SignalTracker

White Paper

Which is central London's best mobile network?

Research aim

The aim of this research is to establish which mobile network gives the best service in central London, based on a comparison of value rather than premium 5G offerings.

Summary of findings

Vodafone has central London's best network:

- Vodafone's average download speed of 48 Mbps was the second best and considerably above the 20 Mbps level where performance deterioration becomes noticeable
- Vodafone's central London coverage at speeds of 20 Mbps and above was far superior to the other networks.
- Vodafone offers the best level of 5G connections while the other networks more frequently used 4G

Research overview

The figures quoted come from over 11,000 tests carried out by PolicyTracker in February and March 2025. Each network was tested outdoors simultaneously at the same locations. The research is based on real-world user experience using data from the SignalTracker app, developed by PolicyTracker

Our benchmarking focuses principally on download speed and its impact on the user experience, but also on 5G availability and the number of failed tests.

The type of 5G being tested is 5G Non-Stand Alone (5G NSA), which uses the 4G computer system. The next evolution of 5G, 5G Stand Alone (5G SA) uses a new computer system dedicated to 5G. This is not covered in these tests because one of the operators, Three, does not offer it and the coverage from other operators is patchy. It is also a premium product, costing about three times as much as the cheapest 5G services. The intention of this research was to identify the best network for the value-orientated consumer.

Failed tests are defined as those where the test cannot complete due to a network error or where the data speed is 0 Mbps. To prevent distortion of the data, only one failed test is recorded per operator per GPS coordinate, even though several tests may have failed on the same spot.

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Research findings

Download speeds

On first inspection, the Three network performs the best, securing central London's highest average download speed of 50 Mbps.

	Average download speed (Mbps)
Vodafone	47.57
EE	34.53
O2	32.27
Three	49.79

2. Average download speed across all technologies

This metric does not take into account the consistency or extent of coverage. An operator's average could be skewed by a small number of very fast results, which mask a multiplicity of poor results and failures.

Three's average is boosted by some extremely high speeds of 150 Mbps, twice as many as its nearest rival, as shown in the table below.

	% of tests above 150 Mbps
Vodafone	5%
EE	1%
O2	1%
Three	10%

Proportion of high-speed tests

But Three has many areas of poor coverage and failed tests: the latter are shown below. Three has the worst score of 11%

	Proportion of failed tests
Vodafone	5%
EE	4%
O2	7%
Three	11%

4. Failed speed tests

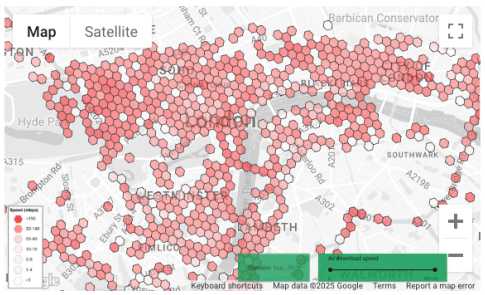
The number of failed tests is indicative of Three's coverage problem, which is explored in more detail in the maps below.

All coverage

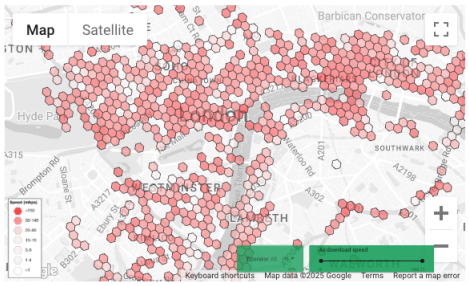
The maps below show the results of all the download speed tests for individual operators in central London. They are based on simultaneous testing of the four UK networks.

The fastest speeds are shown in the darkest red, with speeds above 150 Mbps grouped together.

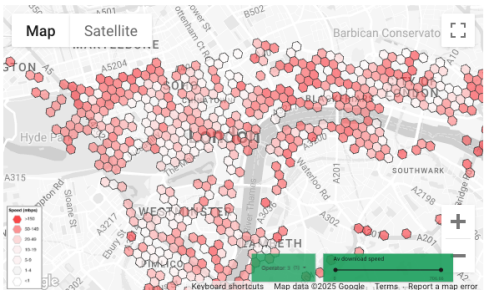
Vodafone has the widest coverage, followed by EE, then Three and O2. Vodafone is also the most consistent with fewer not-spots, shown in the palest red.



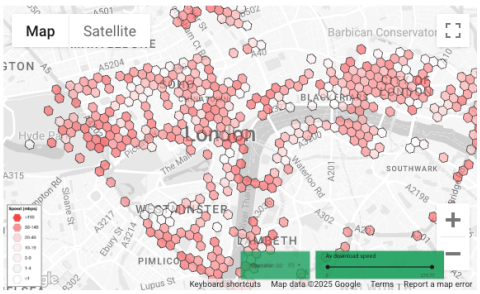
Vodafone



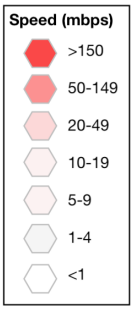
EE



Three



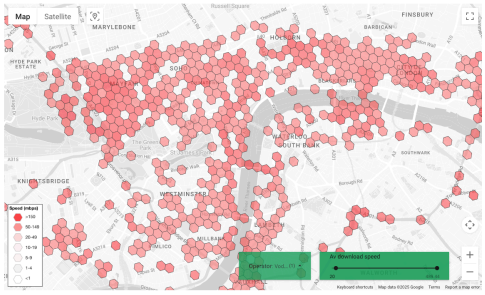
O2



Coverage at reasonable speeds

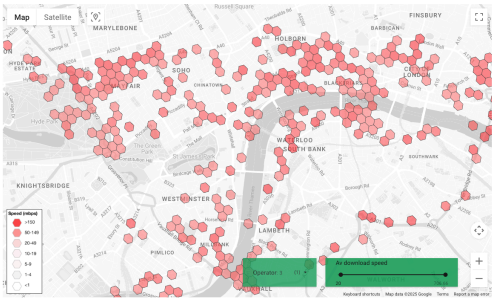
These maps show download speed tests above 20 Mbps for the individual operators. We chose this metric because speeds below 20 Mbps produce a markedly poorer user experience, shown particularly in slower page load times, whereas above this level an increase in speed becomes less noticeable. This is illustrated in our recent video, which shows the BBC website taking about 1 second to load at 190 Mbps and 40 Mbps compared to 2 seconds at 20 Mbps.

Even above 20 Mbps, Vodafone's coverage is still widespread and consistent in central London. It is little different to the previous map showing all download speeds. However, with EE, more gaps appear, and this is even starker with O2 and Three.



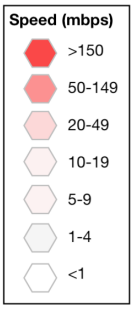
Vodafone

EE



Three

O2

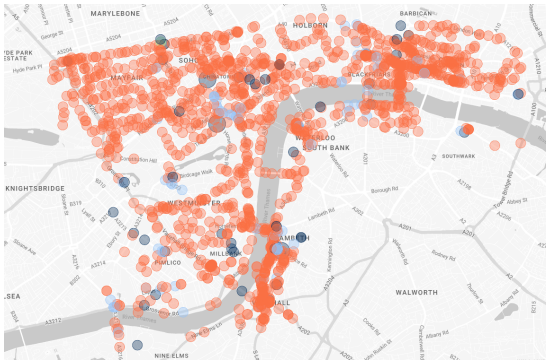


For coverage of central London, Vodafone is the clear winner with EE coming second, followed by O2 and Three.

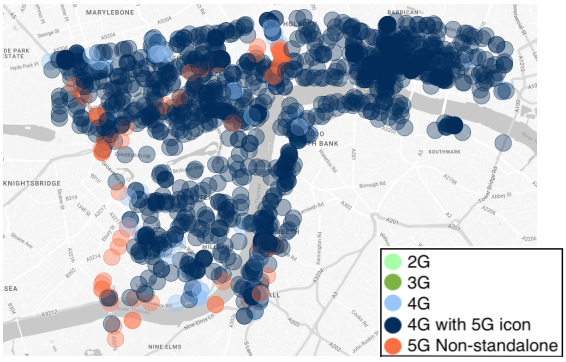
Three users often describe extremely fast downloads, followed by periods of no reception at all. This is illustrated in the map above: areas of 50 Mbps plus, next to patches of very poor service.

Which mobile generation is being used?

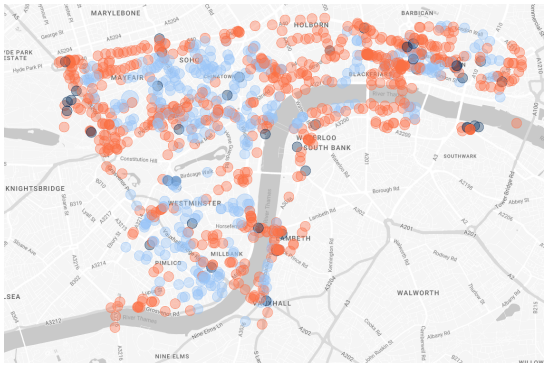
Download speed and network quality are partly dependent on the mobile technology generation, so this is worth considering. The maps below show whether each test was 5G, 4G,3G or 2G. The earliest two generations rarely produce usable speeds and thankfully they accounted for very few tests!



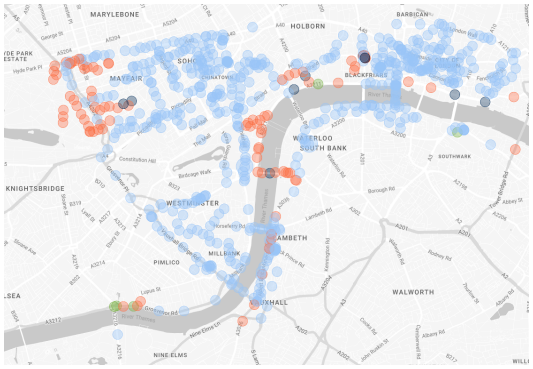
Vodafone



EE



Three



O2

Vodafone did the best job in delivering 5G, which accounted for 89% of their test results. Three was second with 59% with EE and O2 were far behind.

	Vodafone	EE	O2	Three
5G NSA	89%	7%	13%	59%
4G with 5G icon	4%	87%	2%	4%
4G	7%	6%	84%	37%
3G			1%	
2G	0%			

Proportion of total tests (Blank columns = no tests)

87% of EE speed tests were actually 4G even though the 5G icon would have been displayed on the phone. This is because most phones show 5G when the

base station to which they are connected has 5G equipment potentially available, even if the actual connection may be 4G or 5G. Compare this with Vodafone, where only 4% of tests were "icon only" 5G and 89% were actual 5G.

However, the download speeds achieved in "icon only" 5G are quite reasonable. All the operators were achieving over 30 Mbps, compared to around 20 Mbps in 4G. The equipment in base stations upgraded to 5G is likely to be more modern, also optimising the 4G speeds.

	Vodafone	EE	O2	Three
5G NSA	50.48	37.16	70.86	70.62
4G with 5G icon	31.74	34.96	32.38	37.39
4G	20.82	25.86	26.50	17.59
3G			2.71	
2G	0.00			

Av download speed in Mb/s (Blank columns = no tests)

While Vodafone's consistent delivery of 5G is commendable, we attach less weight to this in choosing the best network. Consumers seek reasonable download speeds and good coverage and have little intrinsic interest in which mobile technology is used to deliver this. However, using 5G is a good indication of a future-proofed network which can cope as data usage increases.

More information

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Notes

[1] About Signal Tracker

The tests were carried out using SignalTracker. This is an Android app and is available on Google Play.

It allows consumers to compare the service from different operators using metrics such as signal strength, speed and bands used. Users can save this information for different locations. See the website for more information, which includes an explanatory video.

The SignalTracker app can also provide this detailed spectrum usage data for commercial and regulatory organisations.

[2] 5G Technology

Most UK actual 5G connections are 5G Non Standalone (5G NSA). They connect to the existing 4G computer network using a 4G band but download data using a 5G connection. The technology's next stage, 5G Stand Alone (5G SA), does not use the 4G network but currently has limited deployment.

[3] About PolicyTracker

SignalTracker is produced by PolicyTracker, which provides news, research and training about spectrum policy.

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