TUTELA

Mexico

State of Mobile Networks

Analysts
Montana Jennings

APRIL 2020

Annual Report

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Introduction

As some industries are seeing a temporary downturn in productivity during this time, others are finding ways to adapt and tend to their customers' needs. This is particularly noticeable for the mobile industry across the world and in particular Mexico, with Telmex recently handing over the concession of 3.5 GHz band to Telcel(1), which should greatly step up the operator's 5G progress. It is also predicted that Mexico could have the fastest adoption rate of the 5G network in Latin America, with a 12% adoption rate by 2025 predicted by the GSMA(2).

In a bid to carve away a large portion of America Movil's long-held dominance in Mexico, Telefonica back in November last year teamed up with US company AT&T to use some of their last-mile infrastructure in the country in the way of towers, antennas and fibre-optic cables(3).

(1) Xataka, Telcel pisa el acelerador para lanzar su red 5G en México: Telmex le cede su banda y comienza con pruebas, según El Economista
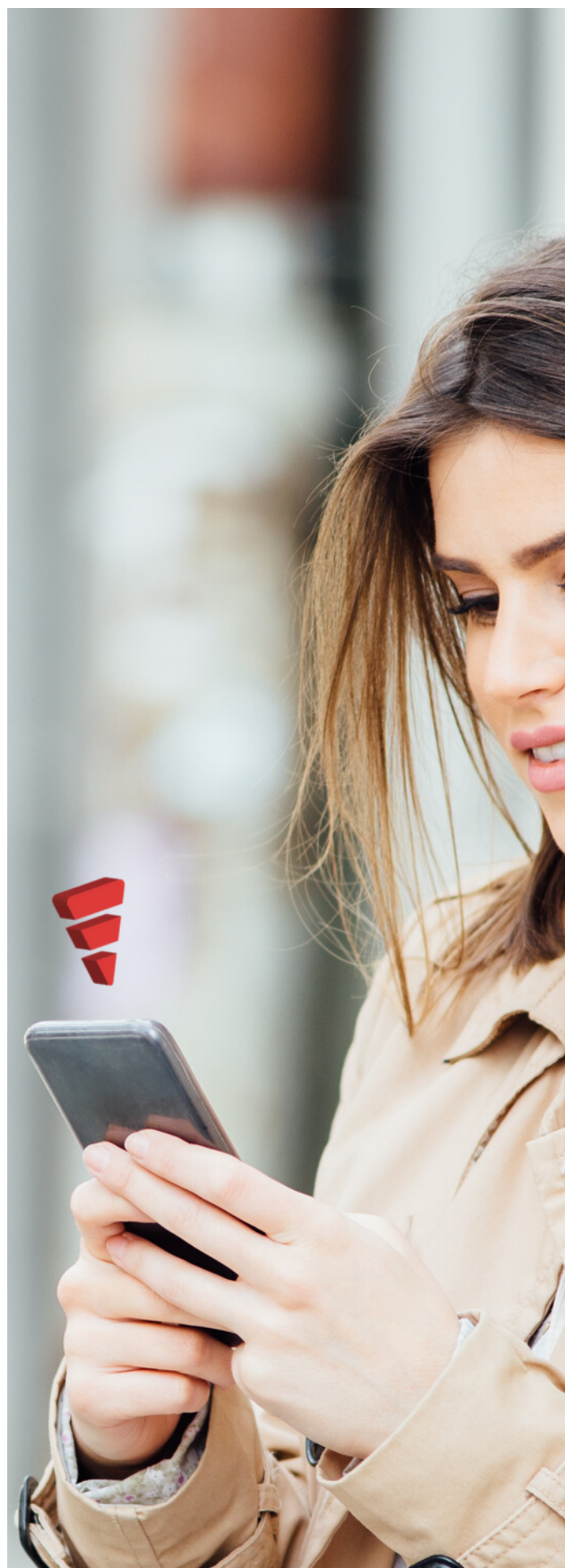https://www.xataka.com.mx/telecomunicaciones/telcel-pisa-acelerador-para-lanzar-su-red-5g-mexico-telmex-le-cede-su-banda-comienza-pruebas-economista
Retrieved 16 April 2020

(2) GSMA, The Mobile Economy Latin America 2019
https://www.gsma.com/mobileeconomy/wpcontent/uploads/2020/03/GSMA_MobileEconomy2020_LATAM_Eng.pdf
Retrieved 16 April 2020

This deal will not only give both companies more traction to beat out the stiff competition, but to also survive financially against rising debt that comes hand in hand with improving network infrastructures. Mexico's watchdog, the Federal Telecommunications Institute, has also created free prepay plans available to all users signed to any of the three major operators in the country to ensure its people are able to keep in contact with loved ones during the outbreak(4).
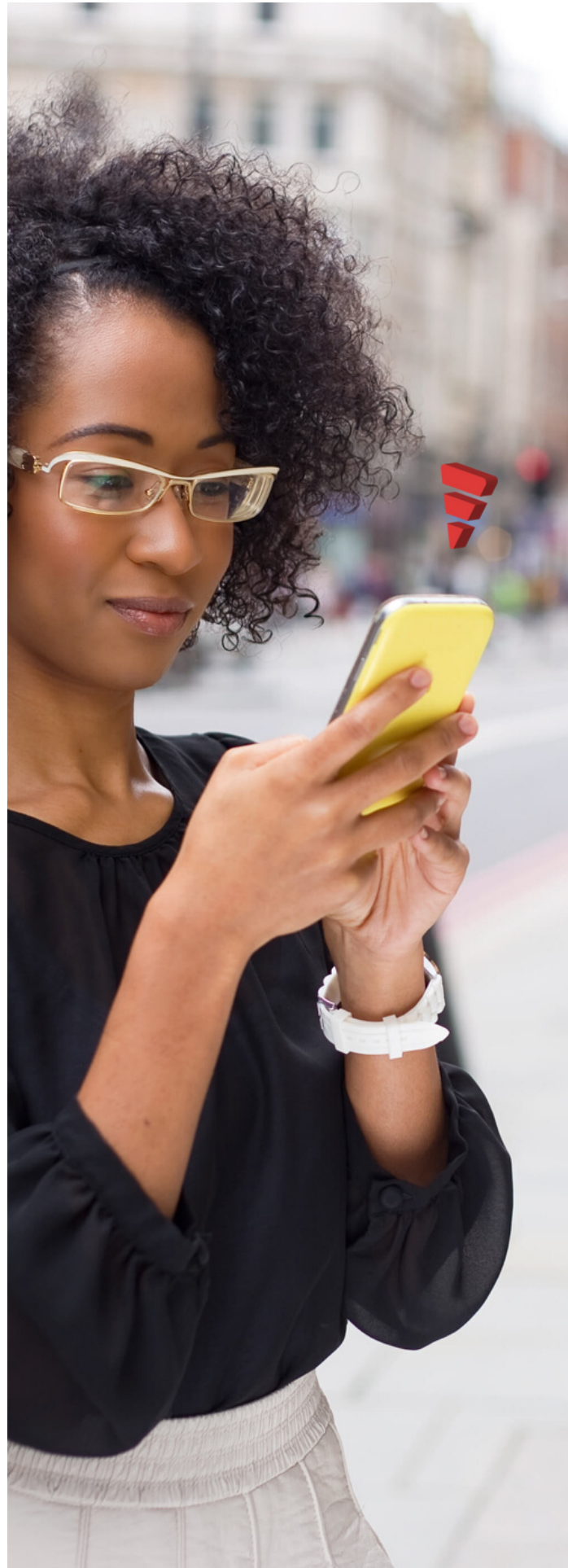
In this State of Mobile report, Tutela has collected and analyzed over 39 million speed tests, 676 million latency tests, and over 6 billion total mobile records between September 1st 2019 and February 29th 2020 to build a complete picture of mobile network experience across the country.

(3) Reuters, Telefonica teams up with AT&T in Mexico in new bid to take fight to Slim
https://www.reuters.com/article/us-mexico-telefonica/telefonica-teams-up-with-att-in-mexico-in-new-bid-to-take-fight-to-slim-idUSKBN1XV2CM
Retrieved 16 April 2020

(4) Telecompaper, Mexican operators offer prepay users free calls and SMS bundle for coronavirus
https://www.telecompaper.com/news/mexican-operators-offer-prepay-users-free-calls-and-sms-bundle-for-coronavirus--1333685
Retrieved 16 April 2020

Key findings

- Telcel outperformed the other operators in four of the five metrics tested, narrowly missing out on a clean sweep thanks to AT&T having the best latency in Mexico.

- Telcel had the highest Excellent Consistent Quality percentage in the country with 70.5% and was the only operator to reach the 90% threshold for Core Consistent Quality with 92.9%.

- Although Movistar may not have reached number one in any of the rankings, it did create some competition for Telcel in Core Consistent Quality with a difference of only 4.1% and also for download speed with a difference of 4.2 Mbps.

- The 1700 MHz band is largely used by AT&T and Telcel, while Movistar is the only operator to utilize 1900 MHz spectrum, with 99.5% of its LTE data volume travelling over the band.

Results overview

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Mobile experience results

Mexico, April 2020

	telcel	AT&T	movistar
Excellent Consistent Quality	⭐ Winner		
Core Consistent Quality	⭐ Winner		
Download throughput	⭐ Winner		
Upload throughput	⭐ Winner		
Latency		⭐ Winner	

Results from over 39 million speed tests, 676 million latency tests, and over 6 billion total mobile records between September 1st 2019 and February 29th 2020.

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

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Best Mobile Network Experience

APRIL 2020

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

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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 networks are (and are not) enabling users to do almost everything that they want to do on their smartphones.

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. These were most recently re-assessed and updated September 1st, 2019.
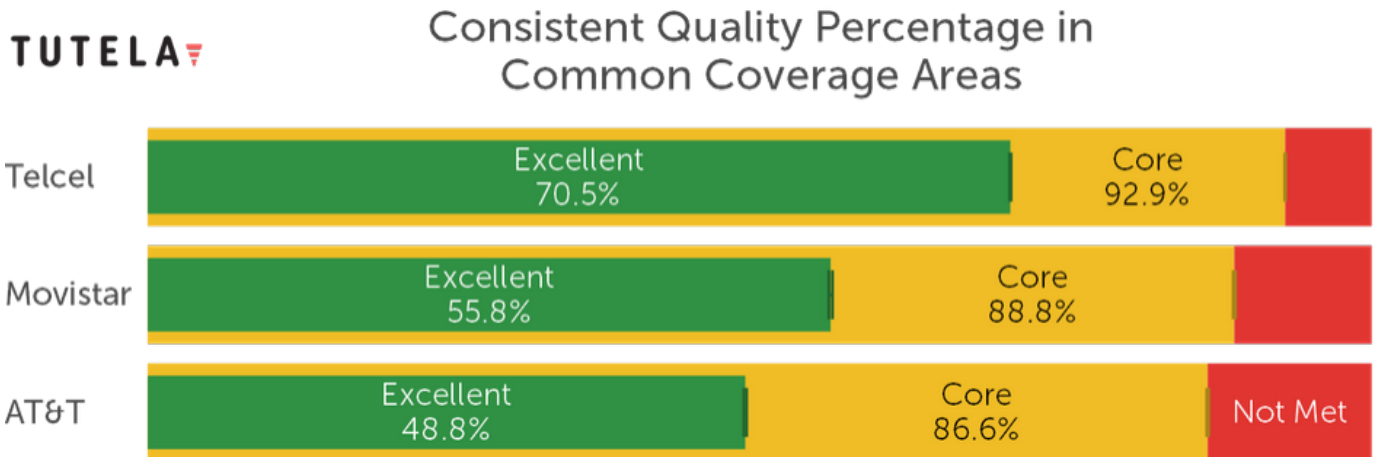
Common Coverage Areas are parts of the country where the majority of operators offer service. In this report, we present results nationally and from Common Coverage Areas, which helps present both a full national picture, as well as highlighting network conditions wherever operators are directly in competition.

TUTELA　　　　Measurement Locations

TUTELA　　　　Common Coverage Areas
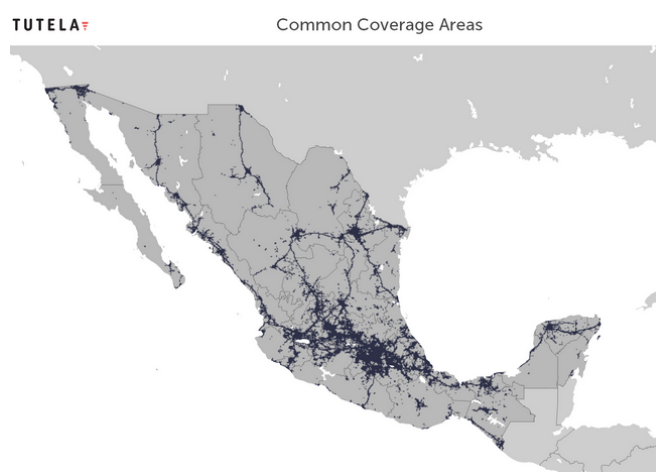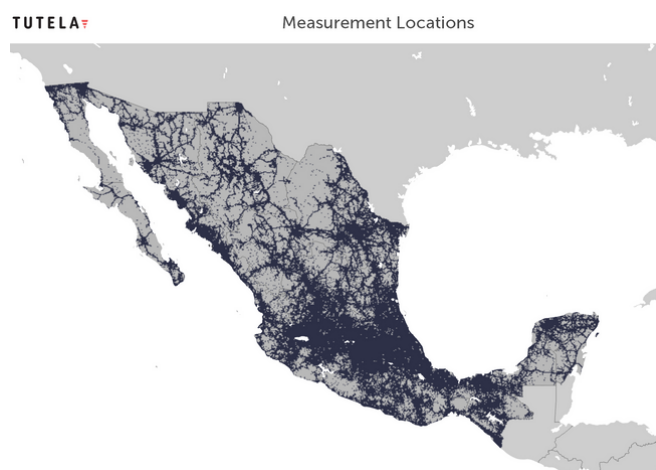
Consistent Quality

In Common Coverage Areas of Mexico, Telcel had the highest Excellent Consistent Quality percentage at 70.5%, far exceeding performance of other operators by at least 20%. Movistar had the second highest Excellent Consistent Quality with 55.8%, and AT&T rounds out the top three with 48.8%.

In regards to Core Consistent Quality, Telcel was the only operator to reach the 90% threshold needed for Core and therefore had the highest percentage at 92.9%. Movistar had a Core Consistent Quality of 88.8%, and again AT&T was in third with 86.6%.

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Consistent Quality Percentage in Common Coverage Areas

Telcel	Excellent 70.5%	Core 92.9%
Movistar	Excellent 55.8%	Core 88.8%
AT&T	Excellent 48.8%	Core 86.6%	Not Met

Download throughput

Looking at download speeds, Telcel again had a healthy lead over the other operators with the fastest median download speed in the country at 13.8 Mbps. Movistar was behind by 4.2 Mbps with a median download speed of 9.6 Mbps, and the performance difference between Telcel and AT&T was 7.9 Mbps, which places AT&T with the slowest median download speed in Mexico at 5.9 Mbps.

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Median Download Speed in Common Coverage Areas

Telcel — 13.8 Mbps

Movistar — 9.6 Mbps

AT&T — 5.9 Mbps
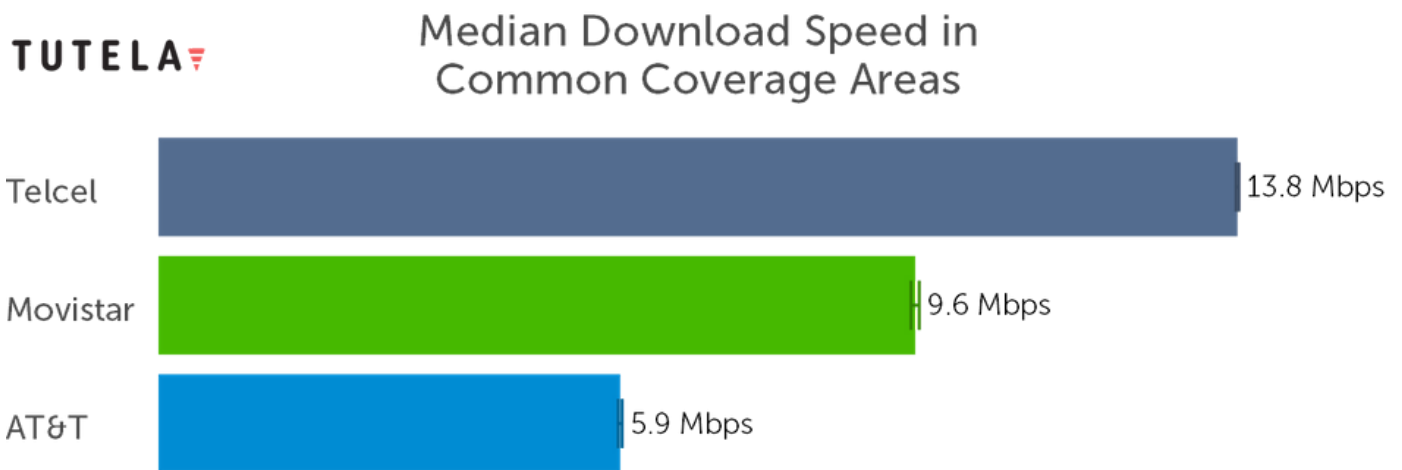
Upload throughput

For upload we see a drop in performance compared to the download speeds but this is to be expected. Telcel is still in first place with the fastest median upload speed in Mexico with a performance of 5.8 Mbps, however this is a drop of 8 Mbps from download. AT&T is in second place with an upload speed of 4.7 Mbps, only 1.2 Mbps d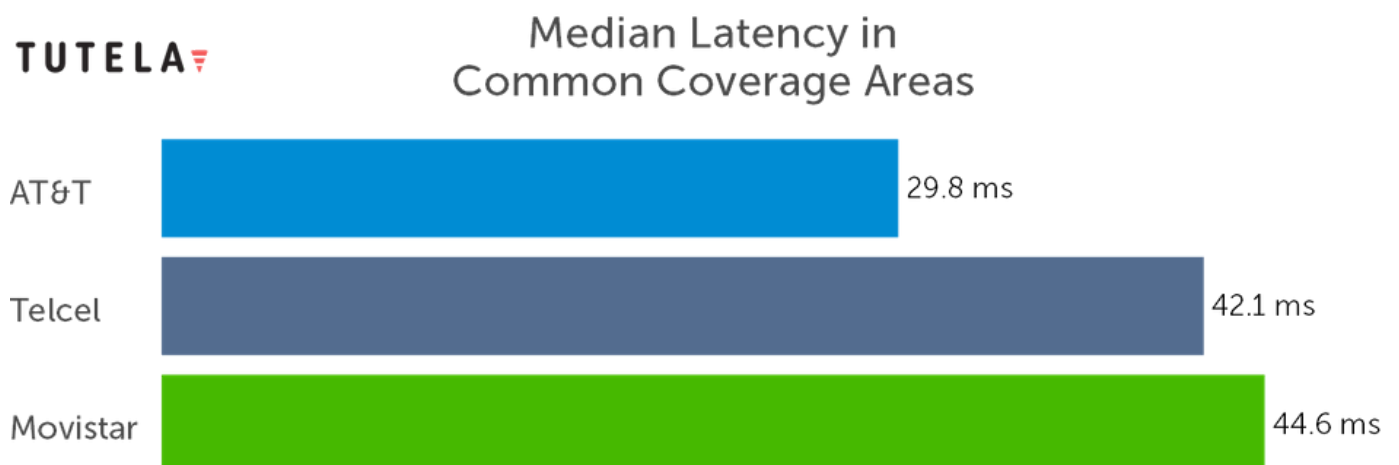rop in performance from download. Movistar performed the worst with a median upload speed of 3.7 Mbps despite having the second fastest download in the country, a drop of 5.7 Mbps from download.

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Median Upload Speed in Common Coverage Areas

Telcel	5.8 Mbps
AT&T	4.7 Mbps
Movistar	3.7 Mbps
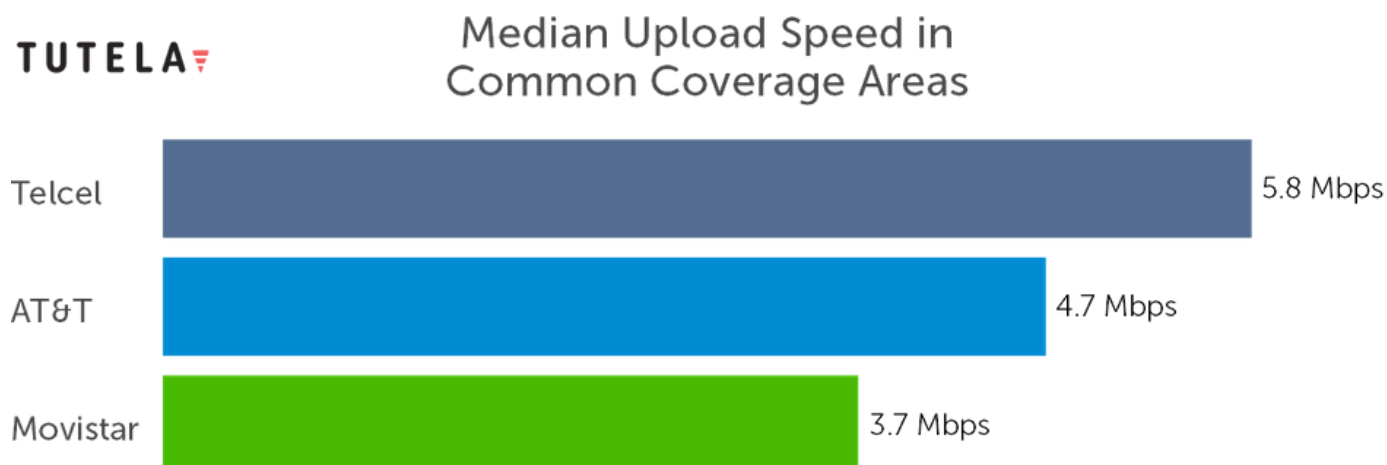
Latency

Testing operators on its latency performance showed a significant change to the rankings, with AT&T for the first time taking out the top spot with a median one-way latency of 29.8 ms. This is a positive result for the operator, showing that its network responds to certain use-cases where it's needed, such as video calling or mobile gaming, despite it having the slowest median download speed. The performance difference between Telcel and AT&T is 12.3 ms which is significant when looking at the performance on download where Telcel dominated. The performance difference between Movistar and AT&T is 14.8 ms.

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Median Latency in Common Coverage Areas

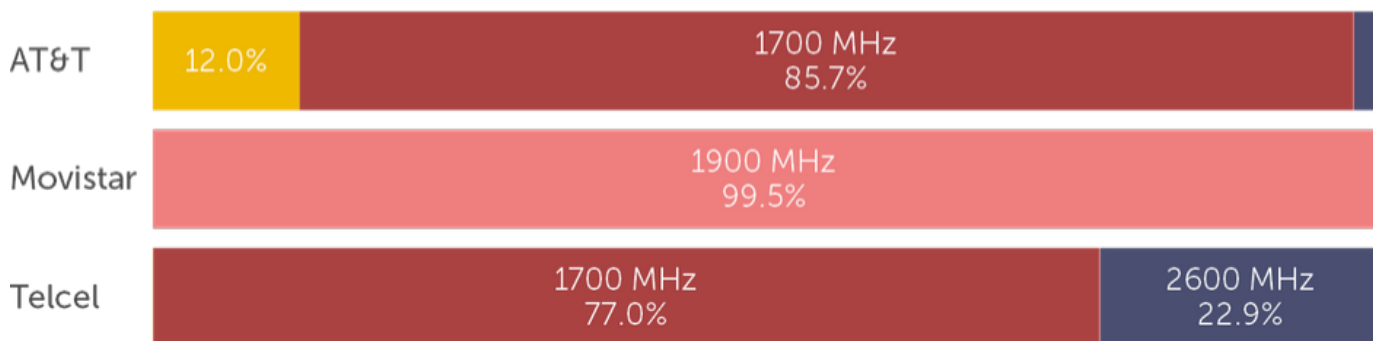| Operator	Latency
AT&T	29.8 ms
Telcel	42.1 ms
Movistar	44.6 ms

Technology usage

All three operators utilize the 4G network a majority of the time for its users, and AT&T had the highest percent of time spent on a 4G network with 82.9%. Telcel was close behind by 9.6% and Movistar had the lowest percent of time spent on 4G at 63.1%, with users spending 36.9% of their time on the 3G radio network.

In regards to mobile data volume, Movistar users send 99.5% of their data traffic over 1900 MHz, the only operator in Mexico to do so. In a Tutela report from February 2019(5) Movistar was shown to have this level of reliance on mid-band spectrum, and this has not changed a year on. AT&T and Telcel had the highest percentage deployed on 1700 Mhz with 85.7% and 77.0% respectively. Telcel is the only operator to predominantly use 2600 Mhz in Mexico, with it accounting for 22.9% of data traffic.

(5) Tutela, Mexico has room for significant improvements in service quality
https://www.tutela.com/blog/mexico-has-room-for-significant-improvements-in-service-quality
Retrieved 16 April 2020

Mobile Data Volume by LTE Band Nationwide

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Operator	Band breakdown
AT&T	850 MHz CLR (Band 5) 12.0% · 1700 MHz AWS-1 (Band 4) 85.7%
Movistar	1700 MHz Extended AWS (Band 66) 1900 MHz 99.5%
Telcel	1700 MHz AWS-1 (Band 4) 77.0% · 2600 MHz 22.9%

Legend:
- 850 MHz CLR (Band 5)
- 1700 MHz AWS-1 (Band 4)
- 1700 MHz Extended AWS (Band 66)
- 1900 MHz (Band 2)
- 2600 MHz (Band 7)

Percent of Time by Mobile Connection Type Nationwide

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Operator	4G	3G
AT&T	82.9%	17.1%
Telcel	73.3%	26.7%
Movistar	63.1%	36.9%
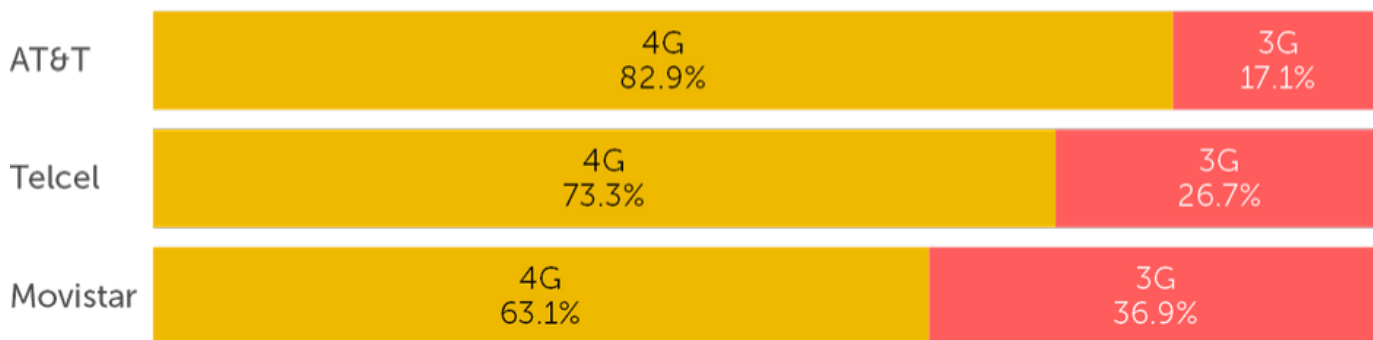
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Methodology

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 organisations in the mobile industry to understand and improve the world's networks.

Tutela collects data and runs network tests via software embedded in a diverse range of over 3000 consumer applications, which enable the measurement of real-world quality of experience for mobile users, 24/7. For this report, Tutela has collected over 39 million speed tests, 676 million latency tests, and over 6 billion total mobile records between September 1st 2019 and February 29th 2020.

Tutela measures network quality based on the real-world performance of actual network subscribers, inclusive of occasions when a network or tariff may be throttled or congested, and of users on the flanker sub-brands of operators. 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 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 to LTE-Advanced 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 networks 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 bases the threshold values on the minimum performance requirements published by popular apps. We most recently updated our Consistent Quality thresholds on September 1st, 2019.

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
Minimum acceptable value	5 Mbps	1.5 Mbps	50 ms	30 ms	1%

Core Quality

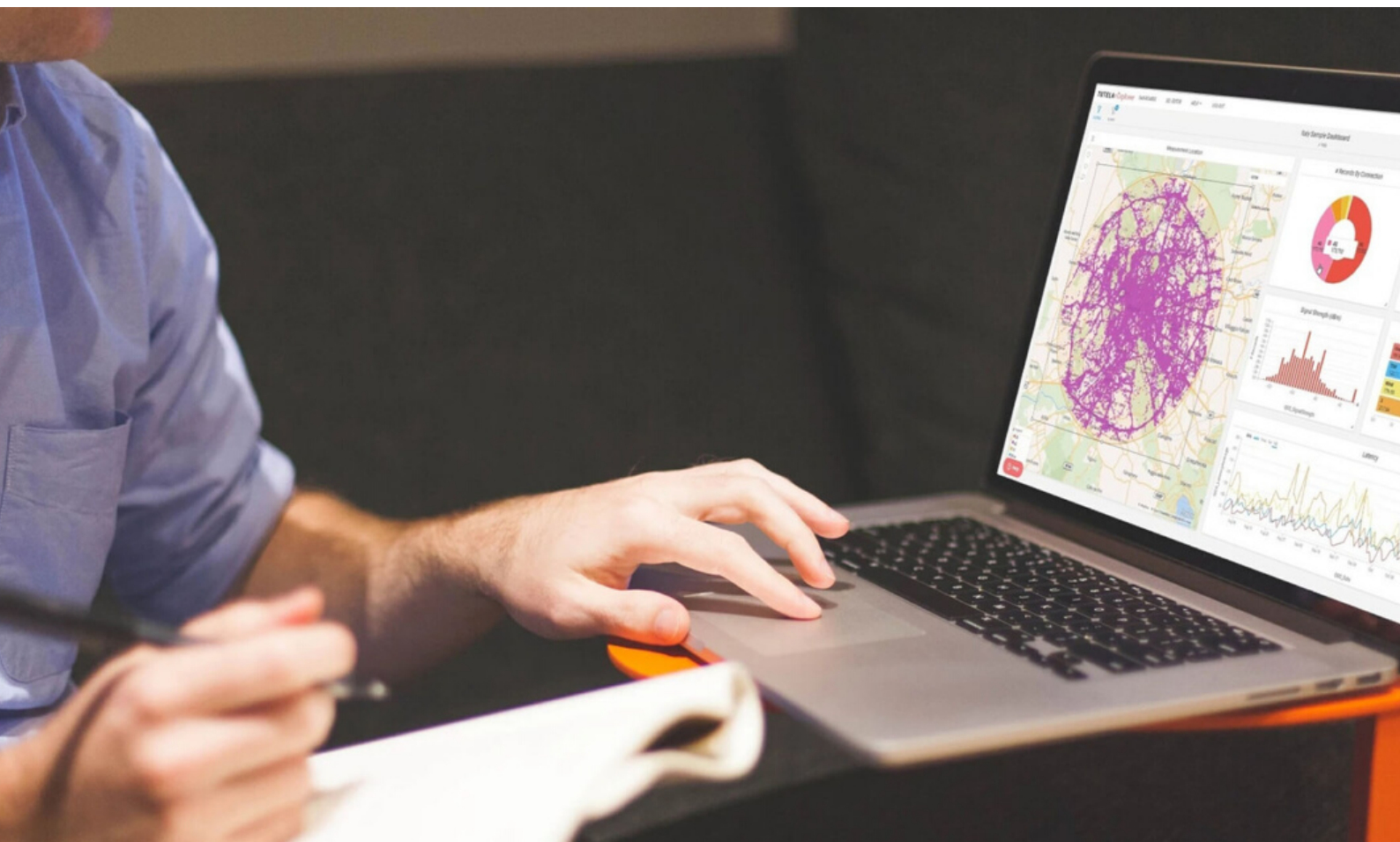| KPI	Download throughput	Upload throughput	Latency	Jitter	Packet loss
Minimum acceptable value	1.5 Mbps	500 Kbps	100 ms	50 ms	5%

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
Nationwide

	Download Throughput	Upload Throughput	Latency	Excellent CQ	Core CQ
AT&T	5.8 Mbps ± 0.03 Mbps	4.7 Mbps ± 0.01 Mbps	29.9 ms ± 0.003 ms	48.62% ± 0.11%	86.46% ± 0.07%
Movistar	9.6 Mbps ± 0.06 Mbps	3.7 Mbps ± 0.01 Mbps	44.6 ms ± 0.006 ms	55.67% ± 0.15%	88.72% ± 0.09%
Telcel	13.4 Mbps ± 0.02 Mbps	5.6 Mbps ± 0.01 Mbps	42.4 ms ± 0.002 ms	69.47% ± 0.06%	92.50% ± 0.03%

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Results Overview
Common Coverage Areas

	Download Throughput	Upload Throughput	Latency	Excellent CQ	Core CQ
AT&T	5.9 Mbps ± 0.03 Mbps	4.7 Mbps ± 0.01 Mbps	29.8 ms ± 0.003 ms	48.83% ± 0.11%	86.61% ± 0.07%
Movistar	9.6 Mbps ± 0.05 Mbps	3.7 Mbps ± 0.01 Mbps	44.6 ms ± 0.006 ms	55.80% ± 0.15%	88.78% ± 0.09%
Telcel	13.8 Mbps ± 0.02 Mbps	5.8 Mbps ± 0.01 Mbps	42.1 ms ± 0.002 ms	70.48% ± 0.06%	92.94% ± 0.03%

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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