

Review of the mobile landscape 1H 2019

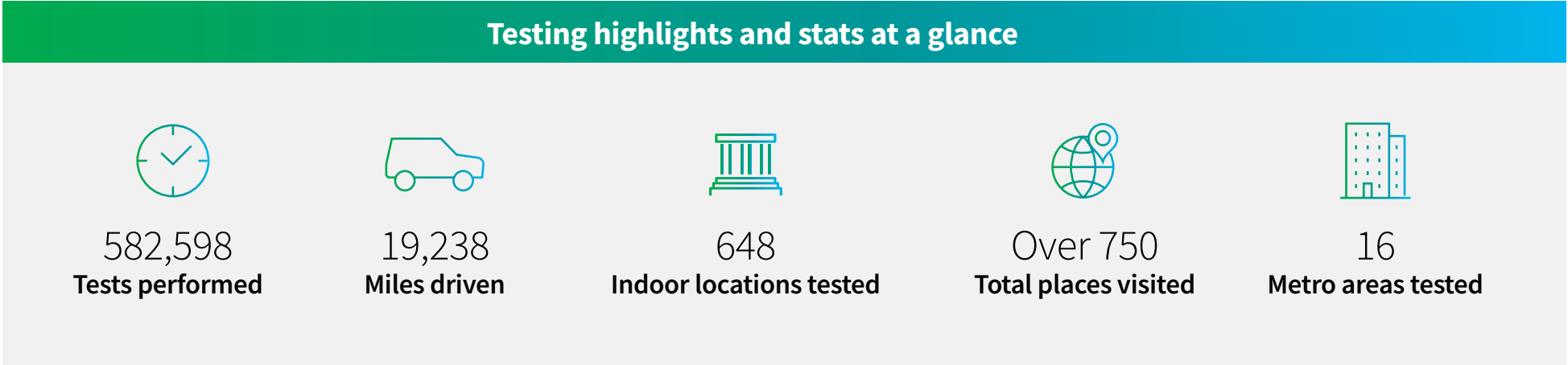
Operator performance at UK-wide, nation,
and metro levels, and a look at what 5G can
mean for your connected lifestyle



Operator performance across the United Kingdom

In today’s connected society, mobile users expect always-on connectivity and a flawless mobile experience anytime and anywhere they use their mobile. To show how the major UK operators fared in the first half of 2019 across all the spaces in which you use your mobile, we’re offering our semi-annual special report on mobile performance in the UK. This report shows you how the networks performed across the entire UK, within each of four UK nations, and across the 16 most populated metropolitan markets in the country. And with 5G deployments soon beginning across the UK, the metro section of our report includes a high-level look at what 5G can mean for your daily mobile lifestyle.

Providing strong service across the entirety of the UK is a tall order. To earn our UK RootScore Awards, an operator needs to offer outstanding performance regardless of location, from cities and villages of all sizes, to roadways, rural areas, and all the places in between. Check below for individual operator highlights from our testing across the entire UK in the first half of 2019.



UK-wide key takeaways and operator highlights

EE shines at the UK-wide level

- **The key story:** EE remained excellent in UK-wide testing, winning or sharing all six awards for the fourth straight test period.
- EE distanced itself from the competition in the call category. In the second half of 2018, EE and Three shared the UK Call RootScore Award. This time, however, EE won the call award outright.
- **Fastest aggregate speed in UK-wide testing:** EE’s aggregate median download speed of 37.6 Mbps across the entirety of the UK was the fastest among all operators.

O2 ranks third or fourth in every category

- **The key story:** O2’s rankings in the important and holistic categories of overall performance, network reliability, network speed, and data performance remained identical to those from our last test period, but the operator’s rankings declined for call and text performance.
- O2 finished fourth for call performance and third in the text category, dropping by one spot in each category compared to 2H 2018. It’s worth noting, however, that O2’s performance in both categories didn’t necessarily get worse. Rather, improvements from other operators contributed to O2’s lower rankings.
- O2 delivered an aggregate median download speed of 11.1 Mbps at the UK-wide level, which was in line with the speeds the operator registered in several metro areas.

UK-wide RootScores (overall, reliability, speed)								
Overall			Reliability			Speed		
Rank	Carrier	RootScore	Rank	Carrier	RootScore	Rank	Carrier	RootScore
1	EE	96.1	1	EE	97.5	1	EE	93.1
2	Vodafone	95.2	2	Vodafone	96.8	2	Vodafone	91.9
3	Three	92.1	3	Three	95.7	3	Three	81.9
4	O2	90.5	4	O2	94.7	4	O2	78.5

UK-wide RootScores (data, call, text)								
Data			Call			Text		
Rank	Carrier	RootScore	Rank	Carrier	RootScore	Rank	Carrier	RootScore
1	EE	96.8	1	EE	94.9	1	EE	99.2
2	Vodafone	96.1	2	Vodafone	93.5	1	Vodafone	99.2
3	Three	91.4	3	Three	92.5	3	O2	97.7
4	O2	89.9	4	O2	90.3	3	Three	96.8

IHS Markit forecasts 9.1B mobile subscribers by 2023 and 1.3B will be 5G. Fixed broadband will grow to just over 1B subscribers.

Three finishes third in all six categories

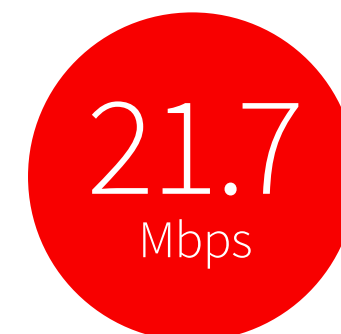
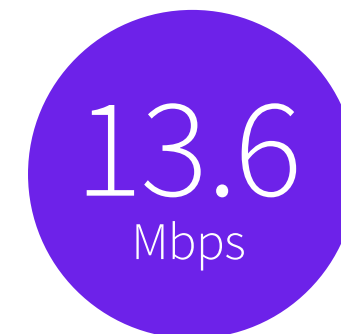
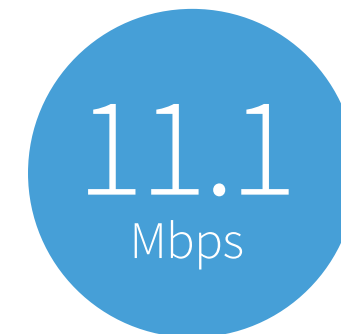
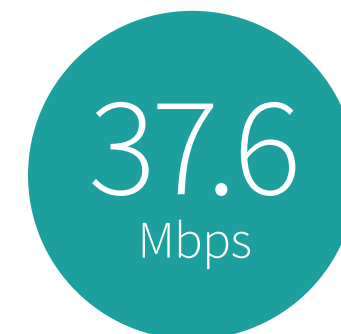
- **The key story:** Three's rankings in the categories of network reliability, call performance, and text performance declined since 2H 2018, but it's important to note that Three's performance in each category wasn't worse than it was in our last period. In fact, Three's RootScores in all three areas were nearly identical to those from the second half of 2018. Three's ranking declines corresponded with improvements from EE and Vodafone.
- In our previous report, Three earned a share of the UK Call RootScore Award, tying with EE for top honours in the category. In the first half of 2019, however, Three's rankings dropped to third in the category.
- Three's aggregate median download speed of 13.6 Mbps in UK-wide testing was a bit faster than that of O2 and similar to Three's speeds in several metro areas.

Vodafone improves in multiple categories, finishing a strong second in UK-wide testing

- **The key story:** Vodafone stepped up in UK-wide testing, earning five second-place finishes while sharing the UK Text RootScore Award with EE. In 2H 2018, Vodafone ranked second in four categories and didn't win any UK RootScore awards.
- Vodafone improved its rankings for network reliability and call performance from third in second-half 2018 testing to second in 1H 2019, and the operator's ranking for text performance moved from second in our last test period into a two-way tie for first with EE in 1H 2019.
- Vodafone delivered an impressive aggregate median download speed of 21.7 Mbps in our UK-wide testing. Similar to what we found in each nation, Vodafone's speed was faster than those of O2 and Three but not as fast as that of EE.

For more information about operator performance across the entire UK, check our [United Kingdom RootScore Report](#).

UK-wide speeds



The speeds above show each operator's aggregate median download speed across the entirety of the UK, which aggregates speed results from testing across the four UK nations and in all 16 metro areas.

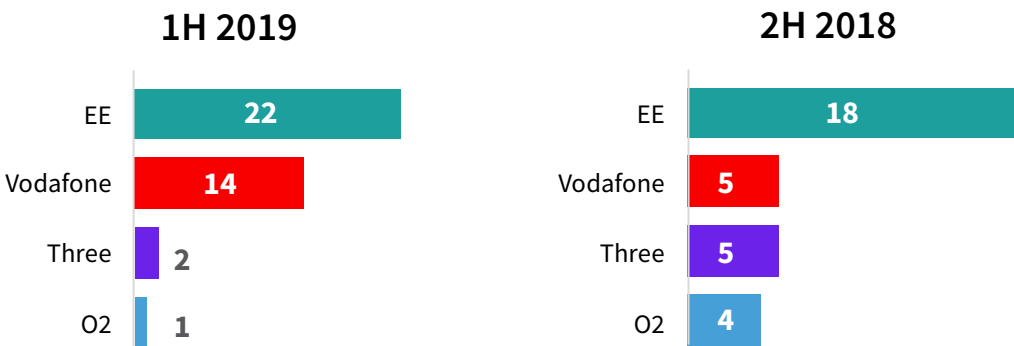


Mobile performance at the nation level: England, Northern Ireland, Scotland, and Wales

Delivering strong service across an entire nation isn't an easy task for the operators. Excelling in dense urban or metro areas doesn't necessarily mean that strong service will translate to good performance in other areas of a nation. Check below for individual operator highlights from our testing of England, Northern Ireland, Scotland, and Wales in the first half of 2019.



Nation RootScore Award tallies



The award tallies above include outright wins and shared awards in both the first half of 2019 and the second half of 2018.

Nation RootScore Award tally (overall, reliability, speed)

	Overall	Reliability	Speed
EE	4	4	3
O2	0	0	0
Three	0	1	0
Vodafone	3	3	1

Nation RootScore Award tally (data, call, text)

	Data	Call	Text
EE	3	4	4
O2	0	0	1
Three	0	1	0
Vodafone	1	3	3

The award tallies above include both outright and shared Nation RootScore Awards by category in 1H 2019.

Nation key takeaways and carrier highlights

To see how the carriers fared in your nation,
check our [Nation RootScore Reports](#).

EE's performance remains outstanding, leading the competition and delivering the fastest aggregate median download speeds across the nations

- **The key story: EE delivers a clean sweep in England, Northern Ireland, and Scotland** - EE users in England, Northern Ireland, and Scotland can take comfort in the fact that EE won or shared every possible RootScore Award in all three nations. And EE's results in Wales weren't far behind, with the operator winning or sharing four RootScore Awards and finishing second in the remaining two categories (network speed and data performance).
- **EE improves its already impressive nation-level results** - EE's tally of UK Nation RootScore Awards increased by four since the second half of 2018, moving from 18 to 22 out of 24 possible award opportunities in 1H 2019.
- **The fastest aggregate speed across any nation:** EE's aggregate median download speed of 38.3 Mbps in England was the fastest speed we recorded by any operator across the four nations.

O2 provides excellent text results in Northern Ireland

- **The key story: O2 remains a strong performer in Northern Ireland** - While O2's nation-level award tally decreased from four in 2H 2018 to one in 1H 2019, the operator's results in Northern Ireland remained generally strong. O2 ranked first for text performance in Northern Ireland and third in all other categories. O2's RootScores in Northern Ireland remained generally high and relatively close to those of the leaders.
- **O2's strong results generally limited to Northern Ireland** - For the third straight test period, O2's best performance in nation testing was found in Northern Ireland. While O2 ranked third or fourth in every category in England, Scotland, and Wales—and in five out of six categories in Northern Ireland—the operator's results could improve if O2 expands its 4G LTE footprint beyond metropolitan markets.
- **Generally strong speeds across the nations:** O2 delivered aggregate median download speeds of at least 10.6 Mbps in all four nations, and its fastest aggregate median download speed of 13.9 Mbps was found in Scotland. At 13.9 Mbps, users can perform the majority of mobile activities without much trouble.



Three delivers solid results in England and Wales

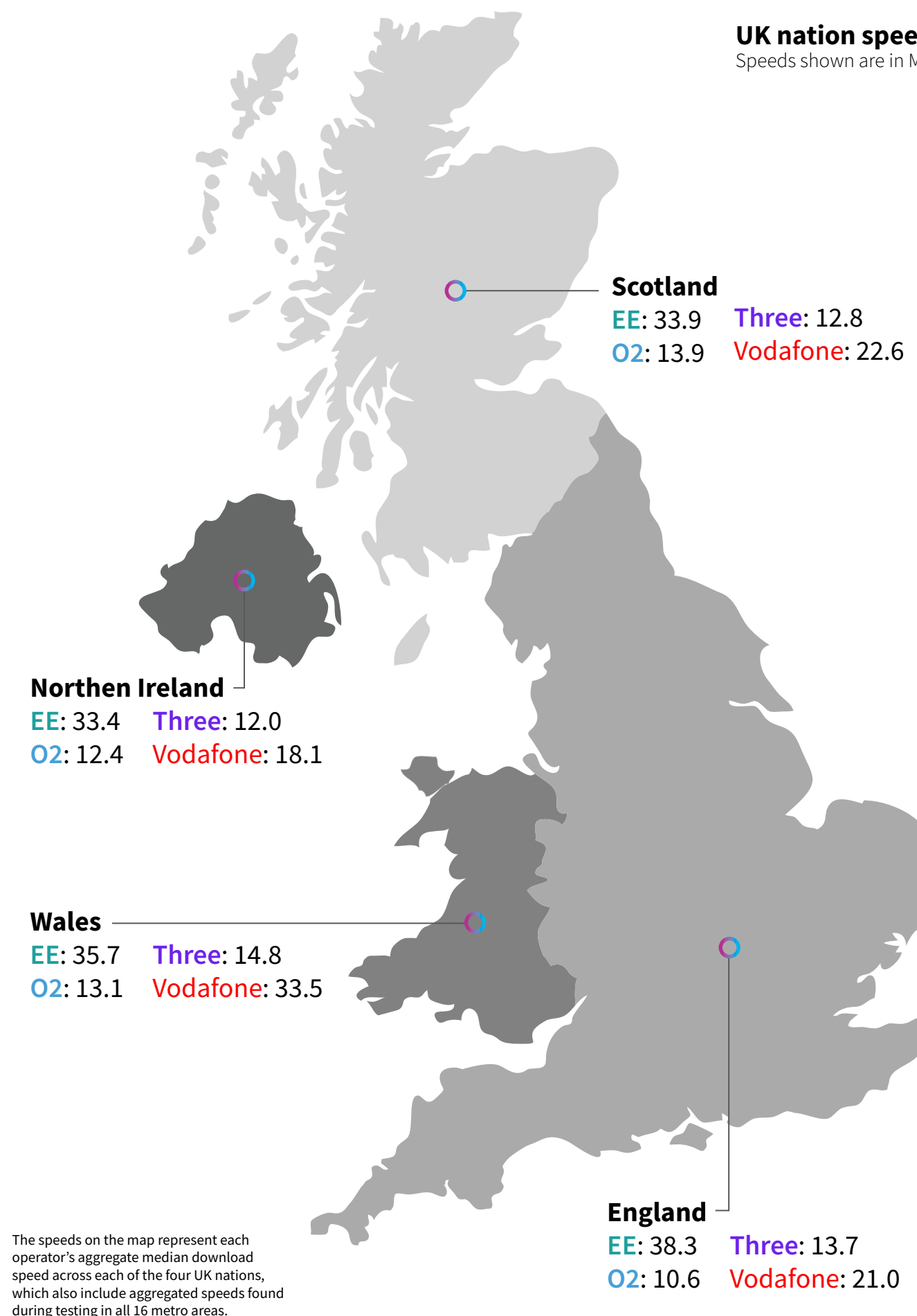
- **The key story: Three shares network reliability and call awards in Wales** – Three’s top performances were found in England and Wales. Three shared RootScore Awards for both network reliability and call performance in Wales, marking the sixth straight time that Three has earned the Network Reliability RootScore Award in Wales. In England, Three’s RootScores in all six categories were competitive with those of the other operators.
- **Three’s performance remains steady despite rankings declines** – Three’s rankings declined in several categories across the nations compared to those in the second half of 2018, but the operator’s performance remained generally good and similar to what we found in our last test period. Three’s network reliability and text results were particularly strong; the operator’s RootScores for both categories in each nation ranged from 91.4 to 97.0.
- **Solid speeds in nation testing:** Three provided strong aggregate speeds across the four nations, with its fastest aggregate median download speed of 14.8 recorded in Wales. Three’s speeds in nation testing were relatively similar to its speeds in several metro areas.

Vodafone establishes its position as a strong number-two performer in nation testing

- **The key story: Vodafone shows considerable improvement at the nation level** – Similar to what we found in UK-wide testing, Vodafone made strong improvements in our nation testing, increasing its award tally from five in second-half 2018 testing to 14 this time.
- **Excellent in Wales** – Vodafone’s results in Wales were the strongest among all networks. The operator ranked first in all six performance categories in 1H 2019, marking the first time Vodafone has swept the awards in any nation since we began testing in 2013. Vodafone improved in four categories in Wales since 2H 2018, showing a particularly impressive gain in the call category, moving from fourth in 2H 2018 into a tie for first with EE and Three in this test period.
- **Fast across the nations:** Vodafone delivered strong aggregate median download speeds in each nation. The operator’s aggregate speeds were faster than those of O2 and Three in all four nations. Vodafone delivered its fastest aggregate speed of 33.5 Mbps in Wales, which was a tick behind that of speed leader EE.

UK nation speeds

Speeds shown are in Mbps



Metro area performance: 4G LTE speeds, reliability, and a look at what 5G will soon mean for your daily connected life

Major metropolitan markets are much more than just city centres. They also include the suburbs, business districts, tourist areas, and the roadways that connect them. In today's connected society, you expect fast and reliable mobile performance across all of these spaces, whether you live and work in a metropolitan market or are visiting on holiday. And with 5G soon rolling out in major metros across the UK, consumers and enterprises alike stand to benefit from even faster speeds and better reliability in the very near future.

This section of our report provides an operator-by-operator overview of speed and reliability performance across the 16 most populated metro areas in the UK, as well as a high-level look at how 5G technology can affect your mobile life.



5G promises (much) faster speeds

4G LTE technology currently provides the fast and reliable network experience we’ve come to expect and enjoy with our mobiles, but the advancement of 5G will take mobile connectivity to another level. 5G is the only network technology that can provide the capacity, low latency, and incredibly fast speeds required to unlock the potential of the Internet of Things (IoT), fuel the growth of smart cities, and (eventually) transform conceptual ideas like driverless cars into fundamental elements of our daily connected lives.

Speeds on 5G should take a quantum leap compared to the speeds experienced today, with median download speeds expected to be in the range of 150 Mbps to 450 Mbps. To put that in perspective, a speed in the middle of that range (300 Mbps) is nearly six times faster than the fastest median download speed we found across all 16 UK metros the first half of 2019 (Vodafone’s 51.7 Mbps in Liverpool).

We recently tested 5G performance in Seoul, South Korea, and the results from early 5G deployments matched well with the ultimate speed promises of 5G; we found extremely compelling speeds that indicate good things to come when 5G launches in the UK.

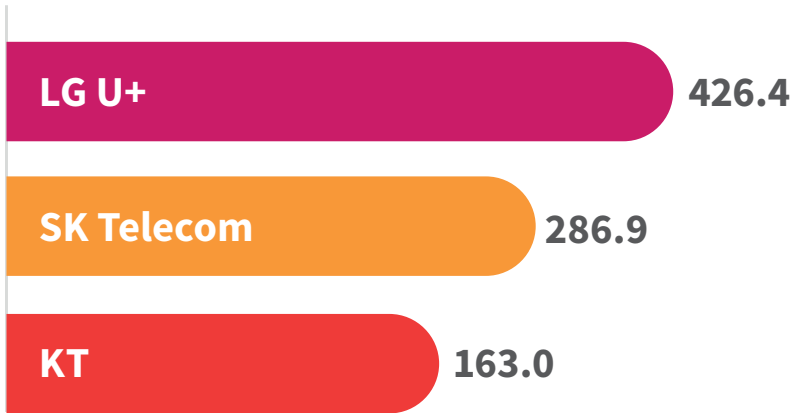
The speeds on the right show the fastest median download speeds delivered by UK operators on 4G LTE technology in metro areas compared to the median download speeds found on the 5G networks of South Korean operators KT, LG U+, and SK Telecom in Seoul. These early results indicate that 5G will bring improved speeds and a much smoother data experience to users across the UK.

We’re testing 5G networks across the globe (including in the UK). UK results are coming soon. Stay tuned. For more on what 5G means for the consumer experience, see our whitepaper:

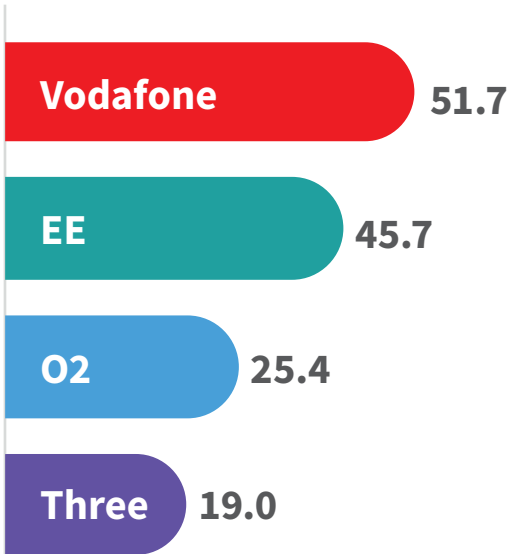
[The promise and potential of 5G: evolution or revolution?](#)



South Korea
5G median download speed (Mbps)



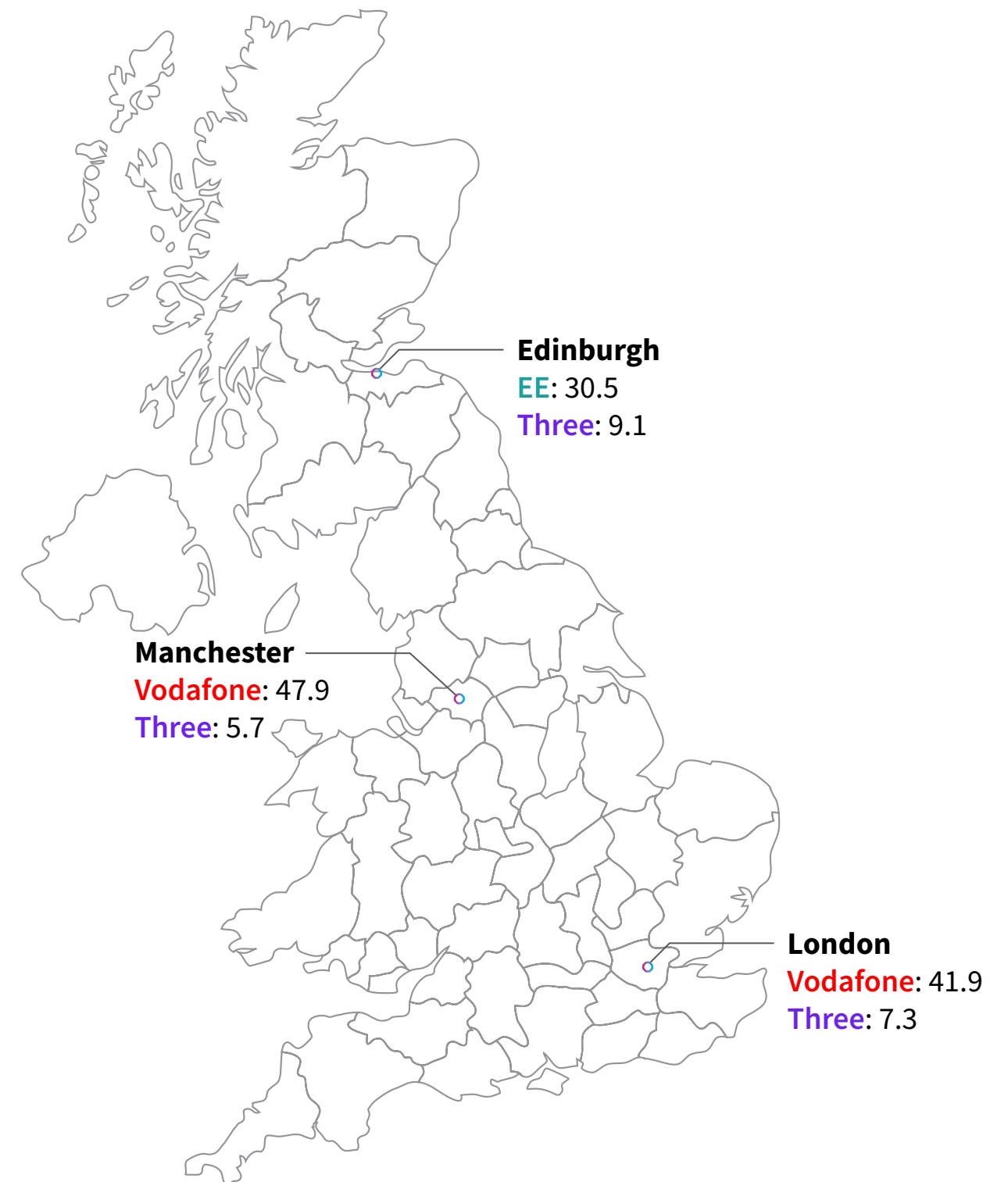
United Kingdom
Fastest 4G LTE median download speed (Mbps)



Mobile performance in highly congested areas of select cities: Edinburgh, London, Manchester: Which operators offered the fastest (and slowest) speeds outdoors?

One of the key benefits that 5G promises is greater capacity. Capacity is crucial for a smooth mobile experience, especially in densely populated urban cores. To provide an even more detailed look at the consumer mobile experience in areas where capacity is paramount, we've expanded our testing during peak usage hours within three major urban cities in the UK. Additional tests were performed in each city where consumers use their mobiles most often: tourist areas, popular travel destinations, business districts, and other high-traffic locations.

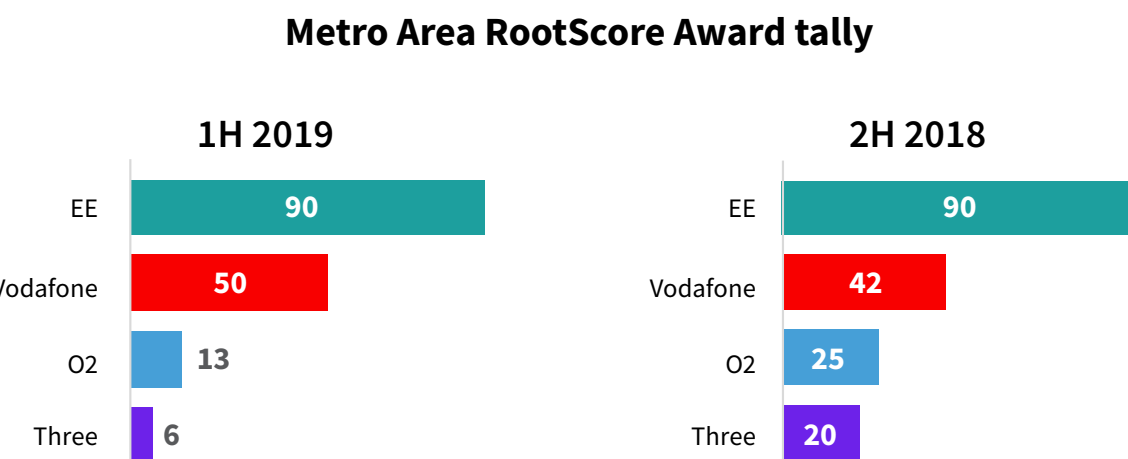
See the map below to learn which operators delivered the fastest and slowest median download speeds outdoors in each market during periods of high congestion.



Speeds shown are in Mbps

Metro Area RootScore Awards (1H 2019 and 2H 2018)

Major metropolitan markets are generally where the majority of mobile users spend most of their time, and expectations for a fast and reliable mobile experience remain high with 5G launches nearing. While large-scale 5G deployments have yet to occur in metropolitan markets across the UK, 4G LTE technology still provides end users with generally fast speeds and strong reliability. Read on to see how the operators performed in our testing across the 16 most populated metro areas in the UK.



The award tallies above show both outright wins and shared awards in both 1H 2019 and 2H 2018.

Key takeaways

In a nutshell: EE earned the highest award tally among all operators and delivered consistently fast speeds, O2 and Three each saw award declines, while Vodafone showed improvement in multiple areas and delivered the fastest median download speed among all networks.

EE remains the operator to beat: EE again registered the strongest combination of outstanding reliability and fast speeds, while earning the highest award tally among all operators at 90 out of 96 total award chances.

O2 registers solid reliability but a lower award tally - O2’s call and data reliability results were good and generally consistent with those from 2H 2018, but the operator’s award tally decreased in this test period. It’s important to note, however, that O2’s performance was generally steady since our last report. Improvements from EE and Vodafone contributed to O2’s lower award count in 1H 2019.

Three provides consistent speeds and good reliability, but its award total decreases: Three’s speed results were consistent with those from 2H 2018, and the operator continued to deliver strong reliability. However, Three’s award total declined since our last test period. But similar to what we observed with O2, Three’s award declines corresponded with improvements from EE and Vodafone.

Vodafone shows considerable improvement: Vodafone continued to provide fast speeds and excellent reliability in metros across the UK, and the operator’s award total increased for the second straight test period. Vodafone’s award count jumped from 42 in 2H 2018 to 50 in this test period, narrowing the gap with EE and adding further separation from both O2 and Three.

South Korea and the US are the only two markets in the world to see significant 5G revenue-generating activity to date, according to the **IHS Markit Mobile Infrastructure Market Tracker – Q1 2019**

Speed and reliability results - at a glance

To give insight into speed performance, we measured each operator’s consistency of delivering median download speeds at various intervals across the 16 metro areas we tested. Because speeds continue to get faster, we’ve adjusted our speed intervals to highlight the operators’ speed gains. In our previous reports, our median download speed intervals considered the number of markets in which each operator delivered speeds at intervals that began at 0-5 Mbps and topped out at 20 Mbps or faster. For this report, we’ve adjusted our intervals upward to reflect the evolving mobile landscape, particularly with 5G promising faster speeds in the very near future.

To evaluate each network’s data reliability, we used our web/app testing as a proxy for overall data reliability. We looked at each operator’s ability to get connected to the network and then stay connected long enough to complete our tests. Web/app success rates above 97% for getting connected and staying connected are denoted as “Excellent.”

Median download speed intervals 1H 2019

Network	0 - 10 Mbps	10 -20 Mbps	20-30 Mbps	30 - 40 Mbps	40 + Mbps
EE	0	0	1	11	4
O2	5	9	2	0	0
Three	1	15	0	0	0
Vodafone	0	5	5	4	2

Number of markets out of 16 in which each operator delivered median download speeds at various intervals.

Data reliability 1H 2019

Network	Excellent reliability - getting connected	Excellent reliability - staying connected
EE	16	16
O2	14	16
Three	14	16
Vodafone	16	16

Number of markets out of 16 in which each operator delivered Excellent data reliability for both getting connected and staying connected.

Key takeaways

EE and Vodafone provide the fastest speeds: EE and Vodafone shined in speed testing; they were the only operators that delivered median download speeds faster than 30 Mbps in any market, and each operator exceeded 40 Mbps in at least two metros. O2 and Three, on the other hand, didn’t register speeds faster than 30 Mbps in any of the 16 markets we tested. That said, the speeds of O2 and Three were fast enough to accomplish the vast majority of mobile activities with relative ease.

Data reliability remains outstanding: EE and Vodafone reached our mark of Excellent data reliability for both getting connected and staying connected in each of the 16 metros we tested. O2 and Three, meanwhile, weren’t far behind: each operator delivered Excellent reliability for getting connected in 14 markets and Excellent reliability for staying connected in all 16 metros.

EE delivers fast speeds, strong reliability, and the highest award tally of any operator.

Key takeaways

- **Faster speeds:** EE increased the number of markets in which it delivered median download speeds of at least 30 Mbps, moving from 11 in second-half 2018 testing to 15 in the first half of 2019, and the operator registered speeds faster than 40 Mbps in four of those markets. EE’s 15 markets with speeds faster than 30 Mbps was the most of any network.
- **Outstanding reliability:** With a total of 15 Network Reliability RootScore Awards—the highest total among all operators—and Excellent data reliability results in every market we tested, EE users looking for a reliable mobile experience shouldn’t be disappointed. EE was also the only operator that reached our mark of Excellent reliability for both blocked and dropped calls (call failure rates below 2%) in all 16 markets.

Award insights

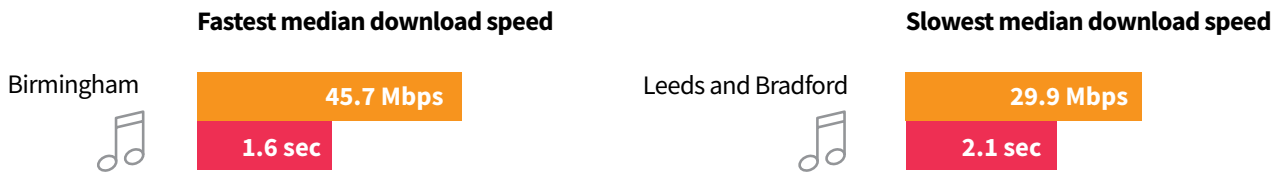
While EE’s award tally remained identical to that from the second half of 2018, there was one key distinction: EE won six more awards outright in this test period, which hurt the other operators’ chances of earning shared awards. More importantly for EE subscribers, the operator earned an astounding 90 awards out of 96 possible award opportunities across the 16 markets we tested. EE’s next-closest competitor in terms of awards was Vodafone, with 50 total awards.

EE’s median download speed intervals					
Median download speed intervals	0-10 Mbps	10-20 Mbps	20-30 Mbps	30-40 Mbps	40+ Mbps
2H 2018	0	0	5	5	6
1H 2019	0	0	1	11	4



EE’s fastest and slowest median download speeds

(and how long it takes to download a 5MB song)



Speeds above show the markets in which EE recorded its fastest and slowest median download speeds (Mbps), and the times indicate how long it typically takes to download a 5MB song at each speed (times in seconds).

EE Metro Area RootScore Award tally				
EE	Outright	Ties	1H 2019 total	Difference from 2H 2018
Overall RootScore Award	9	6	15	-1
Reliability RootScore Award	7	8	15	0
Speed RootScore Award	11	3	14	0
Data RootScore Award	10	5	15	1
Call RootScore Award	5	10	15	0
Text RootScore Award	2	14	16	0
Total awards	44	46	90	0

O2 offers strong call and data reliability in 1H 2019.

Key takeaways

- **O2’s speeds offer a mixed bag:** O2 increased the number of markets in which it delivered median download speeds of at least 20 Mbps from one in 2H 2018 to two this time. At the slower end of the spectrum, meanwhile, O2 registered speeds between 0-10 Mbps in four more markets than it did in our previous test period. That said, O2’s speeds remained fast enough for its subscribers to have a generally smooth data experience in metros across the UK.
- **O2’s reliability remains strong-** O2 achieved Excellent data reliability for getting connected in 14 out of 16 markets while reaching our mark of Excellence for staying connected in all 16 metros for the second straight time. O2’s call reliability was also quite good: the operator reached our mark of Excellent blocked call reliability in 13 out of 16 markets and delivered Excellent dropped call reliability in all 16 markets.
- **New network technologies deployed in some metros-** O2 deployed carrier aggregation technology and invested in 2300 MHz TDD spectrum in some UK metropolitan markets beginning in early 2018. While the operator’s speeds remained solid and showed a modest decline compared to what we found in 2H 2018, it often takes time for new network technologies to mature and make a lasting impact on performance. That being the case, we expect O2’s speeds to improve moving forward.

Award insights

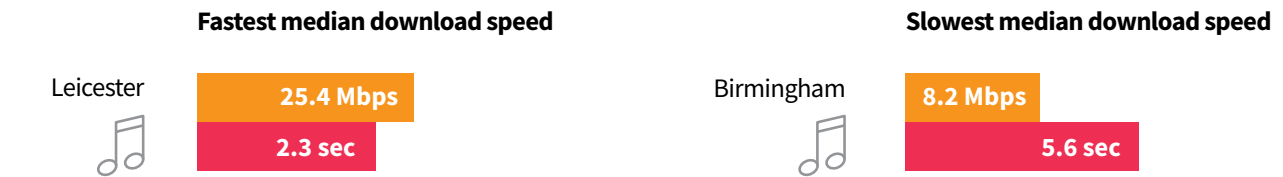
O2’s metro area award tally decreased from 25 in 2H 2018 to 13 in 1H 2019, but the operator’s performance was generally consistent with that from our previous test period. EE’s improvement and Vodafone’s award gains—especially in the categories of network reliability and call performance—contributed to O2’s lower award total.

O2’s median download speed intervals					
Median download speed intervals	0-10 Mbps	10-20 Mbps	20-30 Mbps	30-40 Mbps	40+ Mbps
2H 2018	1	14	1	0	0
1H 2019	5	9	2	0	0



O2’s fastest and slowest median download speeds

(and how long it takes to download a 5MB song)



Speeds above show the markets in which O2 recorded its fastest and slowest median download speeds (Mbps), and the times indicate how long it typically takes to download a 5MB song at each speed (times in seconds).

O2 Metro Area RootScore Award tally

O2	Outright	Ties	1H 2019 total	Difference from 2H 2018
Overall RootScore Award	0	2	2	0
Reliability RootScore Award	0	2	2	-5
Speed RootScore Award	0	0	0	0
Data RootScore Award	0	1	1	1
Call RootScore Award	0	3	3	-6
Text RootScore Award	0	5	5	-2
Total awards	0	13	13	-12

Three delivers consistent speeds and solid reliability in 1H 2019.

Key takeaways

- **Consistent speeds:** Three’s median download speeds were similar to those found in 2H 2018, with speeds of 10 Mbps or faster in 15 out of 16 metros for the second straight test period. While Three’s speeds weren’t quite as fast as those of EE or Vodafone, they should allow Three’s users to accomplish most of their mobile activities without much trouble.
- **Three’s 4G LTE footprint is smaller than those of the other operators:** Three was on 4G LTE during at least 90% of our tests in just 2 out of 16 markets, whereas all other operators were on 4G LTE at least 90% of the time in all 16 metros. Three was, however, on 4G LTE during at least 80% of our tests in 13 metros. That said, Three subscribers should continue to enjoy relatively strong speeds, and if the operator expands its 4G LTE footprint, we could see speed improvements moving forward.
- **Consistently dependable-** Reliability stalwart Three continued its trend of providing users with outstanding call and data reliability in nearly every market we tested.

Award insights

While Three earned the fewest awards among all operators and saw its award tally decline by 14 since 2H 2018, it’s worth noting that Three’s performance wasn’t necessarily worse than it was in the second half of 2018. Rather, Three’s performance remained generally steady in both test periods, but improvements from EE and Vodafone contributed to Three’s lower award total in 1H 2019.

Three’s median download speed intervals					
Median download speed intervals	0-10 Mbps	10-20 Mbps	20-30 Mbps	30-40 Mbps	40+ Mbps
2H 2018	1	15	0	0	0
1H 2019	1	15	0	0	0



Three’s fastest and slowest median download speeds

(and how long it takes to download a 5MB song)



Speeds above show the markets in which Three recorded its fastest and slowest median download speeds (Mbps), and the times indicate how long it typically takes to download a 5MB song at each speed (times in seconds).

Three Metro Area RootScore Award tally				
Three	Outright	Ties	1H 2019 total	Difference from 2H 2018
Overall RootScore Award	0	0	0	-1
Reliability RootScore Award	0	1	1	-6
Speed RootScore Award	0	0	0	0
Data RootScore Award	0	0	0	0
Call RootScore Award	0	5	5	-6
Text RootScore Award	0	0	0	-1
Total awards	0	6	6	-14

Vodafone delivers fast speeds, excellent reliability, and shows improvement in 1H 2019.

Key takeaways

- **Consistently fast:** Vodafone continued to provide fast speeds and excellent reliability in metropolitan markets across the UK. In the first half of 2019, Vodafone delivered median download speeds of at least 30 Mbps in six markets, a total behind that of EE but higher than those of either O2 or Three. Vodafone was also one of two networks that delivered speeds faster than 40 Mbps, doing so in two markets (Bristol and Liverpool).
- **The single fastest speed in 1H 2019:** Vodafone delivered the fastest speed among all networks in this round of testing, clocking a median download speed of 51.7 Mbps in Liverpool. Vodafone’s speeds were also solid at the “slow” end. For instance, the operator’s slowest median download speed of 12.7 Mbps, found in Newcastle, is still a respectable speed. At that speed, Vodafone subscribers should have a generally smooth data experience on their mobiles.
- **Network investments continue to pay off-** Vodafone has continued to deploy its LTE carrier aggregation technology in UK metropolitan markets, and those investments appear to have contributed to improved speed and reliability results in 1H 2019.

Award insights

Award gains: Vodafone was the only operator that increased its award total since our last test period. Vodafone’s award tally improved from 42 in 2H 2018 to 50 this time, with the operator’s gains occurring in the important categories of overall performance, network reliability, and call performance.

Vodafone’s median download speed intervals					
Median download speed intervals	0-10 Mbps	10-20 Mbps	20-30 Mbps	30-40 Mbps	40+ Mbps
2H 2018	0	8	2	2	4
1H 2019	0	5	5	4	2



Vodafone’s fastest and slowest median download speeds

(and how long it takes to download a 5MB song)



Speeds above show the markets in which Vodafone recorded its fastest and slowest median download speeds (Mbps), and the times indicate how long it typically takes to download a 5MB song at each speed (times in seconds).

Vodafone Metro Area RootScore Award tally				
Vodafone	Outright	Ties	1H 2019 total	Difference from 2H 2018
Overall RootScore Award	1	6	7	3
Reliability RootScore Award	1	8	9	4
Speed RootScore Award	2	3	5	-1
Data RootScore Award	1	5	6	0
Call RootScore Award	1	8	9	3
Text RootScore Award	0	14	14	-1
Total awards	6	44	50	8

Methodology - how we test

We believe that real-world results come from real-world testing. To that end, all RootMetrics testing is conducted from the consumer's point of view. We use Samsung Galaxy S9 smartphones purchased off the shelf from operator stores, and tests are conducted during the day and night while walking and driving. We utilise random sampling techniques to ensure our results offer a robust characterisation of performance in the places consumers most often use their mobiles, and all testing is focused on the activities for which consumers typically use their mobiles, including data, call, and text usage. To learn more about our testing, visit the [methodology](#) page of the RootMetrics website.

The first 5G phone in the US - the Motorola Moto Z3/5G Mod - is a compromise of cost and design, according to a **teardown analysis** conducted by IHS Markit.





For more information, visit

<http://rootmetrics.com/uk>