TUTELA

Colombia

State of Mobile Experience

Analysts

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Annual Report

JUNE 2021

www.tutela.com

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Introduction

The telecoms industry continues to play an integral role in keeping businesses and individuals moving forward through these uncertain times, by providing quality mobile experiences powered by reliable wireless connectivity. This is no easy task as mobile operators also experienced their own productivity and revenue losses like any other industry across the globe, however the need for connectivity has never been more essential for us all than right now.

For the Colombian market, this was highlighted by its mobile data usage up 50% by the end of 2020, with an average usage of 3.5 GB[1]. Claro continued to expand its 4G coverage in the country, with the operator reporting an activation of 99% with 8,917 antennas installed[2], and Movistar reported a fixed network increase of 98% for 2020 while mobile data also increased by 87%[3].

WOM, the newest entrant to the Colombian market, has recently deployed its 700 MHz 4G network, won in a December 2019 auction, to 525 rural areas that were previously underserved - an obligation that was set out in the auction rulings[4].

[1] Telecompaper, Colombian mobile data usage up 50% to 3.5 GB per line in 2020
https://www.telecompaper.com/news/colombian-mobile-data-usage-up-50-to-35-gb-per-line-in-2020--1383635
Retrieved 17/06/21

[2] Telecompaper, Claro Colombia expands 4G coverage to 99% of territory
https://www.telecompaper.com/news/claro-colombia-expands-4g-coverage-to-99-of-territory--1379763
Retrieved 17/06/21

[3] Telecompaper, Movistar Colombia reports 98% surge in fixed network use in 2020
https://www.telecompaper.com/news/movistar-colombia-reports-98-surge-in-fixed-network-use-in-2020--1369338
Retrieved 17/06/21

[4] Developing Telecoms, WOM delivering 700MHz services in 525 new locations in Colombia
https://developingtelecoms.com/telecom-technology/wireless-networks/11326-wom-delivering-700mhz-services-in-525-new-locations-in-colombia.html
Retrieved 17/06/21

Although we are yet to see in our data what impact this new player will have in the market, we will continue to keep an eye on developments as the operator looks to finalize the merger with Avantel and absorb all responsibilities in the next few months[5] and looks to carve out 25% of the market share for itself over the next three years[6].

While some countries have already implemented and started to track the progress of 5G, in many others, Colombia included, there are still some obstacles to overcome and strategies to line out before going ahead; however it has been reported that this new technology should be auctioned and awarded in the country by quarter 4 2021[7]. Tigo and Nokia have partnered up to carry out 5G trials once available, with the spotlight on the city of Medellin and categories including virtual and augmented reality[8]. As demand for faster, more streamlined mobile experiences begins to rise along with more people being connected, 5G will eventually be expected by Colombian subscribers to be provided to them. But for present day tasks, mobile operators will need to continue strengthening their existing infrastructure to meet this demand.

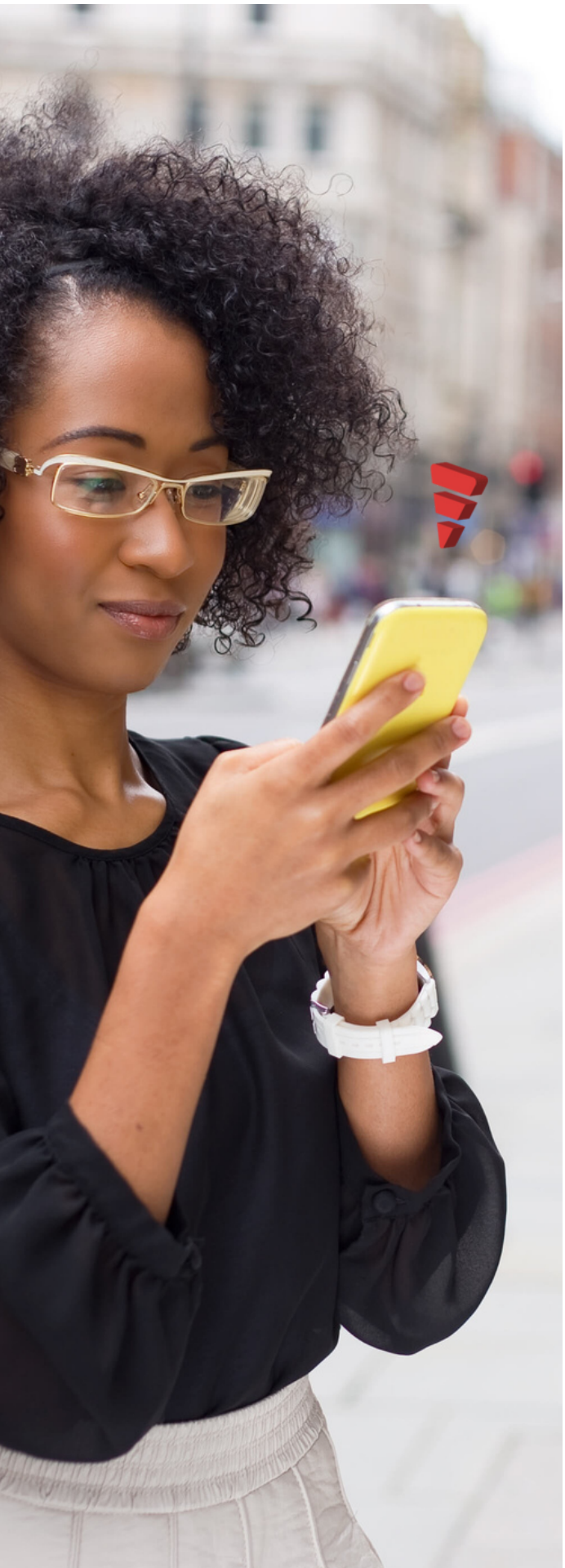
In order to benchmark mobile experience over the last six months, Tutela has evaluated over 2 million speed and latency tests, conducted on the smartphones of real-world users of national mobile operators within Common Coverage Areas, between December 2020 and May 2021.

[5] Developing Telecoms, Colombian operator WOM, Avantel merger to conclude soon
https://developingtelecoms.com/telecom-business/11208-colombian-operator-wom-avantel-merger-to-conclude-soon.html
Retrieved 17/06/21

[6] BNAmericas, How WOM seeks to woo Colombians
https://www.bnamericas.com/en/interviews/how-wom-seeks-to-woo-colombians
Retrieved 17/06/21

[7] Telecompaper, Colombia delays 5G tender to Q4 2021
https://www.telecompaper.com/news/colombia-delays-5g-tender-to-q4-2021--1361636
Retrieved 17/06/21

[8] Telecompaper, Tigo and Nokia to carry out 5G pilot in Medellin
https://www.telecompaper.com/news/tigo-and-nokia-to-carry-out-5g-pilot-in-medellin--1364899
Retrieved 17/06/21



Key findings

- Tigo provided the best mobile experience to its subscribers in Colombia, with the operator dominating in five of the six metrics tested. The operator had the highest Excellent Consistent Quality at 63.4%, the highest Core Consistent Quality at 82.5%, the fastest download (15.2 Mbps) and upload (7.6 Mbps), and best one-way latency result at 46.1 ms

- In Tutela's newest metric for greatest relative area coverage, this category was awarded to Claro for the highest 5G/4G coverage score at 527 and a total score of 735, 252 points ahead of second place Tigo

- Movistar was a strong, albeit varied, competitor to Tigo and Claro in most categories, with only 2.9% separating the operator and Tigo for Core Consistent Quality, 1 Mbps slower in the upload test than Tigo, and second place for total coverage score

Results overview

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Mobile experience results

Colombia, June 2021

	tigo	Movistar	Claro
Excellent Consistent Quality	★ Winner		
Core Consistent Quality	★ Winner		
Download throughput	★ Winner		
Upload throughput	★ Winner		
Latency	★ Winner		
Coverage			★ Winner

Results from over 2 million speed and latency tests within Common Coverage Areas, between December 2020 and May 2021.

"Tigo delivered the highest percentage of Excellent Consistent Quality in Tutela's tests"

TUTELA
Best Mobile Network Experience
JUNE 2021

Based on the highest Excellent Consistent Quality in Common Coverage Areas.

Learn more about Colombia's network performance with a free consultation

During a consultation session we can use Tutela Explorer to dive into the insights you care about most:

- See how each network performs in different regions across Colombia
- Compare coverage and performance by location and time of day
- Understand capacity demands by precise location
- Discover competitor spectrum usage and performance

Visit www.tutela.com/consultation to book a free session with a member of our team.

Learn more

Understanding this report

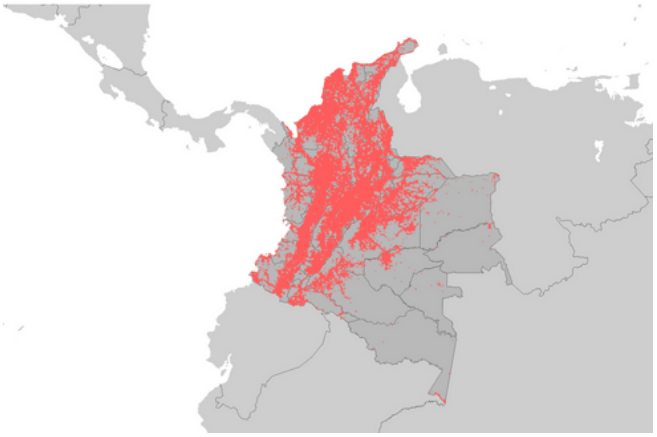
Tutela uses two key methodological components to best compare user experience across operators: Consistent Quality and Common Coverage Areas. Consistent Quality is a set of metrics that Tutela has developed to objectively evaluate when connections networks are (and are not) enabling users to do almost everything that they want to do on their smartphones.

To best serve Tutela's goal to accurately measure and represent the real-world, end-to-end experience of actual users, our methodology is subject to ongoing improvements, which allow us to update the methodology in line with changes in network technology, measurement capabilities, and the realities of how people use their smartphones. As of this report, the methodology includes an updated version of Consistent Quality that better accounts for reliability, an area-based Coverage Score, a more granular Common Coverage Areas definition, and the separation out of users on MVNO or flanker brands. As a result, changes in the numeric values in this report compared to the previous year are not necessarily representative of year-on-year changes in the end-to-end user experience.

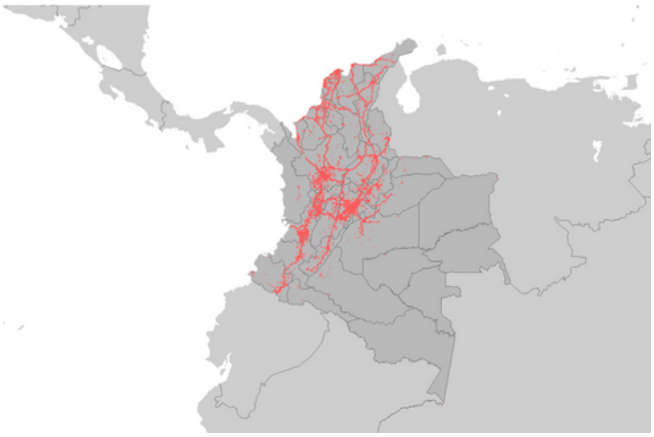
The methodology is covered in detail at the end of this report and on our website, but simply put, there are two sets of thresholds, Excellent and Core. A connection that hits the Excellent threshold is sufficient for use-cases like 1080p video streaming or multiplayer gaming, while a Core connection will stream standard-definition video or handle things like web browsing or uploading photos to social media. The percentages you see in this report represent the percentage of tests on a given operator that were above the Excellent or Core thresholds.

Common Coverage Areas are parts of the country where all national operators offer service, either on their own network or through a domestic roaming agreement. Comparing performance within common coverage areas ensures that user experience is being compared in places where networks are competing head-to-head, and ensures that operators with more diverse coverage are not being penalized. In this report, all performance metrics are taken from tests conducted in Common Coverage Areas only.

Measurement locations



Common Coverage Areas



Consistent Quality

In Common Coverage Areas across Colombia, Tigo had the highest Excellent Consistent Quality with 63.4% of connections having a network experience suitable for use-cases like 1080p video streaming, real-time mobile gaming or HD video calling. The operator had a lead over the competition by at least 22%, with Movistar in second place at 48.4% and Claro in third at 41.1%. The difference in performance was much tighter for Core Consistent Quality, meaning subscribers having a network connection capable of supporting use-cases like SD video streaming, social media sharing and web browsing, however no operator reached the 90% threshold. Tigo was in first place with a Core Consistent Quality of 82.5% followed by Movistar at 79.6%, and Claro in third at 69.6%, a difference of 12.9%.

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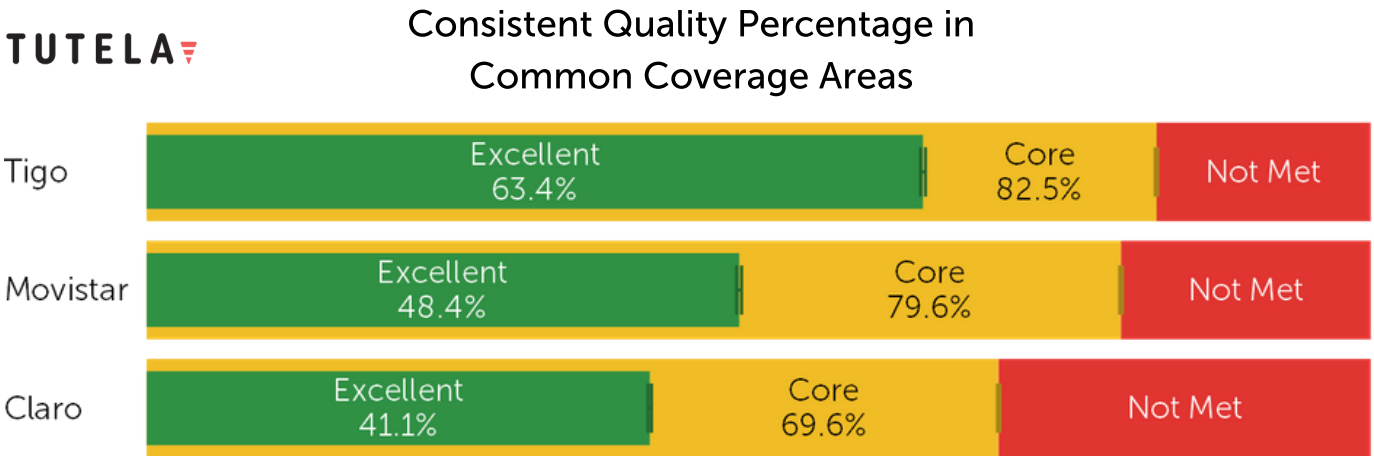
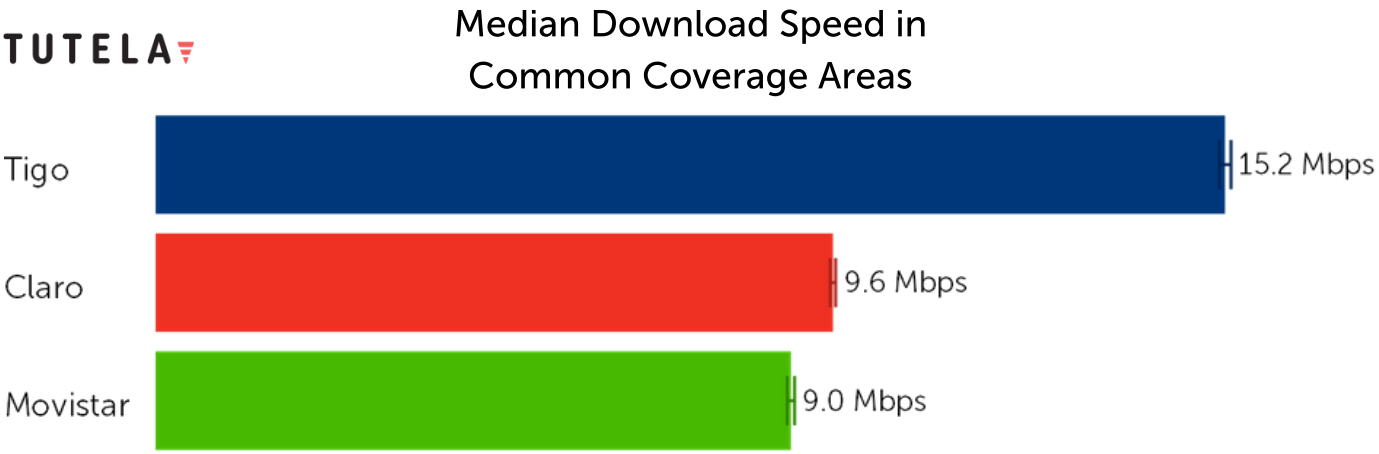


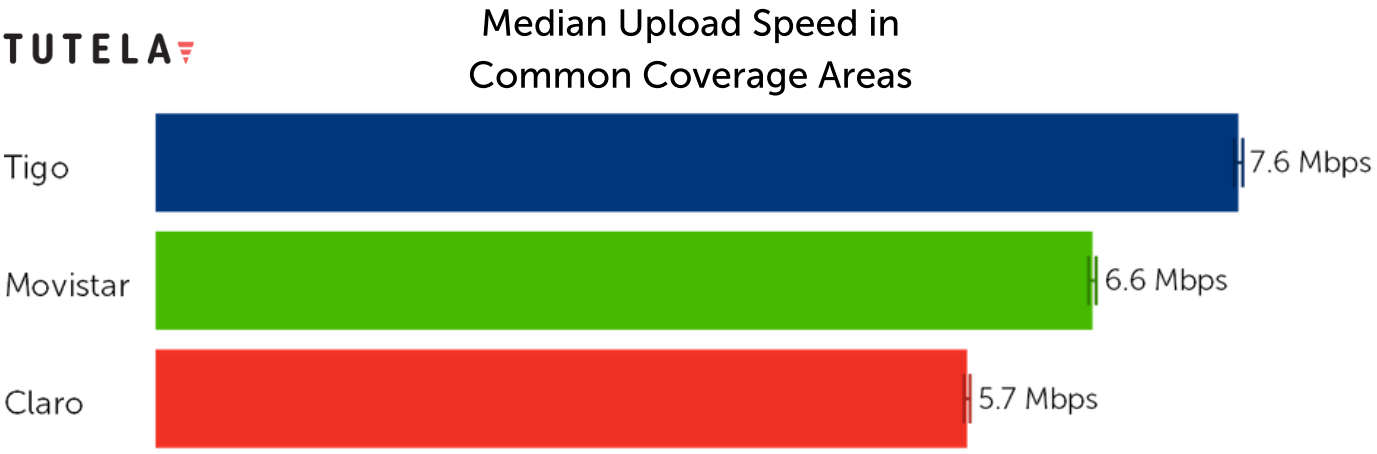
Download throughput

Tigo dominated in the download speed test, with a median throughput of 15.2 Mbps. The operator was 5.6 Mbps faster than second place Claro and 6.2 Mbps faster than Movistar. Movistar and Claro were neck and neck in their performances, with only 0.6 Mbps separating the two in download speeds and 7.3% in the Excellent Consistent Quality metric.



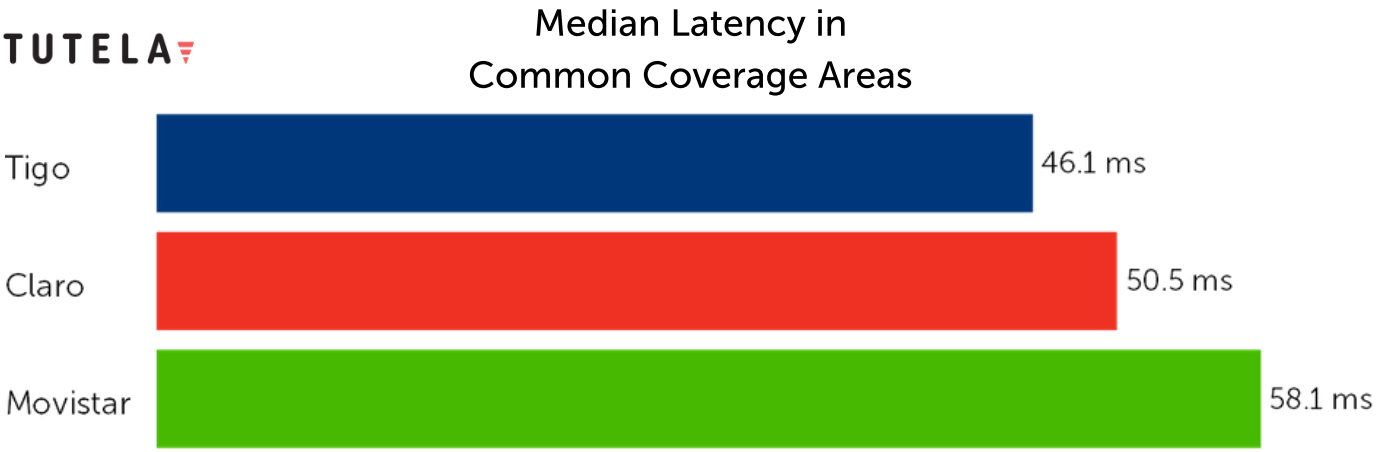
Upload throughput

Tigo may have won in the upload speed test, however both Movistar and Claro were vying for that top spot: Tigo had a median upload speed of 7.6 Mbps, while Movistar was only 1 Mbps slower and Claro only 1.9 Mbps slower to place third.



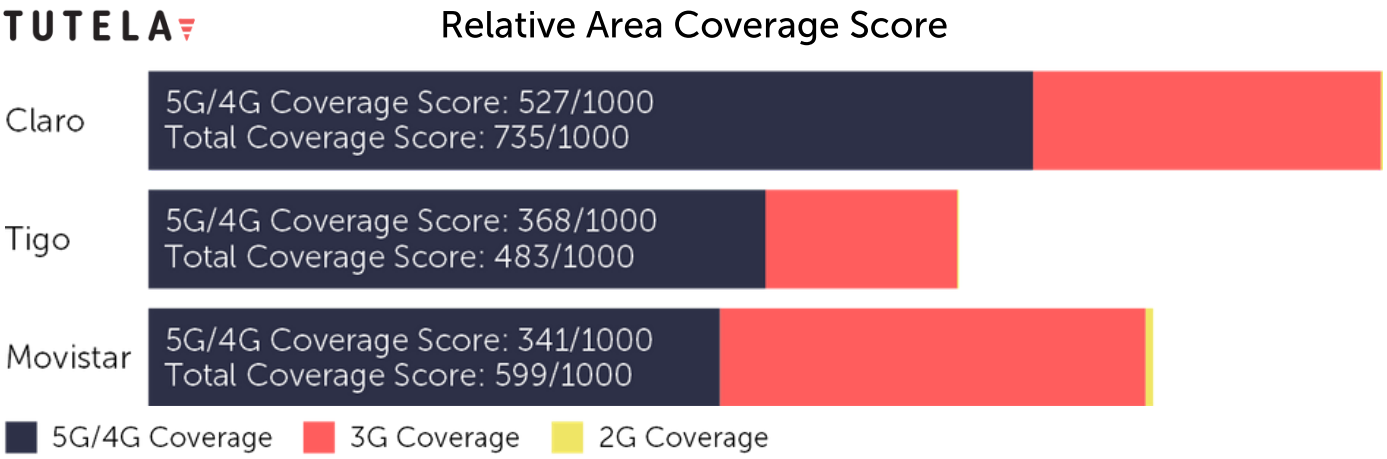
Latency

Tigo had the most responsive network in Common Coverage Areas across Colombia with a median one-way latency result of 46.1 ms. Competition was tight, however, between Tigo and Claro with Claro only 4.4 ms less responsive with a latency result of 50.5 ms. Movistar was in third place with 58.1 ms, 12 ms less responsive than Tigo and 7.6 ms less responsive than Claro.



Coverage

Claro demonstrated the greatest relative area coverage across Colombia for both 5G/4G combined coverage and total coverage. The operator achieved a 5G/4G coverage score of 527, and a total coverage score of 735. There were 208 points between the two coverage scores, showing that Claro still relies on some 3G. 159 points separated second place Tigo from Claro for 5G/4G combined coverage score, however the operator was in third place for a total coverage score of 483 points. Movistar won second spot by 116 points for a total coverage score of 599. Movistar was 186 points behind Claro for 5G/4G and only 27 points behind Tigo for a 5G/4G coverage score of 341.



Tutela measures relative coverage between providers in a country by looking at the geographic area that an operator's subscribers have seen coverage, compared to the total area of the country where the subscribers of any operator can get a mobile connection. The geographic area covered by each operator, relative to the total covered area of the country, is presented as a score out of 1,000.

Tutela measures this coverage from the perspective of end users – that is to say, inclusive of times when coverage is provided as part of a domestic roaming agreement or shared infrastructure program. An equal number of representative samples are considered from each operator in a country to determine coverage. Coverage is assessed over the preceding 12 months to ensure any effects of seasonality are appropriately included.

Methodology

Tutela is an independent crowdsourced data company with a global panel of over 300 million smartphone users. We gather information on mobile infrastructure and test wireless experience, helping organizations in the mobile industry to understand and improve the world's networks. Tutela is a member of the Comlinkdata family.

Tutela collects data and runs network tests via software embedded in a diverse range of consumer applications, which enable the measurement of real-world quality of experience for mobile users, 24/7. For this report, Tutela has collected over 2 million speed and latency tests within Common Coverage Areas, between December 2020 and May 2021.

Tutela measures mobile experience based on the real-world performance of actual network subscribers for a given brand, inclusive of occasions when a network or tariff may be throttled or congested. Results in this report are based on a testing configuration designed to represent the typical (rather than maximum) performance that users experience. We use a 2 MB file to perform our download testing and a 1 MB file to perform our upload testing. Latency performance in this report reflects one-way UDP latency. Tests are conducted against the same content delivery networks that power many of the world's most popular consumer applications and websites, and as such reflect the end-to-end performance of the network.

Consistent Quality

Download speed is most often used as a proxy for network quality, but while download throughput is important, it's just one of several crucial requirements for a "good" connection.

As operators have upgraded 3G networks through to the latest 5G technology, theoretical (and even real-world) peak throughput speeds have increased to where they vastly outstrip the maximum needed for any current use-case. Real-world speeds above 100 Mbps are now common in parts of the world, and with a 4K video stream — which itself is rarely something smartphone users need — using a fifth of that, average download speed has lost some of its relevance as the dominant statistic used to measure the quality of wireless networks.

At its most basic, a good connection is one that doesn't get in the way of users doing what they want to do. In the real world, smartphone users aren't running speed tests all day — they're browsing the web, using apps, voice calling their friends, streaming Netflix and YouTube, or making video calls. To more objectively evaluate when connections are (and are not) enabling users to do those things, Tutela has developed a standard called Consistent Quality.

Simply put, it's two sets of thresholds, called Excellent and Core. If a connection hits the Excellent standard, it's sufficient for the most demanding mobile use-cases, like HD group video calling or 1080p video streaming. A Core connection is good enough for SD video streaming, web browsing, emails, and VOIP calling, but users are more likely to experience delays or buffering when trying to use more demanding apps. Tutela also considers times when a Consistent Quality style test was attempted, but subsequently failed for distinguishable connectivity issues on the download or server response component, towards the total percentage of "failed" tests against both sets of thresholds. Tutela bases the threshold values on the minimum performance requirements published by popular apps. We most recently updated our Consistent Quality thresholds on September 1st, 2020. Tutela's consistent quality metric, as used in our reports, simply measures the percentage of time that users can hit the thresholds. The higher the number, the more often users have a Core or Excellent quality connection.

Excellent Quality

KPI	Download throughput	Upload throughput	Latency	Jitter	Packet loss	Time to first byte
Minimum acceptable value	5 Mbps	1.5 Mbps	50 ms	30 ms	1%	3.2 s

Core Quality

KPI	Download throughput	Upload throughput	Latency	Jitter	Packet loss	Time to first byte
Minimum acceptable value	1.5 Mbps	500 Kbps	100 ms	50 ms	5%	10.67 s

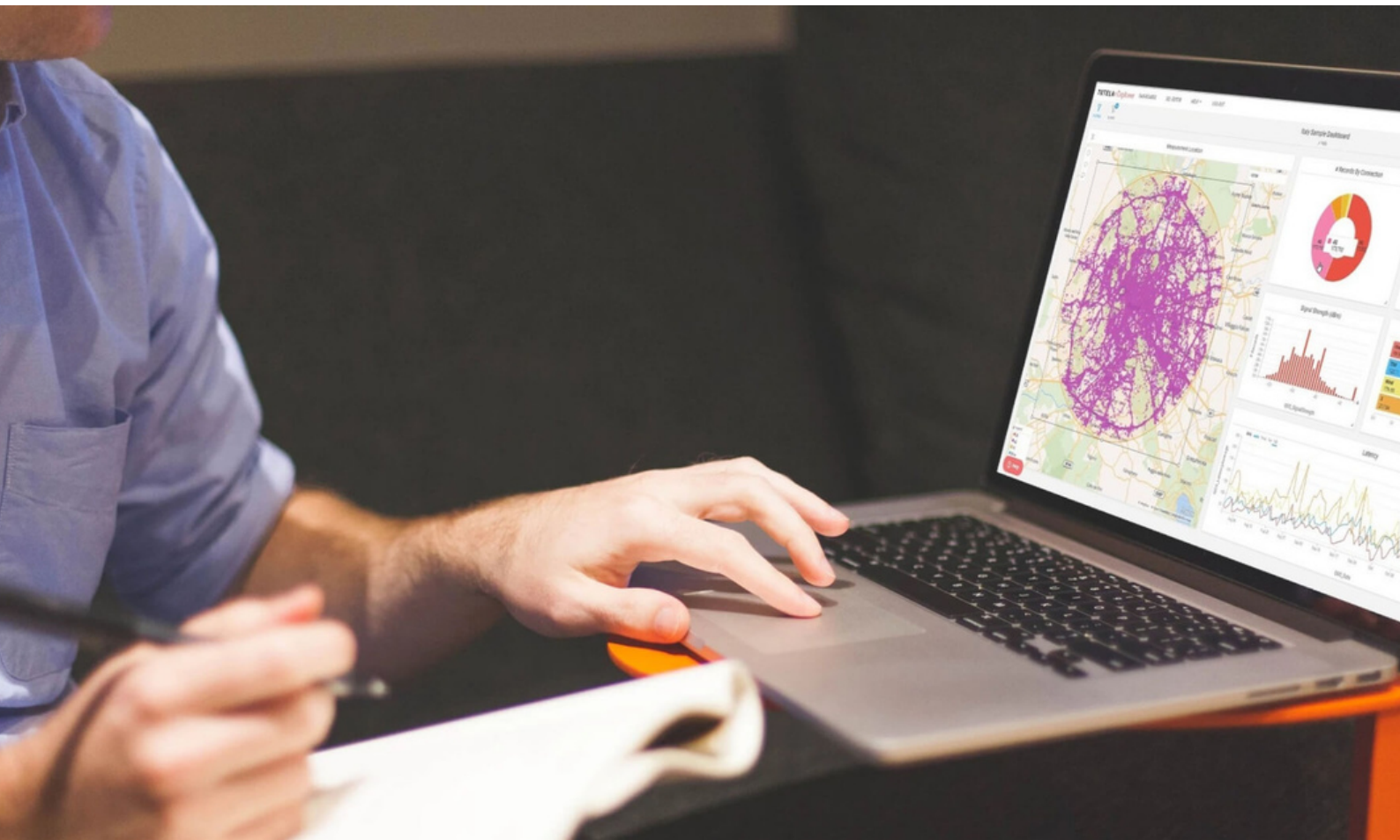
Discover Tutela Explorer

Tutela Explorer is a powerful cloud-based solution for real-time analysis of crowdsourced data. Using the platform, mobile operators can:

- Create coverage and quality maps
- Benchmark network quality and coverage across all operators
- Drill down to any KPI at city, street or even building level
- Analyse spectrum utilisation, performance and more

Visit www.tutela.com/explorer to learn more.

Learn more



Appendix

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Results Overview in Common Coverage Areas

	Download Throughput	Upload Throughput	Latency	Excellent CQ	Core CQ
Claro	9.6 Mbps ± 0.04 Mbps	5.7 Mbps ± 0.02 Mbps	50.5 ms ± 0.038 ms	41.10% ± 0.14%	69.62% ± 0.11%
Movistar	9.0 Mbps ± 0.05 Mbps	6.6 Mbps ± 0.03 Mbps	58.1 ms ± 0.017 ms	48.41% ± 0.20%	79.62% ± 0.12%
Tigo	15.2 Mbps ± 0.08 Mbps	7.6 Mbps ± 0.03 Mbps	46.1 ms ± 0.038 ms	63.43% ± 0.20%	82.51% ± 0.11%

About Tutela

Tutela Technologies, Ltd., is an independent crowdsourced data company with a global panel of over 300 million smartphone users. It gathers information on mobile infrastructure and tests wireless experience, helping organizations in the mobile industry to understand and improve the world's networks. Data and insights provided by Tutela are trusted by the engineering teams at mobile network operators and network equipment manufacturers around the world and used to compare operators as well as inform decisions in network and infrastructure planning and optimisation. The organization is headquartered in Victoria, British Columbia.

Tutela does not collect any sensitive personal data and is compliant with international privacy regulations including CCPA and GDPR.

For further information about the methodology, data and tools used to create this report, please contact analysis@tutela.com or visit www.tutela.com.

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