SignalTracker PolicyTracker

White paper: How do Britain's MVNOs compare with their parent networks?

Research overview[1]

The aim of this research was to compare the user experience for direct customers of the UK's four mobile networks[2] against the third-party providers which piggyback on those networks such as Lebara and Lyca. The network providers are known as Mobile Network Operators (MNOs) and the companies using their networks are called Mobile Virtual Network Operators (MVNOs).

The research seeks to establish whether an MVNO customer gets the same service as a customer using its parent network, known as an MNO. For example, does a Lyca customer get better or worse download speeds than a customer of its parent network, EE? We chose one MVNO from each mobile network, as shown in the table.

MNO	MVNO
Three	iD
Vodafone	Lebara
EE	Lycamobile
O2	giffgaff

Our methodology was to compare download speeds in three sample environments: - Central London, suburban areas and rural areas (See figure 1). These were chosen to compare like with like: technical constraints mean that mobile networks offer slower speeds in rural areas.

Summary of findings

1. **Parent networks generally perform better than their partner MVNOs** when the download speeds achieved are balanced against the number of failed tests. However, the differences are relatively small and, in some comparisons, Lebara and Vodafone namely, MVNOs score better than their parent network.
2. **Performance differences between MVNOs and MNO may not be noticeable to users**. Most download speed are >20 Mbps: speeds above this are hard to distinguish in everyday usage. However, in some circumstances failure rates will be more noticeable.
3. **The performance gap between MNOs and MVNOs varies.** Some MVNOs like Lycamobile have similar performance to their parent, but for others like iD the performance is much worse than Three.
4. **Performance across area types can be inconsistent** e.g. In the South London suburbs, the performance of O2 and giffgaff is closely matched but in the Birmingham suburbs O2 is far superior
5. **Band usage explains some MNO/MVNO speed differences.** iD has slower speeds than its network host, Three, because it lacks the same access to the best performing bands. But for the other pairings band usage profiles do not significantly influence performance.
6. **MVNOs are usually better value.** Although MVNO's performance are not as good overall, customers are unlikely to notice the difference in service.
7. **5G standalone makes a big difference.** No UK MVNO currently has access to 5G standalone, the fastest version of the 5G network. The fastest speeds is one of the key selling points and for the customer willing to spend, it could be what seals the deal.

[1] The SignalTracker mobile app is designed by PolicyTracker, which provides news, research and training about spectrum policy. We use the The SignalTracker app to provide spectrum usage data for commercial and regulatory organisations.

[2] While this research was being carried out, two networks, Vodafone and Three, merged to become VodafoneThree. Our research treats them as two separate networks.

Conclusions

Looking at the results from *all* MNOs and MVNOs, you get a marginally better service from MNOs not because they have significantly better download speeds but because the tests are less likely to fail.

For those MVNOs which have lower download speeds than their parent MNO, namely ID and giffgaff, customers are unlikely to notice a significant difference in service because mostly the speeds achieved are above 20 Mbps, the point at which most internet applications become noticeably slower.

In simple terms, the performance differences between MVNOs and MNOs are unlikely to be noticeable for most consumers. Similarly, the higher fail rate of MVNOs will not be an impediment for to *all* consumers: it is less pronounced in suburban areas, for example.

Technical differences between MVNOs and MNOs

Although MVNOs use an MNO's network they are not getting exactly the same service. Our tests showed variations in the bands and mobile generations used. However, in most cases this makes little overall difference to performance. The exception is Three and iD where the latter has less access to the best performing bands.

In terms of performance, the picture is not quite consistent across all MNO/MVNO pairings. iD offers significantly worse download speeds when compared to Three, but this is not the case for Lebara, Lyca and giffgaff.

Value for money

In general terms MVNOs are better value than their MNO counterparts but some deals are much better than others. Two examples are notable: iD is significantly cheaper than Three but download speeds are considerably worse; also there is little difference in price between O2 and giffgaff but the latter's performance is significantly worse. Most other MVNOs are considerably cheaper but without offering a noticeably poorer service.

It is only when MNOs offer the most technologically advanced form of 5G, called 5G standalone or 5G SA, that their service is significantly better than the MVNOs, who only offer the lesser 5G variant, 5G non-standalone (5G NSA). However, 5G SA costs more and is usually available only on longer term contracts.

Policy implications

Many MNOs are offering a different technical profile to the MVNOs using their network. However, our tests show that this provides a reasonable service where performance differences would be indistinguishable for many customers. This means that MNOs have an additional revenue stream and can make greater use of their networks. They can also exploit network capabilities through a more varied use of the available bands. This improves spectrum efficiency.

MVNOs also enhances the competitiveness of the UK mobile market in several ways:

- By facilitating network switching and therefore market dynamism through short term contracts of as little as a month
- By offering comparable services at cheaper prices
- By offering targeted services aimed specifically at users e.g. migrant workers wishing to call home

This enhanced competitiveness is achieved without the need to build new networks, an undertaking so expensive that very few new entrants have appeared in mobile markets in the past 10 years.

The structure of this document

In the pages that follow we present the evidence for the seven findings listed above. The annex on p13 gives more details on the methodology used.

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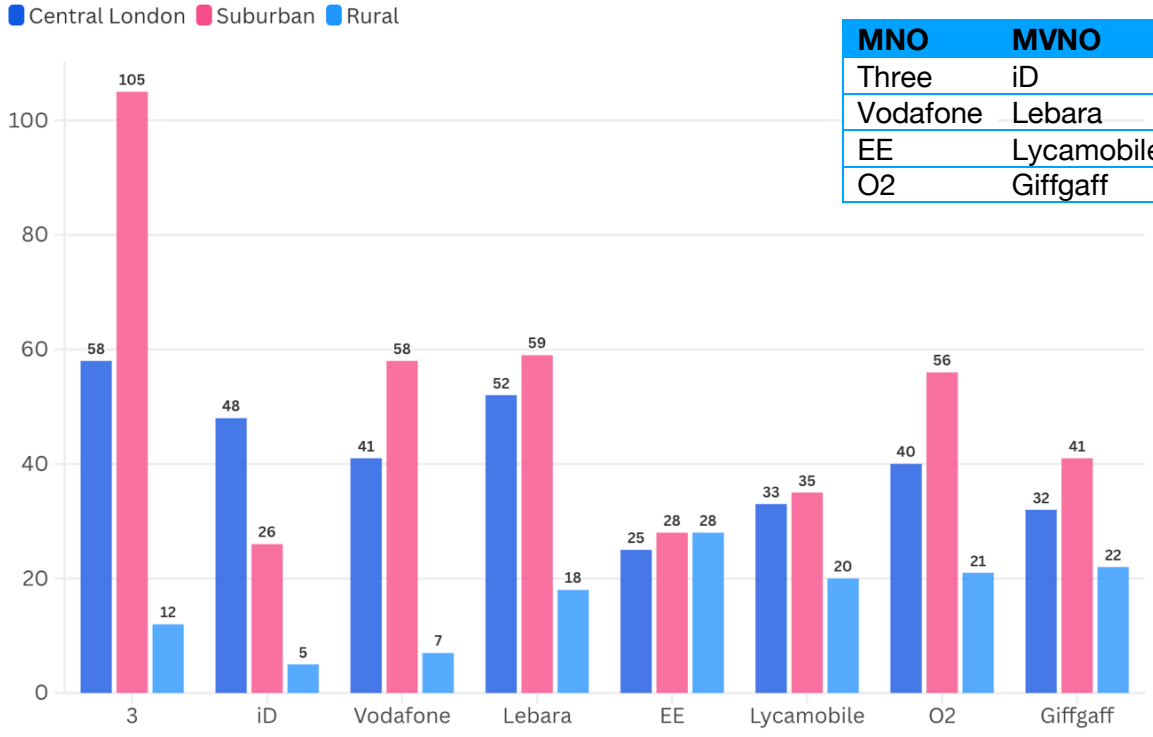
Findings

Finding 1: Parent networks generally perform better than MVNOs



MNO	MVNO
Three	iD
Vodafone	Lebara
EE	Lycamobile
O2	Giffgaff

Figure 1 - Average download speed (Mbps) for operators in three case studies

The graph above shows the download results for each MNO and MVNO pairing, indicating that in terms of speed the two categories are quite evenly matched. However, the balance swings in favour of MNOs when we consider the percentage of failed tests shown below.

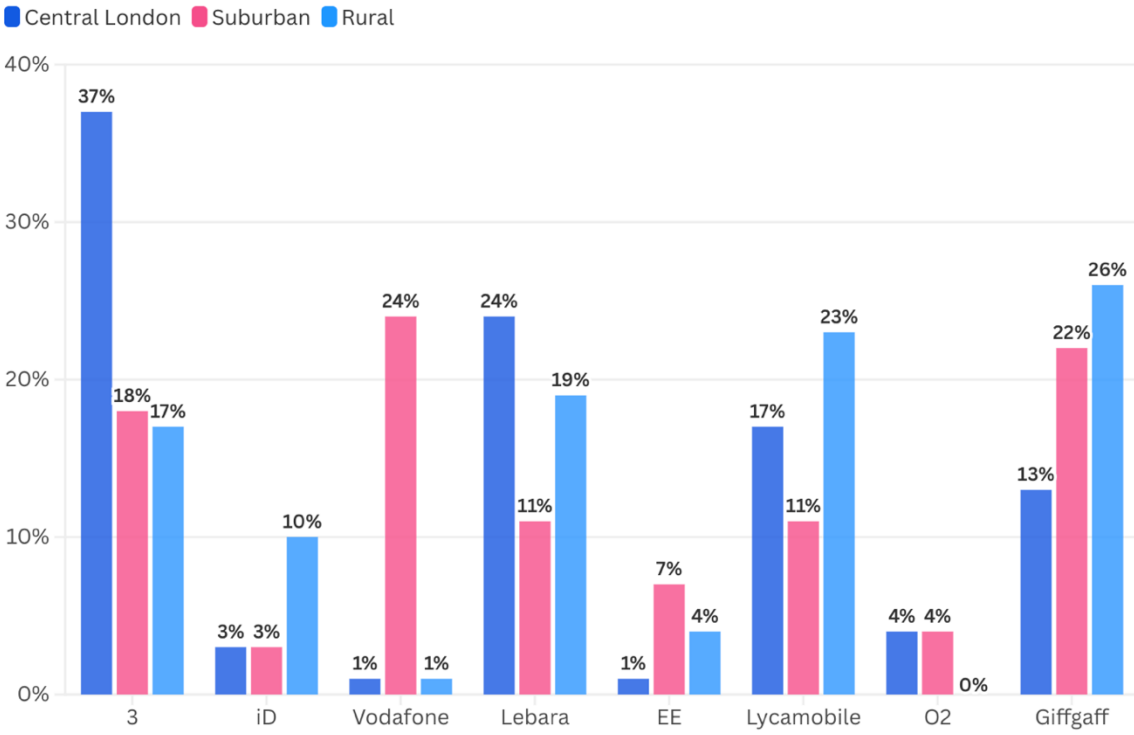


Figure 2 - Percentage of total test failures per operator in three sample areas

MNOs' superior performance is indicated in the chart below, which scores each MNO and MVNO by whether they had the highest download speed in each of the test locations and whether they had the least failed tests. For example, Vodafone gets a score of 0 for download speeds because Lebara had higher speeds in Central London (Figure 1), and in suburban and rural locations; but for failed tests (Figure 2) it gets a score of 2 because it had the least failed tests in Central London and in rural locations. Lebara scores 1 because it had least failed tests in suburban areas.

This is a good metric for the quality of service because customers need both reasonable download speeds but also consistent connectivity.

By download speed MNOs and MVNOs are evenly matched, but when failed tests are considered as well MNOs are superior by 8 to 4.

	Download speed score		Failed tests score	
	MNO	**MVNO**	**MNO**	**MVNO**
3/iD	3	0	0	3
Vodafone/Lebara	0	3	2	1
EE/Lycamobile	1	2	3	0
O2/giffgaff	2	1	3	0
Total	6	6	8	4

Figure 4 Scoring of MNOs and MVNOs based on highest download speeds and least fails across the three test areas (Highest score indicates best performance)

Finding 2: Performance differences between MVNOs and MNOs may not be noticeable to users

In most cases we found MVNOs and MNOs attaining similar speeds, though MVNOs had more test failures. A good example is EE and Lycamobile. In our detailed band analysis, both operators were very similar, and their speeds are so close the differences are statistically insignificant.

For example, in our central London tests, EE and Lycamobile were separated by 3 Mbps, too little for this to affect the user experience.

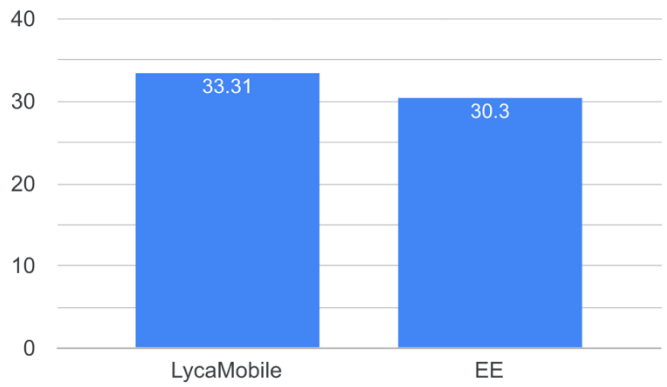


Figure 3 - EE and Lycamobile average download speed in Central London (Mbps)

Similarly, in our suburban survey, Vodafone and Lebara Mobile were separated in their results by less than 1 Mbps in our averages. This is even closer than Lycamobile and EE and would again have little impact on consumer experience. This is statistically insignificant and it is best to regard these averages as effectively the same.

Even in our rural tests, the same can be found between O2 and Giffgaff, which again had just 1 Mbps between them. This is more important as rural settings struggle with good signal, in this case the consumer would save a similarly below average experience on both O2 and Giffgaff without much idication of the difference between the two.

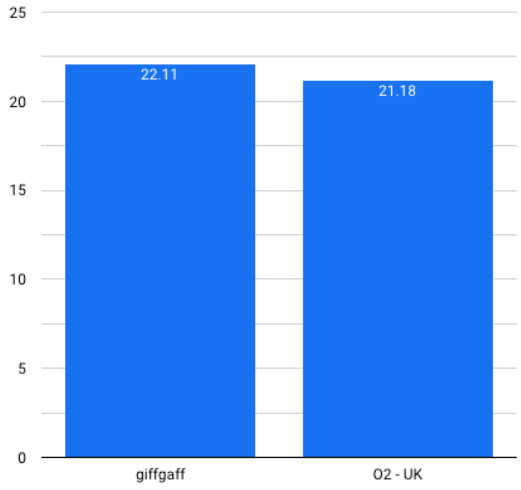


Figure 4 - Rural average download speeds for O2 and Giffgaff (Mbps)

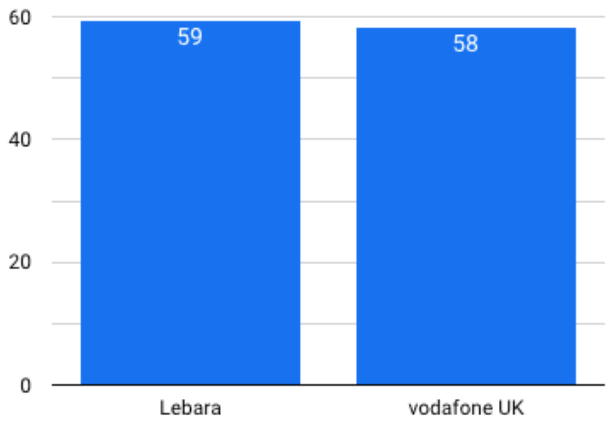


Figure 5 - Average download speeds for Lebara and Vodafone in suburban tests (Mbps)

The closeness of results is expected considering that MNOs and MVNOs share networks and it raises the question of value for money. If an MVNO is getting such similar speeds – why not choose the cheaper service?

SignalTracker has produced a video demonstrating the very small differences in page load times once download speeds exceed 20 Mbps. It can be viewed here.

Finding 3: The performance gap between MNOs and MVNOs varies

While our tests do suggest general conclusions about *all* MNOs and MVNO there are significant differences in performance between the pairings.

Three, along with O2, have the largest gaps in average download speeds between themselves and their MVNOs. This is most noticeable in suburban areas where Three scored an average download of 105 Mbps compared with 26 Mbps for iD. O2's average was 56 Mbps, compared with 41 for giffgaff. This contrasts with Vodafone/Lebara and EE/Lycamobile which both have much smaller performance gaps gaps.

The characteristics of the underlying networks also affect the results that can be achieved by either the MNO or the MVNO. Our earlier study, Central London's Best Mobile Network, highlighted Three's poor coverage in Central London while recognising that it achieved the highest download speeds. In this research our failed tests metric highlights the same problem: 37% of Three's Central London tests were not completed successfully.

Finding 4: Performance across geographical area types can be inconsistent

MNOs or MVNOs do not perform consistently well across all the test areas we have selected to represent suburban or rural locations. While the average figures give a good guide to overall performance in different environments, they also hide considerable regional differences. If possible, customers should carryout tests in their local area even if the network is known for its good coverage.

For example, if you bought a Lebara subscription based on the parent network's reputation for good coverage you would be pleased with the performance in one rural area, Cumbria (59 Mbps) but disappointed in another, North Lincolnshire (3 Mbps).

The graphs below also show that the best network varies from area to area. Vodafone is the winner in Cumbria with its MVNO Lebara not far behind. EE comes top in North Lincolnshire but its MVNO, Lyca lags, managing less than half of EE's 24 Mbps download speed.

In our tests in suburban areas O2 gets an excellent 123 Mbps average download speed in Birmingham but this is not reflected in the performance of its MVNO giffgaff which manages only a third of this. In South London O2's high speed performance is not repeated. It gets 41 Mbps, in this case nearly identical to giffgaff on 40 Mbps.

As in the rural results, the fastest network differs: it is O2 in the Birmingham suburbs and Vodafone in the South London suburbs. But there is considerable consistency in the number 2, 3 and 4 positions which are the same. The download speeds achieved in positions 3 and below are also very similar, ranging from just below 60 Mbps to about 30 Mbps.

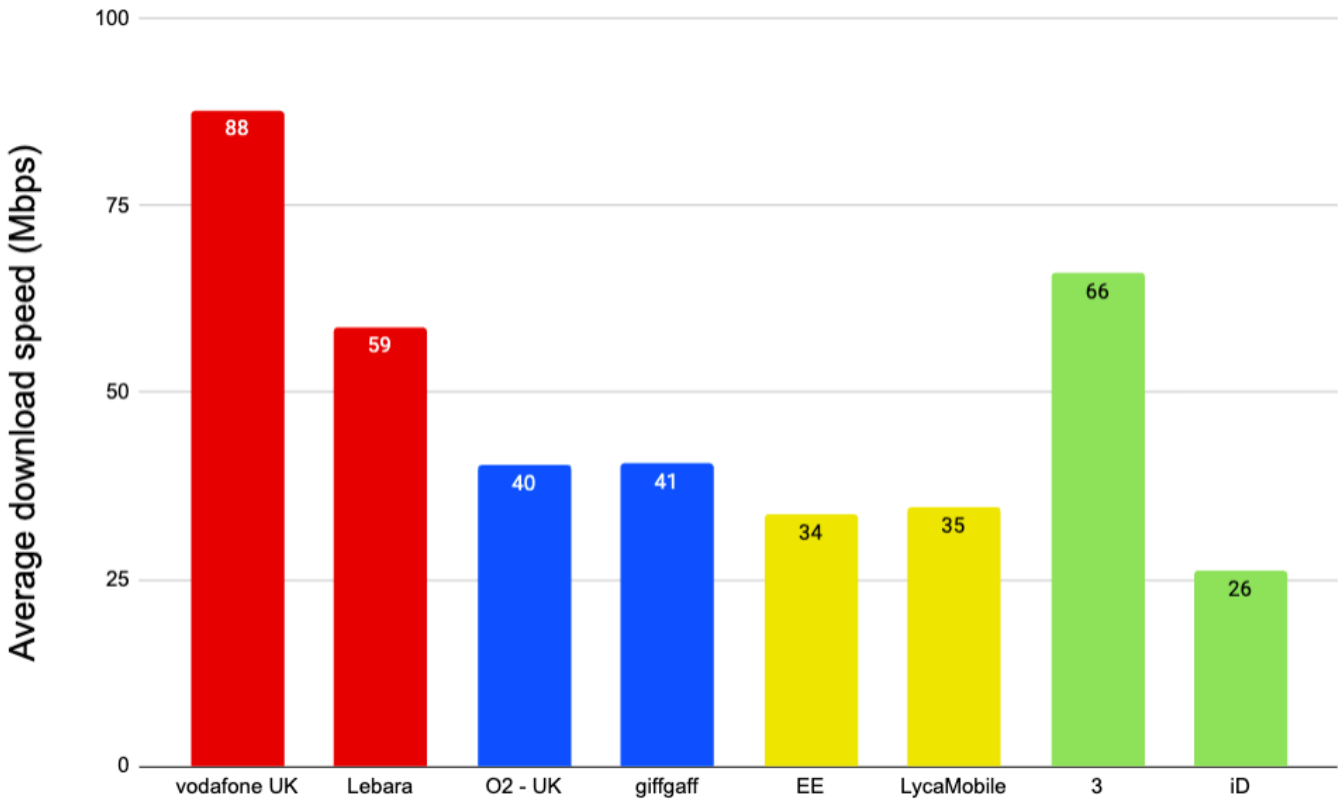


Figure 6 - Cumbria average download speeds

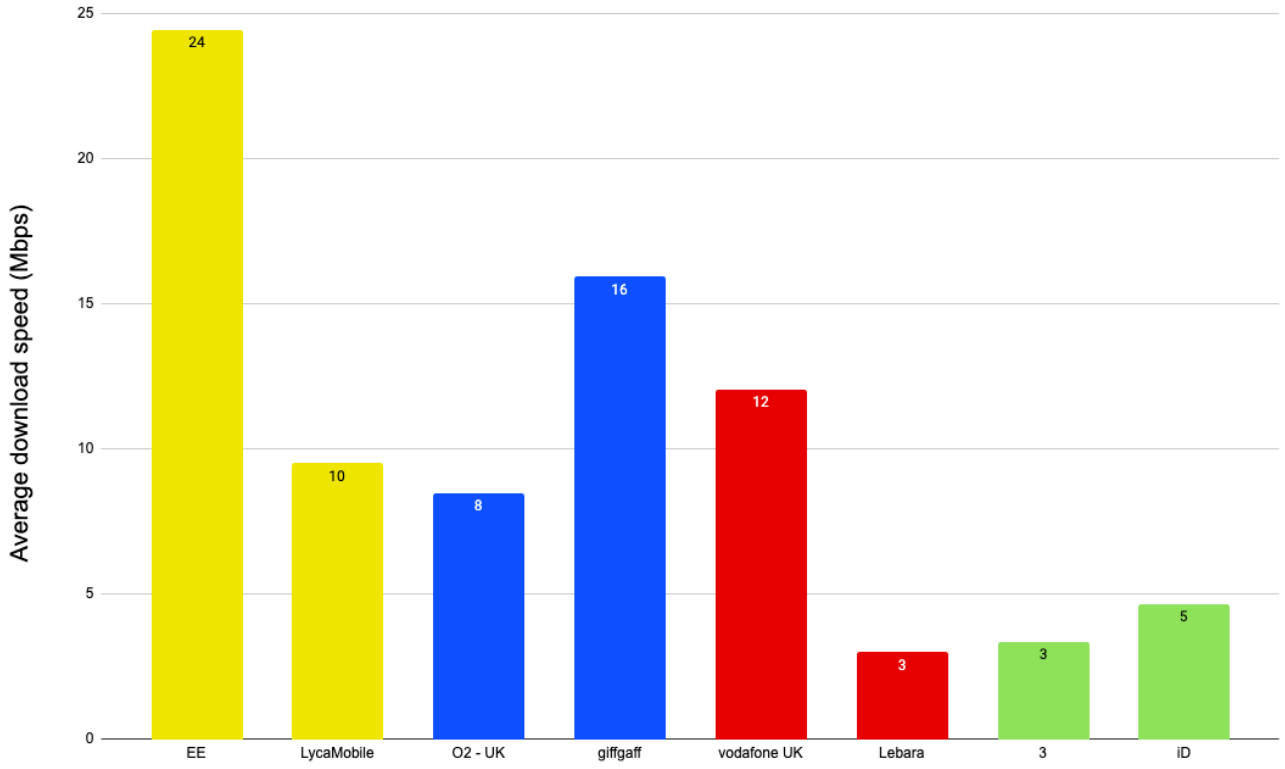


Figure 7 - North Lincolnshire average download speeds

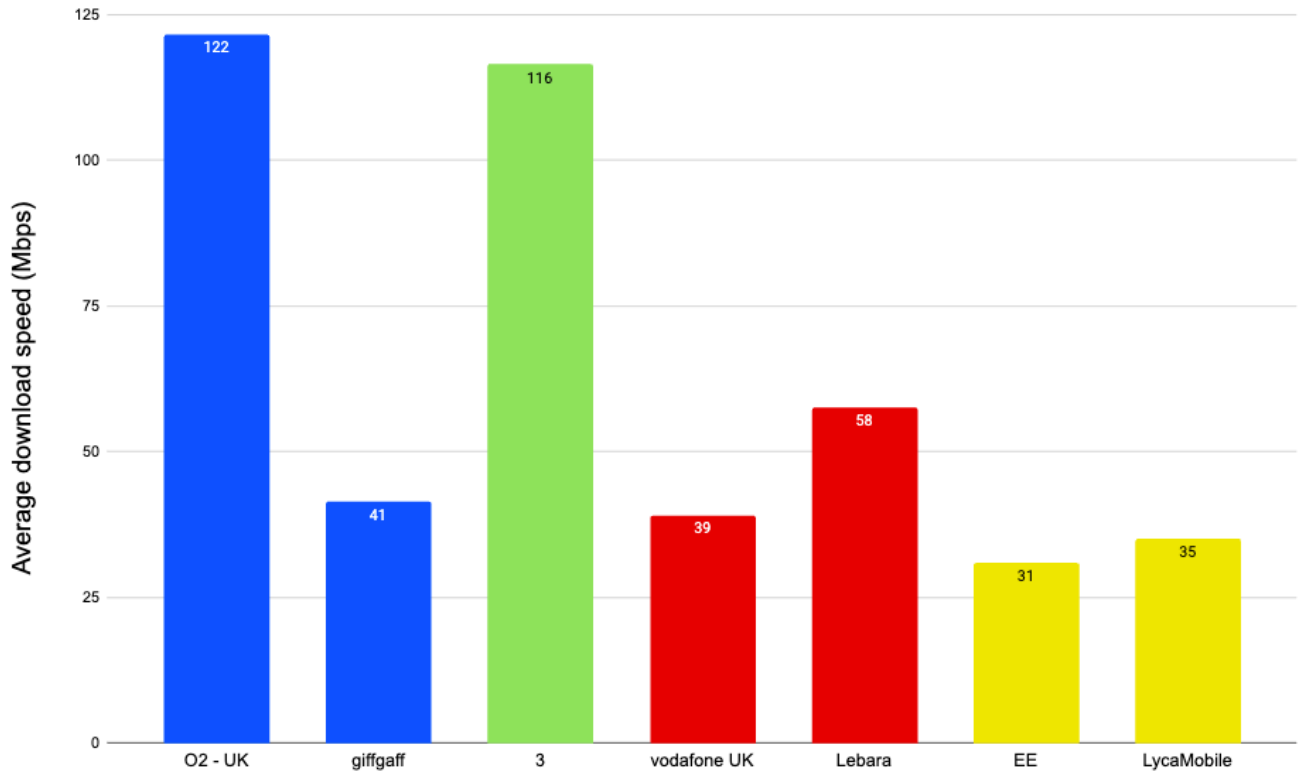


Figure 8 - Birmingham average download speeds

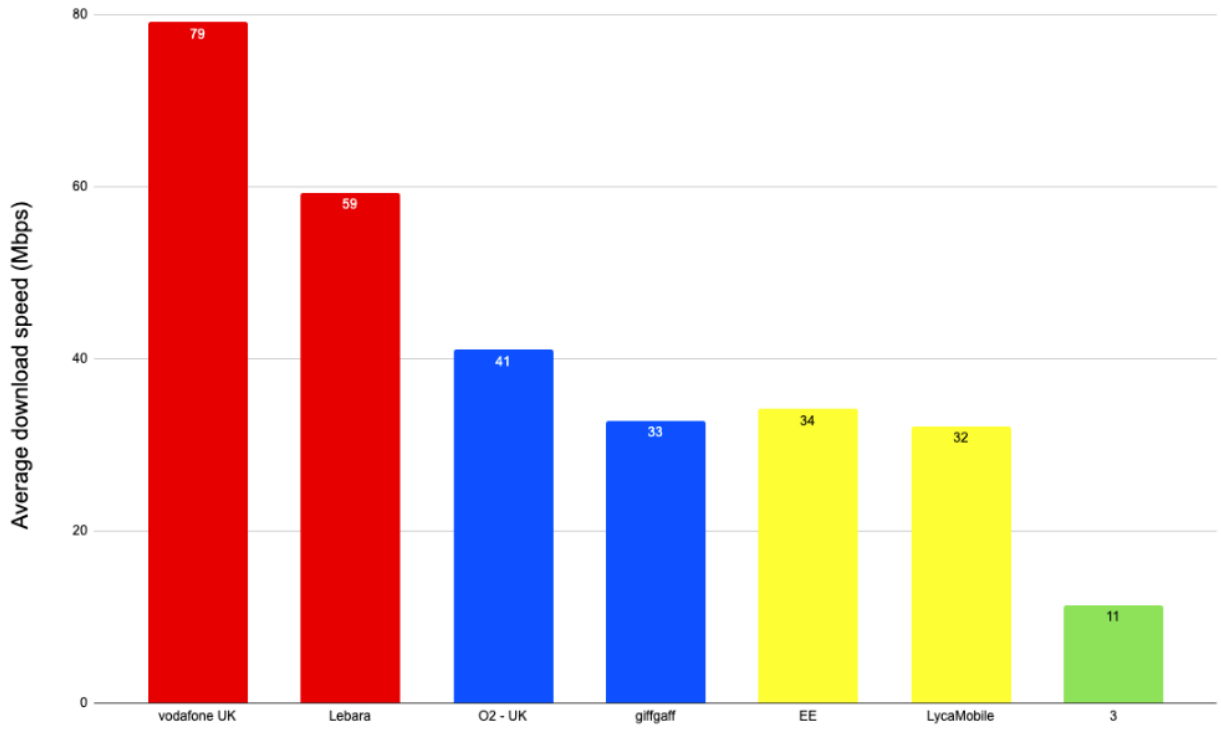


Figure 9 - South London suburbs average download speeds

Finding 5: Band usage explains some MNO/MVNO speed differences

MNOs and MVNOs are not always using the same frequency bands, For example, Vodafone makes moderate use of L-band in Central London and in suburban areas, but Lebara, the MVNO piggybacking on their network uses it hardly at all. But this makes little difference to the overall download speeds achieved by both operators which are similar in each of our rural, suburban and urban test areas.

However, the bands used helps explain the speed gap between Three and iD. In Central London Three was 10 Mbps faster than iD, 79 Mbps faster in suburban areas and 7 Mbps faster in rural areas.

This is because, although the bands used and speeds achieved in 5G were similar, in 4G iD had less access to the bands that produce the highest speeds.

In Central London, 2100 MHz made the biggest contribution to Three's higher speeds averaging 73 Mbps against 39 Mbps for iD. Three used this band in 47% of the 4G tests, compared to 23% for iD.

In the suburban tests 1800 MHz was the main driver of Three's superior results achieving 101 Mbps on average compared to 39 Mbps for iD. 1800 MHz was used in 59% of Three's 4G tests compared to 34% for iD.

In the rural tests 1800 MHz was again the main boost for Three's performance (13 Mbps vis 5 Mbps for iD) and accounted 39% of usage for Three but only 11% for iD.

	Hardest working band[3]	Three average speed	iD average speed	Three % test usage	iD % test usage
Central London	2100 MHz	73 Mbps	39 Mbps	47%	23%
Suburbs	1800 MHz	101 Mbps	39 Mbps	59%	34%
Rural	1800 MHz	13 Mbps	5 Mbps	39%	11%

Figure 10 - Band usage helps explain performance differences between Three and iD

This shows that the technical profiles for MNOs and MVNOs can contribute to significant differences in performance.

Finding 6: MVNOs are usually better value

We have concluded that most MNOs and MVNOs are very similar in terms of download speed, but MNOs are better if you include network fails. This raises the questions of value and consumer decision making. Is this assessment of performance reflected in the prices charged by respective operators? As of August 2025, here are the prices of an unlimited monthly contract on our selected MVNOs. To compare like with like these can all be cancelled at any time.

- Three 1-month data pack unlimited - £31 per month
- iD Mobile unlimited pay monthly sim only - £15 per month
- Vodafone Unlimited Max 30 day contract - £48 per month
- Lebara unlimited 30-day sim - £30 per month
- O2 unlimited pay monthly - £38 per month
- Giffgaff monthly sim only rolling unlimited plan - £35 per month
- EE unlimited essentials pay monthly - £38 per month
- Lycamobile UK unlimited data - £12.50 per 30 days

In two cases there is a particular mismatch between our performance results and the service offered

- The similarity in price between Giffgaff and O2 is in contrast with Giffgaff's significantly poorer performance
- Lycamobile's speed equals and at times surpasses EE in our tests even though it is 67% cheaper (£38 per month compared to £12.50).

MVNO's value proposition has boosted their popularity in the UK mobile market. Research from CCS Insight highlighted that MVNOs added 1.2 million new net customers in 2023, equivalent to growth of 8%. This is compared to just 2% growth for the four network operators, MVNOs also account for 18% of all UK retail connections.

However, we should also note that parent networks can achieve impressive monthly pricings on longer contracts. EE's unlimited essentials contract extended to 24 months becomes £23 a month. Vodafone's £48 unlimited max 30-day contact becomes £36 a month if a 24-month contract is taken. MVNOs certainly align themselves more with short contracts, MNOs offer good deals to customers they expect to stay for longer periods.

[3] This is the band which made the biggest contribution to Three's overall download speed i.e. a combination of how often it was used and the average speeds it achieved

Finding 7: 5G standalone makes a big difference

So far in this study, to compare like with like, we ignored the more advanced form of 5G, known as 5G standalone (5G SA), because MVNOs are not offering this, whereas most MNOs are.

5G standalone uses dedicated a dedicated computer system, unlike 5G non-standalone (5G NSA) which uses the same IT infrastructure as 4G.? 5G standalone promises speeds ten times as fast as 4G. How do our results change if we include this inequivalent set of results? Does it transform the results of MNOs to the point that it offsets the value of our selected MVNOs?

4G with a 5G logo
When a mobile phone is connecting to a base station with 5G capability, unused by the phone, often it will display the 5G logo despite being on 4G. We have separated these results in our graphs to distinguish them from the more straightforward 4G LTE results.

Suburban 5G

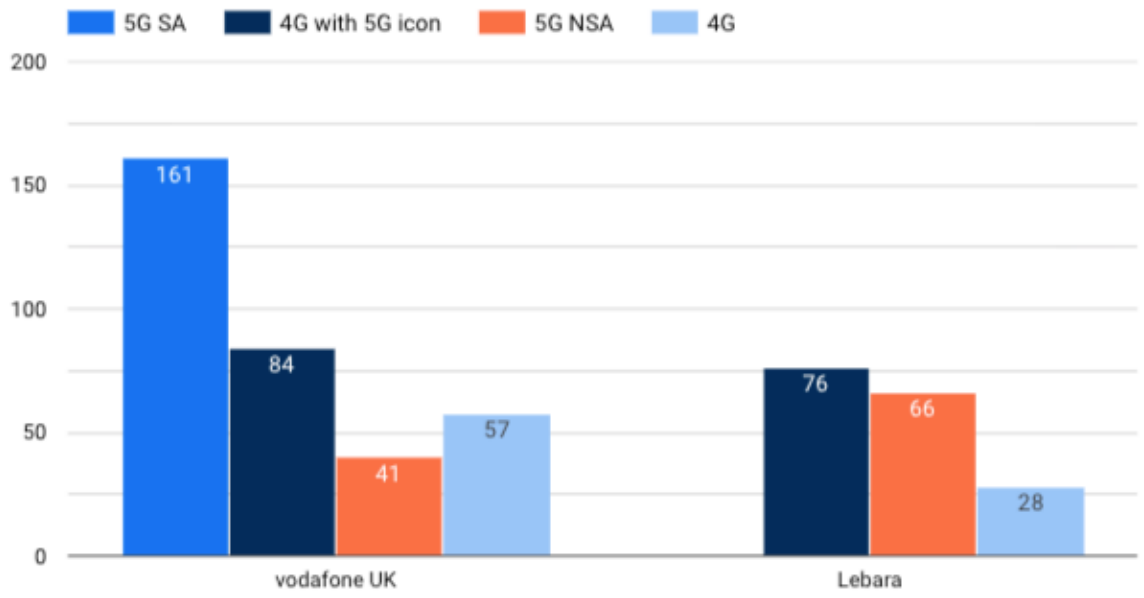


Figure 12 - Vodafone and Lebara (combined results for both South London and Birmingham)

Including 5G standalone greatly increases Vodafone's average compared to our prior results. 161 Mbps is a very fast average speed on 5G SA for Vodafone and boosts the company's overall average to 24.99 Mbps faster than Lebara. Previously, this was 59 Mbps average download speed for Lebara versus 58 Mbps for Vodafone, a very close set of results. Including 5G SA demonstrates Vodafone's advantage and distinguishes its results.

Another case, including EE's 5G SA results from the central London survey, also shows a significant impact. Without the addition of 5G SA, Lycamobile is averaging 33 Mbps against EE's 25 Mbps. With the addition of 5G SA, EE averages 30 Mbps and is getting an average download

speed of 67.26 Mbps on the faster service. This is 30 Mbps faster than Lycamobile's average of 38 Mbps on 5G NSA.

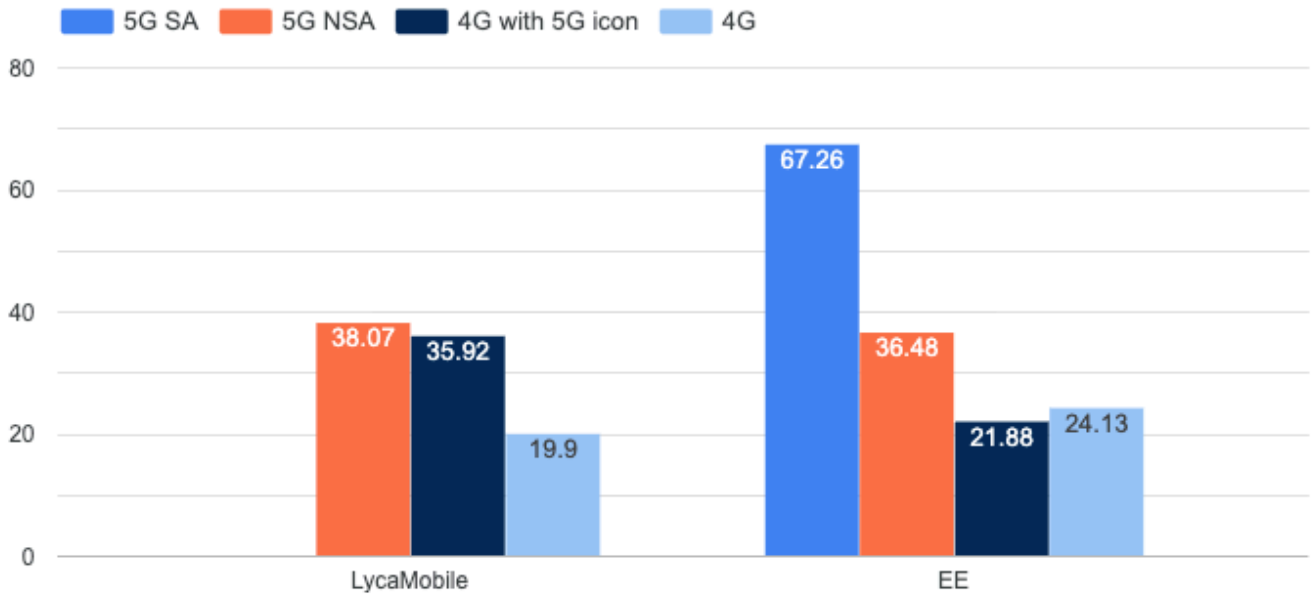


Figure 13 - Lycamobile and EE (Central London results)

In central London, without 5G SA, Lebara averages 54 Mbps and Vodafone averages 41 Mbps. This greatly improves for Vodafone with the addition of 5G SA results, reaching 50 Mbps. Vodafone's 5G standalone in central London averages 99 Mbps, some of our fastest average download speeds in the entire survey, accommodating data intensive tasks – such as streaming and enjoying 4k video – with comfort.

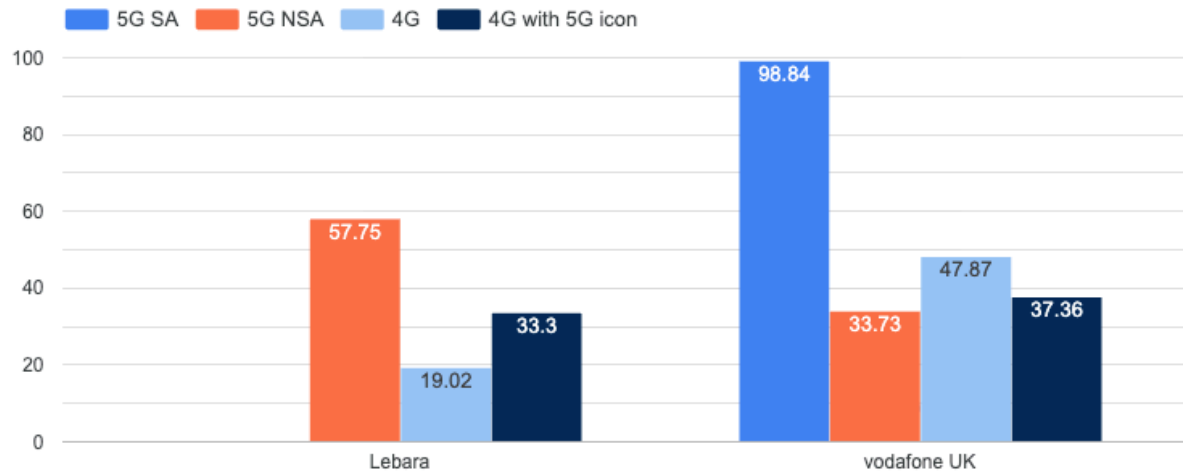


Figure 14 - Vodafone and Lebara (Central London results)

Vodafone and Lebara both suffer poor average download speeds in our rural tests, in our combined results without 5G SA Vodafone averages 7 Mbps and Lebara averages 14 Mbps. However, with the addition of 5G SA, this improves for Vodafone, with its average rising to 22 Mbps. Vodafone, for the time it was on 5G SA, achieved 94 Mbps download speeds on average which is very quick for regions suffering from a lack of concerted 5G rollout.

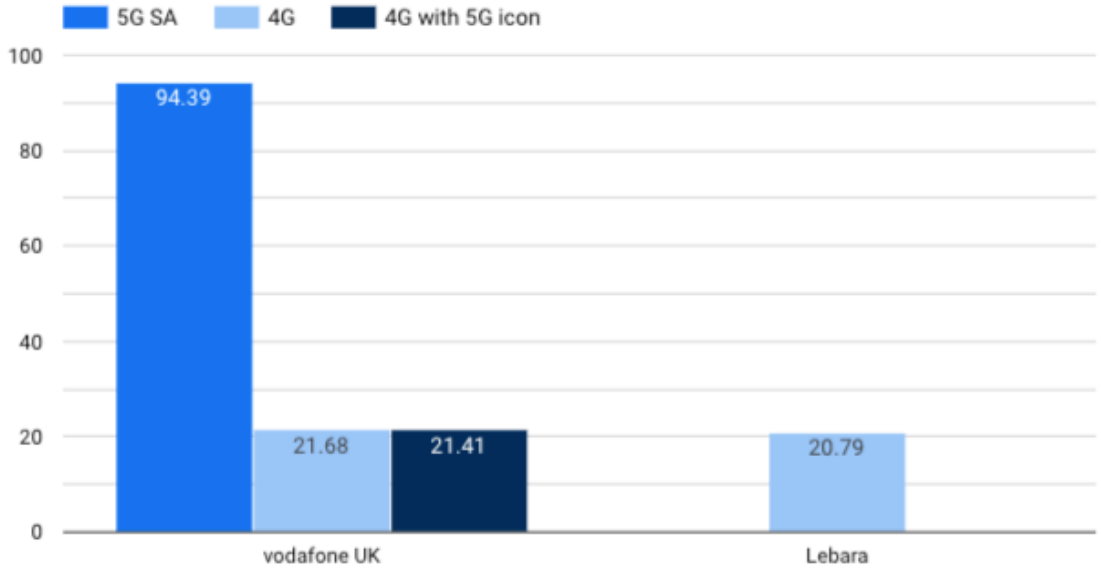


Figure 15 - Vodafone and Lebara (all rural areas including 5G Standalone results)

Annex: Methodology

The figures quoted come from more than 40,000 speed tests carried using the SignalTracker app from March 2025 to August 2025. Each network was tested across three different environments: rural, suburban and urban. Some of the tests were carried out while the phone was stationary, but most were collected in motion while either walking, cycling or in a car.

We compared download speeds in three sample environments: Central London, suburban areas and rural areas. These were chosen because mobile networks are configured differently depending on population density and the built environment. In urban areas higher frequency bands (above 2 GHz) are typically used because they give better download speeds and cope better with large numbers of users. In rural areas lower bands are deployed because they cover wider areas, albeit at lower download speeds. To make an accurate comparison we therefore need to choose similar geographic areas, as the download speeds in a rural area will be slower than those in urban and suburban area.

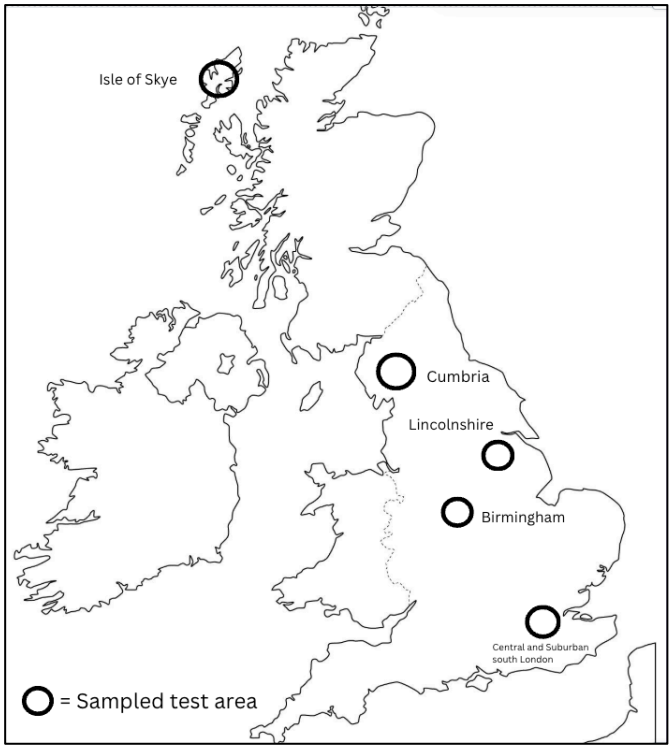


Figure 15 - Survey locations across the UK

Our rural averages are a combination of test results from Cumbria, the Isle of Skye in Scotland and the village of Owston Ferry in North Lincolnshire. Our suburban averages are taken from data obtained across the south of Birmingham (Balsall Heath down to Shirley) and from Tooting, Clapham and Streatham in south London. Our urban case study is Central London itself, the best developed part of the city for telecommunications and covering the region from Marylebone to the eastern edge of the City of London.

Our testing focused primarily on download speed and its impact on the user experience. The percentage of results in each mobile generation were recorded as well as the bands used .

Failed tests were also tracked, defined as tests where a network error prevents data download and the data speed is recorded as 0 Mbps. To prevent this distorting the results - only one ‘fail’ result is recorded per minute.

Mobile phones used

Our tests were performed on Android phones, some of which were 5G SA capable:

- Google Pixel 7a
- Google Pixel 6
- Samsung A22
- Samsung AS21 (5G SA capable)
- Samsung S23 (5G SA capable)

- Oppo A77 5G
- Xiaomi Redmi Note 11 Pro 5G
- Honor X8 5G
- Motorola G62 5G

Three and iD were tested on unlimited data contracts as were Giffgaff, O2, Vodafone and Lebara. EE offers a range of sim plans with their contracts being divided between those speeds capped at 25 Mbps or that speed capped at 100 Mbps. For a fair comparison with EE, we went for a pay month “essentials” plan sim card with access to 5G and a 100 Mbps data cap. Lycamobile does not have any data caps on their plans. Our unlimited plan for Lycamobile cost £25 and the EE equivalent cost £35.

Sim cards were routinely swapped between phones to eliminate any impact from a device’s technical capabilities. However, a separate series of tests was performed with our 5G SA capable devices to assess the benefits of using the faster 5G SA plans that parent networks now have available. To date, no UK MVNO offers 5G.

Multiple test fails in the same location were removed from our results, allowing us to do a fair like-for-like comparison of these eight operators.