5G First Look South Korea

The Promise, Potential, and Real-World Performance



RootMetrics® By IHS Markit



5G First Look South Korea:

The Promise, Potential, and Real-World Performance The 5G race has officially started. On April 3, mobile network operators in the US and South Korea scrambled to lay claim to launching the first publicly available 5G networks. While there remains debate about which operator "won" the 5G release race, there are much more than bragging rights at stake as 5G deployments continue. While the most advanced capabilities of 5G won't be ready at initial launch, 5G networks will be the backbone of our connected communities and promise to open up new use cases for enterprise, industries, and consumers.

Excitement for 5G is high. To understand how early commercial deployments perform under real-world conditions, RootMetrics by IHS Markit is offering a first look at 5G deployments in South Korea, complete with scientific testing that provides an objective benchmark of real-world 5G performance for each network. Our testing shows what is currently possible with initial deployments and how closely the reality of 5G matches earlier 5G promises.

While there is justifiable excitement surrounding 5G, initial test results suggest that a few early growing pains must be worked out. This shouldn't a surprise, nor should it dampen enthusiasm for the possibilities that 5G will eventually bring. New technologies and infrastructure almost always need time to mature in order to reach their full capability. As 5G continues to grow, performance benchmarking from RootMetrics can help operators and infrastructure providers identify and solve network issues to optimize the end-user 5G experience.

5G will help improve existing services and provide the capability to make new use cases possible



Always-on seamless connectivity



Zero-lag video calls



Substantial increases in bandwidth



Driverless cars

Zero-latency gaming

Uninterrupted video

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For more on what 5G is and how IHS Markit defines it, see our whitepaper:

As we continue testing 5G rollouts across the world, we will be creating additional reports with comparative insights to show you how 5G networks perform in different areas. We are testing 5G networks in the following countries:

• The United States

Switzerland



Immersive entertainment and virtual reality with zero delay



IoT growth and development of smart cities, smart homes, and smart industries

• The United Kingdom

Off to a quick start

Although commercial 5G deployments have begun, the full range of planned 5G capabilities will be implemented in a phased approach over the next several years. Advanced capabilities will likely match closely with the plan of upcoming 3GPP Releases.

That said, the impact of 5G deployments is expected to be felt quicker than what was seen during initial rollouts of LTE networks. For instance, the lag time between announcement of 3GPP standards and the availability of new handsets has decreased by approximately half when comparing LTE and 5G.



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Benchmarking what matters most

To provide a holistic view of each network's 5G performance, we've included a quick-view scorecard of results along with key insights across multiple categories. We've also included real-world examples showing how long it would take to download a 600 MB video at each operator's 5G speed. Taken together, this complementary information provides a full picture of the current end-user experience.

5G-enabled mobile handsets:

76.2 million in 2020

616 million in 2025



The promise and potential of 5G

This first category is all about speed. End-users won't always access a 5G network as they move through a city, but we've removed all non-5G test results to show what to expect when 5G is available. Maximum download speeds show what topline performance might be, while median download speeds provide a closer look at "everyday" 5G performance.



Non-5G mode speeds

Since an end-user won't be on 5G all the time, we've looked at speed results that occur on technologies other than 5G—such as LTE—to offer a comparison between purely 5G speeds and those occurring on different network types.



Mixed mode speeds

Because mobile users will connect to 5G for only a portion of the time, it's important to know what speeds users are likely to experience when the networks make handovers between 5G and other technologies such as LTE. Mixed mode results represent the user experience of connecting to 5G with their smartphone and then switching to LTE during the same data activity, or vice-versa.

Speed consistency

At the end of the day, consistency of speed performance has the most impact on the end-user experience. Our speed consistency tables bring together test results across all network technologies to show how often different speed thresholds were reached or surpassed.

5G availability

5G speeds are impressive but are only helpful if an end-user can actually access a 5G network. Understanding how often we connected to 5G during download testing helps put those speeds in broader context.

Latency

A critical benefit of 5G is lower latency. Latency refers to the response time between a user request and an action being taken by a simple function, application, or machine. Latency results within this report show median latency times across all three technology types: 5G, mixed mode, and non-5G mode.

Reliability metrics

While speed grabs headlines, reliability is equally important to a smooth and consistent network experience. You need to be able to connect to a network and then stay connected until your data task is complete. Our reliability metrics show how often we experienced download failures while attempting to access a 5G network, as well as how often download failures occurred after a connection was established.







South Korea testing overview

To show what to expect from South Korean operators as the 5G era begins, we measured 5G performance indoors and outdoors where people most often use their smartphones: tourist areas, business districts, and other high-population areas in Seoul. And to ensure our results offer a holistic picture of network performance, we also tested while driving in suburban areas around Seoul and on the Seoul-Busan KTX transit line. All tests were performed during peak-usage hours and are designed to represent the end-user's real-world 5G data experience.



Dates of testing June 28 – July 6, 2019



Operators tested KT, LG U+, and SK Telecom





Total test samples collected



Device used LG V50 ThinQ 5G



Kilometers driven 1,252



16,306

Our testing looks at latency across multiple consumer use cases, from downloading large files to utilizing AR/VR or interactive gaming. The latency results in this report reflect only use cases associated with downloading. Data and insights for other latency-related use cases are available in our subscription product.



Operator performance highlights:

KT shows strong speed improvements on 5G with compelling reliability

While KT delivered the slowest 5G maximum and median download speeds among all networks, the operator's speeds were still quite fast and much faster than KT's speeds on non-5G mode. KT's 5G median download speed of 163.0 Mbps marked a significant improvement compared to its non-5G mode median download speed of 61.6 Mbps. At KT's 5G median download speed of 163.0 Mbps, an end user could download a 600 MB television show in about 30 seconds, a stark improvement from the 79 seconds it would take to download the same show on non-5G mode.

KT's 5G download latency results exhibited a trend similar to that of its speed results: the operator's 5G median download latency of 107 ms was much lower than its download latency on either mixed mode (218 ms) or non-5G mode (236 ms).

In addition to improved speeds and latency on 5G, KT also delivered outstanding 5G data reliability. We consider download reliability success rates above 97% as "Excellent." KT achieved Excellent data reliability for both getting connected and staying connected on 5G, mixed mode, and non-5G mode.

Summary

KT's excellent 5G reliability and significantly improved 5G speeds indicate a solid foundation for the operator's 5G experience to be built upon. KT also registered the highest 5G download availability rate among all operators at 45.6%, suggesting that good things could be in store for KT customers as the operator's 5G network matures.

KT metrics scorecard



Operator performance highlights:

LG U+ registers the fastest 5G speeds, low latency, and strong reliability

LG U+ delivered the fastest 5G download speeds among all networks, and the operator's speed and latency results showed significant improvements on 5G compared to non-5G mode. LG U+'s 5G median download speed of 426.4 Mbps was the fastest among all networks and much faster than its non-5G mode median download speed of 96.1 Mbps. LG U+ also delivered the fastest 5G maximum download speed of any network at 902.7 Mbps, which indicates strong potential for the operator's 5G network going forward.

What's more, LG U+'s mixed mode median download speed of 139.7 Mbps wasn't too far behind KT's 5G median download speed of 163.0 Mbps. In short, the LG U+ network stood out with the best and most consistent speed performance among the South Korean operators. At LG U+'s 5G median download speed of 426.4 Mbps, an end user could download a television show in about 12 seconds. In contrast, downloading the same television show at the operator's non-5G mode speed would take closer to 51 seconds.

LG U+ also delivered relatively low latency and strong reliability. LG U+'s 5G median download latency of 72 ms was the lowest among all networks and twice as low as LG U+'s non-5G mode median download latency of 159 ms. And similar to what we found with KT and SK Telecom, LG U+'s 5G download reliability was outstanding. LG U+'s 5G network reached our mark of Excellent reliability for both getting connected and staying connected to the network.

Summary

LG U+'s blazing-fast 5G speeds combined with its strong reliability and low latency gives the operator an edge over the competition in the early phases of 5G deployments. As the operator's 5G download availability rate of 44.6% continues to grow, the end-user experience should get even faster and more reliable.

LG U+ metrics scorecard



Operator performance highlights:

SK Telecom delivers fast speeds and strong reliability

While LG U+ registered the fastest 5G download speeds in our testing of South Korea, SK Telecom's speeds were quite fast. SK Telecom's 5G median download speed of 286.9 Mbps was much faster than that of KT (163.0 Mbps) but wasn't as fast as that of LG U+ (426.4 Mbps). SK Telecom's 5G maximum download speed of 638.7, on the other hand, was the slowest among all operators but was impressive nonetheless and hints at a promising future for the network's 5G performance.

SK Telecom's download speeds improved considerably on 5G compared to non-5G mode. While the operator's non-5G mode median download speed of 115.3 Mbps was quite fast for LTE technology—much faster than the LTE speeds we typically find in the US or UK—that speed improved to 286.9 Mbps on 5G. At 286.9 Mbps, an SK Telecom subscriber could download a television show in about 18 seconds. In contrast, downloading the same show at the operator's non-5G mode speed would take a little over 42 seconds.

SK Telecom's 5G download reliability was outstanding. SK Telecom reached our mark of Excellent reliability for both getting connected and staying connected on both 5G and non-5G mode. And while SK Telecom registered the highest 5G median download latency time among all operators at 195 ms, we do expect lower latency from the operator's 5G network as it matures over time.

Summary

SK Telecom delivered strong reliability, impressive 5G speeds, and showed strong speed improvements on 5G compared to non-5G mode. In addition, the operator's 5G download availability rate of 42.2% was competitive with the rates of the other operators and should improve going forward. End users looking for fast 5G speeds and strong reliability may want to consider SK Telecom.

SK Telecom metrics scorecard



5G promises (and delivers) much faster speeds

The 5G speeds we found in South Korea were much faster than the LTE speeds we recorded in the US and UK. The speed table below shows the fastest LTE median download speeds delivered by networks in US and UK metro areas compared to the 5G median download speeds registered by South Korean operators KT, LG U+, and SK Telecom in Seoul. The impressive 5G speeds we found in South Korea suggest that the 5G experience in other countries will become a very fast one in the near future.

RootMetrics is testing 5G deployments in the United States, United Kingdom, and Switzerland, and our series of 5G First Look reports will show you how 5G is changing the mobile landscape across the globe.



The LTE speeds above represent the fastest median download speeds we recorded during testing of the 125 most populated metropolitan markets in the US and across the 16 most populated UK metro areas.





For more information, visit

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