connect

The 2025 Mobile Network Test in the United Kingdom

umlaut
Part of **Accenture**

For the tenth time, we – umlaut and connect – have conducted our comprehensive benchmark of the UK's mobile networks. As in the previous year, the results show a very good winner, two contenders ranking in the good mid-field, and one runner-up with the grade satisfactory.
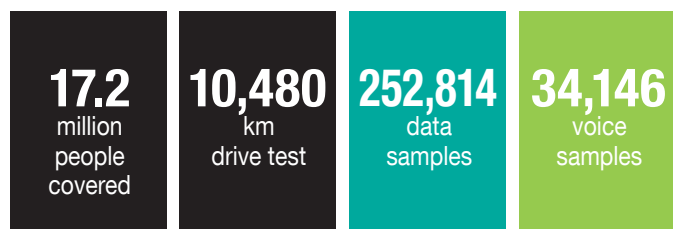
The carefully designed methodology of our 2025 benchmark in the United Kingdom represents a holistic approach to network benchmarking. It combines drive tests and walk tests for executing detailed voice and data measurements under controlled circumstances combined with a sophisticated crowdsourcing methodology. The drive tests and walk tests allow for the maximum capabilities of the networks to be evaluated. Crowdsourcing provides profound insights into the overall coverage of voice, data and 5G services as well as realworld User Download Speeds and Latencies. We have thoroughly weighed these components in order to give a realistic and conclusive assessment of the rated networks' true potential and performance.

● Drivetest
○ Walktest
— Roads
⋯ Train

Glasgow
Edinburgh
Newcastle upon Tyne
Belfast
Leeds
Bradford
Manchester
Liverpool
Sheffield
Stoke on Trent
Nottingham
Stafford
Norwich
Birmingham
Coventry
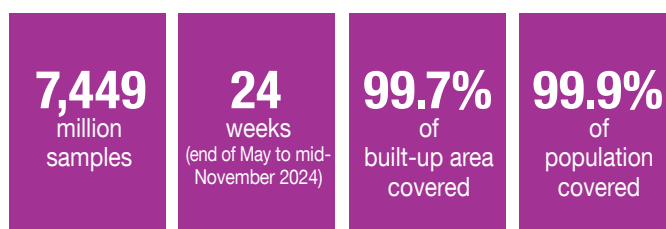Merthyr Tydfil
Cardiff
Bristol
London
Portsmouth

Scope

The 2025 umlaut connect Mobile Network Test in the UK consists of drive tests and walk tests conducted from October 28th to November 13th, 2024. Four drive test cars together covered approx. 10,480 kilometres, visiting 19 cities and 27 towns. Additionally, two walk test teams visited ten cities and travelled on trains between them as well as to more remote destinations. The test areas account for 17.2 million people, or approx. 25.7 percent of the total population of the UK. In addition, the results of extensive crowdsourcing analyses, considering 24 weeks from end of May (calendar week 22) to mid-November 2024 (CW 45) are included in the score. Our detailed methodology is described on pages 14/15.
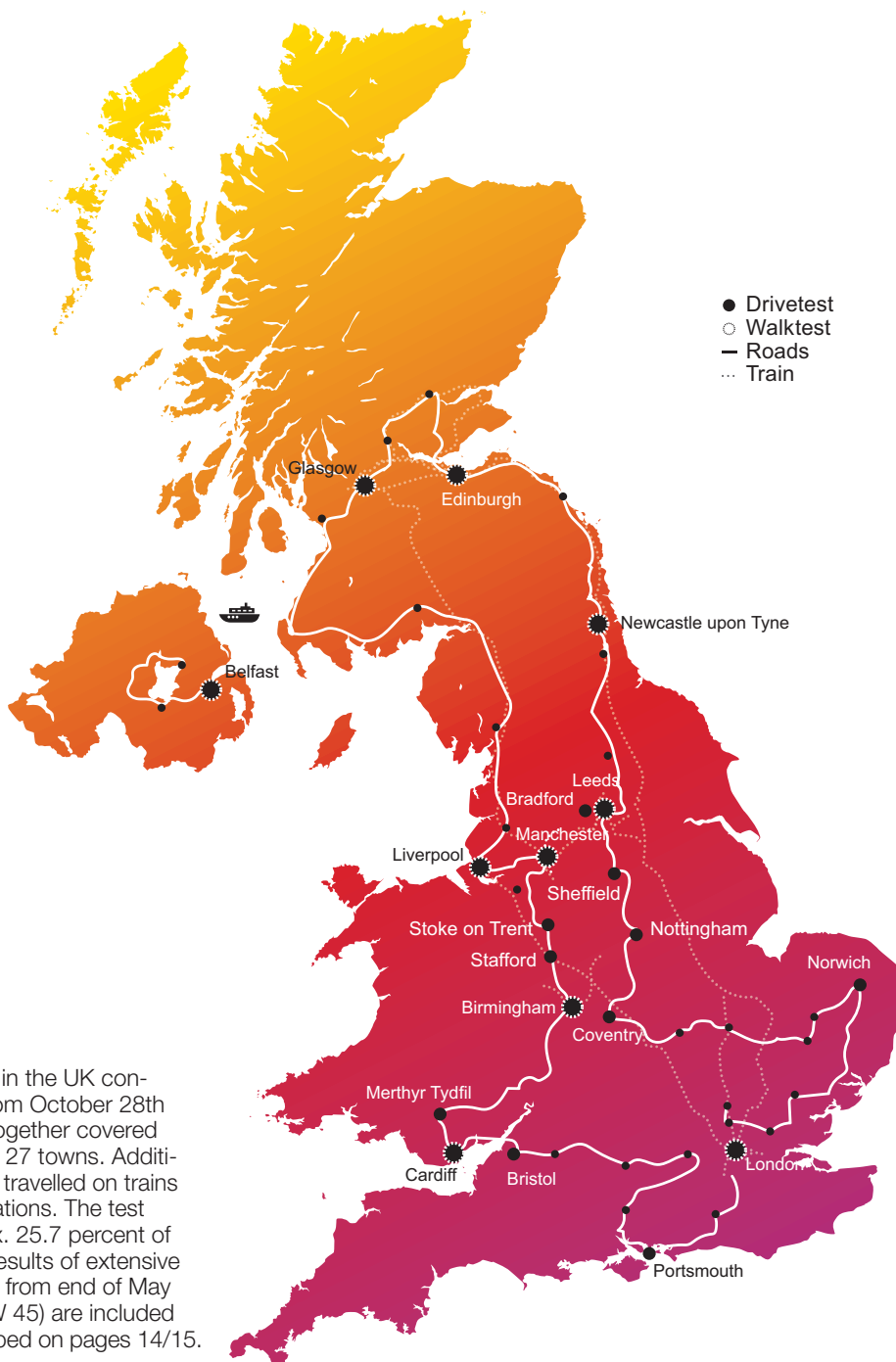
DRIVE TEST AND WALK TEST FACTS

17.2 million people covered	**10,480** km drive test	**252,814** data samples	**34,146** voice samples

CROWDSOURCING FACTS

7,449 million samples	**24** weeks (end of May to mid-November 2024)	**99.7%** of built-up area covered	**99.9%** of population covered

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The UK Mobile Operators

Following the merger of Virgin Media and O2 in June 2021, the joint operator started moving all former Virgin Media mobile customers to O2 in early 2023. Currently counting 45.4 million mobile connections (including MVNOs etc.), VMO2 is the largest mobile network operator in the UK.
Formerly a subsidiary of British Telecom, O2 plc was purchased by the Spanish telecommunications company Telefónica in 2006. In 2021, O2 entered a 50:50 joint venture with Liberty Global, combining Liberty's brand Virgin Media and O2. The joint company also owns half of the mobile virtual network operator Tesco Mobile which operates on the VMO2 network in the UK.
The operator claims to cover approx. 99 percent of the UK population with 4G and states a 5G outdoor coverage of 68 percent of the population. The company plans to cover all populated areas of the UK with 5G by the end of 2030. At the end of 2024, Virgin Media O2's 5G Stand-alone network is available in over 300 towns and cities across the UK.

With approximately 26 million customers, EE (formerly Everything Everywhere) is the second largest mobile network operator in the UK. 11 million of its mobile-only customers are 5G-ready. Since 2016, EE has been part of the British Telecom Group.
EE started offering its 4G service in 2012. Today, the operator reports 4G coverage of more than 99% of the UK population and of 89% of its geography. EE operates a growing number of "4G+" cells that support up to 5CA (five carrier frequencies) with up to 1 Gbps under the name "4GEE". According to the company, EE's 5G network has 80% population coverage and is available in every major town and city. Recently, EE launched its 5G standalone network in 15 major UK cities. It has since announced plans to roll out the technology to a further 16 locations before the end of December 2024 – meaning EE's 5G standalone network will by then cover almost a third of the UK population (approx. 21 million people).

Vodafone UK is part of the international Vodafone Group which is also headquartered in the UK. The Vodafone Group owns and operates networks in 15 countries, and is partnering with mobile networks in 46 further countries.
Vodafone UK launched 4G/LTE in 2013. Reporting 18.5 million mobile subscribers in autumn 2024, Vodafone is the third largest mobile network in the UK. In June 2012, Vodafone and O2 signed a deal to "pool" their network technologies, creating a single national grid of 18,500 transmitter sites. Both operators however announced they would continue to use their own independent spectrum. Vodafone claims to cover more than 99 percent of the UK population with 4G/LTE offering up to 1 Gbps and approx. 60 percent of the population with 5G. In 2023, Vodafone UK started to offer "5G Ultra" – 5G with over 1 Gbps – in a growing number of locations, including but not limited to London, Manchester, Glasgow, and Cardiff. As it is based on the aggregation of specific 5G carrier frequencies, 5G Ultra can only be used with selected smartphones, mainly newer Samsung, Apple and Google models.
In 2023, the company announced its ambition to combine Vodafone UK and Three UK into a joint venture. Negotiations between the companies and the supervisory authority are ongoing.

Three UK is a subsidiary of CK Hutchison and launched its mobile service in the UK in 2003. As a relatively young operator Three started as a 3G-only network supplemented by 2G via national roaming. In December 2013, Three began to roll out its 4G/LTE service and expanded it rapidly all over the UK. With currently 10.9 million customers, Three is the smallest mobile network operator in the UK. The company reports a 4G coverage of 99 percent and a 5G coverage of 64 percent of the UK population. The operator also claims to offer more spectrum for its 5G service than any other UK network operator. Three UK reports that all of its 5G services are provided on the so-called C-band (i.e. around 3.6 GHz).
In June 2023, Three and Vodafone announced a merger in order "to create one of Europe's leading 5G networks". As this merger was neither economically nor technically realized at the time of testing, we still treat them as two independent providers.

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Results at a Glance

For the tenth time in a row, the BT brand is the winner (in 2016 together with Vodafone). EE achieves the grade "very good" and scores clearly ahead of the second-ranking operator. EE's lead is manifested in all three test categories, Voice, Data and Crowdsourcing. Compared to the previous year, EE managed to improve its score by an impressive 31 points. The operator is also making good progress in its 5G roll-out.

Vodafone achieves a good second place and receives the overall grade "good". The operator manages to improve over last year's score by 6 points. The operator scores on a par with EE in the voice evaluation determined in the walk tests in cities and achieves also convincing results in the overall voice and data disciplines tested in the larger cities. In its 5G roll-out, Vodafone also shows good progress.

Three achieves a good third rank, also reaching the grade "good". The operator manages to basically maintain its previous year's performance. Three follows EE on second place in the voice results observed on roads and on railways as well as in the data results in towns. Locally, Three has strongholds in Cardiff, Birmingham and Liverpool. The operator shows relatively high 5G shares in cities and also on railways.

The combined brands rank fourth with the overall grade "satisfactory". In comparison to its score from our previous year's test, VMO2 improves by an impressive 29 points. This rank is confirmed in the test categories Data and Crowdsourcing, in the Voice category VMO2 scores on a par with Three. The operator has local strongholds particularly in Glasgow and Leeds and reaches high 5G shares in cities and on railways.

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BEST IN TEST

EE
12/2024

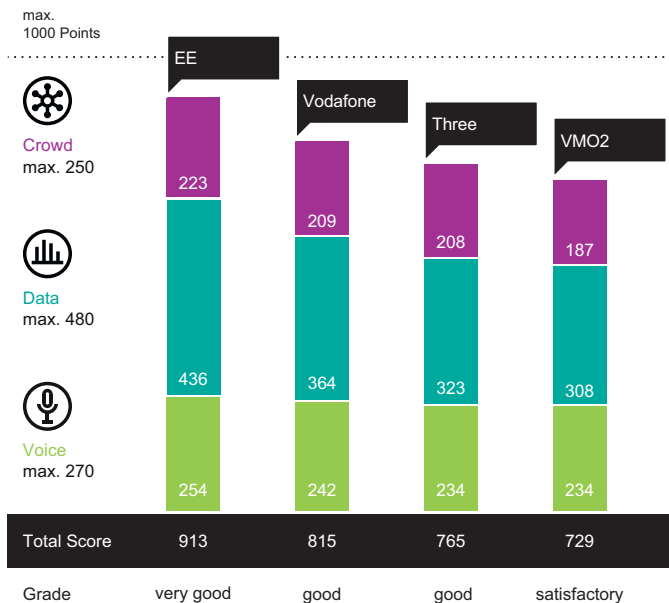**MOBILE NETWORK TEST UNITED KINGDOM**
www.connect-testlab.com

"Congratulations to British Telecom for its brand EE winning our Mobile Network Test in the UK for the tenth time in a row, achieving the highest scores in all test disciplines and also an impressive score improvement compared to the previous year. Vodafone also improved its score and managed to increase its 5G performance. Three achieves a good grade with punctual strengths such as high 5G shares in cities and on railways. VMO2 also managed to improve its score considerably."
Hakan Ekmen, Global Networks Lead, Comms Industry and simultaneously CEO umlaut

Overall Results		EE	Vodafone	Three	VMO2
Voice	max. 270.00 P.	254	242	234	234
Cities (Drivetest)	121.50	94%	90%	86%	89%
Cities (Walktest)	40.50	98%	98%	90%	94%
Towns (Drivetest)	54.00	99%	94%	92%	89%
Roads (Drivetest)	33.75	92%	88%	89%	81%
Railways (Walktest)	20.25	75%	65%	67%	62%
Data	max. 480.00 P.	436	364	323	308
Cities (Drivetest)	216.00	92%	82%	73%	71%
Cities (Walktest)	72.00	95%	81%	55%	65%
Towns (Drivetest)	96.00	90%	67%	69%	55%
Roads (Drivetest)	60.00	90%	72%	68%	64%
Railways (Walktest)	36.00	80%	54%	52%	43%
Crowd	max. 250.00 P.	223	209	208	187
Crowd	250.00	89%	84%	83%	75%
Connect Rating	max. 1000 P.	913	815	765	729

Percentages and points rounded to integer numbers.
For the calculation of points and totals, the accurate, unrounded values were used.

max. 1000 Points

Crowd max. 250

Data max. 480

Voice max. 270

	EE	Vodafone	Three	VMO2
Crowd	223	209	208	187
Data	436	364	323	308
Voice	254	242	234	234
Total Score	913	815	765	729
Grade	very good	good	good	satisfactory

Shown voice, data, crowd and total scores are rounded.

The 2025 Mobile Network Test in the United Kingdom

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Voice

Voice 🎙
270 of 1000 Points

Legend:
- 🟦 EE
- 🟥 Vodafone
- ⬛ Three
- 🟪 VMO2

Cities Drivetest (of 122 P.)
- 94%
- 90%
- 86%
- 89%

Cities Walktest (of 41 P.)
- 98%
- 98%
- 90%
- 94%

Towns Drivetest (of 54 P.)
- 99%
- 94%
- 92%
- 89%

Roads Drivetest (of 34 P.)
- 92%
- 88%
- 89%
- 81%

Railways Walktest (of 20 P.)
- 75%
- 65%
- 67%
- 62%

EE LEADS IN BIG CITIES VOICE DRIVE TESTS, VODAFONE AND VMO2 FOLLOW AT SOME DISTANCE
In the voice tests, conducted by umlaut's test cars while driving in the UK's big cities, EE takes the overall lead. Vodafone and VMO2 follow at some distance, but close to each other. Three falls a little further behind. As in the other scenarios, EE maintains its lead with particularly short call times and slightly better success ratios, followed by Three.

CITIES DRIVE TEST
EE

EE AND VODAFONE TOGETHER AHEAD IN BIG CITIES VOICE WALK TESTS, VMO2 FOLLOWS CLOSE BEHIND
In the walk tests, conducted in Belfast, Birmingham, Cardiff, Edinburgh, Glasgow, Leeds, Liverpool, London, Manchester and Newcastle upon Tyne, EE and Vodafone share the top position, with VMO2 following at a narrow gap. Three also achieves a very good score. In terms of success ratios, Vodafone is slightly ahead of overall winner EE, call setup times are on the same high level as in the drive test or even better.

CITIES WALK TEST
EE AND VODAFONE

EE AHEAD IN SMALLER TOWN VOICE DRIVE TESTS
In the voice tests conducted by umlaut's test cars while visiting 27 smaller towns of the UK (see route map on page 1), EE takes the lead. Vodafone, Three and VMO2 follow, each at small gaps. In this scenario, EE even achieves a success ratio of 100 percent, with Vodafone and the other contenders only narrowly behind. The call setup times are almost on the same level in towns as in the larger cities.

TOWNS DRIVE TEST
EE

EE AHEAD IN VOICE TESTS ON ROADS, THREE AND VODAFONE FOLLOWING CLOSELY.
When it comes to the results of the voice tests performed while driving on British roads, EE again takes the lead with the highest success ratios, the shortest call setup times and the best speech quality MOS. Three takes second place in this scenario due to the second best success ratios and call setup times. Vodafone follows at close distance, VMO2 at a little more distinct gap.

ROADS DRIVE TEST
EE

EE AHEAD OF THREE IN VOICE TESTS ON RAILWAYS
In the voice tests performed by the test teams while travelling in trains through the UK, all operators fall clearly behind their scores in the other scenarios. The good news, however, is that all of them improved their scores noticeably compared to the previous year. EE takes the lead again. The other contenders follow at some distance, with Three scoring slightly ahead of Vodafone, and VMO2 showing the biggest improvement.

RAILWAYS WALK TEST
EE

Operator	EE	Vodafone	Three	VMO2
Cities (Drivetest)				
Success Ratio (%)	99.3	98.7	98.2	98.7
Call Setup Time P90 (s)	1.4	1.8	1.7	2.2
Speech Quality P10 (MOS-LQO)	4.4	4.4	4.4	4.3
Cities (Walktest)				
Sucess Ratio (%)	99.7	99.8	98.7	99.3
Call Setup Time P90 (s)	1.4	1.5	1.4	1.9
Speech Quality P10 (MOS-LQO)	4.6	4.6	4.6	4.5
Towns (Drivetest)				
Sucess Ratio (%)	100.0	99.4	99.1	98.9
Call Setup Time P90 (s)	1.4	1.9	1.7	2.4
Speech Quality P10 (MOS-LQO)	4.5	4.4	4.4	4.3
Roads (Drivetest)				
Sucess Ratio (%)	98.5	97.8	98.0	96.6
Call Setup Time P90 (s)	1.5	2.1	1.9	2.7
Speech Quality P10 (MOS-LQO)	4.3	4.2	4.1	4.1
Railways (Walktest)				
Sucess Ratio (%)	92.4	89.2	89.9	89.3
Call Setup Time P90 (s)	1.5	1.8	1.6	2.8
Speech Quality P10 (MOS-LQO)	4.2	4.1	4.1	3.8

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Data

Data
480 of 1000 Points

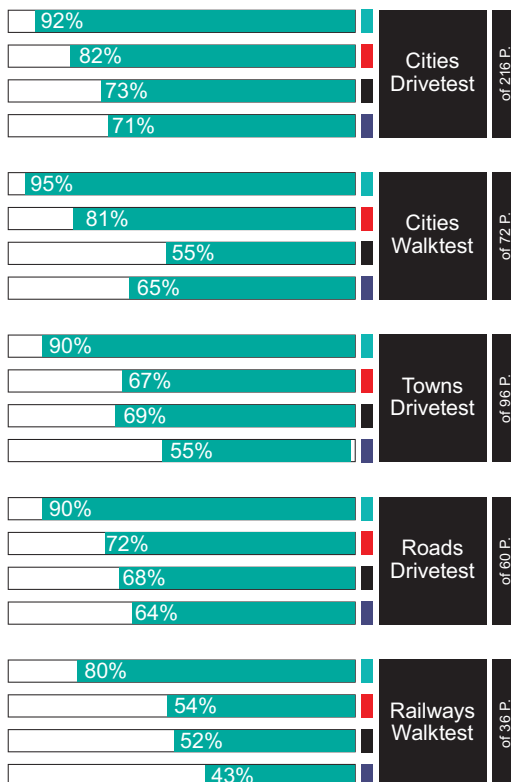Legend: ■ EE ■ Vodafone ■ Three ■ VMO2

EE AHEAD IN BIG CITIES DATA DRIVETESTS

In the data drivetests conducted in big UK cities, EE clearly takes the lead. Vodafone follows at some distance on second rank, and Three follows at third place. VMO2 ranks fourth, but is not too far behind the third-ranking Three in the drivetests. In a more detailed analysis, EE benefits from using LTE-5CA (aggregation of five carrier frequencies), which this operator utilizes above 50 percent in the cities together with 5GNR-2CA. The latter (5GNR on two aggregated frequencies), however, is used by all four UK operators in all tested scenarios.

CITIES DRIVETEST
EE

EE ALSO LEADS IN BIG CITIES DATA WALKTESTS, VODAFONE COMES IN SECOND AND VMO2 THIRD

In the data walktests conducted in the UK's bigger cities, EE also leads the field, Vodafone ranks second. VMO2 ranks third in this scenario, scoring considerably higher than fourth-ranking Three. This ranking order is clearly recognisable in KPIs such as the sucess ratios of 7 second file downloads, of Youtube and Youtube Live playbacks or of the test cases Conversational App, Interactivity E-Gaming or Interactivity Videochat. More than 55 percent of the downlink samples in the networks of EE and Vodafone show a data rate above 100 Mbps in this scenario.

CITIES WALKTEST
EE

Cities Drivetest (of 216 P.): 92%, 82%, 73%, 71%

Cities Walktest (of 72 P.): 95%, 81%, 55%, 65%

Towns Drivetest (of 96 P.): 90%, 67%, 69%, 55%

Roads Drivetest (of 60 P.): 90%, 72%, 68%, 64%

Railways Walktest (of 36 P.): 80%, 54%, 52%, 43%

Data Cities (Drivetest)	EE	Vodafone	Three	VMO2
Web-Page Download				
Success Ratio/Avg. Session Time (%/s)	99.8/1.2	99.2/1.6	97.7/1.4	97.9/1.6
File Download (10 MB)				
Success Ratio/Avg. Session Time (%/s)	100.0/1.3	99.6/2.9	99.5/4.3	99.7/4.9
90%/10% faster than (Mbps)	37.5/256.4	14.9/177.0	7.2/299.2	6.7/162.6
File Upload (5 MB)				
Success Ratio/Avg. Session Time (%/s)	99.6/3.2	99.4/4.6	99.5/5.0	99.4/6.8
90%/10% faster than (Mbps)	6.0/52.8	3.9/52.5	3.3/76.7	2.7/31.9
File Download (7 Seconds)				
Sucess Ratio (%)	99.9	99.5	98.1	98.9
10% faster than (Mbps)	619.4	414.4	637.9	246.4
Speed > 20Mbps / 100Mbps (%)	97.6/77.0	90.8/64.5	80.9/54.6	82.3/44.9
File Upload (7 Seconds)				
Sucess Ratio (%)	99.7	99.5	99.3	98.6
10% faster than (Mbps)	67.3	70.9	106.5	48.3
Speed > 2Mbps / 5Mbps (%)	98.2/93.5	96.1/89.5	96.4/86.8	95.2/84.5
Youtube				
Success Ratio/Start Time (%/s)	99.5/1.8	97.9/2.2	95.4/2.1	95.4/2.3
Average Video Resolution (p)	1080	1079	1078	1078
Youtube live				
Success Ratio/Start Time (%/s)	99.1/2.4	96.8/2.9	93.8/2.7	94.4/3.1
Average Video Resolution (p)	1078	1071	1067	1066
Conversational-App				
Sucess Ratio (%)	99.7	99.0	99.3	98.3
Speech Quality P10 (MOS-LQO)	3.8	3.5	3.5	3.4
Interactivity e-Gaming				
Success Ratio/Interactivity e-Gaming (%)	95.7/74.8	91.3/63.7	88.0/69.4	89.1/67.1
Interactivity Videochat				
Success Ratio/Interactivity Videochat (%)	90.9/86.1	90.1/82.8	82.8/82.4	87.7/82.8

Data Cities (Walktest)	EE	Vodafone	Three	VMO2
Web-Page Download				
Success Ratio/Avg. Session Time (%/s)	99.9/1.2	99.2/1.7	94.8/1.5	97.6/1.6
File Download (10 MB)				
Success Ratio/Avg. Session Time (%/s)	100.0/1.3	100.0/3.0	98.3/5.5	99.1/4.6
90%/10% faster than (Mbps)	52.7/246.6	15.9/149.3	4.9/259.7	8.1/151.8
File Upload (5 MB)				
Success Ratio/Avg. Session Time (%/s)	99.8/2.3	99.8/3.5	96.8/5.8	97.0/6.3
90%/10% faster than (Mbps)	10.1/53.2	5.6/50.5	3.2/69.4	3.2/28.0
File Download (7 Seconds)				
Sucess Ratio (%)	99.8	99.8	94.9	98.5
10% faster than (Mbps)	564.9	334.5	545.2	217.3
Speed > 20Mbps / 100Mbps (%)	97.7/85.6	90.3/55.7	73.6/40.2	82.7/40.4
File Upload (7 Seconds)				
Sucess Ratio (%)	99.8	100.0	97.7	97.4
10% faster than (Mbps)	65.3	72.3	97.4	46.9
Speed > 2Mbps / 5Mbps (%)	99.6/97.2	99.1/94.7	93.8/83.3	95.6/83.2
Youtube				
Success Ratio/Start Time (%/s)	99.5/1.7	96.2/2.3	90.1/2.2	91.6/2.3
Average Video Resolution (p)	1079	1076	1073	1078
Youtube live				
Success Ratio/Start Time (%/s)	99.8/2.4	94.5/3.1	88.2/2.9	93.3/2.9
Average Video Resolution (p)	1078	1071	1062	1068
Conversational-App				
Sucess Ratio (%)	100.0	99.7	99.3	99.5
Speech Quality P10 (MOS-LQO)	3.9	3.8	3.7	4.0
Interactivity e-Gaming				
Success Ratio/Interactivity e-Gaming (%)	97.0/76.6	86.7/64.2	78.6/64.7	88.4/66.7
Interactivity Videochat				
Success Ratio/Interactivity Videochat (%)	95.0/88.1	89.3/82.3	75.0/82.6	86.3/82.8

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Data

EE LEADS IN DATA DRIVE TESTS IN TOWNS. THREE COMES IN SECOND, ALMOST ON A PAR WITH VODAFONE
As in the big cities, EE also leads in the data drive tests performed in 27 smaller towns of the UK. Three comes in second, at a narrow gap of two percentage points ahead of Vodafone. VMO2 falls behind at a pronounced gap, but manages to somewhat improve over its result in this category from the previous year. This ranking can be observed in a number of KPIs, but particularly clear in the Youtube tests.

EE AHEAD IN DATA DRIVETESTS ON THE UK'S ROADS
The data measurements performed by umlaut's test cars on the UK's roads are of particular interest for motorists. In this category, we see the same ranking order as in the overall result: EE once again leads the field. Vodafone follows on a clear second rank, with Three coming in third and VMO2 fourth. Most of the KPIs follow this order, but some of the operators have some isolated strongpoints such as for example VMO2 in the success rates of the 5 MB file uploads.

TOWNS DRIVETEST

EE

ROADS DRIVETEST

EE

Photo: rawpixel.com via shutterstock

Data Towns (Drivetest)	EE	Vodafone	Three	VMO2
Web-Page Download				
Success Ratio/Avg. Session Time (%/s)	99.8/1.3	97.9/1.7	98.5/1.5	95.9/1.9
File Download (10 MB)				
Success Ratio/Avg. Session Time (%/s)	99.9/2.0	99.6/6.0	100.0/5.1	98.2/8.7
90%/10% faster than (Mbps)	24.4/201.1	5.6/131.1	6.5/261.8	3.4/112.2
File Upload (5 MB)				
Success Ratio/Avg. Session Time (%/s)	99.9/4.1	99.4/6.5	98.3/8.2	97.6/8.2
90%/10% faster than (Mbps)	4.7/46.8	2.8/39.1	2.0/50.9	2.1/28.7
File Download (7 Seconds)				
Sucess Ratio (%)	99.9	98.7	98.4	97.4
10% faster than (Mbps)	432.5	215.7	580.9	166.9
Speed > 20Mbps / 100Mbps (%)	93.4/52.6	68.6/21.9	73.1/40.5	60.6/21.6
File Upload (7 Seconds)				
Sucess Ratio (%)	99.9	98.6	97.1	98.3
10% faster than (Mbps)	60.9	49.1	52.3	36.2
Speed > 2Mbps / 5Mbps (%)	98.8/90.2	95.9/81.6	91.9/72.9	89.9/74.6
Youtube				
Success Ratio/Start Time (%/s)	99.7/1.9	94.7/2.4	94.7/2.2	92.2/2.6
Average Video Resolution (p)	1080	1075	1078	1077
Youtube live				
Success Ratio/Start Time (%/s)	99.1/2.6	92.4/3.1	96.5/2.9	90.0/3.4
Average Video Resolution (p)	1078	1063	1064	1046
Conversational-App				
Sucess Ratio (%)	99.9	97.7	99.2	98.1
Speech Quality P10 (MOS-LQO)	3.8	3.8	3.6	3.5
Interactivity e-Gaming				
Success Ratio/Interactivity e-Gaming (%)	94.6/71.6	91.4/58.9	88.0/61.5	87.7/63.8
Interactivity Videochat				
Success Ratio/Interactivity Videochat (%)	90.7/83.3	88.6/83.1	79.3/81.0	85.1/81.8

Data Roads (Drivetest)	EE	Vodafone	Three	VMO2
Web-Page Download				
Success Ratio/Avg. Session Time (%/s)	99.5/1.5	97.4/1.8	96.9/1.7	96.2/1.9
File Download (10 MB)				
Success Ratio/Avg. Session Time (%/s)	100.0/2.8	99.2/7.0	99.4/6.8	99.0/8.4
90%/10% faster than (Mbps)	17.5/141.3	4.9/111.9	5.4/123.3	3.9/72.9
File Upload (5 MB)				
Success Ratio/Avg. Session Time (%/s)	98.9/4.2	99.3/7.3	97.7/11.5	99.4/8.0
90%/10% faster than (Mbps)	4.2/50.3	2.4/34.5	1.3/33.4	2.2/28.2
File Download (7 Seconds)				
Sucess Ratio (%)	99.6	98.8	97.1	97.6
10% faster than (Mbps)	204.8	196.2	193.8	82.7
Speed > 20Mbps / 100Mbps (%)	90.0/34.4	61.9/19.7	69.7/20.8	51.5/8.2
File Upload (7 Seconds)				
Sucess Ratio (%)	99.6	97.7	95.9	97.9
10% faster than (Mbps)	71.9	49.4	42.4	29.0
Speed > 2Mbps / 5Mbps (%)	96.4/88.9	93.3/81.4	89.4/71.6	91.4/79.0
Youtube				
Success Ratio/Start Time (%/s)	98.1/2.1	93.6/2.6	93.3/2.4	89.4/2.6
Average Video Resolution (p)	1079	1075	1075	1074
Youtube live				
Success Ratio/Start Time (%/s)	98.9/2.8	91.0/3.3	93.5/3.3	88.6/3.5
Average Video Resolution (p)	1074	1051	1052	1046
Conversational-App				
Sucess Ratio (%)	99.3	97.6	98.6	98.0
Speech Quality P10 (MOS-LQO)	3.5	3.5	3.2	3.2
Interactivity e-Gaming				
Success Ratio/Interactivity e-Gaming (%)	91.8/66.6	88.8/58.8	77.2/53.3	84.7/63.0
Interactivity Videochat				
Success Ratio/Interactivity Videochat (%)	90.7/82.0	84.4/85.1	73.2/81.1	80.2/83.6

The 2025 Mobile Network Test in the United Kingdom

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Data

EE AHEAD IN RAILWAYS DATA TESTS. SECOND-PLACED VODAFONE AND THIRD-RANKING THREE CLOSE TOGETHER
In the walktests that were specifically conducted on British trains, all operators show some room for improvements. But EE is still ahead in this assessment, and achieves the most distinct score improvement among all operators in this scenario. EE's score gap to second-ranking Vodafone and third-ranking Three is pronounced, but these two candidates score rather close together. VMO2 comes in fourth, scoring considerably weaker than a year ago and showing the largest opportunity for improvement in the demanding railway scenario.

RAILWAYS WALKTEST

EE

Data Railways (Walktest)	EE	Vodafone	Three	VMO2
Web-Page Download				
Success Ratio/Avg. Session Time (%/s)	98.2/1.6	91.0/2.3	91.5/2.0	86.0/2.3
File Download (10 MB)				
Success Ratio/Avg. Session Time (%/s)	99.7/3.1	96.8/9.0	96.2/8.2	90.8/10.3
90%/10% faster than (Mbps)	15.1/219.1	3.1/143.3	3.6/221.5	3.0/115.6
File Upload (5 MB)				
Success Ratio/Avg. Session Time (%/s)	98.5/7.4	94.2/10.6	93.9/12.4	92.1/13.7
90%/10% faster than (Mbps)	2.0/37.7	1.6/32.1	1.2/43.3	1.2/20.0
File Download (7 Seconds)				
Sucess Ratio (%)	98.5	92.7	91.8	86.0
10% faster than (Mbps)	378.4	269.1	439.2	154.5
Speed > 20Mbps / 100Mbps (%)	86.3/41.2	58.0/29.0	63.4/32.8	57.4/21.7
File Upload (7 Seconds)				
Success Ratio (%)	95.7	95.1	88.7	91.5
10% faster than (Mbps)	45.9	38.3	53.5	25.8
Speed > 2Mbps / 5Mbps (%)	89.2/75.8	84.9/68.5	82.2/65.9	85.6/62.2
Youtube				
Success Ratio/Start Time (%/s)	95.2/2.3	83.7/2.9	83.3/2.6	72.7/2.8
Average Video Resolution (p)	1078	1071	1070	1076
Youtube live				
Success Ratio/Start Time (%/s)	94.5/2.9	78.3/3.6	79.4/3.3	69.6/3.8
Average Video Resolution (p)	1070	1036	1049	1024
Conversational-App				
Sucess Ratio (%)	97.2	95.0	97.0	95.9
Speech Quality P10 (MOS-LQO)	3.5	3.4	3.3	3.2
Interactivity e-Gaming				
Success Ratio/Interactivity e-Gaming (%)	79.3/64.7	76.6/57.1	69.5/57.1	67.0/56.7
Interactivity Videochat				
Success Ratio/Interactivity Videochat (%)	75.7/79.6	61.7/81.8	61.9/78.8	65.2/80.9

EE AND THREE COMPETE FOR HIGHEST 5G DATA RATES
5G is the standard setting in our measurements. But to shed light on the progress of the 5G roll-out, we look at the results of the KPI "Data rates of the 7 second Download tests". This gives a good indication of the data rates which are delivered by this technology. But as this assessment does not consider other aspects such as 5G coverage or the latencies of 5G-only connections, we do not identify a separate 5G winner.

That said, in this assessment, EE shows the highest average 5G data rates in the cities, while Three takes the lead in towns, on roads and trains. Also, Three shows the highest P90 values (10 percent faster than...) in all scenarios. Vodafone also delivers high average and P90 values, in terms of data speeds on the roads it even takes the lead. In a comparison to the values seen in the previous year, the data rates at EE, Vodafone and Three have risen significantly, while the values for VMO2 have stayed at the same level. In the cities, all operators show a strong 5G penetration, mostly with more than 75 percent of the tests carried out using 5G technology. EE, Vodafone and VMO2 to some extent use Dynamic Spectrum Sharing (DSS). For Three, the tests did not register this connection type.

5G

Photo: zigres, shutterstock

Data rates 7s Download	EE			Vodafone			Three			VMO2		
Samples with 5G	Share	Average (Mbps)	10% faster than (Mbps)	Share	Average (Mbps)	10% faster than (Mbps)	Share	Average (Mbps)	10% faster than (Mbps)	Share	Average (Mbps)	10% faster than (Mbps)
Cities – Drive test	77.9%	345.6	653.9	58.6%	249.4	466.3	77.4%	306.7	702.8	85.4%	124.4	257.6
Cities – Walk test	87.9%	329.3	578.6	58.1%	205.1	379.2	77.5%	221.7	602.7	80.5%	114.6	230.9
Towns – Drive test	54.3%	223.2	524.4	18.4%	250.0	520.5	56.1%	311.6	714.9	57.0%	89.6	205.2
Roads – Drive test	55.6%	121.4	230.7	13.4%	270.8	491.5	45.3%	143.4	334.9	40.5%	57.8	140.4
Trains – Walk test	54.0%	203.3	490.5	34.1%	185.4	417.5	63.1%	208.6	571.9	69.8%	76.7	184.2
Samples with 5G-DSS	Share	Average (Mbps)	10% faster than (Mbps)	Share	Average (Mbps)	10% faster than (Mbps)	Share	Average (Mbps)	10% faster than (Mbps)	Share	Average (Mbps)	10% faster than (Mbps)
Cities – Drive test	6.4%	135.4	267.7	18.7%	173.2	356.2	–	–	–	2.8%	48.7	119.3
Cities – Walk test	1.1%	151.5	242.6	23.0%	126.7	263.8	–	–	–	5.8%	93.7	193.4
Towns – Drive test	13.4%	110.1	240.4	3.1%	144.1	257.6	–	–	–	1.2%	36.7	71.3
Roads – Drive test	10.4%	95.6	204.1	4.7%	122.8	231.8	–	–	–	1.2%	41.6	97.1
Trains – Walk test	13.1%	88.6	180.6	10.9%	120.4	215.1	–	–	–	1.6%	37.0	70.1

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Case Study: Energy Effiency

The energy efficiency of mobile networks is becoming increasingly important. How can operator successes be measured?

Mobile network operators must reduce the operating costs of their networks and become climate-neutral in the long term. The Radio Access Network (RAN) is the most energy-hungry component of a mobile network. Saving just a few percent of its energy consumption can amount to millions of kilowatt hours and euros per year.

umlaut has analysed how the data collected in drive and walk tests can be used to determine how the networks use a not insignificant proportion of the energy consumed in the RAN: the energy used for active transmission to users. The results also allow conclusions to be drawn about the operator's overarching efficiency strategy. This case study is however not a part of our official assessment.

The approach presented here relates the speed at which the networks transmit data to the smartphone to the transmission power required for this. The result is a value with the unit Mbps per Watt. To test this, umlaut carried out this analysis for the 7-second file download – one of the test items that pushes the performance of a network to the limit.

The value determined in this way is influenced by a variety of factors – for example, the spatial arrangement of the base stations, the operator's network coverage strategy via macro, micro and pico cells as well as the number of frequency bands used and the mobile radio technologies deployed on them.

We have deliberately decided not to reveal the results by operator in order to not suggest any kind of evaluation. However, the ranges shown below illustrate that the presented approach can reveal significant differences between individual operators and considered scenarios.

Photo: steved_np3, shutterstock
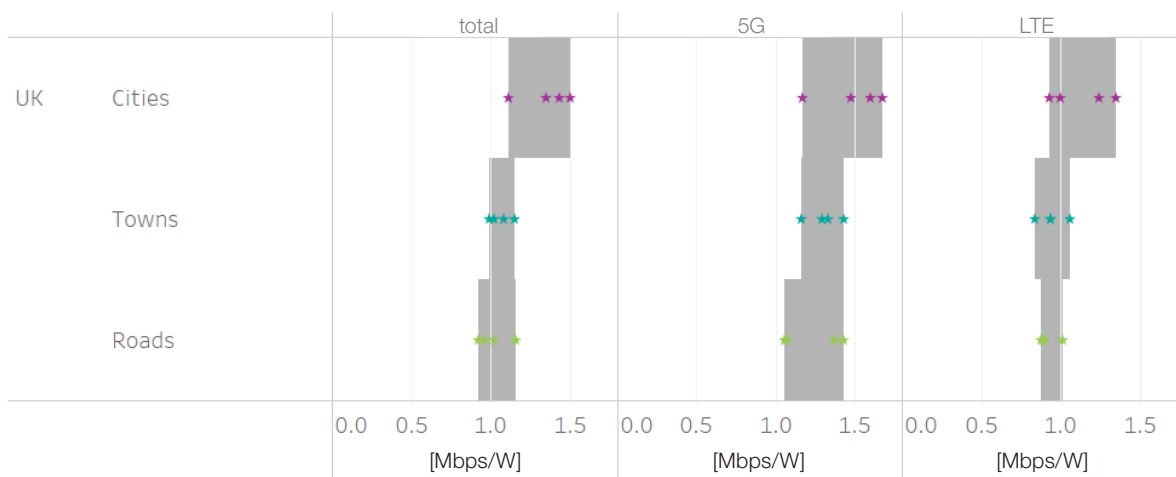
The chart shows the average efficiency of downlink transmission power in various scenarios (total = 5G and 4G/LTE combined). The range between the network operator with the lowest and the one with the highest is shown. (Higher values = higher efficiency.)

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Crowd

Operators	EE	Vodafone	Three	VMO2
Broadband Coverage				
Coverage Quality (%)	98.9	95.7	97.4	90.3
Coverage Reach (%)	96.4	95.2	93.7	96.4
Time on Broadband (%)	98.9	96.7	97.9	92.0
Download Speed (Passive)				
Basic Internet Class(%)	95.6	96.5	95.2	94.3
HD Video Class / UHD Video Class (%)	87.5/28.6	87.1/24.3	83.1/24.6	81.7/22.6
Download Speed (Active)				
Avg. Throughput (Mbit/s)	67.2	46.4	57.8	35.3
90% / 10% faster than (Mbit/s)	4.8/153.3	3.5/113.4	3.0/135.2	3.1/85.6
Upload Speed (Active)				
Avg. Throughput (Mbit/s)	17.5	13.9	12.4	10.1
90% / 10% faster than (Mbit/s)	1.9/40.6	2.0/31.5	1.8/29.0	1.6/23.0
Latency				
Gaming Class / OTT Voice Class (%)	81.4/94.6	68.3/95.0	65.5/93.6	58.1/92.9
High End Gaming (%)	5.5	0.4	5.5	0.6
Voice				
HD Voice (%)	98.6	93.1	96.9	87.9
Stability				
Transaction Success (%)	94.1	92.3	91.3	88.8

EE LEADS IN TERMS OF BROADBAND COVERAGE, FOLLOWED BY THREE AND THEN VODAFONE
In the Coverage Quality assessment (see KPI definitions on pages 14/15), EE is ahead, followed by Three and then Vodafone. In Coverage Reach, EE and VMO2 score on a par, followed by Vodafone. In the investigation of Time of Broadband, EE leads again, followed by Three and then Vodafone. In Coverage Quality and Time on Broadband, VMO2 shows some opportunity for improvement.

BROADBAND COVERAGE

EE

EE LEADS IN PASSIVE DOWNLOAD ANALYSIS
In the passively observed download data rates, EE is ahead again overall, although in the Basic Internet class (minimum of 2 Mbps) Vodafone reaches a slightly higher share. In the HD Video class (at least 5 Mbps), the ranking corresponds to the overall result. In the demanding UHD Video class (at least 20 Mbps), EE leads, but Three is ahead of Vodafone and then VMO2.

DOWNLOADS PASSIVE

EE

EE ALSO AHEAD IN ACTIVE DOWNLOAD ANALYSIS
The actively performed download tests are conducted to better approximate the maximum performance of an internet connection. In this metric, EE again takes the lead. Rank two is shared by Three and Vodafone: Three achieves a higher average throughput and a higher P90 value (10 percent faster than) than Vodafone, while Vodafone is ahead of VMO2 and then Three in the P10 (90 percent faster than). Overall, VMO2 ranks fourth here due to a significantly lower P90 value.

DOWNLOADS ACTIVE

EE

EE AHEAD IN ACTIVE UPLOAD TESTS
In the active Download category, EE again achieves the highest sub-score. The average and P90 values (10 percent faster than) for upload throughputs follow the overall ranking. In the P10 KPI (90 percent of the measured values faster than), Vodafone takes a narrow lead ahead of EE, followed by Three and then VMO2.

UPLOADS ACTIVE

EE

EE LEADS IN HD VOICE AVAILABILITY, THREE RANKS SECOND IN THIS CATEGORY, FOLLOWED BY VODAFONE
In the analysis of the availability of HD voice connections (i.e. Voice over LTE), EE takes the first place. In this assessment, Three ranks second best, ahead of Vodafone and then VMO2.

VOICE

EE

EE PROVIDES SHORTEST LATENCIES, FOLLOWED BY VODAFONE AND THEN RELATIVELY CLOSELY BY THREE
EE also shows the best results in the latency category. In the OTT Voice class (roundtrip times up to 100 ms), Vodafone takes a narrow lead over EE. In the Gaming class (up to 50 ms), the ranking is identical to the overall result. In the most demanding class, High End Gaming (up to 20 ms), EE and Three are on a par, with VMO2 and Vodafone following in this order and very low shares.

LATENCY

EE

EE AHEAD IN CROWDSOURCED ASSESSMENT OF TRANSACTION STABILITY
In the Stability category, which looks at the success rates of regular transaction tests, the overall ranking is once more confirmed: EE takes the lead, while Vodafone, Three and VMO2 follow in this order, with distinct, but still relatively small gaps between their results.

STABILITY

EE

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A Closer Look at Radio Standards

What developments can be seen in the networks in the expansion from 5G NSA to 5G SA? This question can best be answered by a crowdsourcing analysis.

How the expansion of mobile networks is progressing is no longer only reflected in the answer to the question 'Is 5G available?'. The next step in 5G roll-outs is the development from 5G non-standalone (NSA, shared core network with 4G) to 5G standalone (SA, own 5G core network).

As we have deliberately not yet included 5G SA in our drive tests and walk tests for compatibility and performance reasons, the development can best be read from the crowdsourcing data collected by umlaut. The table below shows what proportion of the samples were received via which radio standard. We show the percentage values at the beginning and the end of this year's observation period – but for the entire data pool, without the filtering carried out in the crowd discipline.

The fact that the 5G shares in this analysis are considerably lower than the numbers observed in our drive tests and walk tests can be easily explained: The "take rates" of 5G (i.e. the number customers who both have a suitable smartphone and tariff) are much smaller than the actual coverage or presence of respective 5G cells in the mobile networks.

A small share of 5G NSA samples can already be observed in the networks of Vodafone and VMO2 – in both cases, the numbers have risen between May and November. In the networks of EE, Three and VMO2, also the take rates of 5G (NSA) have grown in this period. The sinking share of 5G NSA at Vodafone might partially be explained by a shift of early-adopter customers to 5G SA.

Relevant numbers of 2G and 3G users can mainly be seen at VMO2. At Three, this number has dropped sharply, at Vodafone and EE it has grown minimally in the observation period.

Photo: Robyn McNeill, shutterstock

Crowdsourcing samples	EE		Vodafone		Three		VMO2	
Month	May 24	November 24	May 24	November 24	May 24	November 24	May 24	November 24
2G/3G	1.9%	2.2%	4.1%	4.4%	5.5%	1.5%	11.4%	11.0%
4G	77.3%	70.1%	84.5%	84.4%	78.4%	78.5%	75.2%	72.2%
5G Non-Standalone	20.8%	27.7%	10.6%	10.1%	16.1%	19.9%	13.4%	16.6%
5G Standalone	0.0%	0.0%	0.8%	1.0%	0,0%	0,0%	0.0%	0.1%

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Reliability

Reliability is not an additional category of our tests, but rather a diffent angle of looking at the results: For each KPI, our scoring distinguishes between "Qualifiers" (the expected basic performance) and "Differentiators" (the additional performance that exceeds the expected basics). The view at Reliability limits itself to most of the Qualifiers and to the basic KPIs of the crowdsourcing – thus conveying an impression of the standard performance a user can reasonably expect from a mobile network. The reference values in this representation are therefore only the subset of score points which we assigned to the Qualifiers. The resulting scores state the reliabiltiy with which an operator offers its network services. This approach concentrates on the compulsory basics instead of the highest peaks of a network's performance.

Operator		EE	Vodafone	Three	VMO2
Voice	max. 162 points	149	139	132	135
Drivetest	126	94%	88%	84%	85%
Walktest	36	85%	80%	73%	77%
Data	max. 288 points	272	229	194	190
Drivetest	223	95%	81%	73%	69%
Walktest	65	93%	73%	48%	55%
Crowd	max. 150 points	131	127	124	115
Crowd	150	87%	85%	82%	76%
Total	max. 600 points	552	495	450	440

EE LEADS IN VOICE RELIABILITY, FOLLOWED BY VODAFONE AND THEN VMO2
In the overall assessment of the Reliability of voice connections, EE achieves the highest score, with Vodafone following ranking second and VMO2 on third place. In this view, Three comes in fourth. This overall ranking can also be seen in both the drive test results as well as the walk test results.
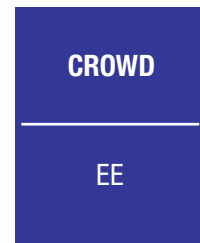
VOICE

EE
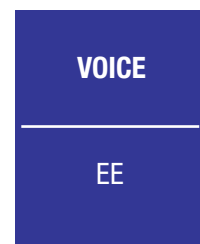
EE LEADS IN DATA RELIABILITY. FOLLOWED BY VODAFONE AND THEN THREE
Looking at Reliability in the Data tests, EE also leads – based both on the results of the drive tests as well as on the results of the walk tests. The gap to the runner-ups is distinct. The drivetest results show the overall ranking. In the walktests, EE also ranks first, and Vodafone second, but VMO2 scores slightly stronger than Three.

DATA

EE

EE ALSO AHEAD IN CROWDSOURCING, FOLLOWED BY VODAFONE, THEN THREE AND THEN VMO2
In the crowdsourced Reliability KPIs, EE once more takes the lead with a noticeable distance ahead of the other contenders. The rest of the field follows in the same order as in the overall Reliability ranking: Vodafone comes in second and Three third, VMO2 follows on fourth place – each at distinct gaps.
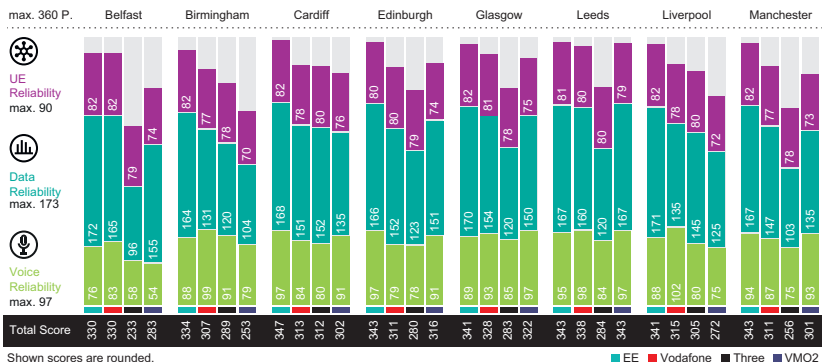
CROWD

EE

RELIABILITY IN CITY SCORES

EE ALSO AHEAD IN THE RELIABILITY CITY SCORES – IN BELFAST ON A PAR WITH VODAFONE AND IN LEEDS WITH VMO2. VODAFONE ALSO STRONG IN GLASGOW AND LEEDS.
In the the Reliability Assessment of the UK's largest cities (also see page 13), EE maintains its strong lead, but has to share the top positions in some cities with other contenders: In Belfast, Vodafone achieves the same Reliability score as EE, in Leeds VMO2 ranks on a par with the BT brand. In Glasgow and Leeds, Vodafone as a runner-up gets quite close to the winners' score. In Edinburgh, VMO2 takes the second rank behind EE, with Vodafone on a strong third position. In Cardiff, Vodafone and Three on second and third rank score just one percentage point apart. In Belfast and Manchester, VMO2 ranks third and clearly overtakes Three in these cities.

max. 360 P.

UE Reliability max. 90
Data Reliability max. 173
Voice Reliability max. 97

	Belfast	Birmingham	Cardiff	Edinburgh	Glasgow	Leeds	Liverpool	Manchester
UE Reliability (EE/Voda/Three/VMO2)	82 / 82 / – / 74	82 / 77 / 78 / 70	82 / 78 / 80 / 76	80 / 80 / 79 / 74	82 / 81 / 78 / 75	81 / 80 / – / 79	82 / 78 / 80 / 72	82 / 77 / 78 / 73
Data Reliability	172 / 165 / 96 / 155	164 / 131 / 120 / 104	168 / 151 / 152 / 135	166 / 152 / 123 / 151	170 / 154 / 120 / 150	167 / 160 / 120 / 167	171 / 135 / 145 / 125	167 / 147 / 103 / 135
Voice Reliability	76 / 83 / 58 / 54	88 / 99 / 91 / 79	97 / 84 / 80 / 91	97 / 79 / 78 / 91	89 / 93 / 85 / 97	95 / 98 / 84 / 97	88 / 102 / 80 / 75	94 / 87 / 75 / 93
Total Score	330 / 330 / 233 / 283	334 / 307 / 289 / 253	347 / 313 / 312 / 302	343 / 311 / 280 / 316	341 / 328 / 283 / 322	343 / 338 / 284 / 343	341 / 315 / 305 / 272	343 / 311 / 256 / 301

Shown scores are rounded.

■ EE ■ Vodafone ■ Three ■ VMO2

The 2025 Mobile Network Test in the United Kingdom

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City Score London

Traditionally, umlaut and connect take a closer look at London to see how the countries' mobile operators cover the UK's capital. This is not only of great interest for the approximately nine million inhabitants of this lively centre of business, politics and culture, but not least for the roughly 20 million visitors per year who frequent Londons' streets, squares and attractions. In this focused assessment, EE and Vodafone achieve the grade "very good", while Three and VMO2 achieve the grade "good".

Photo: Andriii, shutterstock

IN THE VOICE SCORE FOR LONDON, EE IS AHEAD, WITH VODAFONE AND VMO2 SHARING SECOND PLACE
EE achieves the highest score in the voice category in London, with equally strong scores in the drive tests and walk tests. Vodafone and VMO2 are on a par, taking second place in this discipline. In the drive tests they score almost equally strong, in the walk tests VMO2 is a small touch ahead of Vodafone. Three ranks fourth, but with overall good results.

VOICE

EE
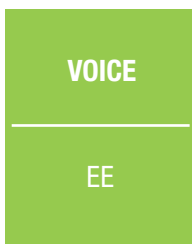
EE AHEAD IN DATA CATEGORY IN LONDON, VODAFONE COMES IN SECOND AND VMO2 THIRD AHEAD OF THREE
In the data category, the lead of EE is pronounced, and Vodafone follows on a strong second place. In the data walk tests, EE and Vodafone score quite close together, in the drive tests the gap become a little more pronounced. VMO2 manages to out-perform Three in this category, particularly due to stronger results in the data walk tests.
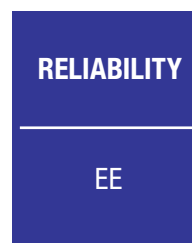
DATA

EE

EE LEADS IN CROWD ASSESSMENT IN LONDON, FOLLO-WED BY VODAFONE, THREE AND THEN VMO2
In the Crowdsourcing concentrated on the London city area, EE is also ahead. The analyses show the same order as in the nationwide ranking: Vodafone follows on second place, with Three closely behind at a gap of just one score point. VMO2 ranks fourth at a somewhat wider gap.

CROWD

EE

EE AHEAD IN RELIABILITY ASSESSMENT FOR LONDON, VMO2 AND VODAFONE STRONG IN VOICE HERE TOO
In the view at only basic requirements EE also leads the field. In the voice category, however, VMO2 outper-forms Vodafone by two score points. The gap becomes more pronounced in the data category. In Crowdsour-cing, EE leads, Vodafone ranks second with a one-point gap, and Three third, a further two points behind.

RELIABILITY

EE

City Score - London
max. 600 points

	EE	Vodafone	VMO2	Three
Crowd max. 150	137	132	123	131
Data max. 288	264	254	201	190
Voice max. 162	158	148	148	136
Total Score	559	534	472	457
Grade	very good	very good	good	good

Shown voice, data, crowd and total scores are rounded.

City Score Reliability - London
max. 360 points

	EE	Vodafone	VMO2	Three
UE Reliability max. 90	79	78	74	76
Data Reliability max. 173	163	160	125	109
Voice Reliability max. 97	95	85	87	73
Total Score	337	323	286	258

Shown voice, data, crowd and total scores are rounded.

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The UK's Largest Cities

In addition to London, umlaut and connect also analyse the local performance in the eight other largest cities of the UK. After all, for their inhabitants and visitors it is also interesting to see how the different operators perform in their areas. With a maximum score of 600 points in this assessment, the grade "very good" starts at 510 points (and "good" at 450 points; "outstanding" would start at 570). Very good results are thus achieved by EE in all eight considered cities, by Vodafone in Belfast, Edinburgh, Glasgow and Leeds, by Three in Cardiff and Liverpool as well as by VMO2 in Glasgow and Leeds.

max. 600 P.	Belfast	Birmingham	Cardiff	Edinburgh	Glasgow	Leeds	Liverpool	Manchester
Crowd max. 150	136 132 126 116	138 127 133 116	138 127 135 123	135 131 130 120	138 131 128 123	137 135 135 129	137 127 134 118	138 128 129 121
Data max. 288	273 261 173 239	268 211 204 180	274 235 248 209	264 242 196 229	273 249 207 238	269 252 209 262	274 213 241 204	271 234 177 221
Voice max. 162	139 145 119 114	151 157 154 140	161 146 142 152	160 141 139 152	152 155 147 158	158 159 146 158	151 160 142 136	157 145 138 153
Total Score	548 538 418 469	557 495 491 436	573 508 525 484	559 514 465 501	563 535 482 519	564 546 490 549	562 500 517 458	566 507 444 495

Shown scores are rounded.

■ EE ■ Vodafone ■ Three ■ VMO2

VODAFONE COMES CLOSE TO LEADING EE IN BELFAST, VMO2 ON THIRD RANK CLEARLY AHEAD OF THREE
In the capital of Northern Ireland, EE takes the lead due to strong data and crowdsourcing results. Vodafone comes quite close to EE, as this operator achieves the highest voice score here. VMO2 outranks Three due to a higher score in the data category. In the crowdsourcing discipline, the nationwide ranking applies.

BELFAST
___
EE

EE AHEAD IN BIRMINGHAM, FOLLOWED BY VODAFONE AND THREE WHO RANK CLOSE TOGETHER
In the West Midlands city, the lead of EE is undisputed – the BT brand achieves the highest scores in the data and crowdsourcing categories. However, Vodafone and also Three are stronger in the voice assessment and rank quite close together. VMO2 scores fourth in all categories in Birmingham.

BIRMINGHAM
___
EE

EE AHEAD IN CARDIFF, THREE TAKES SECOND PLACE, FOLLOWED BY VODAFONE AND VMO2
In the capital of Wales, EE takes the lead, but Three takes second place here, due to relatively high scores in the data and crowdsourcing disciplines. Vodafone comes in third with good results in all three test disciplines. In the voice category, VMO2 achieves the second-highest score behind EE, but loses valuable points in the data discipline.

CARDIFF
___
EE

EE LEADS IN EDINBURGH, FOLLOWED BY VODAFONE. VMO2 RANKS THIRD HERE, AHEAD OF THREE
In the capital of Scotland, EE is ahead overall with the highest scores in all test disciplines. Vodafone ranks second with good data and crowdsourcing scores. VMO2 achieves third place, with a distinct gap to fourth-ranking Three, due to stronger results both in the voice as well as in the data assessment.

EDINBURGH
___
EE

EE LEADING IN GLASGOW, FOLLOWED BY VODAFONE AND THEN VMO2. THREE RANKS FOURTH
In the scottish lowland harbour city, the ranking is the same as in the capital of Scotland: EE ist clearly ahead, Vodafone ranks second with a higher voice score than EE. VMO2 follows on third place, due to the best voice result in the city and good results in the other disciplines. Three ranks last with a particular opportunity for improvement in the data discipline.

GLASGOW
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EE

EE WINS IN LEEDS, HERE VMO2 OUTRANKS VODAFONE, BOTH CLEARLY AHEAD OF THREE
In the Yorkshire city, EE also leads the field, but VMO2 is nevertheless a kind of local champion here, achieving a very good second rank and scoring on a par with EE in the voice discipline. Still, the highest voice score in Leeds is achieved by Vodafone, that overall follows at a close gap behind VMO2. Three ranks last, but with overall good results.

LEEDS
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EE

EE AHEAD IN LIVERPOOL, AHEAD OF STRONG THREE. VODAFONE RANKS THIRD, AND VMO2 FOURTH
In the northwest English city, EE once more takes the overall lead. But here, the second rank is achieved by Three that shows the second best data and crowdsourcing scores in this city. Vodafone leads the field in the voice assessment. VMO2 ranks last here with opportunities for improvement in all categories.

LIVERPOOL
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EE

EE IS AHEAD IN MANCHESTER, VODAFONE TAKES SECOND PLACE AND VMO2 THIRD, AHEAD OF THREE
In northwest Englands industrial center, EE leads at a distinct gap ahead of second-placed Vodafone. EE achieves the highest scores in all categories, Vodafone the second highest data score. VMO2 comes in third with the second highest voice score, and Three fourth, with the second highest score in the crowdsourcing.

MANCHESTER
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EE

Methodology

The umlaut connect Mobile Network Test is the result of extensive drivetests and walktests, combined with a sophisticated crowdsourcing analysis.

Logistics

connect's network test partner umlaut sent four measurement vehicles through the country, each equipped with twelve smartphones. For each network operator, a Samsung Galaxy S23 took the voice measurements, and another S23 established the connections for the test case "conversational app" (see section "Data connections" below). For the actual data test, we used a third Samsung Galaxy S23 per operator. For all measurements, the smartphones were set to "5G preferred" – so wherever supported by the network, the data tests took place via 5G.

In addition to the drive tests, two walk test teams carried out measurements on foot in each country, in zones with heavy public traffic such as railway station concourses, airport terminals, cafés, public transport and museums. The walk test programme also included journeys on long-distance railway lines. For the walk tests, the same three smartphone types were used per network operator for the same measurements as in the drive tests. The walk test teams transport the smartphones in backpacks or trolleys equipped with powerful batteries. The firmware of the test smartphones corresponded to the original network operator version in each case.

The drive and walk tests took place between 8 am and 10 pm. For the drive tests, two vehicles were in the same city, but not in the same place, so that one car would not falsify the measurements of the other. On the connecting roads, two vehicles each drove the same routes, but one after the other with some time and distance between them. For the selection of the test routes, umlaut created four different suggestions for each country, from which connect blindly selected a route.
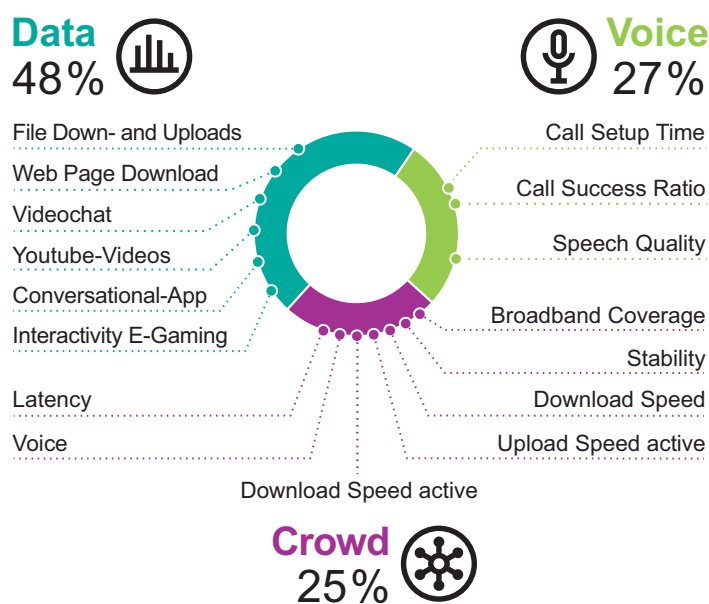
Voice connections

Voice connections account for 27 percent of the overall result. For this purpose, mobile telephone calls were established from vehicle to vehicle ("mobile-to-mobile") and their success rates, call set-up time and voice quality were measured. The smartphones of the walk test teams made calls to a stationary (smartphone) remote station for the voice tests.

To ensure realistic conditions, data traffic was handled simultaneously in the background. The transmission quality was evaluated with the POLQA wideband method suitable for HD voice. '5G non-standalone preferred' was configured on all phones, with voice telephony being handled via VoLTE.

Data connections

The data measurements account for 48 percent of the total result. Several popular live pages (dynamic) and the ETSI reference page

Data 48%
- File Down- and Uploads
- Web Page Download
- Videochat
- Youtube-Videos
- Conversational-App
- Interactivity E-Gaming
- Latency
- Voice
- Download Speed active

Voice 27%
- Call Setup Time
- Call Success Ratio
- Speech Quality
- Broadband Coverage
- Stability
- Download Speed
- Upload Speed active

Crowd 25%

known as the Kepler page (static) were retrieved to assess internet page calls. In addition, umlaut developed and used a preliminary stage of a designated successor to the Kepler page (working title: 'Newton'), which ETSI is currently considering.

Additionally, 10 MB and 5 MB files were downloaded and uploaded, respectively, in order to determine the performance for smaller data transfers. We also determined the data rate within a 7-second period when uploading and downloading large files.

As Youtube dynamically adapts the resolution to the available bandwidth, the evaluation takes into account the average image resolution or number of lines of the videos as well as the success rate and the time until playback starts.

A typical over-the-top voice connection (OTT) is represented by the "conversational app" test case. To do this, we set up a voice channel via the SIP and STUN protocols using the OPUS codec and determined the success rate and voice quality. In addition, for our test point "Interactivity of eGaming" our measurements simulated a highly interactive UDP multiplayer session to determine the latency times of the connection and any possible packet losses.

A video chat is also part of the test scope, which follows the ITU-T G.1051 recommendation. It measures latencies, packet delays and data rates in both directions. >>

connect

The 2025 Mobile Network Test in the United Kingdom

umlaut
Part of **Accenture**

Methodology

Crowdsourcing
Crowdsourcing results account for 25 percent of the overall rating. They show which network performance actually arrives at the user – however, the end devices and tariffs used also have an impact on these results.

To obtain the data basis for these analyses, a large number of popular apps record the parameters described below in the background – provided the user agreed to the completely anonymous data collection. In slightly simplified terms, measured values are recorded in 15-minute intervals and transmitted to the umlaut servers once a day. The reports contain only a few bytes, so they hardly burden the user's data volume.

Broadband Coverage
To determine the broadband *coverage reach*, umlaut lays a grid of 2 x 2 km tiles ("Evaluation Areas", in short EAs) over the test area. A minimum number of users and measured values had to be available for each EA. For the evaluation, umlaut awarded one point per EA if the network under consideration offered 3G coverage. Three points are awarded if 4G or 5G was available in the EA. The score achieved is divided by the achievable number of points (three points per EA in the "union footprint" – the area of the country measured by all testers with their smartphones).

We also look at the *coverage quality*. For each operator, it indicates the average percentage of 4G or 5G coverage on an EA, averaged over all EAs in the "common footprint", i.e. the area in which data is collected for all operators.

The *time on broadband* in turn tells us how often a user had 4G or 5G reception in the period under consideration – regardless of the EAs in which the samples were recorded. For this purpose, umlaut sets the samples that show 4G/5G coverage in relation to the total number of all samples. Important: The percentage values determined for all three parameters reflect the respective degree of fulfilment – and not a percentage of 4G/5G mobile coverage in relation to area or population.

Data rates and Latencies
The *passive* determination of *download data rates* and *latencies* is carried out independently of the EAs and focuses on the experience of each user. Samples that were captured via Wi-fi or when flight mode was activated, for example, are filtered out by umlaut before the analysis.

To take into account that many mobile phone tariffs throttle the data rate, umlaut defined three application-related speed classes: *Basic internet* requires a minimum of 2 Mbit/s, *HD video* requires 5 Mbit/s and *UHD video* requires 20 Mbit/s. For a sample to be valid, a minimum amount of data must have flowed in a 15-minute period.

Similarly, the latency of the data packets is assigned to an application-related class: Roundtrip times up to 100 ms are sufficient for

OTT voice services, less than 50 ms qualify a sample for *gaming* and less than 20 ms for *high-end gaming*. This way, the evaluation also does justice to the fact that the passively observed data rates depend on the applications used in each case.

In order to better assess the maximum possible throughput, umlaut also conducts *active* measurements of *upload* and *download* data rates once a month. They determine the amount of data transferred in 3.5 seconds. For the determined values, we consider the average data rate, the P10 value (90% of the values higher than the specified threshold, a good approximation of the typical minimum speed) and the P90 (10% above this threshold), a view at the peak values.

Stability
Based on the determined data rates and additional browsing and connection tests, umlaut also examines when a broadband connection could be used at all. The averaged and weighted results define the percentage of *transaction success*.

HD Voice
The parameter *HD voice* shows the proportion of the user's voice connections that were established in HD quality – and thus via VoLTE (Voice over LTE) or VoWiFi (Voice over WiFi). A prerequisite is that the used smartphone supports this standard.

Reliability
umlaut divides all measured values into basic requirements ("Qualifier KPIs") and values related to peak performance ("Differentiator KPIs"). The presentation of *reliability* takes into account only the "Qualifier KPIs" from the voice and data category as well as the basic KPIs from crowdsourcing.

Drive test	Score Breakdown	
	Cities — Drive test	**337.50**
	Cities — Walk test	**112.50**
Walk test	Towns — Drive test	**150.00**
	Roads — Drive test	**93.75**
Crowd	Trains — Walk test	**56.25**
	Crowdsourcing	**250.00**