rate in %

nPerf.com

The highest value is the best.

BOLT! has proposed the best rate of performance in video streaming during the year 2018.

XL Axiata is not far from BOLT! on streaming performances.

Streaming performance rate averages
January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Legend: 3 Tri, BOLT!, Indosat Ooredoo, Smartfren, Telkomsel, XL Axiata

nPerf.com

The highest value is the best.

This graph illustrates the ability of providers to maintain a constant streaming performance during the year, regardless of network load (number of connected clients).

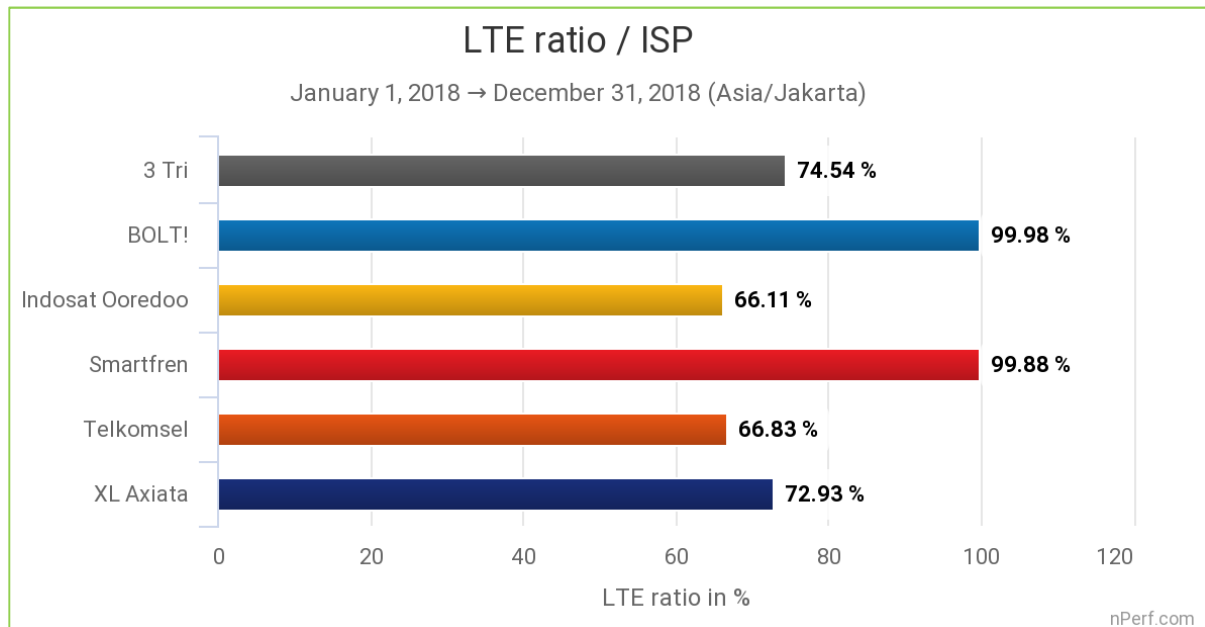## 2.8 4G and 4G+ connection rate

nPerf data is used to determine the 4G and 4G+ connection rates. These indicators are calculated from test data from nPerf applications.

The principle is simple: for each operator, the number of tests performed in 4G or 4G+ on the total number of cellular tests is calculated. For the relevance of the result, all tests carried out on the terminals that do not make it possible to benefit from 4G are excluded beforehand.

Important note: we do not have the possibility to distinguish commercial offers. As a result, although they are few, users who do not benefit from a 4G plan but who have a 4G mobile are not excluded from the results.
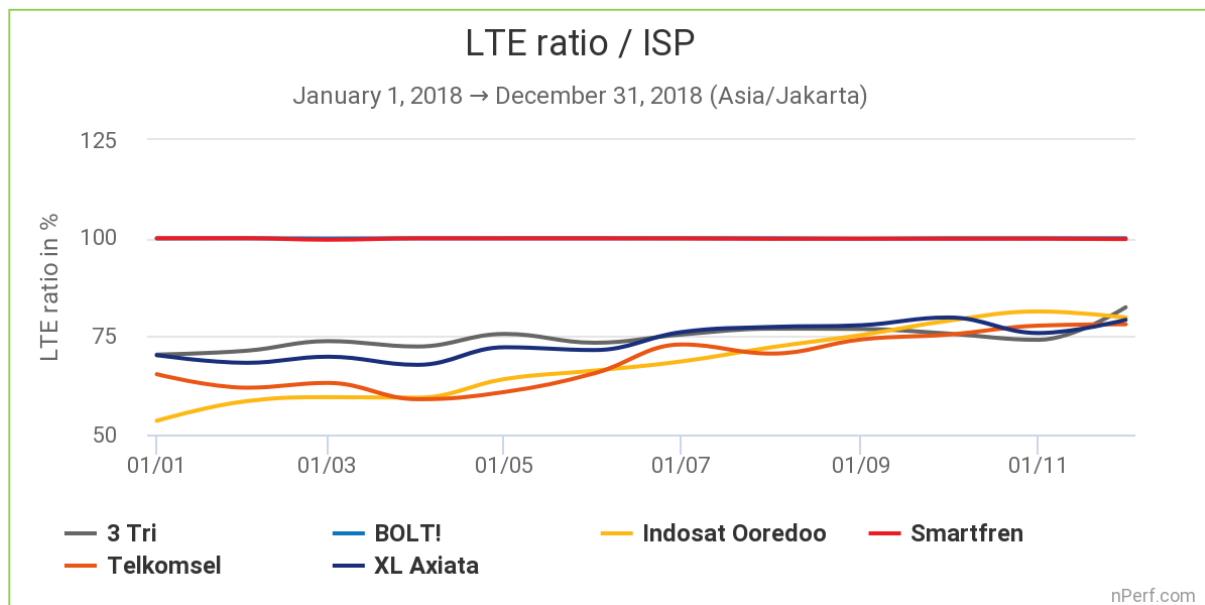
2.8.1 4G connection rate

Statistics based on 266 446 tests performed on 4G terminals. List of 4G terminals in annex.

nperf

LTE ratio / ISP
January 1, 2018 → December 31, 2018 (Asia/Jakarta)

ISP	LTE ratio
3 Tri	74.54 %
BOLT!	99.98 %
Indosat Ooredoo	66.11 %
Smartfren	99.88 %
Telkomsel	66.83 %
XL Axiata	72.93 %

nPerf.com

The highest value is the best.

BOLT! and Smartfren have delivered the best 4G connection rates for the year 2018.

LTE ratio / ISP
January 1, 2018 → December 31, 2018 (Asia/Jakarta)
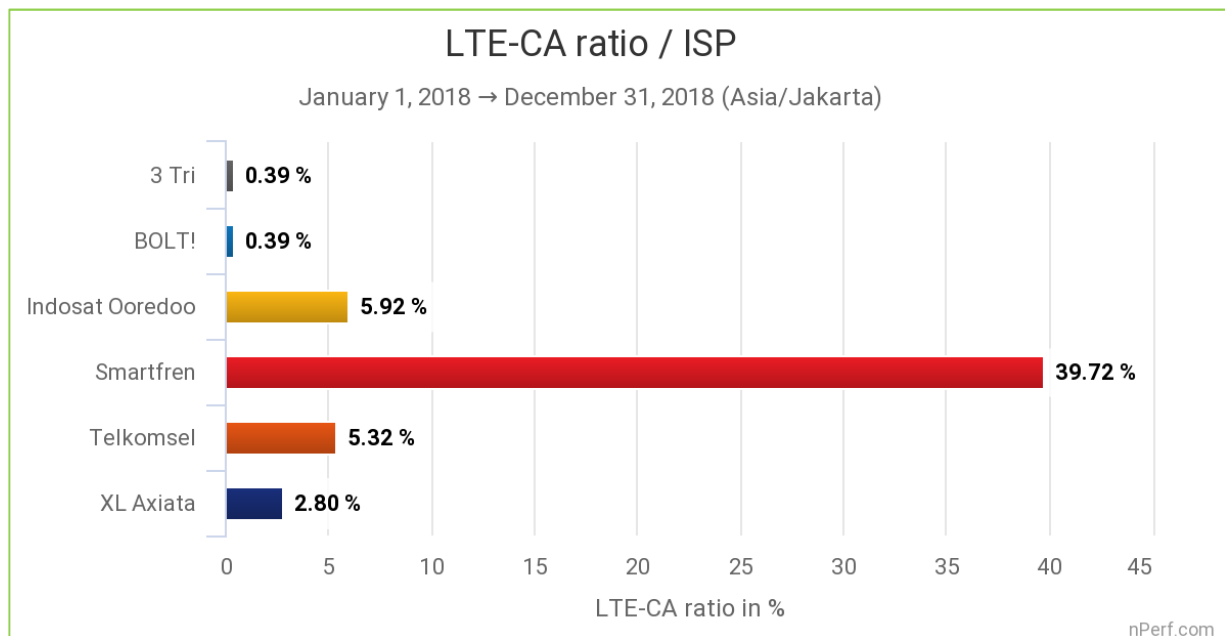
nPerf.com

The highest value is the best.

This graph illustrates the evolution of the 4G connection rate throughout the year.

We can note that all the operators delivering both 3G and 4G technologies reached a 4G connection rate of 80% end of 2018.
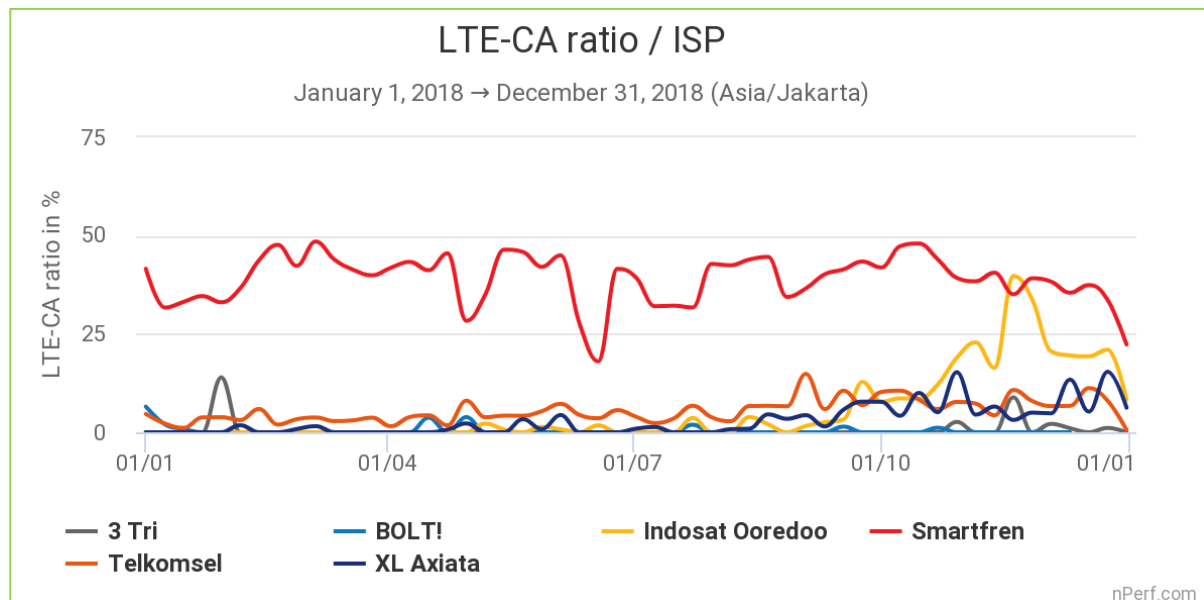
2.8.2 4G+ connection rate

Statistics based on 49 166 tests carried out on 4G terminals (Categories 6 or +) which allow the identification of the 4G+ (LTE Advanced with Carrier Aggregation). List of 4G+ terminals in annex.

LTE-CA ratio / ISP
January 1, 2018 → December 31, 2018 (Asia/Jakarta)

ISP	LTE-CA ratio
3 Tri	0.39 %
BOLT!	0.39 %
Indosat Ooredoo	5.92 %
Smartfren	39.72 %
Telkomsel	5.32 %
XL Axiata	2.80 %

The highest value is the best.

Smartfren got the best 4G+/LTE-CA connection rate for the year 2018.

LTE-CA ratio / ISP
January 1, 2018 → December 31, 2018 (Asia/Jakarta)

This graph illustrates the evolution of the 4G+ connection rate throughout the year.

We note that Indosat Ooredoo, XL Axiata and Telkomsel sped up their 4G+ deployment last september.
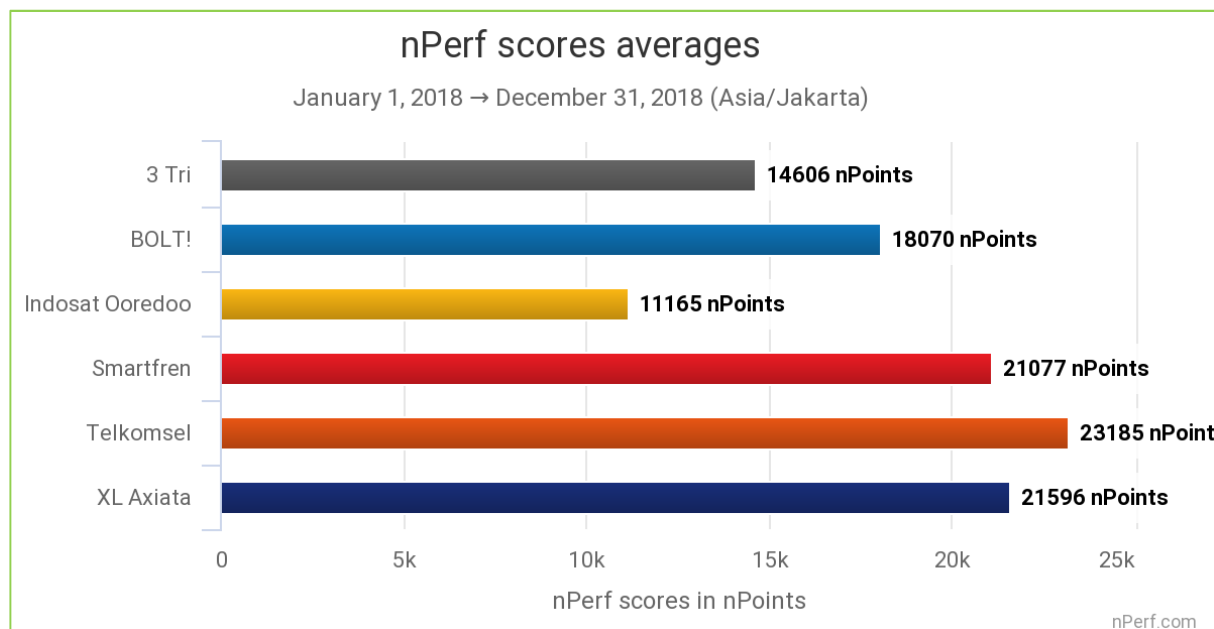
2.9 2G/3G/4G nPerf Score

The nPerf score, expressed in nPoints, gives an overall picture of the quality of a connection. It accounts for 60% of the measured speed (80% downward + 20% upload) and for 40% of the QoS tests, equal parts between navigation and streaming.

Thus, this score reflects the overall quality of the connection **felt by the user**.

The results below consider all the previous indicators and therefore all the tests carried out. As technologies are grouped together, the proportion of tests in different technologies strongly impacts this global trend. This shows a general ranking of providers for the whole of Indonesia.

nPerf scores averages
January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Provider	nPoints
3 Tri	14606 nPoints
BOLT!	18070 nPoints
Indosat Ooredoo	11165 nPoints
Smartfren	21077 nPoints
Telkomsel	23185 nPoint
XL Axiata	21596 nPoints

nPerf scores in nPoints

nPerf.com

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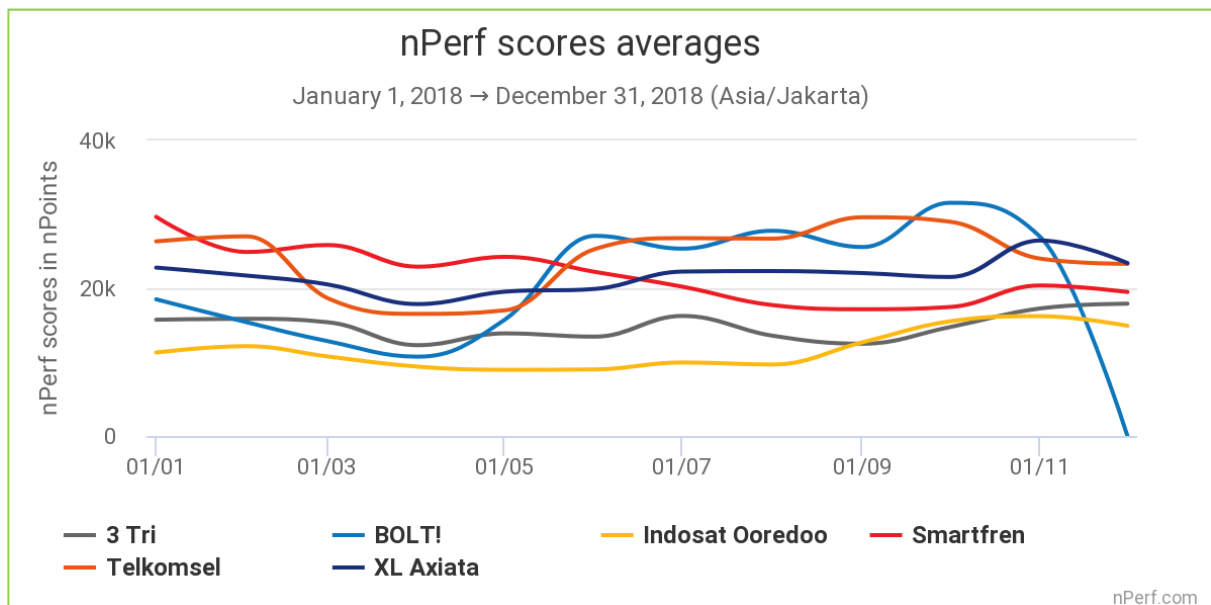*The highest value is the best.*

The best mobile Internet performance in 2018:

Telkomsel provided the best mobile Internet services in 2018.

Thanks to the nPerf application, find this global indicator directly on your smartphone or tablet via the « ≡ Compare » function at the end of the full test. It is updated in real time over 14 rolling days.

nperf

nPerf scores averages

January 1, 2018 → December 31, 2018 (Asia/Jakarta)

Legend: 3 Tri — BOLT! — Indosat Ooredoo — Smartfren — Telkomsel — XL Axiata

nPerf.com

The highest value is the best.

Evolution of the overall average score throughout the year 2018.

The BOLT network was cut at the end of the year 2018 so its December score went down to 0.

Scores tend to converge at the end of the year even if Telkomsel and XL Axiata stay one step ahead.

3 You too, participate in the nPerf panel!

To participate in the panel, simply use the nPerf application, available for free on the Apple AppStore for iPhone and iPad, on Google Play for Android devices and on the Windows Store for Windows 10 Mobile phones.

Download the nPerf App	
Android	http://android.nperf.com/
iOS	http://ios.nperf.com/
Windows Phone	http://wp.nperf.com/

Also participate in the Fixed Connections Barometer panel by testing your DSL, cable or fiber optic connection at www.nPerf.com.

4 Custom analysis & contact

Do you need further study or want to get the raw data, punctually or automatically, to compile it yourself?

You can contact nPerf via www.nPerf.com "Contact Us" section or directly from the mobile app.

Phone contact: +33 482 53 34 11

nPerf [Facebook](#) – [Twitter](#) – [Instagram](#)

Address: nPerf SAS, 87 rue de Sèze, 69006 LYON, France

5 Appendices

5.1   Methodology

5.1.1   The panel

nPerf offers a free application for testing the quality of the Internet connection, downloadable on Android, iOS (Apple) and Windows Phone mobile devices.

Everyone is free to use this app to measure the quality of their mobile connection. All users of the nPerf application form the panel of this study.

Thus, the nPerf study is based on the tens of thousands of tests carried out each month exclusively by the operators' end customers., making it the "crowdsourcing" study with the largest panel in Indonesia.

5.1.2   Definitions and objectives

5.1.2.1   Success rate
The success rate is the number of successful tests compared to the number of tests performed.

5.1.2.2   Speed and latency tests
The purpose of the nPerf Speed Test is to measure the maximum capacity of the connection in terms of bit rate and latency.

To achieve this, nPerf simultaneously establishes multiple connections to saturate the bandwidth to accurately measure it.

The speed measurements thus reflect **the maximum capacity** of the connection. This rate may not be representative of the user experience experienced during normal use of the Internet because it is measured only on nPerf servers.

The user experience will be measured by quality of service (QoS) tests.

5.1.2.3   nPerf servers
To ensure maximum user bandwidth at all times, nPerf relies on a network of servers dedicated to this task.

These servers are located with hosts in Indonesia and abroad. nPerf has also installed dedicated servers directly at Indonesia providers Smartfren and Bolt! to maximize measurement reliability. The other providers are invited to contact us to setup a free nPerf server in their network.

The total bandwidth available for Indonesia is greater than 6 Gb/s.

5.1.2.4 The browsing test

The browsing test allows the user to accurately measure the loading time of the 5 websites most frequented by Indonesian Internet users (YouTube is excluded from this test as it is subject to the following test).

This indicator reflects the quality of navigation perceived by the user. It can however be negatively impacted by the performance of the terminal used, especially if it is old.

It is calculated considering the loading time of the page. A page loaded in 10 seconds or more gets a 0% performance rate and a page loaded instantly gets a performance rate of 100%. For example, a page loaded in 2 seconds will get a performance rate of 80%.

5.1.2.5 YouTube streaming test

The goal of the streaming test is to measure the quality of video viewing on the most popular streaming platform in Indonesia and around the world: YouTube.

It operates under conditions similar to the direct use of YouTube and therefore takes into account the quality of the network between the user and the YouTube servers.

It is calculated considering all the time required to load the video (before or during playback). If the ratio between the duration of the video and the overall reading time (reading + loading) tends to 1 then the performance index will tend towards 100%. And conversely, the more the ratio moves away from 1, the more the index will tend towards 0%.

5.1.3 Filtering of test results

The results obtained are subject to automatic and manual checks to avoid duplication and to rule out possible abusive or fraudulent use (massive tests, robots ...). The exclusive nPerf algorithm retains only the relevant tests, thus eliminating biases related to the overrepresentation of certain terminals, users or test locations.

The results are classified by provider. The results for each provider include the tests performed on the partner networks (roaming, pooling).

5.1.3.1 Filtering of devices

In order not to introduce any bias related to the capabilities of the terminals, only the tests carried out on the 4G compatible terminals are retained. The exhaustive list is provided in the appendix.

5.1.3.2 Filtering 4G+ compatible terminals

For calculating the 4G + connection rate, only 4G+ compatible terminals are selected. The exhaustive list is provided in the appendix.

5.1.4 Modification of the methodology in 2018

As of January 1, 2018, the formula for calculating the nPerf score evolves to better represent the user's feeling. The new formula considers latency and gives more importance to upload and user experience (browsing, streaming). This new formula is only applied to tests carried out from 1 January 2018.

This publication based on the 2018 tests uses the new formula.

5.2 Complete list of 4G terminals selected for 2018

Samsung Galaxy S4 LTE, Samsung Galaxy S3 LTE, LG Nexus 5, Samsung Galaxy Note 3 LTE, Sony Xperia SP, Sony Xperia Z1, Samsung Galaxy Mega 6.3 LTE, HTC One M7, Samsung Galaxy Note II LTE, Sony Xperia Z, Samsung Galaxy Express, HTC One mini, Samsung Galaxy S4 LTE+, Samsung Galaxy S4 Mini LTE, LG G2, Samsung Galaxy Note LTE 10.1, Samsung Galaxy Tab 3 10.1 LTE, HTC One X+, Bouygues Telecom Ultym 4, LG Optimus G, HTC One SV, Asus Nexus 7, Samsung Galaxy S4 LTE (Google), Sony Xperia Z Ultra, Samsung Galaxy S4 Active, LG Optimus True HD, HTC Desire 601, Samsung Galaxy Ace 3 LTE, Samsung Galaxy S4 LTE Advanced, Samsung Galaxy Note II LTE, Alcatel One Touch Idol S, Samsung Galaxy Note II LTE, Bouygues Telecom BS501, Sony Xperia V, Samsung Galaxy Note II LTE, LG Optmius F6, HTC One max, Apple iPhone 5, Apple iPhone 5S, Apple iPhone 5C, Apple iPad Air, Apple iPad mini 2, Apple iPad 4, Nokia Lumia 920, Nokia Lumia 925, Nokia Lumia 1020, Nokia Lumia 820, Nokia Lumia 625, Nokia Lumia 1520, Nokia Lumia 1320, Sony Xperia Z1 Compact, Huawei Ascend G740, Samsung Galaxy S5, Sony Xperia Z2, HTC One M8, HTC One VX, Motorola Moto X, RIM BlackBerry Z10, LG G3, Nokia Lumia 930, Motorola Moto G 4G, Nokia Lumia 635, Sony Xperia M2, HTC One mini 2, HTC Desire 610, Alcatel One Touch Idol 2 S, Samsung Galaxy S5 LTE-A, HTC Desire 816, Samsung Galaxy S5 LTE-A, ZTE Grand S Flex, Apple iPhone 6, Apple iPhone 6+, Sony Xperia Z3, Sony Xperia Z3 Compact, Samsung Galaxy Alpha LTE-A, Samsung Galaxy Alpha LTE, Samsung Galaxy Note 4 LTE, Samsung Galaxy Note 4 LTE-A, Motorola Moto X 2014, OnePlus One, Motorola Nexus 6, Apple iPad Air 2, Apple iPad mini 3, Wiko WAX LTE, Samsung Galaxy Core LTE, Samsung Galaxy S5 mini, Samsung Galaxy Note 3 Lite, Samsung Galaxy S4 VE, Wiko Rainbow 4G, Archos 50 Helium 4G, Archos 50b Helium 4G, Archos 45 Helium 4G, Archos 45b Helium 4G, Samsung Galaxy Grand II LTE, Nokia Lumia 735, Nokia Lumia 830, Nokia Lumia 822, Nokia Lumia 928, Nokia Lumia 636, Motorola Droid Turbo, Samsung Galaxy Note Edge, Samsung Galaxy S5 Active, Huawei Ascend Mate 7, Huawei Honor 6, Huawei Ascend G620s, Samsung Galaxy Ace Style LTE, Meizu MX4, Meizu MX4 Pro, Sony Xperia E3, Sony Xperia T3, Wiko Birdy, Wiko Highway 4G, Samsung Galaxy S6, Samsung Galaxy S6 Edge, HTC One M9, Asus Zenfone 2, Samsung Galaxy Grand Prime, Archos 50 Diamond, LG G3 S, Samsung Galaxy A3, Samsung Galaxy Tab 4 10.1" LTE, Samsung Galaxy Tab S 10.5" LTE, Samsung Galaxy Core Prime, Samsung Galaxy A5, Wiko Ridge Fab 4G, Wiko Ridge 4G, Motorola Moto G2, Microsoft Lumia 640 XL LTE Dual SIM, Huawei Ascend G7, OnePlus Two, Apple iPhone 6s, Apple iPhone 6s+, Samsung Galaxy Note 5, Samsung Galaxy J2, Samsung Galaxy J7, Samsung Galaxy J5, Samsung Galaxy J1 Ace, Samsung Galaxy A8, Motorola Moto X Style, Motorola Moto X Pure Edition, Motorola Moto G3, Samsung Galaxy S6 Edge+, Sony Xperia Z3+, LG G4, Huawei Honor 7, LG Nexus 5X, Huawei Nexus 6P, Hisense Andromax R, Hisense PureShot+, Hisense PureShot, Huawei P8lite, Huawei P8, Sony Xperia Z5 Cat6, Sony Xperia M4 Aqua Dual, Sony Xperia Z5 Compact Cat6, Sony Xperia M4 Aqua, Sony Xperia M2 Aqua, Sony Xperia C5, Sony Xperia E4g, Samsung Grand Prime VE, Samsung Galaxy S5 Neo, Samsung Galaxy A7, Samsung Galaxy Tab S 8.4" LTE, Alcatel One Touch Idol 3 5.5", Alcatel One Touch Idol 3 4.7", Alcatel One Touch Pop 2 Premium, Orange Nura, Alcatel One Touch Pop S7, Lenovo A7000, Lenovo A6000, Xiaomi Redmi Note 2, Xiaomi Redmi Note 3, Xiaomi Mi 4i, Xiaomi Mi 4, Microsoft Lumia 950, Microsoft Lumia 950 XL, Samsung Galaxy S7, Samsung Galaxy S7 Edge, Wiko Tommy 4G, LG G Flex 2, Apple iPad mini 4, Apple iPad Pro 10", Apple iPad Pro 13", Apple iPhone SE, Wiko Fever, Motorola Moto X Play, OnePlus X, Microsoft Lumia 640 LTE, Microsoft Lumia 640 LTE Dual SIM, Microsoft Lumia 550 LTE, Microsoft Lumia 1330, Microsoft Lumia 650, Microsoft Lumia 650 Dual SIM, Microsoft Lumia 640 XL LTE, Microsoft Lumia 638, Nokia Lumia 929, Smartfren Andromax E2, Samsung Galaxy A5 2016, Huawei Honor 4X, Samsung Galaxy A3 2016, Huawei Honor 5X, Huawei Ascend Mate 8, Sony Xperia Z5 Premium, Sony Xperia X, LG G5, LG V10, Samsung Galaxy A7 2016, Apple iPhone 7, Apple iPhone 7+, Sony Xperia X Performance, Samsung Galaxy Note 7, OnePlus 3, Huawei Y560, Samsung Galaxy Tab A 9.7" LTE, Motorola Moto G4, Asus Zenfone 5, Huawei P9, Huawei P9 Lite, Huawei Honor 5C, LeEco Le Max 2 X820, BlackBerry Priv, Motorola Moto E2, Motorola Moto E3, Motorola Moto Maxx, Samsung Galaxy J3, Asus Zenfone Max, Xiaomi Redmi 3, Xiaomi Mi 5, HTC 10, Huawei Honor 8, Lenovo Vibe K5, Smartfren Andromax Q, Smartfren Andromax R2, Xiaomi Redmi 3s, Lenovo Vibe K4 Note, LG K10, Meizu M2 Note, Samsung Galaxy A9 Pro, Xiaomi Mi Max, Sony Xperia XZ, Motorola Moto G4 Play, Huawei P9 Plus, Huawei Mate 9, Wiko Pulp 4G, Meizu M3 Note, Samsung Galaxy J7 Prime, Samsung Galaxy J2 Prime, Samsung Galaxy Tab A 10.1" LTE, Samsung Galaxy Tab S2 9.7" LTE, Samsung Galaxy Xcover 3, Oppo F1s, Oppo A37, Oppo F1, Oppo F1 Plus, Oppo A33, Xiaomi Redmi Note 4, Xiaomi Redmi Note 4X, Xiaomi Redmi 4, Xiaomi Redmi 4a, Xiaomi Redmi 4X, Asus Zenfone 3 Max, Asus Zenfone 3, Asus Zenfone Go LTE, Asus Zenfone 3 Deluxe, Motorola Moto Z Play, Motorola Moto Z, Motorola Moto X Force, Alcatel Flash Plus 2, Vivo V3Max, Vivo V3, Smartfren Andromax A, Smartfren Andromax E2 Plus, Smartfren Andromax L, Wiko U Feel, Huawei Y6 II, Huawei Mate S, Huawei Honor 6X, Huawei G8, Huawei P8 Lite 2018, Lenovo A2010, Lenovo Vibe P1m, Lenovo Vibe K5 Note, Lenovo P70, Sony Xperia E5, Sony Xperia XA, Sony Xperia X Compact, LG V20, LG X power, LG K8, LG Magna, Google Pixel, Google Pixel XL, OnePlus 3T, Samsung Galaxy S8, Samsung Galaxy S8+, Sony Xperia XZ Premium, Samsung Galaxy A7 2018, Samsung Galaxy A3 2018, Samsung Galaxy J5 Prime, Samsung Galaxy Grand Prime Plus, Samsung Galaxy Tab S2 9.7" VE, Samsung Galaxy Tab A 7" LTE, Samsung Galaxy Tab S2 8.0" LTE, Samsung Galaxy Tab S2 8.0" VE, Motorola Moto G5, Motorola Moto G5 Plus, Huawei P10, Huawei P10 Lite, Huawei P10 Plus, Huawei Mediapad M3 LTE, Huawei Nova, Huawei Mate 9 Pro, Huawei Y5II, ZTE Axon 7, Lenovo P2, Lenovo C2, Lenovo K6, Lenovo Vibe K6 Note, Xiaomi Mi 5s, Xiaomi Redmi 3X, Xiaomi Mi 5s Plus, Asus Zenfone Go ZB500KL, Xiaomi Redmi 2, Xiaomi Redmi Pro, LG G4 Stylus, LG G5 SE, Meizu M3s, Apple iPhone 8, Apple iPhone 8+, Apple iPhone X, ZTE V9820, Samsung Galaxy S8 Active, OnePlus 5, LG G6, Oppo A57, Oppo A39, Samsung Galaxy Note 8, Samsung Galaxy J7 Pro, True SMART 4G Octa 5.5, Huawei Mate 10 Pro, OnePlus 5T, Samsung Galaxy J5 2018, HTC U11, HTC U11 Life, HTC U11+, Motorola Z2 Play, Sony Xperia XZ1, Sony Xperia XZ1 Compact, Google Pixel 2, Google Pixel 2 XL, Samsung Galaxy A5 2018, Xiaomi Mi A1, Motorola Moto G5S Plus, Motorola Moto G5S, Motorola Moto E4 Plus, Motorola Moto E4, Motorola Moto X4, Xiaomi Redmi Note 5A, Xiaomi Mi Max 2, Xiaomi Mi 6, Xiaomi Mi Mix 2, Xiaomi Redmi 5A, Xiaomi Redmi Note 5, Huawei Honor 9, Huawei Mate 10 Lite, Huawei Honor 8 Pro, Huawei Honor 7X, Huawei Honor View 10, Asus Zenfone 4 Max, Asus Zenfone Live, Asus Zenfone 2 Laser, Vivo 1606, Vivo V5s, Vivo V5 Lite, Vivo V7, Vivo Y55s, Vivo Y55L, Samsung Galaxy J7 Nxt, Samsung Galaxy A8 2018, Samsung Galaxy S9+, Samsung Galaxy S9, Samsung Galaxy Note FE, Samsung Galaxy C9 Pro, Samsung Galaxy J3 2018, Samsung Galaxy C7 2018, Samsung Galaxy Tab S3 9.7" LTE, ZTE Blade Q Lux, Oppo F5, Oppo F3, Oppo A71, Oppo R9s, LG X power2, LG Q6, LG X style, Vivo V5 Plus, Wiko U Feel Lite, Lenovo Vibe P1 Turbo, Vivo V7+, Lenovo Vibe C, Sony Xperia XA1 2CA, Sony Xperia XA1, Sony Xperia XA1 Ultra, Motorola Moto C Plus, OnePlus 6, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, Huawei P Smart, Huawei Honor 10, Nokia 7 Plus, Nokia 8, Samsung Galaxy A8+ 2018, Wiko Wim Lite, Wiko Wim, Xiaomi Mi Mix 2S, Xiaomi Mi Note 2, Sony Xperia XZ2, Sony Xperia XA2 Ultra, Sony Xperia XA2, Sony Xperia XZ2 Compact, Oppo F7, Oppo A71 2018, Oppo A83, Oppo F3 Plus, Oppo F5 Youth, Oppo R9s Plus, Asus Zenfone Max Plus M1, Asus Zenfone 4 Selfie, Asus Zenfone Go, Asus Zenfone 4, Huawei Honor 7i, Huawei Honor 9 Lite, Huawei Y9 2018, Huawei Y7 Prime, Huawei Y7, Huawei Y5 2018, Nokia 6, Nokia 5, Nokia 3, Xiaomi Redmi Note 5 Pro, Xiaomi Redmi 5, Xiaomi Mi Note 3, Essential PH-1, LG V30, ZTE Blade A452, Vivo V9, Vivo Y51, Vivo V9 Youth, Vivo Y65, Sony Xperia

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L1, Samsung Galaxy J2 2016, Samsung Galaxy J2 Pro 2018, Samsung Galaxy Xcover 4, Samsung Galaxy J7 Max, True SMART 4G MAX 5.0, True SMART 4G MAX 5.5, True SMART 4G MAX 4.0, True SMART 4G M1 Plus, True SMART MAX 4.0 PLUS, Bittium Tough Mobile, Telma NAVTECH 4GEN, Vivo Y69, Advan S5E, Advan i5C, Infinix X573B, Motorola Moto C, Samsung Galaxy Note 9, Samsung Galaxy A6+ 2018, Samsung Galaxy A6 2018, Samsung Galaxy J6 2018, Samsung Galaxy J6+ 2018, Asus ZenFone Max Pro M1, Xiaomi Redmi S2, Xiaomi Mi 8, Xiaomi Pocophone F1, Huawei Nova 3i, Vivo Y71, Motorola Moto G6 Plus, Lenovo K8 Note, Oppo A3s, Apple iPhone Xs, Apple iPhone Xs Max, Apple iPhone XR, Apple iPad 9.7" 2018 WiFi+Cell, Apple iPad Pro 12.9" 2018 WiFi+Cell, Apple iPad Pro 10.5" 2018 WiFi+Cell, Apple iPad 9.7" 2018 WiFi, Apple iPad Pro 11" 2018 WiFi+Cell, Apple iPad Pro 12.9" 2018 WiFi+Cell, Oppo F9, Huawei Mate 20 Pro, Huawei Mate 20 X, Huawei Honor 8X, Huawei Mate 20 Lite, Huawei Honor Play, Huawei Y5 Prime 2018, Huawei Y9 2019, OnePlus 6T, Xiaomi Mi A2 Lite, Xiaomi Mi Max 3, Xiaomi Mi A2, Xiaomi Redmi Note 6 Pro, LG K4 2018, Motorola Moto G6 Play, Nokia 6.1, Samsung Galaxy J8 2018, Samsung Galaxy J4 2018, Asus Zenfone 5Z, Vivo V11

5.3 Complete list of 4G+ terminals selected for 2018

Only terminals on which band aggregation can be identified are considered.

Samsung Galaxy S5 LTE-A, Samsung Galaxy S5 LTE-A, Samsung Galaxy Alpha LTE-A, Samsung Galaxy Note 4 LTE-A, Samsung Galaxy Note Edge, Samsung Galaxy S6, Samsung Galaxy S6 Edge, Samsung Galaxy Note 5, Samsung Galaxy A8, Samsung Galaxy S6 Edge+, Sony Xperia Z3+, LG G4, LG Nexus 5X, Sony Xperia Z5 Cat6, Sony Xperia Z5 Compact Cat6, Samsung Galaxy S5 Neo, Samsung Galaxy S7, Samsung Galaxy S7 Edge, LG G Flex 2, Samsung Galaxy A5 2016, Samsung Galaxy A3 2016, Sony Xperia Z5 Premium, Sony Xperia X, LG G5, LG V10, Samsung Galaxy A7 2016, Sony Xperia X Performance, Samsung Galaxy Note 7, OnePlus 3, Huawei P9, Huawei P9 Lite, LeEco Le Max 2 X820, BlackBerry Priv, Sony Xperia XZ, Huawei P9 Plus, Huawei Mate 9, Motorola Moto Z Play, Motorola Moto Z, Huawei Mate S, Huawei P8 Lite 2018, Sony Xperia X Compact, LG V20, Google Pixel, Google Pixel XL, OnePlus 3T, Samsung Galaxy S8, Samsung Galaxy S8+, Sony Xperia XZ Premium, Samsung Galaxy A7 2018, Samsung Galaxy A3 2018, Huawei P10, Huawei P10 Lite, Huawei P10 Plus, Huawei Nova, ZTE Axon 7, Lenovo P2, Samsung Galaxy S8 Active, OnePlus 5, LG G6, Samsung Galaxy Note 8, Samsung Galaxy J7 Pro, Huawei Mate 10 Pro, OnePlus 5T, Samsung Galaxy J5 2018, HTC U11, HTC U11 Life, HTC U11+, Motorola Z2 Play, Sony Xperia XZ1, Sony Xperia XZ1 Compact, Google Pixel 2, Google Pixel 2 XL, Xiaomi Mi A1, Motorola Moto G5S Plus, Motorola Moto X4, Xiaomi Mi 6, Huawei Honor 9, Huawei Mate 10 Lite, Huawei Honor 8 Pro, Huawei Honor View 10, Samsung Galaxy A8 2018, Samsung Galaxy S9+, Samsung Galaxy S9, Samsung Galaxy Note FE, Samsung Galaxy C9 Pro, Samsung Galaxy Tab S3 9.7" LTE, Oppo F5, Oppo R9s, LG X power2, LG Q6, Vivo V5 Plus, Sony Xperia XA1 2CA, Sony Xperia XA1 Ultra, OnePlus 6, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, Huawei P Smart, Huawei Honor 10, Nokia 7 Plus, Nokia 8, Samsung Galaxy A8+ 2018, Wiko Wim Lite, Wiko Wim, Xiaomi Mi Mix 2S, Xiaomi Mi Note 2, Sony Xperia XZ2, Sony Xperia XA2 Ultra, Sony Xperia XA2, Sony Xperia XZ2 Compact, Xiaomi Mi Note 3, Samsung Galaxy Note 9, Samsung Galaxy A6+ 2018, Samsung Galaxy A6 2018, Samsung Galaxy J6 2018, Samsung Galaxy J6+ 2018, Xiaomi Redmi S2, Xiaomi Mi 8, Xiaomi Pocophone F1, Huawei Nova 3i, Motorola Moto G6 Plus, Lenovo K8 Note, Oppo A3s, Oppo F9, Huawei Mate 20 Pro, Huawei Mate 20 X, Huawei Honor 8X, Huawei Mate 20 Lite, Huawei Honor Play, Huawei Y9 2019, OnePlus 6T, Xiaomi Mi A2 Lite, Xiaomi Mi Max 3, Xiaomi Mi A2, Xiaomi Redmi Note 6 Pro, Samsung Galaxy J8 2018, Asus Zenfone 5Z, Vivo V11

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